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What Our Students have to Say....

Aman Mahajan (CA AIR 19)

I really liked your classes, especially the practical linkages explained with amazing graphics. The full subject test series helped a lot in improving my writing speed and presentation skills.

Sundar Sri Renganathan B (AIR 33)

I took Accounting from IndigoLearn and the classes were really good. They emphasized on conceptual clarity over getting things done quickly, which is really vital to score good marks in practical papers. Other resources like Notes, Quizzes and Forum was beneficial too.

Dwarakesh

Thank you IndigoLearn team for the guidance and support throughout the past few months. I had great conceptual clarity in all the subjects and the revision classes by Suraj Sir were very helpful. Study planner and Free resources were very useful. Thank you Team IndigoLearn.

Yug Manoj Kumar Bhattad

I have cleared my CA Foundation examination with the total of 286. And this was not possible without the efforts and support of IndigoLearn. The way of teaching with utmost conceptual clarity is the best thing at IndigoLearn.

Prakash Bhatt

Superb, one stop solution for All CA and Accountancy students they serve real Education at very very reasonable price

Naveen Kumar S

Good experience, unlimited views helped a lot in last one month preparation. Looking forward for

Bhagyasree Chougule

It was only because of IndigoLearn that my concepts became very clear, and I was able to crack the exam. I wasn't 100% prepared I needed more practice but luckily I got through. I'm definitely choosing IndigoLearn for group 2 preparation. A big thanks!

Mohd Thayyab

Theoretical subjects made easier through story based examples and charts. Concept clarity 100%. Fully exam+practical oriented classes will help not only to retain the concepts during exams but for the longer duration.

Lalit Chetan Sanpal

IndigoLearn has been fantastic and brilliant. Helped me a lot in my preparations. I cleared both the groups in first attempt with your brilliant classes and notes. Thanks to all the faculties, coordinators, forum admins and everyone at IndigoLearn. Really grateful. Will go for CA Finals at IndigoLearn For sure. Thank you so much IndigoLearn.

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Abishek M

I'd like to thank IndigoLearn for all the support they've provided me with. Modules were great. They were time saving and straight to the point. I extensively used the materials provided before exams, they were so helpful. Also I'd appreciate them for providing unlimited views as I kept looking into the maths modules till the end.

Munnur Nandini Sree

Accounting classes I have taken from IndigoLearn. Now I feel that it's a great choice that I have made (after seeing my result) because only in Accounting I got exemption. Thank you IndigoLearn.

Harshita G

Thank u so much IndigoLearn for your guidance. This is only possible because of u people.... For my finals also my journey will continue with IndigoLearn.

Bharathsha PS

I purchased Economics, IT, FM, EIS and Audit from IndigoLearn. All your classes are superb and anyone can easily crack the CA exams. What makes u special is your classes help us to understand the concepts very well. Special thanks to the FM faculty, I studied only 2 chapters in economics, and still managed to score exemption in the 8th paper.

Nayi Mihir kumar

This platform is very helpful in all activity like mcq practise, notes, teaching activities, revisions and the forum interaction with all students which I like the most. If anybody want to clear their exams in first attempt then IndigoLearn is the best platform for them. My all regards to IndigoLearn. Thank you so much.

Rajalaxmi CA Inter

Can't believe I cleared. Sathya Sir, Suraj Sir, Yogita Mam ... thanks to all my faculties. Basically an Eng student with zero accounts knowledge. Thanks IndigoLearn for making me clear in first attempt.

Priyanka Udeshi

All the faculties have excellent knowledge of the subject and deliver it in very crisp & effective manner. Also, quick response at Forums never let any of my doubts go unresolved no matter how small they were. Thank you once again to all the teachers & staff at IndigoLearn!

Naveen Kumar T

It been a great journey with indigo learn team. Thanks to all the facilities and forum friends who support me a lot.

Index	Page #
Material Cost	1.1 – 1.35
Employee Cost & Direct Expenses	2.1 – 2.25
Overheads- Absorption Costing Method	3.1 – 3.33
Activity Based Costing	4.1 – 4.35
Cost Sheet	5.1 – 5.29
Cost Accounting System	6.1 – 6.28
Unit & Batch Costing	7.1 – 7.9
Job Order Costing	8.1 – 8.8
Process & Operating Costing	9.1 – 9.34
Joint & By Products	10.1 – 10.21
Service Costing	11.1 – 11.33
Standard Costing	12.1 – 12.29
Marginal Costing	13.1 – 13.32
Budget & Budgetary Control	14.1 – 14.25

MATERIAL COST
Past Exams and RTP Questions Compiler

Q1. May 2024, 5 marks

Tesco cycles Ltd. used about 3,60,000 cycle locks per annum and the usage is fairly constant at 30,000 per month. The cycle lock costs ₹ 240 each at wholesale rate and carrying cost is estimated to be 10% of the annual average inventory value. The cost to place an order is ₹ 1200. It takes 45 days to receive delivery from the date of order. In order to avoid any kind of disruption in assembly line, safety stock of 6,500 cycle locks is always maintained by Tesco Cycles Ltd.

(Assume 360 days in a year). Compute:

- (i) E.O.Q.
- (ii) The re-order level.
- (iii) The company has been offered a quantity discount of 2% on the purchase of cycle locks provided the order size is 30,000 units at a time. Advise whether quantity discount offer can be accepted?

Answer:

Calculation of Economic Order Quantity

$$EOQ = \sqrt{\frac{2 \times A \times O}{C}} = \sqrt{\frac{2 \times 3,60,000 \text{ units} \times 1200}{24}} = 6,000 \text{ units}$$

Where,

A = Annual Demand = 3,60,000 units

O = Ordering cost per order = ₹1200

C = Inventory carrying cost per unit per annum = 10% of ₹240 = ₹ 24

(ii) **Re-order Level = Safety Stock + Lead Time Consumption**

$$= 6,500 + (1,000 \times 45) \text{ units} = 51,500 \text{ units}$$

Or,

Minimum level of cycle locks + [Average rate of consumption × Average time required to obtain fresh delivery]

$$= 6,500 + (1,000 \times 45) \text{ units} = 51,500 \text{ units}$$

(iii) Evaluation of Profitability of Different Options of Order Quantity

(a) When EOQ is ordered (order size of 6,000 units)

		(₹)
Purchase Cost	(3,60,000 units × ₹ 240)	8,64,00,000
Ordering Cost	[(3,60,000 units/6,000 units) × ₹ 1,200]	72,000
Carrying Cost	(6,000 units × ₹240 × 1/2 × 10/100)	72,000

Total Cost		8,65,44,000
------------	--	--------------------

(b) When Quantity Discount is accepted (order size of 30,000 units)

		(₹)
Purchase Cost	[3,60,000 units × ₹ 235.2 (240-4.8)]	8,46,72,000
Ordering Cost	[(3,60,000 units/30,000 units) × ₹1,200]	14,400
Carrying Cost	(30,000 units × ₹ 235.2 × $\frac{1}{2}$ × 10/100)	3,52,800
Total Cost		8,50,39,200

Advise – The total cost of inventory is lower if discount is accepted. Hence, the company is advised to accept the quantity discount.

Q2. Nov 2023, 5 marks

ABC Limited manufactures a product 'AM25' using material 'CEE'. The following information is available regarding material 'CEE':

Purchase price per unit	₹ 300
Cost of placing an order	₹ 150
Carrying cost per unit per annum	6% of purchase price
Consumption of material 'CEE' per annum	1,94,400 units
Lead time	Average 6 days, Maximum 8 days, Minimum 4 days

Maximum consumption of material 'CEE' per day is 200 kg more than the average consumption per day.

Required:

Calculate the following in relation to material 'CEE':

- Economic Order Quantity.
- Reorder Level
- Maximum Stock Level. (Assume 360 days in a year)

Answer:

- Economic Order Quantity (EOQ) = $\sqrt{2AO/C}$

Where, A= Annual demand for the material CEE = 1,94,400 Kgs O = Ordering cost = ₹ 150

C = Carrying cost per unit per annum = 6% of ₹ 300 = 18

EOQ = $\sqrt{2 \times 1,94,400 \times 150 / 18}$ = 1,800 Units (Kgs.)

- Re-order level (ROL) = Maximum consumption# × Maximum lead time

ROL = 740 × 8 = 5,920 Kg.

Maximum Consumption = Average consumption +200 kg

= 1,94,400 / 360 + 200 = 540 + 200 Kg = 740 Kg.

Maximum lead time = 8 days

- (iii) Maximum Stock level = Re-order quantity + Re-order level – (Min. consumption* × Min. lead time)

$$= 1,800 + 5,920 - (340 \times 4)$$

$$= 7,720 - 1,360 = 6,360 \text{ Kg}$$

*Minimum consumption = 2 × Average consumption – Maximum Consumption

$$= 2 \times 540 - 740$$

$$= 1080 - 740 = 340 \text{ kg.}$$

Q3. May 2023, 10 marks

A Limited has furnished the following information for the months from 1 stJanuary to 30th April, 2023:

	January	February	March	April
Number of Working days	25	24	26	25
Production (in units) per working day	50	55	60	52
Raw Material Purchases (% by weights to total of 4 months)	21%	26%	30%	23%
Purchase price of raw material (per kg)	₹ 10	₹ 12	₹ 13	₹ 11

Quantity of raw material per unit of product: 4 kg.

Opening stock of raw material on 1stJanuary: 6,020 kg. (Cost ₹ 63, 210)

Closing stock of raw material on 30thApril: 5,100 kg.

All the purchases of material are made at the start of each month.

Required:

- Calculate the consumption of raw materials (in kgs) month-by- month and in total.
- Calculate the month-wise quantity and value of raw materials purchased.
- Prepare the priced stores ledger for each month using the FIFO method.

Answer:

- (i) **Calculation of consumption of Raw Material (in kgs) month by month and total**

Particulars	Jan	Feb	March	April	Total
No. of working days	25	24	26	25	-
Production (Per day)	50	55	60	52	-
Production	1,250	1,320	1,560	1,300	5,430
Raw Material Consumed (in kgs)	5,000	5,280	6,240	5,200	21,720

Calculation of Raw Material Purchased

Purchased	(Kg)
Closing stock on 30 th April	5,100
Add: Raw Material consumed	21,720

Less: Opening stock on 1 st January	(6,020)
Raw Material purchased	20,800

(ii) **Calculation of month wise quantity and value of raw material purchased**

	%	Purchased (Kg)	Price (₹)	Value (₹)
January	21	4,368	10	43,680
February	26	5,408	12	64,896
March	30	6,240	13	81,120
April	23	4,784	11	52,624
Total		20,800		2,42,320

(iii) **Store Price Ledger by using FIFO method.**

Months	Particulars	Receipts			Issue			Balance		
		Qty	Rate	Amount (₹)	Qty	Rate	Amount (₹)	Qty	Rate	Amount (₹)
Jan	Opening							6,020	10.5	63,210
	Purchases	4,368	10	43,680				6,020	10.5	63,210
								4,368	10	43,680
	Consumption				5,000	10.5	52,500	1,020	10.5	10,710
Feb								4,368	10	43,680
	Purchases	5,408	12	64,896				1,020	10.5	10,710
								4,368	10	43,680
	Consumption							5,408	12	64,896
March								108	10	1,080
	Purchase	6,240	13	81,120				5,408	12	64,896
								108	10	1,080
	Consumption							5,408	12	64,896
April								6,240	13	81,120
	Purchases	4,784	11	52,624				5,516	13	71,708
								5,516	13	71,708
	Consumption							4,784	11	52,624
								316	13	4,108
								4,784	11	52,624
										56,732

Q4. May 2023, 5 marks

TSK Limited manufactures a variety of products. The annual demand for one of its products- Product 'X' is estimated as ₹1,35,000 units. Product 'X' is to be manufactured done in batches. Set up cost of each batch is ₹ 3,375 and inventory holding cost is ₹ 5 per unit. It is expected that demand of Product 'X' would be uniform throughout the year.

Required:

- Calculate the Economic Batch (EBQ) for Product 'X'.
- Assuming that the company has a policy of manufacturing 7,500 units of Product 'X' per batch, calculate the additional cost incurred as compared to the cost incurred as per Economic Batch Quantity (EBQ) as computed in (i) above.

Answer:

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2 \times D \times S}{C}}$$

where,

D = Annual demand for the product

S = Set-up cost per batch

C = Carrying cost per unit per annum.

$$\sqrt{\frac{2 \times D \times S}{C}} = \sqrt{\frac{2 \times 1,35,000 \times 3,375}{5}} = 13,500 \text{ Units}$$

(ii) Total Cost (of maintaining the inventories) when batch size (Q) are 13,500 and 7,500 units respectively

Total cost = Total set-up cost + Total carrying cost.

	When batch size is 13,500 units	When batch size is 7,500 units
Total set up cost	$= \frac{1,35,000}{13,500} \times ₹ 3,375 = ₹ 33,750$ Or, No. of setups = 10 $= 10 \times ₹ 3,375 = ₹ 33,750$	$= \frac{1,35,000}{7,500} \times ₹ 3,375 = ₹ 60,750$
Total Carrying cost	$1/2 \times 13,500 \times 5 = ₹ 33,750$	$1/2 \times 7,500 \times 5 = ₹ 18,750$
Total Cost	₹ 67,500	₹ 79,500

₹ 12,000 is the excess cost borne by the company due to batch size not being economic batch quantity.

Alternative presentation

	EOQ 13,500	Batch size 7500	Extra cost	Saving
No of setup	10	18	$8 \times 3375 = 27,000$	
Carrying cost	$13,500 - 7500 = 6000 / 2 @ 5$			15,000

Net extra cost = (27,000 - 15,000) = ₹ 12,000

Q5. Nov 2022, 5 marks

MM Ltd. uses 7500 valves per month which is purchased at a price of ₹ 1.50 per unit. The carrying cost is estimated to be 20% of average inventory investment on an annual basis. The cost to place an order and getting the delivery is ₹ 15. It takes a period of 1.5 months to receive a delivery from the date of placing an order and a safety stock of 3200 valves is desired. You are required to determine:

- The Economic Order Quantity (EOQ) and the frequency of orders.
- The re-order point.
- The Economic Order Quantity (EOQ) if the valve cost ₹ 4.50 each instead of ₹ 1.50 each. (Assume a year consists of 360 days).

Answer

i. Calculation of Economic Order Quantity

Annual requirement (A) = $7500 \times 12 = 90,000$ Valves

$$\begin{aligned}
\text{Cost per order (O)} &= ₹ 15 \\
\text{Inventory carrying cost (i)} &= 20\% \\
\text{Cost per unit of spare (c)} &= ₹ 1.5 \\
\text{Carrying cost per unit (i} \times \text{c)} &= ₹ 1.5 \times 20\% = ₹ 0.30 \\
\text{Economic Order Quantity (EOQ)} &= \sqrt{\frac{2 \times A \times O}{c}} \\
&= \sqrt{\frac{2 \times 90000 \times 15}{0.3}} = 3,000 \text{ Valves}
\end{aligned}$$

Frequency of order or Number of Orders = $90,000 / 3,000 = 30$ orders.

So, Order can be placed in every 12 (360 days / 30) days.

(ii) **Re-order Quantity** = {Maximum Consumption X Maximum lead time} + safety Stock
 $= \{7500 \times 1.5\} + 3200 = 14,450$ Valves

(iii) **Calculation of Economic Order Quantity if valve costs ₹4.50**

Carrying cost is 20% of ₹ 4.50 = ₹ 0.90

$$\begin{aligned}
\text{Economic Order Quantity (EOQ)} &= \sqrt{\frac{2 \times A \times O}{c}} \\
&= \sqrt{\frac{2 \times 90000 \times 15}{0.9}} = 1,732.0508 \text{ units or } 1,733 \text{ Valves}
\end{aligned}$$

Q6. Nov 2022, 5 marks

Which system of inventory management is known as 'Demand pull' or 'Pull through' system of production? Explain. Also, specify the two principles on which this system is based.

Answer

Just in Time (JIT) Inventory Management is also known as 'Demand pull' or 'Pull through' system of production. In this system, production process starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase.

It is a system of inventory management with an approach to have zero inventories in stores. According to this approach material should only be purchased when it is required for production.

JIT is based on two principles:

- Produce goods only when it is required and
- The products should be delivered to customers at the time only when they want.

Q7. May 2022, 5 marks

A Limited a toy company purchases its requirement of raw material from S Limited at ₹ 120 per kg. The company incurs a handling cost of ₹ 400 plus freight of ₹ 350 per order. The incremental carrying cost of inventory of raw material is ₹ 0.25 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹ 15 per kg per annum. The annual production of the toys is 60,000 units and 5 units of toys are obtained from one kg. of raw material. Required:

- Calculate the Economic Order Quantity (EOQ) of raw materials.
- Advise, how frequently company should order to minimize its procurement cost.
Assume 360 days in a year.
- Calculate the total ordering cost and total inventory carrying cost per annum as per EOQ.

Answer

Annual requirement of raw material in kg. (A) = $\frac{60000 \text{ Units}}{2 \text{ Kgs}} = 12000 \text{ units}$

Ordering Cost (Handling & freight cost) (O) = ₹ 400 + ₹ 350 = ₹ 750

Carrying cost per unit per annum i.e., inventory carrying cost + working capital cost
(c × i)

$$= (\text{₹ } 0.25 \times 12 \text{ months}) + \text{₹ } 15 = \text{₹ } 18 \text{ per kg.}$$

$$(i) \quad \text{E.O.Q.} = \sqrt{\frac{2 \times 12000 \times 750}{18}} = 1,000 \text{ kg.}$$

(ii) Frequency of orders for procurement:

Annual consumption (A) = 12,000 kg.

Quantity per order (EOQ) = 1,000 kg.

No. of orders per annum $\left(\frac{A}{EOQ}\right) = \frac{12000 \text{ kg}}{1000 \text{ kg}} = 12$

Frequency of placing orders (in months) = $\frac{12 \text{ months}}{12 \text{ orders}} = 1 \text{ months}$

Or (in days) = $\frac{360 \text{ days}}{12 \text{ orders}} = 30 \text{ days}$

(iii) Calculation of total ordering cost and total inventory carrying cost as per EOQ:

	Amount/Quantity
Size of the order	1,000 kg.
No. of orders	12
Cost of placing orders	₹9,000 (12 orders × ₹750)
Inventory carrying cost	₹9,000 (1,000 kg. × ½ × ₹18)
Total cost	₹18,000

Q8. May 2022, 5 marks

Write down the treatment of following items associated with purchase of materials.

- (i) Cash discount
- (ii) IGST
- (iii) Demurrage
- (iv) Shortage
- (v) Basic Custom Duty

Answer

Treatment of items associated with purchase of materials is tabulated as below:

S No	Items	Treatment
(i)	Cash discount	Cash discount is not deducted from the purchase price. It is treated as interest and finance charges. It is ignored.
(ii)	IGST	Integrated Goods and Service Tax (IGST) is paid on inter-state supply of goods and provision of services and collected from the buyers. It is excluded from the cost of purchase if credit for the same is available . Unless mentioned specifically it should not form part of cost of purchase.
(iii)	Demurrage	Demurrage is a penalty imposed by the transporter for delay in uploading or offloading of materials. It is an abnormal cost and not included with cost of purchase
(iv)	Shortage	Shortage in materials are treated as follows:

		Shortage due to normal reasons: Good units absorb the cost of shortage due to normal reasons. Losses due to breaking of bulk, evaporation, or due to any unavoidable conditions etc. are the reasons of normal loss. Shortage due to abnormal reasons: Shortage arises due to abnormal reasons such as material mishandling, pilferage, or due to any avoidable reasons are not absorbed by the good units. Losses due to abnormal reasons are debited to costing profit and loss account.
(v)	Basic Custom Duty	Basic Custom duty is paid on import of goods from outside India. It is added with the purchase cost.

Q9. Dec 2021, 5 marks

XYZ Ltd. uses two types of raw materials – 'Material A' and 'Material B' in the production process and has provided the following data for the year ended on 31st March, 2021:

	Material A	Material B
Opening stock as on 01.04.2020	30,000	32,000
Purchase during the year	90,000	51,000
Closing stock as on 31.03.2021	20,000	14,000

- (i) You are required to calculate:
- The inventory turnover ratio of 'Material A' and 'Material B'.
 - The number of days for which the average inventory is held for both materials 'A' and 'B'.
- (ii) Based on above calculations, give your comments.
(Assume 360 days in a year.)

Answer

(i) Calculation of Inventory Turnover ratios and number of days:

	Material A	Material B
Opening stock	30,000	32,000
Add: Purchase	90,000	51,000
	1,20,000	83,000
Less: Closing stock	20,000	14,000
Materials Consumed	1,00,000	69,000
Average inventory: (Opening Stock + Closing Stock) ÷ 2	25,000	23,000
(a) Inventory Turnover ratio: (Consumption ÷ Average inventory)	4 times	3 times
(b) Number of days for which the average inventory held (Number of Days in a year/IT ratio)	90 days	120 days

- (ii) Comments:** Material A is moving faster than Material B. Or Material A has a less holding period.

Q10. July 2021, 5 marks

AUX Ltd. has an Annual demand from a single customer for 60,000 Covid-19 vaccines. The customer prefers to order in the lot of 15,000 vaccines per order. The production cost of vaccine is ₹ 5,000 per vaccine. The set-up cost per production run of Covid-19 vaccines is ₹ 4,800. The carrying cost is ₹ 12 per vaccine per month.

You are required to:

- Find the most Economical Production Run.
- Calculate the extra cost that company incurs due to production of 15,000 vaccines in a batch.

Answer**(i) Calculation of most Economical Production Run**

$$= \sqrt{\frac{2 \times 60000 \times 4800}{1 \times 12}} = 20000 \text{ vaccines}$$

(ii) Calculation of Extra Cost due to processing of 15,000 vaccines in a batch

	When run size is 2,000 vaccines	When run size is 15,000 vaccines
Total set up cost	$\frac{60000}{20000} \times ₹4800 = ₹ 1,44,000$	$\frac{60000}{15000} \times ₹4800 = ₹19,200$
Total Carrying cost	$\frac{1}{2} \times 2,000 \times ₹144 = ₹1,44,000$	$\frac{1}{2} \times 15,000 \times ₹ 144 = ₹ 10,80,000$
	₹ 2,88,000	₹ 10,99,200

Thus, extra cost = ₹ 10,99,200 – ₹ 2,88,000 = ₹ 8,11,200

Q11. July 2021, 5 marks

Specify the types of Responsibility centres under the following situations:

- Purchase of bonds, stocks, or real estate property.
- Ticket counter in a Railway station.
- Decentralized branches of an organization.
- Maharana, Navratna and Miniratna public sector undertaking (PSU) of Central Government.
- Sales Department of an organization.

Answer

Particulars	Types of Responsibility Centre
(i) Purchase of bonds, stocks, or real estate property.	Investment Centre
(ii) Ticket counter in a Railway station.	Revenue Centre
(iii) Decentralized branches of an organization.	Profit Centre
(iv) Maharana, Navratna and Miniratna public sector undertaking (PSU) of Central Government.	Investment Centre
(v) Sales Department of an organization.	Revenue Centre

Q12. Jan 2021, 5 marks

GHI Ltd. manufactures 'Stent' that is used by hospitals in heart surgery. As per the estimates provided by Pharmaceutical Industry Bureau, there will be a demand of 40 Million 'Stents' in the coming year. GHI Ltd. is expected to have a market share of 2.5% of the total market demand of the Stents in the coming year. It is estimated that it costs ₹1.50 as inventory holding cost per stent per month and that the set-up cost per run of stent manufacture is ₹ 225.

Required:

- What would be the optimum run size for Stent manufacture?
- What is the minimum inventory holding cost?
- Assuming that the company has a policy of manufacturing 4,000 stents per run, how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above?

Answer**(i) Computation of Optimum Run size of 'Stents' or Economic Batch Quantity (EBQ)**

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2 \times D \times S}{C}}$$

Where, D = Annual demand for the Stents
 = 4,00,00,000 × 2.5% = 10,00,000 units

S = Set- up cost per run
= ₹ 225
C = Carrying cost per unit per annum
= ₹1.50 × 12 = ₹ 18

$$EBQ = \sqrt{\frac{2 \times 10,00,000 \times 225}{18}} = 5000 \text{ units stents}$$

(ii) Minimum inventory holding cost

Minimum Inventory Cost = Average Inventory × Inventory Carrying Cost per unit per annum
= (5,000 ÷ 2) × ₹18 = ₹ 45,000

(iii) Calculation of the extra cost due to manufacturing policy

	When run size is 4,000 Units	When run size is 5,000 Units i.e. EBQ
Total set up cost	$\frac{10,00,000}{4,000} \times ₹225 = ₹ 56,250$	$\frac{10,00,000}{5,000} \times ₹225 = ₹45,000$
Total Carrying cost	$\frac{1}{2} \times 4,000 \times ₹18 = ₹36,000$	$\frac{1}{2} \times 5,000 \times ₹ 18 = ₹ 45,000$
Total Cost	₹92,250	₹ 90,000

Extra cost= ₹ 92,250 - ₹ 90,000 = ₹ 2,250

Q13. Jan 2021, 5 marks

State how the following items are treated in arriving at the value of cost of material purchased:

- Detention Charges/Fines
- Demurrage
- Cost of Returnable containers
- Central Goods and Service Tax (CGST)
- Shortage due to abnormal reasons.

Answer

Treatment of items in arriving at the value of cost of material Purchased

S No	Items	Treatment
(i)	Detention Charges / Fines	Detention charges/ fines imposed for non-compliance of rule or law by any statutory authority. It is an abnormal cost and not included with cost of purchase.
(ii)	Demurrage	Demurrage is a penalty imposed by the transporter for delay in uploading or offloading of materials. It is an abnormal cost and not included with cost of purchase.
(iii)	Cost of Returnable containers	Treatment of cost of returnable containers are as follows: Returnable Containers: If the containers are returned and their costs are refunded, then cost of containers should not be considered in the cost of purchase. If the amount of refund on returning the container is less than the amount paid, then, only the short fall is added with the cost of purchase.
(iv)	Central Goods and Service Tax (CGST)	Central Goods and Service Tax (CGST) is paid on manufacture and supply of goods and collected from the buyer. It is excluded from the cost of purchase if the input credit is available for the same. Unless mentioned specifically CGST is not added with the cost of purchase.
(v)	Shortage due to abnormal reasons.	Shortage arises due to abnormal reasons such as material mishandling, pilferage, or due to any avoidable reasons are not absorbed by the good

		units. Losses due to abnormal reasons are debited to costing profit and loss account.
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Q14. Nov 2020, 10 marks

An automobile company purchases 27,000 spare parts for its annual requirements. The cost per order is ₹ 240 and the annual carrying cost of average inventory is 12.5%. Each spare part costs ₹ 50. At present, the order size is 3,000 spare parts. (Assume that number of days in a year = 360 days)

Find out:

- How much the company's cost would be saved by opting EOQ model?
- The Re-order point under EOQ model if lead time is 12 days.
- How frequently should orders for procurement be placed under EOQ model?

Answer

Working Notes:

Annual requirement (A) = 27,000 units

Cost per order (O) = ₹ 240

Inventory carrying cost (i) = 12.5%

Cost per unit of spare (c) = ₹ 50

Carrying cost per unit (i × c) = ₹ 50 × 12.5% = ₹ 6.25

$$\begin{aligned} \text{Economic Order Quantity (EOQ)} &= \sqrt{\frac{2 \times A \times O}{c}} \\ &= \sqrt{\frac{2 \times 27000 \times 240}{6.25}} = 1440 \text{ units} \end{aligned}$$

(i) Calculation of saving by opting EOQ:

	Existing order policy	EOQ Model
No of orders	9 $\frac{27,000}{3,000}$	18.75 or 19 $\frac{27000}{1440}$
A. Ordering cost (₹)	2,160 (₹240 × 9)	4500 $240 \times \frac{27000}{1440}$
B. Carrying cost (₹)	9,375 $\frac{3000 \times ₹6.25}{2}$	4500 $\frac{1440 \times ₹6.25}{2}$
Total Cost (A+B) (₹)	11535	9000

Savings of Cost by opting EOQ Model = ₹ 11,535 – ₹ 9,000 = ₹ 2,535

(ii) Re-order point under EOQ:

Re-order point/ Re-order level = Maximum consumption × Maximum lead time Consumption per day = $\frac{27,000}{360 \text{ days}} = 75 \text{ units}$

Re-order point/ Re-order level = 75 units × 12 days = 900 units

(iii) Frequency of Orders (in days):

$$\frac{360 \text{ days}}{\text{No. of orders a year}} = \frac{360 \text{ days}}{19} = 18.95 \text{ days or } 19 \text{ days}$$

Q15. Nov 2019, 5 marks

Surekha Limited produces 4,000 Litres of paints on a quarterly basis. Each Litre requires 2 kg of raw material. The cost of placing one order for raw material is ₹ 40 and the purchasing price of raw material is ₹ 50 per kg. The storage cost and interest cost is 2% and 6% per annum respectively. The lead time for

procurement of raw material is 15 days. Calculate Economic Order Quantity and Total Annual Inventory Cost in respect of the above raw material.

Answer

Working:

Calculation of Annual demand of raw material

Annual Demand = 4,000 Litres (per quarter) x 4 (Quarters in a year) x 2 kg. (material for each Litre of paint)
= **32,000 kg.**

Calculation of Carrying cost

Storage rate = 2% & Interest Rate = 6%

Total = 8% per annum

Carrying cost per unit per annum = 8% of ₹ 50 = ₹ 4 per unit per annum

$$(i) \quad EOQ = \sqrt{\frac{2 \times \text{Annual demand (A)} \times \text{Ordering cost per order (O)}}{\text{Carrying cost per unit per annum (C)}}} =$$

$$= \sqrt{\frac{2 \times 32000 \times 40}{4}} = 800\text{kg}$$

(ii) Total Annual Inventory Cost

Purchasing cost of 32,000 kg @ ₹ 50 per kg = ₹ 16,00,000

Ordering Cost $\left(\frac{32000\text{kg}}{800\text{kg}} \times ₹40 \right) = ₹ 1,600$

Carrying Cost of Inventory $\frac{15\text{days}}{30\text{days}} \times 800\text{kg} \times ₹4 = ₹ 1,600$

₹16,03,200

Q16. Nov 2019, 5 marks

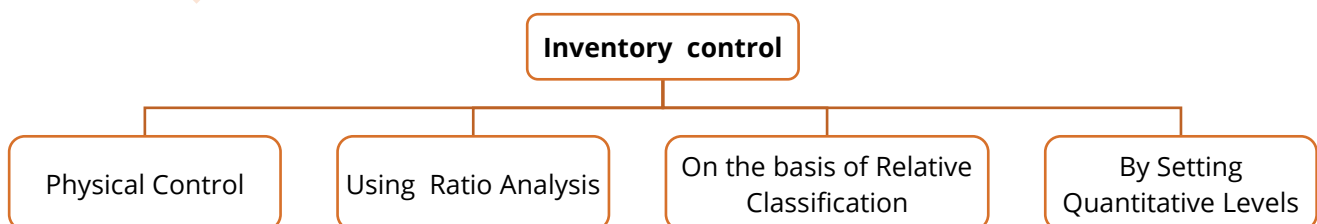
Define Inventory Control and give its objectives.

List down the basis to be adopted for Inventory Control.

Answer

Inventory Control: The Chartered Institute of Management Accountants (CIMA) **defines** Inventory Control as "The function of ensuring that sufficient goods are retained in stock to meet all requirements without carrying unnecessarily large stocks."

The **objective** of inventory control is to make a balance between sufficient stock and over-stock. The stock maintained should be sufficient to meet the production requirements so that uninterrupted production flow can be maintained. Insufficient stock not only pause the production but also cause a loss of revenue and goodwill. On the other hand, Inventory requires some funds for purchase, storage, maintenance of materials with a risk of obsolescence, pilferage etc. A trade-off between Stock-out and Over-stocking is required. The management may employ various methods of Inventory control to have a balance. Management may adopt the following **basis** for Inventory Control.



Q17. May 2019, 10 marks

The following are the details of receipt and issue of material 'CXE' in a manufacturing Co. during the month of April 2019:

Date	Particulars	Quantity (Kg)	Rate per Kg
April 4	Purchase	3,000	₹16
April 8	Issue	1,000	
April 15	Purchase	1,500	₹18
April 20	Issue	2,000	
April 25	Return to supplier out of purchase made on April 15	300	
April 26	Issue	1,000	
April 28	Purchase	500	₹17

Opening stock as on 01-04-2019 is 1,000 kg @ ₹ 15 per kg.

On 30th April, 2019 it was found that 50 kg of material 'CXE' was fraudulently misappropriated by the store assistant and never recovered by the Company.

Required:

- Prepare a store ledger account under each of the following method of pricing the issue:
 - Weighted Average Method
 - LIFO
- What would be the value of material consumed and value of closing stock as on 30-04-2019 as per these two methods?

Answer

(i) (a) Stores Ledger Account for the month of April, 2019 (Weighted Average Method)

Receipt				Issue			Balance		
Date	Qty Units	Rate (₹)	Amount (₹)	Qty Units	Rate (₹)	Amount (₹)	Qty Units	Rate (₹)	Amount (₹)
1-4-19	—	—	—	—	—	—	1,000	15.00	15,000
4-4-19	3,000	16.00	48,000	—	—	—	4,000	15.75	63,000
8-4-19	—	—	—	1,000	15.75	15,750	3,000	15.75	47,250
15-4-19	1,500	18.00	27,000	—	—	—	4,500	16.50	74,250
20-4-19	—	—	—	1,200	16.50	19,800	3,300	16.50	54,450
25-4-19	—	—	—	300	18.00	5,400	3,000	16.35	49,050
26-4-19	—	—	—	1,000	16.35	16,350	2,000	16.35	32,700
28-4-19	500	17.00	8,500	—	—	—	2,500	16.48	41,200
30-4-19	—	—	—	50	16.48	824	2,450	16.48	40,376

(b) Stores Ledger Account for the month of April, 2019 (LIFO)

Receipt				Issue			Balance		
Date	Qty Units	Rate (₹)	Amount (₹)	Qty Units	Rate (₹)	Amount (₹)	Qty Units	Rate (₹)	Amount (₹)
1-4-19	-	-	-	-	-	-	1,000	15	15,000
4-4-19	3,000	16	48,000	-	-	-	1,000	15	15,000
							3,000	16	48,000
8-4-19	-	-	-	1,000	16	16,000	1,000	15	15,000
							2,000	16	32,000
15-4-19	1,500	18	27,000	-	-	-	1,000	15	15,000
							2,000	16	32,000
							1,500	18	27,000

20-4-19	-	-	-	1,200	18	21,600	1,000 2,000 300	15 16 18	15,000 32,000 5,400
25-4-19	-	-	-	300	18	5,400	1,000 2,000	15 16	15,000 32,000
26-4-19	-	-	-	1,000	16	16,000	1,000 1,000	15 16	15,000 16,000
28-4-19	500	17	8,500	-	-	-	1,000	15	15,000
							1,000 500	16 17	16,000 8,500
30-4-19	-	-	-	50	17	850	1,000 1,000 450	15 16 17	15,000 16,000 7,650

(ii) Value of Material Consumed and Closing Stock

	Weighted Average method (₹)	LIFO method (₹)
Opening stock as on 01-04-2019	15,000	15,000
Add: Purchases	83,500	83,500
	98,500	98,500
Less: Return to supplier	5,400	5,400
Less: Abnormal loss	824	850
Less: Closing Stock as on 30-04-2019	40,376	38,650
Value of Material Consumed	51,900	53,600

Q18. Nov 2018, 5 marks

M/s. SJ Private Limited manufactures 20000 units of a product per month. The cost of placing an order is ₹1,500. The purchase price of the raw material is ₹100 per kg. The re-order period is 5 to 7 weeks. The consumption of raw materials varies from 200 kg to 300 kg per week, the average consumption being 250 kg. The carrying cost of inventory is 9.75% per annum.

You are required to calculate:

- Re-order quantity
- Re-order level
- Maximum level
- Minimum level
- Average stock level

Answer

Annual consumption 250 kg × 52 weeks = 13,000 kg.

$$\text{Re-order Quantity or EOQ} = \sqrt{\frac{2 \times A \times O}{C}}$$

A = Annual Consumption = 13,000 kg

O = Ordering Cost = ₹1,500

C = Cost per kg = ₹100

i = carrying cost rate = 9.75%

Carrying cost per kg per annum (c × i) = 100 × 9.75% = ₹9.75

$$\begin{aligned}\therefore \text{EOQ} &= \sqrt{\frac{2 \times 13000 \times 1500}{9.75}} \\ &= \sqrt{\frac{39000000}{9.75}} = \mathbf{2000 \text{ kg}}\end{aligned}$$

- (ii) Re-order level = Max. re-order period $\times$ Max, Consumption
 $= 7 \text{ weeks} \times 300 \text{ kg} = \mathbf{2,100 \text{ kg}}$
- (iii) Maximum level = Re-order level + Re-order Qty – (Min re-order Period $\times$ Min. Consumption)
 $= 2100 \text{ kg} + 2000 \text{ kg} - (5 \times 200) \text{ kg} = \mathbf{3100 \text{ kg}}$
- (iv) Minimum level = Re-order level – (Avg. re-order period $\times$ Avg. Consumption)
 $= 2,100 \text{ kg} - (6 \times 250) \text{ kg} = \mathbf{600 \text{ kg.}}$
- (iv) Avg. stock level $= \frac{1}{2} (\text{Max. level} + \text{Min. level})$
 $= \frac{1}{2} (3100 + 600)$
 $= \mathbf{1850 \text{ kg}}$
 OR
 $= \text{Minimum level} + \frac{1}{2} \text{ROQ}$
 $= 600 \text{ kg.} + \frac{1}{2} 2000 \text{ kg.} = \mathbf{1600 \text{ kg}}$

Q19. Nov 2018, 5 marks

Explain obsolescence and circumstances under which materials become obsolete. State the steps to be taken for its treatment.

Answer

Obsolescence: Obsolescence is defined as "the loss in the intrinsic value of an asset due to its super session".

Materials may become obsolete under any of the following **circumstances**:

- where it is a spare part, or a component of a machinery used in manufacture and that machinery becomes obsolete;
- where it is used in the manufacture of a product which has become obsolete;
- where the material itself is replaced by another material due to either improved quality or fall in price.

Treatment: In all three cases, the value of the obsolete material held in stock is a total loss and immediate steps **should be taken to dispose it off** at the best available price. The loss arising out of obsolete materials on **abnormal loss does not form part of the cost** of manufacture.

Q20. May 2018, 5 marks

M/s. X Private Limited is manufacturing a special product which requires a component "SKY BLUE". The following particulars are available for the year ended 31st March, 2018:

Annual demand of "SKY BLUE"	12000 Units
Cost of placing an order	₹ 1800
Cost per unit of "SKY BLUE"	₹ 640
Carrying cost per annum	18.75%

The company has been offered a quantity discount of 5 on the purchases of "SKY BLUE" provided the order size is 3000 components at a time.

You are required to:

- Compute the Economic Order Quantity.
- Advise whether the quantity discount offer can be accepted.

Answer

(i) Calculation of Economic Order Quantity

$$EOQ = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 12,000 \text{ units} \times ₹1,800}{₹640 \times 18.75/100}} = 600 \text{ units}$$

(ii) Evaluation of Profitability of Different Options of Order Quantity

When EOQ is ordered

	(₹)
Purchase Cost (12,000 units × ₹640)	76,80,000
Ordering Cost [$\frac{A}{Q} \times O$] (12,000 units / 600 units) ₹1,800	36,000
Carrying Cost ($\frac{Q \times C \times i}{2}$) 600 units × ₹640 × $\frac{1}{2} \times 18.75/100$	36,000
Total Cost	77,52,000

(b) When Quantity Discount is accepted

	(₹)
Purchase Cost (12,000 units × ₹608)	72,96,000
Ordering Cost [$\frac{A}{Q} \times O$] (12,000 units / 3000 units) ₹1,800	7,200
Carrying Cost ($\frac{Q \times C \times i}{2}$) 3000 units × ₹608 × $\frac{1}{2} \times 18.75/100$	1,71,000
Total Cost	74,74,200

Advise – The total cost of inventory is higher if EOQ is adopted. If M/s. X Private Limited gets a discount of 5% on the purchases of “SKY BLUE” (if order size is 3,000 components at a time), there will be financial benefit of ₹2,77,800 (77,52,000 - 74,74,200). However, order size of big quantity will increase volume of average inventory to 5 times. There may be risk of shrinkage, pilferage and obsolescence etc., of inventory due to increase in the average volume of inventory holding. This aspect also has to be taken into consideration before opting the discount offer and taking final decision.

Q21. May 2018, 5 marks

Explain 'Just In Time' (JIT) approach of inventory management.

Answer

Just in Time (JIT) Inventory Management JIT is a system of inventory management with an approach to have a zero inventories in stores. According to this approach material should only be purchased when it is actually required for production.

JIT is based on two principles

- Produce goods only when it is required and
- The products should be delivered to customers at the time only when they want.

It is also known as 'Demand pull' or 'Pull through' system of production. In this system, production process actually starts after the order for the products is received. Based on the demand, production process starts and the requirement for raw materials is sent to the purchase department for purchase. This can be understood with the help of the following diagram:



Q22. Nov 2023, RTP

Following details are related to a manufacturing concern:

Re-order Level	1,60,000 units
Economic Order Quantity	90,000
Minimum Stock Level	1,00,000 units
Maximum Stock Level	1,90,000 units
Average Lead Time	6 days
Difference between minimum lead time and Maximum lead time	4 days

Calculate:

- Maximum consumption per day
- Minimum consumption per day

Answer:

Difference between Minimum lead time Maximum lead time = 4 days

Max. lead time – Min. lead time = 4 days

Or, Max. lead time = Min. lead time + 4 days.....(i)

Average lead time is given as 6 days i.e.

[Max.lead time + Min.lead time] / 2 = 6 days.....(ii)

Putting the value of (i) in (ii),

[Min. lead time + 4 days + Min.lead time] / 2 = 6 days

Or, Min. lead time + 4 days + Min. lead time = 12 days

Or, 2 Min. lead time = 8 days

Or, Minimum lead time = 8days / 2 = 4 days

Putting this Minimum lead time value in (i), we get Maximum lead time = 4 days + 4 days = 8 days

(i) Maximum consumption per day:

Re-order level = Max. Re-order period × Maximum Consumption per day

1,60,000 units = 8 days × Maximum Consumption per day

Or, Maximum Consumption per day = 1,60,000units / 8days = 20,000 units

(ii) Minimum Consumption per day:

Maximum Stock Level =

Re-order level + Re-order Quantity – (Min. lead time × Min. Consumption per day)

Or, 1,90,000 units = 1,60,000 units + 90,000 units – (4 days × Min. Consumption per day)

Or, 4 days × Min. Consumption per day = 2,50,000 units – 1,90,000 units

Or, Minimum Consumption per day = 60,000 units / 4 days = 15,000 units

Q23. May 2023 RTP

Reliable India Pvt Ltd is a startup company engaged in manufacturing of Agro Tech product from a raw material, which is purchased at ₹190 per kg. The company incurs a handling cost of ₹1,470 plus, freight of ₹770 per order. The incremental carrying cost of inventory of raw material is ₹3 per kg per month. In addition, the cost of working capital finance on the investment in inventory of raw material is ₹20 per kg

per annum. The annual production of the product is 1,50,000 units and 3 units are obtained from one kg. of raw material.

Assume 360 days in a year.

Required:

- Calculate the economic order quantity of raw materials.
- Determine, how frequently company should order for procurement be placed.
- If the company proposes to rationalize placement of orders on quarterly basis, determine the percentage of discount in the price of raw materials should be negotiated?

Answer

(i) Calculation of Economic Order Quantity (E.O.Q)

Annual requirement (usage) of raw material in kg. (A) = $\sqrt{\frac{1,50,000 \text{ units}}{3 \text{ units per kg.}}} = 50,000 \text{ kg.}$

Ordering Cost (Handling & freight cost) (O) = ₹1,470 + ₹770 = ₹2,240

Carrying cost per unit per annum

i.e. inventory carrying cost + working capital cost = (₹3 × 12 months) + ₹20 = ₹56 per kg.

$$\begin{aligned} \text{E.O.Q} &= \sqrt{\frac{2AO}{C}} \\ &= \sqrt{\frac{2 \times 50,000 \text{ kg.} \times ₹2,240}{₹56}} \\ &= 2,000 \text{ kg.} \end{aligned}$$

(ii) Frequency of placing orders for procurement :

Annual consumption (A) = 50,000 kg.

Quantity per order (E.O.Q) = 2,000 kg.

No. of orders per annum = $\frac{A}{\text{E.O.Q}} = \frac{50,000 \text{ kg.}}{2,000 \text{ kg.}} = 25 \text{ orders}$

Frequency of placing orders (in days) = $\frac{360 \text{ days}}{25 \text{ orders}} = 14.4 \text{ Days}$

(iii) Percentage of discount in the price of raw materials to be negotiated:

Particulars	On Quarterly Basis	On E.O.Q Basis
1. Annual Usage (in Kg.)	50,000 kg.	50,000 kg.
2. Size of the order	12,500 kg.	2,000 kg.
3. No. of orders (1+2)	4	25
4. Cost of placing orders or Ordering cost (No. of orders × Cost per order)	₹ 8,960	₹ 56,000
5. Inventory carrying cost (Average inventory × Carrying cost per unit)	(4 order × ₹ 2,240)	(25 orders × ₹ 2,240)
6. Total Cost (4 + 5)		

	₹3,50,000	₹56,000
	(12,500 kg. × ½ × ₹ 56)	(2,000 kg. × ½ × ₹ 56)
	₹ 3,58,960	₹ 1,12,000

When order is placed on quarterly basis the ordering cost and carrying cost increased by ₹2,46,960 (₹3,58,960 - ₹1,12,000). So, discount required = ₹ 2,46,960

Total annual purchase = 50,000 kg. × ₹190 = ₹95,00,000

So, Percentage of discount to be negotiated = $\frac{₹ 2,46,960}{₹ 95,00,000} \times 100 = 2.60\%$

Q24. Nov 2022 RTP

M/s Tanishka Materials Private Limited produces a product which names "ESS". The consumption of raw material for the production of "ESS" is 210 Kgs to 350 Kgs per week. Other information is as follows:

Procurement Time: 5 to 9 Days

Purchase price of Raw Materials: ₹ 100 per kg

Ordering Cost per Order: ₹ 200

Storage Cost: 1% per month plus ₹ 2 per unit per annum

Consider 365 days a year.

You are required to CALCULATE:

- Economic Order Quantity
- Re-Order Level (ROL)
- Maximum Stock Level
- Minimum Stock Level
- Average Stock Level
- Number of Orders to be placed per year
- Total Inventory Cost
- If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders, whether offer is acceptable?
- If the answer is no, what should be the counteroffer w.r.t. percentage of discount?

Answer

As procurement time is given in days, consumption should also be calculated in days:

Maximum Consumption per Day : $\frac{350}{7} = 50$ Kgs

Minimum Consumption per Day : $\frac{210}{7} = 30$ Kgs.

Average Consumption per Day : $\frac{(50+30)}{2} = 40$ Kgs

(a) Calculation of Economic Order Quantity (EOQ)

Annual consumption of Raw Materials (A): 40 Kgs x 365 days = 14,600 Kgs

Storage or Carrying Cost per unit per annum (C): (₹100 x 1% x 12 months) + ₹ 2 = ₹ 14

Ordering Cost (O): ₹ 200 per Order

$$\text{EOQ} = \sqrt{\frac{2AO}{C}} = \sqrt{\frac{2 \times 14,600 \times ₹ 200}{₹ 14}}$$
$$= 646 \text{ Kgs.}$$

(b) Re-Order Level (ROL) = (Maximum consumption Rate × Maximum Procurement Time)

$$= 50 \text{ kgs per day} \times 9 \text{ days}$$

$$= 450 \text{ kgs}$$

(c) Maximum Stock Level = Recorder Level + Recorder Quantity - (Minimum Consumption Rate × Minimum Procurement Time)

$$= 450 \text{ kgs} + 646 \text{ kgs} - (30 \text{ kgs} \times 5 \text{ days})$$

$$= 946 \text{ kgs}$$

(d) Minimum Stock Level = Recorder Level - (Average consumption Rate × Average Procurement Time)

$$= 450 \text{ kgs} - (40 \text{ kgs} \times 7 \text{ days})$$

$$= 170 \text{ kgs}$$

(e) Average Stock Level = $\frac{\text{Maximum Stock Level} + \text{Minimum Stock Level}}{2}$

$$= \frac{946 \text{ kgs} + 170 \text{ kgs}}{2} = 558 \text{ kgs}$$

(f) Number of Orders to be placed per year = $\frac{\text{Annual Consumption of Raw Materials}}{\text{EOQ}}$

$$= \frac{14600 \text{ kgs}}{646 \text{ kgs}} = 22.60 \text{ Orders or } 23 \text{ Orders}$$

(g) Total Inventory Cost = Cost of Materials (A × Purchase Price) (14600 kgs × ₹ 100) = ₹ 14,60,000

Total Ordering Cost (No. of Orders × O) (23 Orders × 200) = ₹ 4,600

Total Carrying Cost (EOQ / 2 × C) (646 kgs / 2 × ₹ 14) = ₹ 4,522

Total Inventory Cost = ₹ 14,69,122

(h) If the supplier is willing to offer 1% discount on purchase of total annual quantity in two orders:

Offer Price = ₹ 100 × 99% = ₹ 99

Revised Carrying Cost = (₹ 99 × 1% × 12 months) + ₹ 2 = ₹ 13.88

Revised Order Quantity = 14600 kgs / 2 Orders = 7,300 kgs

Total Inventory Cost at Offer Price

Cost of Materials (A × Purchase Price) (14600 kgs × ₹ 99) = ₹ 14,45,400

Total Ordering Cost (No. of Orders × O) (2 Orders × 200) = ₹ 400

Total Carrying Cost (EOQ / 2 x C) (7300 kgs / 2 x ₹13.88) = ₹ 50,662

Total Inventory Cost = ₹ 14,96,462

Advice: As total inventory cost at offer price is ₹ 27,340 (14,96,462 – 14,69,122) higher, offer should not be accepted.

(i) Counter-offer:

Let Discount Rate = z%

Counter-Offer Price = ₹ 100 – z% = ₹ 100 – z

Revised Carrying Cost = [(₹ 100 – z) x 1% x 12 months] + ₹ 2 = ₹ 12 – 0.12z + ₹ 2

= ₹ 14 – 0.12z

Total Inventory Cost at Counter-Offer Price

Cost of Materials (A x Purchase Price) [14600 kgs x (₹ 100 – z)] = ₹ 14,60,000 – 14,600z

Total Ordering Cost (No. of Orders x O) (2 Orders x 200) = ₹ 400

Total Carrying Cost (EOQ / 2 x C) [7300 kgs / 2 x (₹ 14 – 0.12z)] = ₹ 51,100 – 438z

Total Inventory Cost = ₹ 15,11,500 – 15038z

₹ 14,69,122 = ₹ 15,11,500 – 15038z

Or 15038z = 42,378

Or z = 2.82

Therefore, discount should be at least 2.82% in offer price.

Q25. May 2022 RTP

Sky & Co., an unregistered supplier under GST, purchased material from Vye Ltd. which is registered under GST. The following information is available for one lot of 5,000 units of material purchased:

Listed price of one lot	₹ 2,50,000
Trade discount	@ 10% on listed price
CGST and SGST (Credit Not available)	12% (6% CGST + 6% SGST)
Cash discount	@ 10%
(Will be given only if payment is made within 30 days.)	
Toll Tax paid	₹ 5,000
Freight and Insurance	₹ 17,000
Demurrage paid to transporter	₹ 5,000
Commission and brokerage on purchases	₹ 10,000
Amount deposited for returnable containers	₹ 30,000

Amount of refund on returning the container

₹ 20,000

Other Expenses

@ 2% of total cost

20% of material shortage is due to normal reasons.

The payment to the supplier was made within 21 days of the purchases.

You are required to CALCULATE cost per unit of material purchased by Sky & Co.

Answer

1. Calculation of cost per unit:

Particulars	Units	(₹)
Listed Price of Materials	5,000	2,50,000
Less: Trade discount @ 10% on invoice price		(25,000)
		2,25,000
Add: CGST @ 6% of ₹ 2,25,000		13,500
Add: SGST @ 6% of ₹ 2,25,000		13,500
		2,52,000
Add: Toll Tax		5,000
Freight and Insurance		17,000
Commission and Brokerage Paid		10,000
Add: Cost of returnable containers:		
Amount deposited ₹ 30,000		
Less: Amount refunded ₹ 20,000		10,000
		2,94,000
Add: Other Expenses @ 2% of Total Cost ($\frac{₹ 2,94,000}{98} \times 2$)		6,000
Total cost of material		3,00,000
Less: Shortage material due to normal reasons @ 20%	1,000	-
Total cost of material of good units	4,000	3,00,000
Cost per unit (₹ 3,00,000/4,000 units)		75

Note:

1. GST is payable on net price i.e., listed price less discount.

2. Cash discount is treated as interest and finance charges; hence it is ignored.
3. Demurrage is penalty imposed by the transporter for delay in unloading or off-loading of materials. It is an abnormal cost and not included.
4. Shortage due to normal reasons should not be deducted from cost to ascertain total cost of good units.

Q26. Nov 2021 RTP

The following data are available in respect of material X for the year ended 31st March, 2021:

	(₹)
Opening stock	9,00,000
Purchases during the year	1,70,00,000
Closing stock	11,00,000

- i. CALCULATE:
 - (a) Inventory turnover ratio, and
 - (b) The number of days for which the average inventory is held.
- ii. INTERPRET the ratio calculated as above if the industry inventory turnover rate is 10.

Answer

(i) (a) Inventory turnover ratio (Refer to working note) = $\frac{\text{Average stock of raw material}}{\text{Cost of stock of raw material consumed}}$

$$= \frac{\text{₹ } 1,68,00,000}{\text{₹ } 10,00,000} = 16.8$$

(b) Average number of days for which the average inventory is held

$$= \frac{365}{\text{Inventory turnover ratio}} = \frac{365 \text{ days}}{16.8} = 21.73 \text{ days}$$

Working Note:

Particulars	(₹)
Opening stock of raw material	9,00,000
Add: Material purchases during the year	1,70,00,000
Less: Closing stock of raw material	11,00,000
	1,68,00,000

(ii) The Inventory turnover ratio for material X is 16.8 which mean an inventory item takes only 21.73 or 22 days to issue from stores for production process. The rate is better than the industry rate which is 10 time or 36.5 days. This inventory turnover ratio indicates better inventory management system and good demand for the final product in market.

Q27. May 2021 RTP

A Ltd. produces a product 'X' using a raw material 'D'. To produce one unit of X, 4 kg of D is required. As per the sales forecast conducted by the company, it will be able to sale 20,000 units of X in the coming year. The following are the information related to the raw material D:

- (i) The Re-order quantity is 400 kg. less than the Economic Order Quantity (EOQ).
(ii) Maximum consumption per day is 40 kg. more than the average consumption per day.
(iii) There is an opening stock of 2,000 kg.
(iv) Time required to get the raw materials from the suppliers is 4 to 8 days.
(v) The purchase price is ₹ 250 per kg.
There is an opening stock of 1,800 units of the finished product X. The carrying cost of inventory is 14% p.a. To place an order company has to incur ₹ 1,340 on paper and documentation work. From the above information FIND OUT the followings in relation to raw material D:

- (a) Re-order Quantity
(b) Maximum Stock level
(c) Minimum Stock level
(d) Calculate the impact on the profitability of the company by not ordering the EOQ. [Take 300 days for a year]

Answer

Working Notes:

(i) Computation of Annual consumption & Annual Demand for raw material 'D':

Sales forecast of the product 'X'	20,000 units
Less: Opening stock of 'X'	1,800 units
Fresh units of 'X' to be produced	18,200 units
Raw material required to produce 18,200 units of 'X' (18,200 units × 4 kg.)	72,800 kg.
Less: Opening Stock of 'D'	2,000 kg.
Annual demand for raw material 'D'	70,800 kg.

(ii) Computation of Economic Order Quantity (EOQ):

$$EOQ = \sqrt{\frac{2 \times \text{Annual demand of 'D'} \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}}$$

$$= \sqrt{\frac{2 \times 70,800 \text{ kg.} \times ₹ 1,340}{₹ 250 \times 14\%}} = \sqrt{\frac{2 \times 70,800 \text{ kg.} \times ₹ 1,340}{₹ 35}} = 2,328 \text{ kg}$$

(iii) Re- Order level:

$$= (\text{Maximum consumption per day} \times \text{Maximum lead time})$$

$$= \left\{ \left(\frac{\text{Annual Consumption of 'D'}}{300 \text{ days}} + 40 \text{ kg} \right) \times 8 \text{ days} \right\}$$

$$= \left\{ \left(\frac{70,800 \text{ kgs}}{300 \text{ days}} + 40 \text{ kg} \right) \times 8 \text{ days} \right\} = 2,208 \text{ kg.}$$

(iv) Minimum consumption per day of raw material 'D':

Average Consumption per day = 236 Kg.

Hence, Maximum Consumption per day = 236 kg. + 40 kg. = 276 kg.

So Minimum consumption per day will be

$$\text{Average Consumption} = \frac{\text{Min.consumption} + \text{Max.consumption}}{2}$$

$$\text{Or, } 236 \text{ kg.} = \frac{\text{Min.consumption} + 276 \text{ kg}}{2}$$

$$\text{Or, Min. consumption} = 472 \text{ kg} - 276 \text{ kg.} = 196 \text{ kg.}$$

(a) Re-order Quantity :

$$\text{EOQ} - 400 \text{ kg.} = 2,328 \text{ kg.} - 400 \text{ kg.} = 1,928 \text{ kg.}$$

(b) Maximum Stock level:

$$= \text{Re-order level} + \text{Re-order Quantity} - (\text{Min. consumption per day} \times \text{Min. lead time})$$

$$= 2,208 \text{ kg.} + 1,928 \text{ kg.} - (196 \text{ kg.} \times 4 \text{ days}) = 4,136 \text{ kg.} - 784 \text{ kg.} = 3,352 \text{ kg.}$$

(c) Minimum Stock level:

$$= \text{Re-order level} - (\text{Average consumption per day} \times \text{Average lead time})$$

$$= 2,208 \text{ kg.} - (236 \text{ kg.} \times 6 \text{ days}) = 792 \text{ kg.}$$

(d) Impact on the profitability of the company by not ordering the EOQ.

		When purchasing the ROQ	When purchasing the EOQ
I	Order quantity	1,928 kg.	2,328 kg.
II	No. of orders a year	$\frac{70,800 \text{ kg.}}{1,928 \text{ kg.}} = 36.72 \text{ or } 37 \text{ orders}$	$\frac{70,800 \text{ kg.}}{2,328 \text{ kg.}} = 30.41 \text{ or } 31 \text{ orders}$
III	Ordering Cost	37 orders $\times$ ₹ 1,340 = ₹ 49,580	31 orders $\times$ ₹ 1,340 = ₹ 41,540
IV	Average Inventory	$\frac{1,928 \text{ kg.}}{2} = 964 \text{ kg.}$	$\frac{2,328 \text{ kg.}}{2} = 1,164 \text{ kg.}$
V	Carrying Cost	964 kg. $\times$ ₹ 35 = ₹ 33,740	1,164 kg. $\times$ ₹ 35 = ₹ 40,740
VI	Total Cost	₹ 83,320	₹ 82,280

Extra Cost incurred due to not ordering EOQ = ₹83,320 - ₹82,280 = ₹1,040

Q28. Nov 2020 RTP

A company uses four raw materials A, B, C and D for a particular product for which the following data apply :-

Raw Material	Usage per unit of product (Kg.)	Re-order Quantity (Kg.)	Price per Kg. (₹)	Delivery period (in weeks)			Reorder level (Kg.)	Minimum level (Kg.)
				Minimum	Average	Maximum		
A	12	12,000	12	2	3	4	60,000	?
B	8	8,000	22	5	6	7	70,000	?

C	6	10,000	18	3	5	7	?	25,500
D	5	9,000	20	1	2	3	?	?

Weekly production varies from 550 to 1,250 units, averaging 900 units of the said product. What would be the following quantities:-

- Minimum Stock of A?
- Maximum Stock of B?
- Re-order level of C?
- Average stock level of A?
- Re-order level of D?
- Minimum Stock level of D?

Answer

(i) Minimum stock of A

$$\begin{aligned}
 &= \text{Re-order level} - (\text{Average consumption} \times \text{Average time required to obtain delivery}) \\
 &= 60,000 \text{ kg.} - (900 \text{ units} \times 12 \text{ kg.} \times 3 \text{ weeks}) = 27,600 \text{ kg.}
 \end{aligned}$$

(ii) Maximum stock of B

$$\begin{aligned}
 &= \text{Re-order level} + \text{Re-order quantity} - (\text{Min. Consumption} \times \text{Min. Re-order period}) \\
 &= 70,000 \text{ kg.} + 8,000 \text{ kg.} - (550 \text{ units} \times 8 \text{ kg.} \times 5 \text{ weeks}) \\
 &= 78,000 - 22,000 = 56,000 \text{ kg.}
 \end{aligned}$$

(iii) Re-order level of C

$$\begin{aligned}
 &= \text{Maximum re-order period} \times \text{Maximum Usage} \\
 &= 7 \text{ weeks} \times (1,250 \text{ units} \times 6 \text{ kg.}) = 52,500 \text{ kg.}
 \end{aligned}$$

OR

$$\begin{aligned}
 &= \text{Minimum stock of C} + (\text{Average consumption} \times \text{Average delivery time}) \\
 &= 25,500 \text{ kg.} + [(900 \text{ units} \times 6 \text{ kg.}) \times 5 \text{ weeks}] = 52,500 \text{ kg.}
 \end{aligned}$$

(iv) Average stock level of A

$$\begin{aligned}
 &= \frac{\text{Minimum stock} + \text{Maximum stock}}{2} \quad (\text{Refer to Working Note}) \\
 &= \frac{27,600 + 58,800}{2} = 43,200 \text{ kg.}
 \end{aligned}$$

Working note

$$\begin{aligned}
 \text{Maximum stock of A} &= \text{ROL} + \text{ROQ} - (\text{Minimum consumption} \times \text{Minimum re-order period}) \\
 &= 60,000 \text{ kg.} + 12,000 \text{ kg.} - [(550 \text{ units} \times 12 \text{ kg.}) \times 2 \text{ weeks}] = 58,800 \text{ kg.}
 \end{aligned}$$

(v) Re-order level of D

$$\begin{aligned}
 &= \text{Maximum re-order period} \times \text{Maximum Usage} \\
 &= 3 \text{ weeks} \times (1,250 \text{ units} \times 5 \text{ kg.}) = 18,750 \text{ kg}
 \end{aligned}$$

(vi) Minimum stock of D

= Re-order level – (Average consumption × Average time required to obtain delivery)

$$= 18,750 \text{ kg.} - (900 \text{ units} \times 5 \text{ kg.} \times 2 \text{ weeks}) = 9,750 \text{ kg.}$$

Q29. May 2020 RTP

Arnav Electronics manufactures electronic home appliances. It follows weighted average Cost method for inventory valuation. Following are the data of component X:

Date	Particulars	Units	Rate per unit (₹)
15-12-19	Purchase Order- 008	10,000	9,930
30-12-19	Purchase Order- 009	10,000	9,780
01-01-20	Opening stock	3,500	9,810
05-01-20	GRN*-008 (against the Purchase Order-008)	10,000	-
05-01-20		500	-
06-01-20	MRN**-003 (against the Purchase Order-008)	3,000	-
07-01-20	Material Requisition-011	10,000	9,750
10-01-20	Purchase Order- 010	4,500	-
12-01-20	Material Requisition-012	10,000	-
12-01-20		400	-
15-01-20	GRN-009 (against the Purchase Order-009)	2,200	-
24-01-20	MRN-004 (against the Purchase Order-009)	1,500	-
25-01-20		10,000	-
28-01-20	Material Requisition-013	4,000	-
31-01-20	Material Requisition-014	3,200	-
	GRN-010 (against the Purchase Order- 010)		
	Material Requisition-015		
	Material Requisition-016		

*GRN- Goods Received Note; **MRN- Material Returned Note

Based on the above data, you are required to CALCULATE:

- Re-order level
- Maximum stock level
- Minimum stock level
- PREPARE Store Ledger for the period January 2020 and DETERMINE the value of stock as on 31-01-2020.

- v. Value of components used during the month of January, 2020.
vi. Inventory turnover ratio.

Answer

Workings:

Consumption is calculated on the basis of material requisitions:

Maximum component usage = 4,500 units (Material requisition on 10-01-20)

Minimum component usage = 1,500 units (Material requisition on 24-01-20)

Lead time is calculated from purchase order date to material received date

Maximum lead time = 21 days (15-12-2019 to 05-01-2020)

Minimum lead time = 14 days (30-12-2019 to 12-01-2020)

Calculations:

(i) Re-order level

= Maximum usage × Maximum lead time

= 4,500 units × 21 days = 94,500 units

(ii) Maximum stock level

= Re-order level + Re-order Quantity – (Min. Usage × Min. lead time)

= 94,500 units + 10,000 units – (1,500 units × 14 days)

= 1,04,500 units – 21,000 units = 83,500 units

(iii) Minimum stock level

= Re-order level – (Avg. consumption × Avg. lead time)

= 94,500 units – (3,000 units × 17.5 days)

= 94,500 units – 52,500 units

= 42,000 units

(iv) Store Ledger for the month of January 2020:

Date	Receipts				Issue				Balance		
	GRN / MRN	Units	Rate ₹	Amt. (₹'000)	MRN / MR	Units	Rate ₹	Amt. (₹'000)	Units	Rate ₹	Amt. (₹'000)
01-01-20	-	-	-	-	-	-	-	-	3,500	9,810	34,335
05-01-20	008	10,000	9,930	99,300	003	500	9,930	4,965	13,000	9,898	1,28,670

06-01-20	-	-	-	-	011	3,000	9,89 8	29,694	10,00 0	9,89 8	98,980
10-01-20	-	-	-	-	012	4,500	9,89 8	44,541	5,500	9,89 8	54,439
12-01-20	009	10,00 0	9,78 0	97,80 0	004	400	9,78 0	3,912	15,10 0	9,82 3	1,48,32 7
15-01-20	-	-	-	-	013	2,200	9,82 3	21,611	12,90 0	9,82 3	1,23,71 6
24-01-20	-	-	-	-	014	1,500	9,82 3	14,734	11,40 0	9,82 3	1,11,98 2
25-01-20	010	10,00 0	9,75 0	97,50 0	-	-	-	-	21,40 0	9,78 9	2,09,48 2
28-01-20	-	-	-	-	015	4,000	9,78 9	39,156	17,40 0	9,78 9	1,70,32 6
31-01-20	-	-	-	-	016	3,200	9,78 9	31,325	14,20 0	9,78 9	1,39,00 1

[Note: Decimal figures may be rounded-off to the nearest rupee value wherever required)

Value of stock as on 31-01-2020 ('000) = ₹1,39,001

(v) Value of components used during the month of January 2020:

Sum of material requisitions 011 to 016 ('000)

$$= ₹ 29,694 + ₹ 44,541 + ₹ 21,611 + ₹ 14,734 + ₹ 39,156 + ₹ 31,325 = ₹ 1,81,061$$

(vi) Inventory Turnover Ratio

$$= \frac{\text{Value of materials used}}{\text{Average stock value}}$$

$$= \frac{1,81,061}{(1,39,001 + 34,335) / 2} = \frac{1,81,061}{86,668}$$

$$= 2.09$$

Q30. Nov 2019 RTP

HBL Limited produces product 'M' which has a quarterly demand of 20,000 units. Each product requires 3 kg. and 4 kg. of material X and Y respectively. Material X is supplied by a local supplier and can be procured at factory stores at any time, hence, no need to keep inventory for material X. The material Y is not locally available, it requires to be purchased from other states in a specially designed truck container with a capacity of 10 tons. The cost and other information related with the materials are as follows:

Particulars	Material -X	Material-Y
Purchase price per kg. (excluding GST)	₹140	₹640

Rate of GST	18%	18%
Freight per trip (fixed, irrespective of quantity)	-	₹28,000
Loss of materials in transit*	-	2%
Loss in process*	4%	5%

*On purchased quantity

Other information:

- The company has to pay 15% p.a. to bank for cash credit facility.

- Input credit is available on GST paid on materials.

Required:

- CALCULATE cost per kg. of material X and Y
- CALCULATE the Economic Order quantity for both the materials.

Answer

Working Notes:

(a) Annual purchase quantity for material X and Y:

Annual demand for product M- 20,000 units × 4 = 80,000 units

Particulars	Mat-X	Mat-Y
Quantity required for per unit of product M	3 kg.	4 kg.
	2,40,000 kg.	3,20,000 kg.
Net quantity for materials required	-	6,881 kg.
Add: Loss in transit	10,000 kg.	17,204 kg.
Add: Loss in process	2,50,000 kg.	3,44,085 kg.
Purchase quantity		

Note - Input credit on GST paid is available; hence, it will not be included in cost of material.

(i) Calculation of cost per kg. of material X and Y:

Particulars	Mat-X	Mat-Y
Purchase quantity	2,50,000 kg.	3,44,085 kg.
Rate per kg	₹140	₹640
Purchase price	₹3,50,00,000	₹22,02,14,400
Add: Freight	0	₹9,80,000*
Total cost	₹3,50,00,000	₹22,11,94,400
Net Quantity	2,40,000 kg.	3,20,000 kg
Cost per kg	₹145.83	₹691.23

*No. of trucks = 3,44,085kg. 10ton 1,000 □ = 34.40 trucks or 35 trucks

Therefore, total freight = 35 trucks × ₹28,000 = ₹9,80,000

(ii) Calculation of Economic Order Quantity (EOQ) for Mat.-X and Y:

$$EOQ = \sqrt{\frac{2 \times \text{Annual demand of } D \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}}$$

Particulars	Mat-X	Mat-Y
Annual Requirement	2,50,000 kg.	3,44,085 kg.
Ordering cost	0	₹28,000
Cost per unit	₹145.83	₹691.23
Carrying cost	15%	15%
Carrying cost per unit p.a	0*	₹103.68
EOQ	0	13,632.62 kg.

Q31. May 2019 RTP

Ananya Ltd. produces a product 'Exe' using a raw material Dee. To produce one unit of Exe, 2 kg of Dee is required. As per the sales forecast conducted by the company, it will be able to sell 10,000 units of Exe in the coming year. The following is the information regarding the raw material Dee:

- The Re-order quantity is 200 kg less than the Economic Order Quantity (EOQ).
- Maximum consumption per day is 20 kg. more than the average consumption per day.
- There is an opening stock of 1,000 kg.
- Time required to get the raw materials from the suppliers is 4 to 8 days.
- The purchase price is ₹125 per kg.

There is an opening stock of 900 units of the finished product Exe.

The rate of interest charged by bank on Cash Credit facility is 13.76%.

To place an order company has to incur ₹ 720 on paper and documentation work.

From the above information FIND OUT the followings in relation to raw material Dee:

- Re-order Quantity
- Maximum Stock level
- Minimum Stock level
- CALCULATE the impact on the profitability of the company by not ordering the EOQ. [Take 364 days for a year]

Answer

Working Notes:

(i) Computation of Annual consumption & Annual Demand for raw material 'Dee':

Sales forecast of the product 'Exe'	10,000 units
Less: Opening stock of 'Exe'	900 units
Fresh units of 'Exe' to be produced	9,100 units

Raw material required to produce 9,100 units of 'Exe' (9,100 units × 2 kg.)	18,200 kg.
Less: Opening Stock of 'Dee'	1,000 kg.
Annual demand for raw material 'Dee'	17,200 kg.

(ii) Computation of Economic Order Quantity (EOQ):

$$\begin{aligned}
 \text{EOQ} &= \sqrt{\frac{2 \times \text{Annual demand of 'Dee'} \times \text{Ordering cost}}{\text{Carrying cost per unit per annum}}} \\
 &= \sqrt{\frac{2 \times 17,200 \text{ kg} \times ₹ 720}{₹ 125 \times 13.76\%}} = \sqrt{\frac{2 \times 17,200 \text{ kg} \times ₹ 720}{₹ 17.2}} \\
 &= 1,200 \text{ kg.}
 \end{aligned}$$

(ii) Re- Order level:

$$\begin{aligned}
 &= (\text{Maximum consumption per day} \times \text{Maximum lead time}) \\
 &= \left\{ \left(\frac{\text{Annual Consumption of 'Dee'}}{364 \text{ days}} + 20 \text{ kg.} \right) \times 8 \text{ days} \right\} \\
 &= \left\{ \left(\frac{18,200 \text{ kg.}}{364 \text{ days}} + 20 \text{ kg.} \right) \times 8 \text{ days} \right\} = 560 \text{ kg.}
 \end{aligned}$$

(iii) Minimum consumption per day of raw material 'Dee':

Average Consumption per day = 50 Kg.

Hence, Maximum Consumption per day = 50 kg. + 20 kg. = 70 kg.

So Minimum consumption per day will be

$$\text{Average Consumption} = \frac{\text{Min.consumption} + \text{Max.consumption}}{2}$$

$$\text{Or, } 50 \text{ kg.} = \frac{\text{Min.consumption} + 70 \text{ kg.}}{2}$$

$$\text{Or, Min. Consumption} = 100 \text{ kg} - 70 \text{ kg.} = 30 \text{ kg.}$$

(a) Re-order Quantity :

$$\text{EOQ} - 200 \text{ kg.} = 1,200 \text{ kg.} - 200 \text{ kg.} = 1,000 \text{ kg.}$$

(b) Maximum Stock level:

$$\begin{aligned}
 &= \text{Re-order level} + \text{Re-order Quantity} - (\text{Min. consumption per day} \times \text{Min. lead time}) \\
 &= 560 \text{ kg.} + 1,000 \text{ kg.} - (30 \text{ kg.} \times 4 \text{ days}) \\
 &= 1,560 \text{ kg.} - 120 \text{ kg.} = 1,440 \text{ kg.}
 \end{aligned}$$

(c) Minimum Stock level:

$$\begin{aligned}
 &= \text{Re-order level} - (\text{Average consumption per day} \times \text{Average lead time}) \\
 &= 560 \text{ kg.} - (50 \text{ kg.} \times 6 \text{ days}) = 260 \text{ kg.}
 \end{aligned}$$

(d) Impact on the profitability of the company by not ordering the EOQ.

	When purchasing the ROQ	When purchasing the EOQ
--	-------------------------	-------------------------

I	Order quantity	1,000 kg.	1,200 kg.
II	No. of orders a year	$\frac{17,200\text{kg.}}{1,000\text{kg.}} = 17.2\text{ or }18\text{ orders}$	$\frac{17,200\text{kg.}}{1,200\text{kg.}} = 14.33\text{ or }15\text{ orders}$
III	Ordering Cost	18 orders $\times$ ₹ 720 = ₹ 12,960	18 orders $\times$ ₹ 720 = ₹ 10,800
IV	Average Inventory	$\frac{1,000\text{kg.}}{2} = 500\text{ kg.}$	$\frac{1,200\text{kg.}}{2} = 600\text{ kg.}$
V	Carrying Cost	500 kg. $\times$ ₹ 17.2 = ₹ 8,600	600 kg. $\times$ ₹ 17.2 = ₹ 10,320
VI	Total Cost	₹ 21,560	₹ 21,120

Q32. Nov 2018 RTP

Rounak Ltd. is the manufacturer of monitors for PCs. A monitor requires 4 units of Part-M. The following are the details of its operation during 20X8:

Average monthly market demand	2,000 Monitors
Ordering cost	₹ 1,000 per order
Inventory carrying cost	20% per annum
Cost of Part	₹ 350 per part
Normal usage	425 parts per week
Minimum usage	140 parts per week
Maximum usage	710 parts per week
Lead time to supply	3-5 weeks

COMPUTE from the above:

- Economic Order Quantity (EOQ). If the supplier is willing to supply quarterly 30,000 units of Part-M at a discount of 5%, is it worth accepting?
- Reorder level
- Maximum level of stock
- Minimum level of stock.

Answer

(1) A = Annual usage of parts = Monthly demand for monitors $\times$ 4 parts $\times$ 12 months
= 2,000 monitors $\times$ 4 parts $\times$ 12 months = 96,000 units

O = Ordering cost per order = ₹ 1,000/- per order

C1 = Cost per part = ₹ 350/-

iC1 = Inventory carrying cost per unit per annum = 20% $\times$ ₹ 350 = ₹ 70/- per unit, per annum

Economic order quantity (EOQ):

$$\text{E.O.Q} = \sqrt{\frac{2AO}{iC1}}$$

$$= \sqrt{\frac{2 \times 96,000 \text{ units} \times 1,000}{70}}$$

$$= 1,656 \text{ parts (approx.)}$$

The supplier is willing to supply 30,000 units at a discount of 5%, therefore cost of each part shall be ₹350 – 5% of 350 = ₹332.5

Total cost (when order size is 30,000 units):

= Cost of 96,000 units + Ordering cost + Carrying cost.

= Cost of 96,000 units + Ordering cost + Carrying cost.

$$= (96,000 \text{ units} \times ₹ 332.50) + \left(\frac{96,000 \text{ units}}{30,000 \text{ units}} \times 1,000 \right) + \frac{1}{2} (30,000 \text{ units} \times 20\% \times ₹332.50)$$

$$= ₹3,19,20,000 + ₹3,200^* + ₹9,97,500 = ₹3,29,20,700$$

Total cost (when order size is 1,656 units):

$$= (96,000 \text{ units} \times ₹ 350) + \left(\frac{96,000 \text{ units}}{1,656 \text{ units}} \times 1,000 \right) + \frac{1}{2} (1,656 \text{ units} \times 20\% \times ₹350)$$

$$= ₹3,36,00,000 + ₹57,970^* + ₹57,960 = ₹3,37,15,930$$

Since, the total cost under the supply of 30,000 units with 5% discount is lower than that when order size is 1,656 units, therefore the offer should be accepted.

Note: While accepting this offer consideration of capital blocked on order size of 30,000 units has been ignored. *Order size can also be taken in absolute figure.

(2) Reorder level

= Maximum consumption × Maximum re-order period

$$= 710 \text{ units} \times 5 \text{ weeks} = 3,550 \text{ units}$$

(3) Maximum level of stock

= Re-order level + Reorder quantity – (Min. usage × Min. reorder period)

$$= 3,550 \text{ units} + 1,656 \text{ units} - (140 \text{ units} \times 3 \text{ weeks}) = 4,786 \text{ units.}$$

(4) Minimum level of stock

= Re-order level – Normal usage × Average reorder period

$$= 3,550 \text{ units} - (425 \text{ units} \times 4 \text{ weeks}) = 1,850 \text{ units.}$$

Q33. May 2018 RTP

Aditya Brothers supplies surgical gloves to nursing homes and polyclinics in the city. These surgical gloves are sold in pack of 10 pairs at price of ₹ 250 per pack. For the month of April 2018, it has been anticipated that a demand for 60,000 packs of surgical gloves will arise. Aditya Brothers purchases these gloves from the manufacturer at ₹ 228 per pack within a 4 to 6 days lead time. The ordering and related cost is ₹ 240 per order. The storage cost is 10% p.a. of average inventory investment. Required:

- CALCULATE the Economic Order Quantity (EOQ)
- CALCULATE the number of orders needed every year

- iii. CALCULATE the total cost of ordering and storage of the surgical gloves.
 iv. DETERMINE when should the next order to be placed. (Assuming that the company does maintain a safety stock and that the present inventory level is 10,033 packs with a year of 360 working days).

Answer

(i) Calculation of Economic Order Quantity:

$$\begin{aligned} \text{E.O.Q} &= \sqrt{\frac{2AO}{Ci}} \\ &= \sqrt{\frac{2 \times (60,000 \text{ packs } 12 \text{ months}) \times ₹ 240}{₹ 228 \times 10\%}} \\ &= 3,893.3 \text{ packs or } 3,893 \text{ packs.} \end{aligned}$$

(ii) Number of orders per year

$$\begin{aligned} &= \frac{\text{Annual requirements}}{\text{E.O.Q}} \\ &= \frac{7,20,000 \text{ packs}}{3,893 \text{ packs}} = 184.9 \text{ or } 185 \text{ orders a year} \end{aligned}$$

(iii) Ordering and storage costs

	(₹)
Ordering costs :- 185 orders × ₹ 240	44,400.00
Storage cost :- $\frac{1}{2}$ (3,893 packs × 10% of ₹228)	44,380.20
Total cost of ordering & storage	88,780.20

(iv) Timing of next order

(a) Day's requirement served by each order.

$$\text{Number of requirements} = \frac{\text{No. of days working}}{\text{No. of order in year}} = \frac{360 \text{ days}}{185 \text{ orders}} = 1.94 \text{ days supply.}$$

This implies that each order of 3,893 packs supplies for requirements of 1.94 days only.

(b) Days requirement covered by inventory □

$$\begin{aligned} &= \frac{\text{Units in inventory}}{\text{Economic order quantity}} \times (\text{Day's requirement served by an order}) \\ &= \frac{10,033 \text{ packs}}{3,893 \text{ packs}} \times 1.94 \text{ days} = 5 \text{ days requirement} \end{aligned}$$

(c) Time interval for placing next order

Inventory left for day's requirement – Average lead time of delivery

$$5 \text{ days} - 5 \text{ days} = 0 \text{ days}$$

This means that next order for the replenishment of supplies has to be placed immediately.

Q1. May 2024, 4 marks

Describe briefly idle time and explain the treatment of idle time in cost accounts in following situations:

- (i) The setting up time for the machine in case of Direct Worker Mr. A.
- (ii) Normal break time for lunch in case of Indirect Worker Mr. B.
- (iii) Time lost due to breakdown of machine in case of Worker Mr. C.

Answer:

The time during which no production is carried-out because the worker remains idle but are paid. In other words, it is the difference between the time paid and the time booked. Idle time can be normal or abnormal.

Situation	Idle Time	Treatment
The setting up time for the machine in case of Direct Worker Mr. A	Normal idle time	It is treated as a part of cost of production. It is to be considered while setting of standard hours or standard rate.
Normal rest time, breaktime for lunch in case of Indirect Worker Mr. B	Normal idle time	It is to be considered for the computation of overhead rate.
Time lost due to break- down of machines in case of Worker Mr. C	Abnormal idletime	It is to be shown as a separate item in the Costing Profit and Loss Account.

Q2. May 2024, 6 marks

Super Ltd, a manufacturing company is facing the problem of high labour turnover in the factory. Before analysing the causes and taking remedial steps, the management of the company wants to ascertain the profit lost for the year 2022-23 on account of labour turnover. For this purpose, it has given you the following information:

- (i) Sales for the last year 2022-23 was ₹ 2,16,80,000 and P/V ratio was 15%.
- (ii) The total number of actual hours worked by the direct labour force was 5,00,000 hours. The actual direct labour hours included 60,000 hours attributable to training new recruits, out of which 40% of the hours were unproductive.
- (iii) Due to delays by the Personnel Department in filling vacancies on account of labour turnover, 95,000 potential productive hours (excluding unproductive training hours) were lost.
- (iv) 1,500 units of the output produced during training period were defective. Cost of rectification of defective units was ₹ 40 per unit.
- (v) Settlement cost of the workers leaving the organization was ₹ 2,37,880.
- (vi) Recruitment and Selection cost was ₹ 1,40,000.
- (vii) Cost of Training and Induction was ₹ 1,61,950.

Assuming that the potential production lost as a consequence of labour turnover could have been sold at prevailing prices, find the profit lost for the year 2022-23 on account of labour turnover.

Answer:

Workings:

- (i) Computation of productive hours

Actual hours worked (given)	5,00,000
-----------------------------	----------

Less: Unproductive training hours	24,000
Actual productive hours	4,76,000

(ii) Productive hours lost:

Loss of potential productive hours+ Unproductive training hours
 $= 95,000 + 24,000 = 1,19,000$ hours

(iii) Loss of contribution due to unproductive hours :

$= \text{Sales value} / \text{Actual productive hours} \times \text{Total unproductive hours}$
 $= ₹ 2,16,80,000 / 4,76,000 \text{ hrs} \times 1,19,000 \text{ hours} = ₹ 54,20,000$

Contribution lost for 1,19,000 hours = ₹ 54,20,000 $\times$ 15% = ₹ 8,13,000

Computation of profit forgone on account of employee turnover

	(₹)
Contribution foregone (as calculated above)	8,13,000
Settlement cost due to leaving	2,37,880
Recruitment and Selection cost	1,40,000
Training and Induction costs	1,61,950
Cost of Rectification (1500 units $\times$ ₹40)	60,000
Profit foregone	14,12,830

Q3. Nov 2023, 5 marks

A worker took 60 hours to complete a job in a factory. The normal rate of wages is ₹ 80 per hour. The worker is entitled to receive bonus according to the Halsey Premium Plan. Factory overhead is recovered on the job at ₹ 60 per man hour actually worked. The factory cost of the job is ₹ 37,280 and material cost of the job is ₹ 28,400.

Required:

- Calculate the standard time for completing the job and effective hourly rate under the Halsey Premium plan.
- Calculate the effective rate of earnings per hour if wages would have been paid under the Rowan Plan.

Answer

- Calculation of standard time and effective hourly rate:

Standard time = Actual hours worked + time saved = 60 + 12 = 72 hours

Effective hourly rate under Halsey premium plan = Total labour cost / Actual hour worked
 $= 5,280 / 60 = ₹ 88$

- Calculation of effective rate earnings under Rowan plan:

$(\text{Rate} \times \text{Actual hours worked}) + \text{Rate} \times \text{Time Saved} / \text{Std. Time} \times \text{Time taken}$

$₹ 80 \times 60 \text{ hours} + ₹ 80 \times 12 / 72 \times 60$

$₹ 4,800 + 800 = ₹ 5,600$

Effective rate per hour = $5,600 \div 60 \text{ hour} = ₹ 93.33$

Working Note:

- Calculation of labour cost = Factory cost – Material cost – Factory Overhead

$= 37,280 - 28,400 - (₹ 60 \times 60 \text{ hours})$

$= 37,280 - 28,400 - 3,600 = ₹ 5,280$

- Calculation of bonus and time saved

Total labour cost = Normal Rate $\times$ Actual hours worked + $\frac{1}{2}$ time saved $\times$ normal rate

$₹ 5,280 = (₹ 80 \times 60 \text{ hours}) + \frac{1}{2} (\text{time saved} \times ₹ 80)$

$40 \times \text{time saved} = ₹ 5,280 - ₹ 4,800$

$\text{Time saved} = (5,280 - 4,800) \div 40$

$\text{Time saved} = 12 \text{ hours}$

Q4. May 2023, 5 marks

How does the high employee turnover increase the cost of production? Explain.

Answer:

High Employee Turnover increases the cost of production

Replacement costs are the costs which arise due to employee turnover. If employees leave soon after they acquire the necessary training and experience of good work, additional costs will have to be incurred on new workers, i.e., cost of recruitment, training and induction, abnormal breakage and scrap and extra wages and overheads due to the inefficiency of new workers.

It is obvious that a company will incur very high replacement costs if the rate of employee turnover is high. Similarly, only adequate preventive costs can keep Employee turnover at a low level. Each company must, therefore, work out the optimum level of Employee turnover keeping in view its personnel policies and the behaviour of replacement cost and preventive costs at various levels of Employee turnover rates.

Q5. May 2023, 5 marks

SMC Company Limited is producing a particular design of toys under the following existing incentive system:

Normal working hours in the week	48 hours
Late shift hours in the week	12 hours
Rate of payment	Normal working: ₹ 150 per hour Late shift: ₹ 300 per hour

Average output per operator for 60 hours per week (including late shift hours): 80 toys.

The company's management has now decided to implement a system of labour cost payment with either the Rowan Premium Plan or the Halsey Premium Plan in order to increase output, eliminate late shift overtime, and reduce the labour cost.

The following information is obtained:

The standard time allotted for ten toys is seven and half hours.

Time rate: ₹ 150 per hour (as usual).

Assuming that the operator works for 48-hours in a week and produces 100 toys, you are required to calculate the weekly earnings for one operator under-

- (i) The existing Time Rate,
- (ii) Rowan Premium Plan and,
- (iii) Halsey Premium Plan (50%).

Answer:

Working Notes:

- (1) Effective rate per hour:

$$\begin{aligned}\text{Incentive for 60 hours} &= (\text{₹ } 150 \times 48 \text{ hours} + \text{₹ } 300 \times 12 \text{ hours}) \\ &= 7,200 + 3,600 = \text{₹ } 10,800 \\ &= \text{₹ } 10,800 \div 60 \text{ hours} = \text{₹ } 180 \text{ per hour}\end{aligned}$$

- (2) Time taken/ Allowed to produce 100 toys:

$$= (60 \text{ hours} \div 80 \text{ toys}) \times 100 \text{ toys} = 75 \text{ hours}$$

- (3) Time saved = Time Allowed – Time Taken**

$$= 75 \text{ hours} - 48 \text{ hours} = 27 \text{ hours}$$

- (i) Calculation of weekly earnings for one operator under the existing time rate:**

$$= (48 \text{ hours} \times ₹ 150) + (12 \text{ hours} \times ₹ 300) = ₹ 10,800$$

Alternative solution

$$= \text{Effective rate per hour (WN-1)} \times \text{Time required for 100 toys (WN-2)}$$

$$= ₹ 180 \times 75 \text{ hours} = ₹ 13,500$$

(ii) Calculation of weekly earnings for one operator under Rowan Premium plan:

$$(\text{Time taken} \times \text{Rate per hour}) + (\text{Time Saved} / \text{Time Allowed} \times \text{Time taken} \times \text{Rate per hour})$$

$$= (48 \text{ hours} \times ₹ 150) + [(27 \div 75) \times 48 \times ₹ 150]$$

$$= 7,200 + 2,592 = ₹ 9,792$$

(iii) Calculation of weekly earnings for one operator under Halsey Premium plan:

$$(\text{Time taken} \times \text{Rate per hour}) + (50\% \text{ of Time Saved} \times \text{Rate per hour})$$

$$= (48 \text{ hours} \times ₹ 150) + (50\% \text{ of } 27 \text{ hours} \times ₹ 150)$$

$$= ₹ 7,200 + ₹ 2,025 = ₹ 9,225$$

Q6. Nov 2022, 6 marks

A skilled worker, in PK Ltd., is paid a guaranteed wage rate of ₹ 15.00 per hour in a 48-hour week. The standard time to produce a unit is 18 minutes. During a week, a skilled worker -Mr. 'A' has produced 200 units of the product. The Company has taken a drive for cost reduction and wants to reduce its labour cost.

You are required to:

(i) Calculate wages of Mr. 'A' under each of the following methods:

- Time rate,
- Piece-rate with a guaranteed weekly wage,
- Halsey Premium Plan
- Rowan Premium Plan

(ii) Suggest which bonus plan i.e. Halsey Premium Plan or Rowan Premium Plan, the company should follow.

Answer

(i) Calculation of wages of Mr. 'A' under different wage schemes:

A. Time rate

$$\text{Wages} = \text{Time Worked} \times \text{Rate for the time}$$

$$= 48 \text{ hours} \times ₹ 15 = ₹ 720$$

B. Piece rate with a guaranteed weekly wage

$$\text{Wages} = \text{Number of units produced} \times \text{Rate per unit}$$

$$= 200 \text{ units} \times ₹ 4.50^* = ₹ 900$$

$$*(₹ 15 / 60 \text{ minutes}) \times 18 \text{ minutes} = ₹ 4.50$$

C. Halsey Premium Plan

$$\text{Wages} = \text{Time taken} \times \text{Time rate} + 50\% \text{ of time saved} \times \text{Time rate}$$

$$\text{Wages} = \text{Time taken} \times \text{Time rate} + 50\% (\text{Standard time} - \text{Actual time}) \times \text{Time rate}$$

$$= (48 \text{ hours} \times ₹ 15) + 50\% \text{ of } (60 \text{ hours}^{\#} - 48 \text{ hours}) \times ₹ 15$$

$$= ₹ 720 + ₹ 90 = ₹ 810$$

$$\#(200 \text{ units} \times 18 \text{ minutes}) / 60 \text{ minutes} = 60 \text{ hours}$$

D. Rowan Premium Plan

$$\text{Wages} = \text{Time taken} \times \text{Rate per hour} + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time taken} \times \text{Rate per hour}$$

$$= (48 \text{ hours} \times ₹ 15) + \left(\frac{60 - 48 \text{ hours}}{60 \text{ hours}} \right) \times 48 \text{ hours} \times ₹ 15$$

$$= ₹ 720 + ₹ 144 = ₹ 864$$

(ii) The company may follow Halsey Premium Plan over Rowan Premium Bonus Plan as the total wages paid is lower than that of Rowan Premium Bonus Plan.

Q7. May 2022, 5 marks

PQR Limited has replaced 72 workers during the quarter ended 31st March 2022. The labour rates for the quarter are as follows:

Flux method	16%
Replacement method	8%
Separation method	5%

You are required to ascertain:

- Average number of workers on roll (for the quarter),
- Number of workers left and discharged during the quarter,
- Number of workers recruited and joined during the quarter,
- Equivalent employee turnover rates for the year.

Answer

Working Note:

(i) Average number of workers on roll (for the quarter):

Employee Turnover rate using Replacement method

$$= \frac{\text{No. of replacements}}{\text{Average number of workers on roll}} \times 100$$

$$\text{Or, } \frac{8}{100} = \frac{72}{\text{Average number of workers on roll}}$$

$$\text{Or, Average number of workers on roll} = \frac{72 \times 100}{8} = 900$$

(ii) Number of workers left and discharged:

Employee turnover rate (Separation method)

$$= \frac{\text{No. of separations (S)}}{\text{Average number of workers on roll}} \times 100$$

$$= \frac{5}{100} = \frac{S}{900} \quad \text{Or, } S = 45$$

Hence, number of workers left and discharged comes to 45

(iii) Number of workers recruited and joined:

Employee turnover rate (Flux method)

$$= \frac{\text{No. of Separations (S) + No. of Accessions (A)}}{\text{Average number of workers on roll}} \times 100$$

$$\text{Or, } \frac{16}{100} = \frac{45 + A}{900}$$

$$\text{Or, } A = \frac{14400 - 45}{100} = 99$$

No. of workers recruited and joined 99

(iv) Calculation of Equivalent employee turnover rates:

$$= \frac{\text{Employee Turnover rate for the quarter(s)}}{\text{Number of quarter(s)}} \times 4 \text{ quarters}$$

$$\text{Using Flux method} = \frac{16\%}{1} \times 4 = 64\%$$

$$\text{Using Replacement method} = \frac{8\%}{1} \times 4 = 32\%$$

$$\text{Using Separation method} = \frac{5\%}{1} \times 4 = 20\%$$

Q8. Dec 2021, 5 marks

A skilled worker is paid a guaranteed wage rate of ₹ 150 per hour. The standard time allowed for a job is 10 hours. He took 8 hours to complete the job. He has been paid the wages under Rowan Incentive Plan.

You are required to:

- Calculate an effective hourly rate of earnings under Rowan Incentive Plan.
- Calculate the time in which he should complete the job, if the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings.

Answer

(i) Calculation of Effective hourly rate of earnings under Rowan Incentive Plan:

Standard time allowed = 10 hours

Time taken = 8 hours; Time saved = 2 hours

Particulars	Amount (₹)
-------------	------------

A	Basic guaranteed wages (₹150×8 hours)	1,200
B	Add: Bonus for time saved ($\frac{2}{10} \times 8 \times ₹ 150$)	240
C	Total earnings (A+B)	1,440
D	Hours worked	8 hours
E	Effective hourly rate (C÷D)	180

(ii) Let the time taken to complete the job is "T" and the time saved is 10-T

Effective hourly rate under the Halsey Incentive scheme

$$= \frac{(\text{Rate} \times \text{Hours Worked}) + (\text{Rate} \times 50\% \text{ of Time Saved})}{\text{Hours Worked}} = ₹ 180$$

$$= \frac{(\text{₹ } 150 \times T) + ₹ 150 \times 50\% (10 - T)}{T} = ₹ 180$$

$$150T + 750 - 75T = 180T$$

$$180T - 75T = 750$$

$$T = \frac{750}{105} = 7.14 \text{ hours}$$

Q9. July 2021, 5 marks

Following information is given of a newly setup organization for the year ended on 31st March, 2021.

Number of workers replaced during the period	50
Number of workers left and discharged during the period	25
Average number of workers on the roll during the period	500

You are required to:

- Compute the Employee Turnover Rates using Separation Method and Flux Method.
- Equivalent Employee Turnover Rates for (i) above, given that the organization was setup on 31st January, 2021.

Answer

(i) Employee Turnover rate

Using Separation method:

$$= \frac{\text{Number of employees Separated during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

□

$$= \frac{25}{500} \times 100 = 5\%$$

Using Flux method:

$$= \frac{\text{Number of employees Separated} + \text{Number of employees Replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

□

$$= \frac{50+25}{500} \times 100 = 15\%$$

(ii) Equivalent Employee Turnover rate:

$$= \frac{\text{Employee Turnover rate for the period}}{\text{Number of days in the period}} \times 365$$

$$\text{Using Separation method} = \frac{5}{60} \times 365 = 30.42\%$$

$$\text{Or, } = \frac{5}{60} \times 360 = 30\%$$

$$\text{Or, } = \frac{5}{2} \times 12 = 30\%$$

$$\text{Using Flux method} = \frac{15}{60} \times 365 = 91.25\%$$

$$\text{Or, } = \frac{15}{60} \times 360 = 90\%$$

$$\text{Or, } = \frac{15}{2} \times 12 = 90\%$$

Z Ltd is working by employing 50 skilled workers. It is considering the introduction of an incentive scheme - either Halsey Scheme (with 50% Bonus) or Rowan Scheme - of wage payment for

increasing the labour productivity to adjust with the increasing demand for its products by 40%. The company feels that if the proposed incentive scheme could bring about an average 20% increase over the present earnings of the workers, it could act as sufficient incentive for them to produce more and the company has accordingly given assurance to the workers. Because of this assurance, an increase in productivity has been observed as revealed by the figures for the month of April, 2020:

Hourly rate of wages (guaranteed)	₹ 50
Average time for producing one unit by one worker at the previous performance (this may be taken as time allowed)	1.975 hours
Number of working days in a month	
Number of working hours per day of each worker	24
Actual production during the month	8
	6,120 units

Required:

- Calculate the effective increase in earnings of workers in percentage terms under Halsey and Rowan scheme.
- Calculate the savings to Z Ltd in terms of direct labour cost per unit under both the schemes.
- Advise Z Ltd about the selection of the scheme that would fulfil its assurance of incentivising workers and also to adjust with the increase in demand.

Answer

Working Notes:

- Total time wages of 50 workers per month:

$$= \text{No. of working days in the month} \times \text{No. of working hours per day of each worker} \\ \times \text{Hourly rate of wages} \times \text{No. of workers} \\ = 24 \text{ days} \times 8 \text{ hrs.} \times ₹ 50 \times 50 \text{ workers} = ₹ 4,80,000$$

- Time saved per month:

Time allowed per unit to a worker	1.975 hours
No. of units produced during the month by 50 workers	6,120 units
Total time allowed to produce 6,120 units (6,120 × 1.975 hrs)	12,087 hours
Actual time taken to produce 6,120 units (24 days × 8 hrs. × 50 workers)	9,600 hours
Time saved (12,087 hours – 9,600 hours)	2,487 hours

- Bonus under Halsey scheme to be paid to 50 workers:

$$\text{Bonus} = (50\% \text{ of time saved}) \times \text{hourly rate of wages} \\ = 50/100 \times 2,487 \text{ hours} \times ₹ 50 = ₹ 62,175$$

Total wages to be paid to 50 workers are (₹ 4,80,000 + ₹ 62,175) ₹ 5,42,175, if Z Ltd. considers the introduction of Halsey Incentive Scheme to increase the worker productivity.

- Bonus under Rowan Scheme to be paid to 50 workers:

$$\text{Bonus} = \frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{hourly rate} \\ = \frac{9,600 \text{ hours}}{12,087 \text{ hours}} \times 2,487 \text{ hours} \times ₹ 50 = ₹ 98,764$$

Total wages to be paid to 50 workers are (₹ 4,80,000 + ₹ 98,764) ₹ 5,78,764, if Z Ltd. considers the introduction of Rowan Incentive Scheme to increase the worker productivity.

(i) (a) Effective hourly rate of earnings under Halsey scheme:

(Refer to Working Notes 1, 2 and 3)

$$= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Halsey scheme}}{\text{Total hours worked}} \\ = \frac{₹ 4,80,000 + ₹ 62,175}{9,600 \text{ hours}} = ₹ 56.48$$

$$\text{Effective increase in earnings of worker (in \%)} = \frac{₹ 56.48 - ₹ 50}{₹ 50} \times 100 = 2.96\%$$

(b) Effective hourly rate of earnings under Rowan scheme:

(Refer to Working Notes 1, 2 and 4)

$$= \frac{\text{Total time wages of 50 workers} + \text{Total bonus under Rowan scheme}}{\text{Total hours worked}}$$

$$= \frac{\text{₹ 4,80,000} + \text{₹ 96,875}}{9,600 \text{ hours}} = \text{₹ 60.29}$$

$$\text{Effective increase in earnings of worker (in \%)} = \frac{\text{₹ 60.29} - \text{₹ 50}}{\text{₹ 50}} \times 100 = 20.58\%$$

(ii) (a) Saving in terms of direct labour cost per unit under Halsey scheme:

(Refer to Working Note 3)

Labour cost per unit (under time wage scheme)

$$= 1.975 \text{ hours} \times \text{₹ 50} = \text{₹ 98.75}$$

Labour cost per unit (under Halsey scheme)

$$= \frac{\text{Total wages paid under the scheme}}{\text{Total number of units produced}} = \frac{\text{₹ 5,42,175}}{6,120} = \text{₹ 88.60}$$

$$\text{Saving per unit} = \text{₹ 98.75} - \text{₹ 88.60} = \text{₹ 10.15}$$

(b) Saving in terms of direct worker cost per unit under Rowan Scheme:

(Refer to Working Note 4)

$$\text{Labour cost per unit under Rowan scheme} = \frac{\text{₹ 5,78,764}}{6,120 \text{ units}} = \text{₹ 94.57}$$

$$\text{Saving per unit} = \text{₹ 98.75} - \text{₹ 94.57} = \text{₹ 4.18}$$

(iii) Calculation of Productivity:

Normal Production Hours worked/Unit per Hour (9,600/1.975)	4,861
Actual Production Units	6,120
Increase in labour productivity	1,259
% Productivity i.e. increase in production/Normal production	25.9%

Advice: Rowan plan fulfils the company's assurance of 20% increase over the present earnings of workers. This would increase productivity by 25.9% only. It will not adjust with the increase in demand by 40%.

Q10. Nov 2020, 6 marks

Following are the particulars of two workers 'R' and 'S' for a month:

Particulars	R	S
i. Basic Wages (₹)	15,000	30,000
ii. Dearness Allowance	50%	50%
iii. Contribution to EPF (on basic wages)	7%	7.5%
iv. Contribution to ESI (on basic wages)	2%	2%
v. Overtime (hours)	20	-

The normal working hours for the month are 200 hrs. Overtime is paid at double the total of normal wages and dearness allowance. Employer's contribution to State Insurance and Provident Fund are at equal rates with employees' contributions.

Both workers were employed on jobs A, B and C in the following proportions :

Jobs	A	B	C
R	75%	10%	15%
S	40%	20%	40%

Overtime was done on job 'A'.

You are required to :

1. Calculate ordinary wage rate per hour of 'R' and 'S'.
2. Allocate the worker's cost to each job 'A', 'B' and 'C'

Answer

i. Calculation of Net Wages paid to Worker 'R' and 'S'

Particulars	R (₹)	S (₹)
Basic Wages	15,000.00	30,000.00
Dearness Allowance (DA) (50% of Basic Wages)	7,500.00	15,000.00
Overtime Wages (Refer to Working Note 1)	4,500.00	---
Gross Wages earned	27,000.00	45,000.00

Less: Provident Fund (7% × ₹ 15,000); (7.5% × ₹30,000)	(1,050.00)	(2,250.00)
Less: ESI (2% × ₹ 15,000); (2% × ₹ 30,000)	(300.00)	(600.00)
Net Wages paid	25,650.00	42,150.00

Calculation of ordinary wage rate per hour of Worker 'R' and 'S'

Particulars	R (₹)	S (₹)
Gross Wages (Basic Wages + DA) (excluding overtime)	22,500.00	45,000.00
Employer's contribution to P.F. and E.S.I.	1,350.00	2,850.00
	23,850.00	47,850.00
Ordinary wages Labour Rate per hour (₹ 23,850 ÷ 200 hours); (₹ 47,850 ÷ 200 hours)	119.25	239.25

ii. **Statement Showing Allocation of workers cost to each Job**

	Total Wages	Jobs		
		A	B	C
Worker R				
Ordinary Wages (15:2:3)	23,850.00	17,887.50	2,385.00	3,577.50
Overtime	4500.00	4500.00	--	--
Worker S				
Ordinary Wages (2:1:2)	47,850.00	19,140.00	9,570.00	19,140.00
	76,200.00	41,527.50	11,955.00	22,717.50

Working Note:

Normal Wages are considered as basic wages

$$\begin{aligned}\text{Over time} &= \frac{2 \times (\text{Basic wages} + \text{D.A.}) \times 20 \text{ hours}}{200 \text{ hours}} \\ &= 2 \times \frac{₹22,500}{200} \times 20 \text{ hours} \\ &= ₹ 4500\end{aligned}$$

Q11. Nov 2019, 10 marks

Zico Ltd. has its factory at two locations viz Nasik and Satara. Rowan plan is used at Nasik factory and Halsey plan at Satara factory.

Standard time and basic rate of wages are same for a job which is similar and is carried out on similar machinery. Normal working hours is 8 hours per day in a 5 day week.

Job at Nasik factory is completed in 32 hours while at Satara factory it has taken 30 hours. Conversion costs at Nasik and Satara are ₹ 5,408 and ₹ 4,950 respectively. Overheads account for ₹ 25 per hour.

Required:

- To find out the normal wage; and
- To compare the respective conversion costs.

Answer

Particulars	Nasik	Satara
Hours worked	32 hr.	30 hr.
Conversion Costs	₹5,408	₹4,950
Less: Overheads	₹800 (₹25×32 hr.)	₹750 (₹25×30 hr.)
Labour Cost	₹4,608	₹4,200

(i) Finding of Normal wage rate:

Let Wage rate be ₹R per hour, this is same for both the Nasik and Satara factory.

Normal wage rate can be found out taking total cost of either factory.

Nasik: Rowan Plan

Total Labour Cost = Wages for hours worked + Bonus as per Rowan plan

$$₹ 4,608 = \text{Hours worked} \times \text{Rate per hour} + \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Hours worked} \times \text{Rate per hour}$$

□ □ □ □ □

$$\text{Or, ₹ 4,608} = 32 \text{ hr.} \times R + \frac{40-32}{40} \times 32 \times R$$

$$\text{Or, ₹ 4,608} = 32R + 6.4R$$

$$R = ₹ 120$$

$$\text{Normal wage} = 32 \text{ hrs} \times ₹ 120 = ₹ 3,840$$

OR

Satara: Halsey Plan

Total Labour Cost = Wages for hours worked + Bonus as per Halsey plan

$$₹ 4,200 = \text{Hours worked} \times \text{Rate per hour} + (50\% \times \text{Hours saved} \times \text{Rate per hour})$$

$$₹ 4,200 = 30 \text{ hr.} \times R + 50\% \times (40 \text{ hr.} - 30 \text{ hr.}) \times R$$

$$₹ 4,200 = 35 R$$

$$\text{Or } R = ₹ 120$$

$$\text{Normal Wage} = 30 \text{ hrs} \times ₹ 120 = ₹ 3,600$$

(ii) Comparison of conversion costs:

Particulars	Nasik (₹)	Satara (₹)
Normal Wages (32 x 120)	3,840	
(30x120)		3,600
Bonus (6.4 x 120)	768	
(5 x 120)		600
Overhead	800	750
	5,408	4,950

Q12. May 2019, 5 marks

M/s Zeba Private Limited allotted a standard time of 40 hours for a job and the rate per hour is ₹ 75. The actual time taken by a worker is 30 hours. You are required to calculate the total earnings under the following plans:

- Halsey Premium Plan (Rate 50%)
- Rowan Plan
- Time Wage System
- Piece Rate System
- Emerson Plan

Answer

(i) Halsey Premium plan:

$$= (\text{Time taken} \times \text{Rate per hour}) + \left(\frac{1}{2} \times \text{Time saved} \times \text{Rate per hour}\right)$$

$$= (30 \text{ hours} \times ₹ 75) + \left(\frac{1}{2} \times 10 \text{ hours} \times ₹ 75\right)$$

$$= ₹ 2,250 + ₹ 375 = ₹ 2,625$$

(ii) Rowan Premium plan:

$$= (\text{Time taken} \times \text{Rate per hour}) + \frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate per hour}$$

$$= (30 \text{ hours} \times ₹ 75) + \frac{10}{40} \times 30 \times ₹ 75$$

$$= ₹ 2,250 + ₹ 562.5 = ₹ 2,812.5 \text{ or } ₹ 2,813$$

(iii) Time wage system:

$$= \text{Time taken} \times \text{Rate per hour}$$

$$= 30 \times ₹ 75 = ₹ 2,250$$

(iv) Piece Rate System:

$$= \text{Std. Time} \times \text{Rate per hour}$$

$$= 40 \times ₹ 75 = ₹ 3,000$$

(v) Emerson plan:

$$\text{Efficiency level} = 40/30 = 133.33\%$$

$$\text{Time taken} \times (120\% + 33.33\%) \text{ of Rate}$$

$$= 30 \text{ hours} \times 153.33\% \text{ of } ₹ 75$$

$$= ₹ 3,450$$

Q13. Nov 2018, 5 marks

Following data have been extracted from the books of M/s. ABC Private Limited:

i.	Salary (each employee, per month)	₹ 30,000
ii.	Bonus	25% of salary
iii.	Employer's contribution to PF, ESI etc.	15% of salary
iv.	Total cost at employees' welfare activities	₹ 6,61,500 per annum
v.	Total leave permitted during the year	30 days
vi.	No. of employees	175
vii.	Normal idle time	70 hours per annum
viii.	Abnormal idle time (due to failure of power supply)	50 hours
ix.	Working days per annum	310 days of 8 hours

You are required to calculate:

1. Annual cost of each employee
2. Employee cost per hour
3. Cost of abnormal idle time, per employee

Answer

1.

	Annual cost of each employee	₹
1	Salary (30,000×12)	3,60,000
2	Bonus (25% of Salary)	90,000
3	Employees Contribution to PF (15% of Salary)	54,000
4	Employers welfare (661500/175)	3,780
	Total Annual Cost	5,07,780

2.

Effective Working hours (310 days × 8 hours)	2480 hours
Less: Leave days (30 days × 8 hours)	240 hours*
Available Working hours	2240 hours
Less: Normal Loss @	70 hours
	2170 hours

$$\text{Employee Cost per hour} = \frac{507780}{2170} = ₹. 234$$

*It is assumed 310 working days are without taking leave permitted into consideration

3. Cost of abnormal idle time per employee = ₹ 234 × 50 hours = ₹ 11700

Alternative solution for Part (2) and (3)

(2) Calculation of Employee cost per hour:

Working hours per annum	2,480*
Less: Normal Idle time hours	70
Effective hours	2,410
Employee cost	5,07,780
Employee cost per hour	210.70

***It is assumed 310 working days are after adjusting leave permitted during the year.**

(3) Cost of Abnormal idle time per employee:

Abnormal Idle time hours	50
Employee cost per hour	210.70
Cost of Abnormal idle time (210.70 × 50)	10,534.85

Q14. May 2018, 5 marks

A worker takes 15 hours to complete a piece of work for which time allowed is 20 hours. His wage rate is ₹ 5 per hour. Following additional information are also available: Material cost of work ₹ 50 Factory overheads 100% of wages

Calculate the factory cost of work under the following methods of wage payments:

- Rowan Plan
- Halsey Plan

Answer

₹

(i) Rowan Plan : Normal time wage = 15 hours @ ₹ 5 = 75

Bonus = Time saved / Time allowed × (Time taken × Time rate) = $\frac{5}{20} \times 15 \times 5 = 18.75$

Total Earnings = 93.75

(ii) Halsey Plan: Normal time wage = 15 hours @ ₹ 5 =

75

Bonus = 50% of (Time saved × Time rate) = 50% of (5 × 5) =

12.5

87.5

Statement of Comparative Factory cost of work

	Rowan Plan (₹)	Halsey Plan (₹)
Materials	50	50
Direct Wages	93.75	87.5
Prime Cost	143.75	137.5
Factory Overhead (100% of Direct wages)	93.75	87.5
Factory Cost	237.5	225

Q15. May 2018, 10 marks

The information regarding number of employees on roll in a shopping mall for the month of December 2017 are given below:

Number of employees as on 01-12-2017 900

Number of employees as on 31-12-2017 1100

During December, 2017, 40 employees resigned and 60 employees were discharged. 300 employees were recruited during the month. Out of these 300 employees, 225 employees were recruited for an expansion project of the mall and rest were recruited due to exit of employees. Assuming 365 days in a year, calculate Employee Turnover Rate and Equivalent Annual'

Employee Turnover Rate by applying the following:

- Replacement Method
- Separation Method
- Flux Method

Answer

Labour turnover rate:

It comprises of computation of labour turnover by using following methods:

(i) Replacement Method:

$$\text{Labour turnover rate} = \frac{\text{No. of workers replaced}}{\text{Average number of workers}} \times 100$$

$$= \frac{75}{1000} \times 100 = 7.5\%$$

$$\text{Equivalent Annual Turnover Rate} = \frac{7.5 \times 365}{31} = 88.31\%$$

(ii) Separation Method:

$$\text{Labour turnover rate} = \frac{\text{No. of workers left} + \text{No. of workers discharged}}{\text{Average number of workers}} \times 100$$

$$= \frac{(40 + 60)}{(900 + 1100) / 2} \times 100$$

$$= \frac{100}{1000} \times 100 = 10\%$$

$$\text{Equivalent Annual Turnover Rate} = \frac{10 \times 365}{31} = 117.74\%$$

(iii) Flux Method:

$$\begin{aligned}\text{Labour turnover rate} &= \frac{\text{No. of separations} + \text{No. of accessions}}{\text{Average number of workers}} \times 100 \\ &= \frac{(100 + 300)}{(900 + 1100) / 2} \times 100 \\ &= \frac{400}{1000} \times 100 = 40\%\end{aligned}$$

$$\text{Equivalent Annual Turnover Rate} = \frac{40 \times 365}{31} = 470.97\%$$

OR

(iii) Flux Method:

$$\begin{aligned}\text{Labour turnover rate} &= \frac{\text{No. of separation} + \text{No. of replaced}}{\text{Average number of workers}} \times 100 \\ &= \frac{100 + 75}{1000} \times 100 = 17.5\%\end{aligned}$$

$$\text{Equivalent Annual Turnover Rate} = \frac{17.5 \times 365}{31} = 206.05\%$$

Q16. Nov 2023, RTP

A skilled worker is paid a guaranteed wage rate of Rs. 120 per hour. The standard time allowed for a job is 6 hour. He took 5 hours to complete the job. He is paid wages under Rowan Incentive Plan.

- (i) Calculate his effective hourly rate of earnings under Rowan Incentive Plan.
- (ii) If the worker is placed under Halsey Incentive Scheme (50%) and he wants to maintain the same effective hourly rate of earnings, calculate the time in which he should complete the job.

Answer:

- (i) Effective hourly rate of earnings under Rowan Incentive Plan
Earnings under Rowan Incentive plan =

$$(\text{Actual time taken} \times \text{wage rate}) + \frac{\text{Time Saved}}{\text{Time Allowed}} \times \text{Time taken} \times \text{Wage rate}$$

$$\begin{aligned}&= (5 \text{ hours} \times \text{Rs. } 120) + (1 \text{ hour} / 6 \text{ hour}) \times 5 \text{ hours} \times \text{Rs. } 120 \\ &= \text{Rs. } 600 + \text{Rs. } 100 = \text{Rs. } 700\end{aligned}$$

$$\text{Effective hourly rate} = \text{Rs. } 700 / 5 \text{ hours} = \text{Rs. } 140 / \text{hour}$$

- (ii) Let time taken = X

$$\text{Effective hourly rate} = \text{Earnings under Halsey Scheme} / \text{Time Taken}$$

$$\text{Or, Effective hourly rate under Halsey Incentive plan} =$$

$$[(\text{Time taken} \times \text{Rate}) + 50\% \text{ of Rate} \times (\text{Time allowed} - \text{Time taken})] / \text{Time Taken}$$

$$\text{Or, Rs. } 140 = [(X \times \text{Rs. } 120) + 50\% \text{ of Rs. } 120 \times (6 - X)] / X$$

$$\text{Or, } 140X = 120X + 360 - 60X$$

$$\text{Or, } 80X = 360$$

$$\text{Or, } X = 360 / 80 = 4.5 \text{ hours}$$

Therefore, to earn effective hourly rate of Rs.140 under Halsey Incentive Scheme worker has to complete the work in 4.5 hours.

Q17. May 2023, RTP

Following information are available from the cost records of BMR Limited, CALCULATE Labour turnover rate and Labour flux rate:

No. of Employees as on 01.04.2021 = 9,400

No. of Employees as on 31.03.2022 = 10,600

During the year, 160 Employees left while 640 Employees were discharged and 1,500 Employees were recruited during the year; of these, 400 Employees were recruited because of exits and the rest were recruited in accordance with expansion plans.

Answer

Employee turnover rate:

It comprises of computation of Employee turnover by using following methods:

$$(i) \text{ Separate Method} = \frac{\text{Number of employees separated during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

OR,

$$\begin{aligned} &= \frac{\text{Number of employees left} + \text{Number of employees discharged}}{\text{Average number of employees during the period on roll}} \times 100 \\ &= \frac{(160 + 640)}{(9,400 + 10,600) \div 2} \times 100 \\ &= \frac{800}{10000} \times 100 = 8\% \end{aligned}$$

$$(ii) \text{ Replacement Method} = \frac{\text{Number of employees replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{400}{10000} \times 100 = 4\%$$

$$(iii) \text{ New Recruitment} = \frac{\text{Number of employees joining in a period (excluding replacement)}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{\text{Number of Recruitments} - \text{Number of Replacements}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{1500 - 400}{10000} \times 100$$

$$= \frac{1100}{10000} \times 100 = 11\%$$

$$\text{Flux Method} = \frac{\text{Number of separation} + \text{Number of replacement} + \text{Number of new joining}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{(800 + 400 + 1,100)}{(9,400 + 10,600) \div 2} \times 100$$

$$= \frac{2300}{10000} \times 100 = 23\%$$

Q18. Nov 2022, RTP

HR Ltd. is progressing in its legal industry. One of its trainee executives, Mr. H, in the Personnel department has calculated labour turnover rate 24.92% for the last year using Flux method. Following is the data provided by the Personnel department for the last year:

Employees	At the beginning	Joined	Left	At the end
Records clerk	810	1,620	90	2,340
Human Resource Manager	?	30	90	60
Legal Secretary	?	90	--	?
Staff Attorney	?	30	30	?
Associate Attorney	?	30	--	45
Senior Staff Attorney	6	--	--	18
Senior Records clerk	12	--	--	51
Litigation attorney	?	--	--	?
Employees transferred from the Subsidiary Company				
Senior Staff Attorney	--	12	--	--
Senior Records clerk	--	39	--	--
Employees transferred to the Subsidiary Company				
Litigation attorney	--	--	90	--
Associate Attorney	--	--	15	--

At the beginning of the year there were total 1,158 employees on the payroll of the company. The opening strength of the Legal Secretary, Staff Attorney and Associate Attorney were in the ratio of 3 : 3 : 2.

The company has decided to abandon the post of Litigation attorney and consequently all the Litigation attorneys were transferred to the subsidiary company.

The company and its subsidiary are maintaining separate set of books of account and separate Personnel Department.

You are required to:

- CALCULATE Labour Turnover rate using Replacement method and Separation method.
- VERIFY the Labour turnover rate calculated under Flux method by Mr. H

Answer

Working Notes:

i. Calculation of no. of employees at the beginning and end of the year

	At the Beginning of the year	At the end of the year
Records clerk	810	2,340
Human Resource Manager [Left- 90 + Closing- 60 – Joined- 30]	120	60
Legal Secretary*	45	135
Staff Attorney*	45	45
Associate Attorney*	30	45
Senior Staff Attorney	6	18
Senior Records clerk	12	51
Litigation attorney	90	0
Total	1,158	2,694

(*) At the beginning of the year:

Strength of Legal Secretary, Staff Attorney and Associate Attorney =

[1158 – {810 + 120 + 6 + 12 + 90} employees] or [1158 – 1038 = 120 employees]

[{Legal Secretary - $120 \times \frac{3}{8} = 45$, Staff Attorney - $120 \times \frac{3}{8} = 45$ & Associate Attorney - $120 \times \frac{2}{8} = 30$ } employees]

At the end of the year:

[Legal Secretary -(Opening 45 + 90 Joining) = 135; Staff Attorney - (Opening 45 + 30 Joined – 30 Left) = 45]

ii. No. of Employees Separated, Replaced and newly recruited during the year

Particulars	Separations	New Recruitment	Replacement	Total Joining
Records clerk	90	1,530	90	1,620
Human Resource Manager	90	--	30	30
Legal Secretary	--	90	--	90
Staff Attorney	30	--	30	30
Associate Attorney	15	15	15	30
Senior Staff Attorney	--	12	--	12
Senior Records clerk	--	39	--	39
Litigation attorney	90	--	--	--
Total	315	1,686	165	1,851

(Since, HR Ltd. and its subsidiary are maintaining separate Personnel Department, so transfer-in and transfer-out are treated as recruitment and separation respectively.)

(a) Calculation of Labour Turnover rate:

Replacement Method = $\frac{\text{No. of employees replaced during the year}}{\text{Average no. of employees on roll}} \times 100$

□

$$= \frac{165}{(1,158+2,694)/2} \times 100 = \frac{165}{1,926} \times 100 = 8.57\%$$

Separation Method = $\frac{\text{No. of employees separated during the year}}{\text{Average no. of employees on roll}} \times 100$

□

$$= \frac{315}{1,926} \times 100 = 16.36\%$$

(b) Labour Turnover rate under Flux Method:

$$\begin{aligned}
&= \frac{\text{No. of employees (Joined + Separated) during the year}}{\text{Average no. of employees on roll}} \times 100 \\
&= \frac{\text{No. of employees (Replaced + New recruited + Separated) during the year}}{\text{Average no. of employees on roll}} \times 100 \\
&= \frac{1,851 + 315}{1,926} \times 100 = 112.46\%
\end{aligned}$$

Labour Turnover rate calculated by Mr. H is incorrect as it seems he has not taken the No. of new recruitment while calculating the labour turnover rate under Flux method.

Q19. May 2022, RTP

A total of 108 labour hours have been put in a particular job card for repair work engaging a semi-skilled and skilled labour (Mr. Deep and Mr. Sam respectively).

The hours devoted by both the workers individually on daily basis for this particular job are given below:

Monday	Tuesday	Wednesday	Thursday	Friday
10.5	8.0	10.5	9.5	10.5

The skilled labour also worked on Saturday for 10 hours.

Sunday is a weekly holiday and each worker has to work for 8 hours on all week days and 5 hours on Saturdays; the workers are however paid full wages for Saturday (8 hours for 5 hours worked). Semi-skilled and skilled worker is paid ordinary wage @ ₹ 400 and ₹ 600 respectively per day of 8 hours labour. Further, the workers are also paid dearness allowance @ 20%.

Extra hours worked over and above 8 hours are also paid at ordinary wage rate however, overtime premium of 100% of ordinary wage rate is paid if a worker works for more than 9 hours in a day AND 48 hours in a week.

You are required to COMPUTE the wages payable to Mr. Deep (Semi-skilled) and Mr. Sam (Skilled).

Answer

Calculation of total normal hours to be paid for Mr. Deep (Semi-skilled):

Day	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
	A	B	C	D = C×2	E = A+B+D
Monday	8	1	1½	3	12
Tuesday	8	--	--	--	8
Wednesday	8	1	1½	3	12
Thursday	8	1	½	1	10
Friday	8	1	1½	3	12
Saturday	--	--	--	--	--
Total	40	4	5	10	54

Calculation of total normal hours to be paid for Mr. Sam (Skilled):

Day	Normal hours	Extra hours	Overtime hours	Equivalent normal hours for overtime worked	Total normal hours
	A	B	C	D = C×2	E = A+B+D
Monday	8	1	1½	3	12
Tuesday	8	--	--	--	8
Wednesday	8	1	1½	3	12
Thursday	8	1	½	1	10
Friday	8	1	1½	3	12
Saturday	5	3*+1	1**	2	--
Total	45	8	6	12	65

*Mr. Sam will be paid for equivalent 8 normal working hours at ordinary wage rate, though 5 hours of working is required on Saturday. Further, extra 9th hour worked will also be paid at ordinary wage rate.

** Overtime of 1 hour worked over and above 9 hours will be paid at overtime rate.

Wages payable:

	Mr. Deep	Mr. Sam
Basic Wages per hour (₹ 400/8, ₹ 600/8) (₹)	50	75
Dearness allowance per hour (@ 20%) (₹)	10	15
Hourly rate (₹)	60	90
Total equivalent normal hours	54	65
Total Wages payable (₹)	3,240	5,850

Q20. Nov 2021, RTP

Textile Ltd. pays following overtime premium for its labour beside normal wages of ₹ 100 per hour:

Before and after normal working hours	80% of basic wage rate
Sundays and holidays	150% of basic wage rate

During the previous year 2019-20, the following hours were worked:

Normal time	300000 hours
Overtime before and after normal working hours	60000 hours
Overtime on Sundays and holidays	15000 hours
Total	375000 hours

During the current year 2020-21, the following hours have been worked on job 'Spinning':

Normal	4,000 hours
Overtime before and after normal working hours	400 hours
Overtime on Sundays and holidays	100 hours
Total	4,500 hours

You are required to CALCULATE the labour cost chargeable to job 'Spinning' and overhead in each of the following instances:

- Where overtime is worked regularly throughout the year as a policy due to the workers' shortage.
- Where overtime is worked irregularly to meet the requirements of production.
- Where overtime is worked at the request of the customer to expedite the job.

Answer

Workings:

Basic wage rate = ₹ 100 per hour

Overtime wage rate before and after working hours = ₹ 100 + (₹ 100 × 80%)
= ₹ 180 per hour

Overtime wage rate for Sundays and holidays = ₹ 100 + (₹ 100 × 150%)
= ₹ 250 per hour

Computation of average inflated wage rate (including overtime premium):

Particulars	Amount (₹)
Annual wages for the previous year for normal time (3,00,000 hrs. × ₹ 100)	3,00,00,000
Wages for overtime before and after normal working hours (60,000 hrs. × ₹ 180)	1,08,00,000
Wages for overtime on Sundays and holidays (15,000 hrs. × ₹ 250)	37,50,000

Total wages for 3,75,000 hrs.	4,45,50,000
-------------------------------	-------------

$$\text{Average inflated wage rate} = \frac{\text{₹ 4,45,50,000}}{3,75,000 \text{ hours}} = \text{₹ 118.80}$$

a. Where overtime is worked regularly as a policy due to workers' shortage

The overtime premium is treated as a part of employee cost and job is charged at an inflated wage rate. Hence, employee cost chargeable to job 'Spinning'

$$= \text{Total hours} \times \text{Inflated wage rate} = 4,500 \text{ hrs.} \times \text{₹ 118.80} = \text{₹ 5,34,600}$$

b. Where overtime is worked irregularly to meet the requirements of production

Basic wage rate is charged to the job and overtime premium is charged to factory overheads as under:

$$\begin{aligned} \text{Employee cost chargeable to Job 'Spinning'} &= 4,500 \text{ hours} @ \text{₹ 100 per hour} \\ &= \text{₹ 4,50,000} \end{aligned}$$

$$\begin{aligned} \text{Factory overhead} &= \{400 \text{ hrs.} \times (\text{₹ 100} \times 80\%)\} + \{100 \text{ hrs.} \times (\text{₹ 100} \times 150\%)\} \\ &= \{\text{₹ 32,000} + \text{₹ 15,000}\} = \text{₹ 47,000} \end{aligned}$$

c. Where overtime is worked at the request of the customer, overtime premium is also charged to the job as under:
(₹)

Job 'Spinning' Employee cost:	4500hrs. @ ₹ 100	450000
Overtime premium:	400 hrs. @ (₹ 100 × 80%)	32000
	100 hrs. @ (₹ 100 × 150%)	15000
Total		497000

Q21. May 2021, RTP

JBL Sisters operates a boutique which works for various fashion houses and retail stores. It has employed 26 workers and pays them on time rate basis. On an average an employee is allowed 8 hours for boutique work on a piece of garment. In the month of December 2020, two workers M and J were given 15 pieces and 21 pieces of garments respectively for boutique work. The following are the details of their work:

	M	J
Work assigned	15 pcs.	21 pcs.
Time taken	100 hours	140 hours

Workers are paid bonus as per Halsey System. The existing rate of wages is ₹ 60 per hour. As per the new wages agreement the workers will be paid ₹ 72 per hour w.e.f. 1st January 2021. At the end of the month December 2020, the accountant of the company has wrongly calculated wages to these two workers taking ₹ 72 per hour.

Required:

- CALCULATE the loss incurred due to incorrect rate selection.
- CALCULATE the loss incurred due to incorrect rate selection, had Rowan scheme of bonus payment followed.
- CALCULATE the loss/ savings if Rowan scheme of bonus payment had followed.
- DISCUSS the suitability of Rowan scheme of bonus payment for JBL Sisters?

Answer

Workings Notes:

Calculation of Total hours saved:

	M	J
No. of garments assigned (Pieces.)	15	21
Hour allowed per piece (Hours)	8	8
Total hours allowed (Hours)	120	168
Hours Taken (Hours)	100	140
Hours Saved (Hours)	20	28

(i) Calculation of loss incurred due to incorrect rate selection:

(While calculating loss only excess rate per hour has been taken)

	M (₹)	J (₹)	Total (₹)
Basic Wages	1,200 (100 Hrs. × ₹12)	1,680 (140 Hrs. × ₹12)	2,880
Bonus (as per Halsey Scheme) (50% of Time Saved × Excess Rate)	120 (50% of 20 Hrs. × ₹12)	168 (50% of 28 Hrs. × ₹12)	288
Excess Wages Paid	1,320	1,848	3,168

(ii) Calculation of loss incurred due to incorrect rate selection had Rowan scheme of bonus payment followed:

	M (₹)	J (₹)	Total (₹)
Basic Wages	1,200 (100 Hrs. × ₹12)	1,680 (140 Hrs. × ₹12)	2,880
Bonus (as per Rowan Scheme) $\frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Excess Rate}$	200 $\frac{100}{120} \times 20 \times ₹12$	280 $\frac{140}{168} \times 28 \times ₹12$	480
Excess Wages Paid	1,400	1,960	3,360

(iii) Calculation of amount that could have been saved if Rowan Scheme were followed

	M (₹)	J (₹)	Total (₹)
Wages paid under Halsey Scheme	1,320	1,848	3,168
Wages paid under Rowan Scheme	1,400	1,960	3,360
Difference (loss)	(80)	(112)	(192)

(iv) Rowan Scheme of incentive payment has the following benefits, which is suitable with the nature of business in which JBL Sisters operates:

- Under Rowan Scheme of bonus payment, workers cannot increase their earnings or bonus by merely increasing its work speed. Bonus under Rowan Scheme is maximum when the time taken by a worker on a job is half of the time allowed. As this fact is known to the workers, therefore, they work at such a speed which helps them to maintain the quality of output too.
- If the rate setting department commits any mistake in setting standards for time to be taken to complete the works, the loss incurred will be relatively low.

Q22. Nov 2020, RTP

GZ Ltd. pays the following to a skilled worker engaged in production works. The following are the employee benefits paid to the employee:

a)	Basic salary per day	₹1,000
b)	Dearness allowance (DA)	20% of basic salary
c)	House rent allowance	16% of basic salary
d)	Transport allowance	₹50 per day of actual work
e)	Overtime	Twice the hourly rate (considers basic and DA), only if works more than 9 hours a day otherwise no overtime allowance. If works for more than 9 hours a day then overtime is considered after 8th hours
f)	Work of holiday and Sunday	Double of per day basic rate provided works atleast 4 hours. The holiday and Sunday basic is eligible for all allowances and statutory

		deductions.
g)	Earned leave & Casual leave	These are paid leave.
h)	Employer's contribution to Provident fund	12% of basic and DA
i)	Employer's contribution to Pension fund	7% of basic and DA

The company normally works 8-hour a day and 26-day in a month. The company provides 30 minutes lunch break in between.

During the month of August 2020, Mr.Z works for 23 days including 15th August and a Sunday and applied for 3 days of casual leave. On 15th August and Sunday he worked for 5 and 6 hours respectively without lunch break.

On 5th and 13th August he worked for 10 and 9 hours respectively.

During the month Mr. Z worked for 100 hours on Job no.HT200.

You are required to CALCULATE:

- Earnings per day
- Effective wages rate per hour of Mr. Z.
- Wages to be charged to Job no.HT200

Answer

Workings:

1. Normal working hours in a month = (Daily working hours – lunch break) × no. of days

$$= (8 \text{ hours} - 0.5 \text{ hours}) \times 26 \text{ days} = 195 \text{ hours}$$

2. Hours worked by Mr.Z = No. of normal days worked + Overtime + holiday/ Sunday worked

$$= (21 \text{ days} \times 7.5 \text{ hours}) + (9.5 \text{ hours} + 8.5 \text{ hours}) + (5 \text{ hours} + 6 \text{ hours}) \\ = 157.5 \text{ hours} + 18 \text{ hours} + 11 \text{ hours} = 186.50 \text{ hours.}$$

(i) Calculation of earnings per day

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Dearness allowance (20% of basic salary)	5,200
	31,200
House rent allowance (16% of basic salary)	4,160
Employer's contribution to Provident fund (12% × ₹31,200)	3,744
	2,184
Employer's contribution to Pension fund (7% × ₹31,200)	41,288
	26
	1,588
No. of working days in a month (days)	50
Rate per day	1,638
Transport allowance per day	
Earnings per day	

(ii) Calculation of effective wage rate per hour of Mr. Z:

Particulars	Amount (₹)
Basic salary (₹1,000 × 26 days)	26,000
Additional basic salary for Sunday & holiday (₹1,000 × 2 days)	2,000
	5,600
Dearness allowance (20% of basic salary)	33,600
	4,480
House rent allowance (16% of basic salary)	1,150
Transport allowance (₹50 × 23 days)	1,150
Overtime allowance (₹160 × 2 × 2 hours)*	640
Employer's contribution to Provident fund (12% × ₹33,600)	4,032
	2,352
Employer's contribution to Pension fund (7% × ₹33,600)	46,254
	186.5

₹33,600)	248
Total monthly wages	
Hours worked by Mr. Z (hours)	
Effective wage rate per hour	

*(Daily Basic + DA) ÷ 7.5 hours

$$= (1,000+200) \div 7.5 = ₹160 \text{ per hour}$$

(iii) Calculation of wages to be charged to Job no. HT200

$$= ₹ 248 \times 100 \text{ hours} = ₹ 24,800$$

Q23. May 2020, RTP

From the following information, CALCULATE employee turnover rate using – (i) Separation Method, (ii) Replacement Method, (iii) New Recruitment Method, and (iv) Flux Method :

No. of workers as on 01.01.2019 = 3,600

No. of workers as on 31.12.2019 = 3,790

During the year, 40 workers left while 120 workers were discharged. 350 workers were recruited during the year, of these 150 workers were recruited because of exits and the rest were recruited in accordance with expansion plans.

Answer

Employee turnover rate:

It comprises of computation of Employee turnover by using following methods:

(i) Separate Method: = $\frac{\text{Number of employees left} + \text{Number of employees discharged}}{\text{Average number of employees during the period on roll}} \times 100$

$$= \frac{(40 + 120)}{(3,600 + 3,790) \div 2} \times 100 = \frac{160}{3,695} \times 100 = 4.33\%$$

(ii) Replacement Method = $\frac{\text{Number of employees replaced during the period}}{\text{Average number of employees during the period on roll}} \times 100$

$$= \frac{150}{3,695} \times 100 = 4.06\%$$

(iii) New Recruitment = $\frac{\text{Number of employees joining in a period (excluding replacement)}}{\text{Average number of employees during the period on roll}} \times 100$

$$= \frac{\text{Number of Recruitments} - \text{Number of Replacements}}{\text{Average number of employees during the period on roll}} \times 100$$

$$= \frac{350 - 150}{3,695} \times 100 = \frac{200}{3,695} \times 100 = 5.41\%$$

Flux Method = $\frac{\text{Number of separation} + \text{Number of replacement} + \text{Number of new joining}}{\text{Average number of employees during the period on roll}} \times 100$

$$= \frac{(160+350)}{(3,600 + 3,790) \div 2} \times 100 = \frac{510}{3,695} \times 100 = 13.80\%$$

Q24. Nov 2019, RTP

ADV Pvt. Ltd. manufactures a product which requires skill and precision in work to get quality products. The company has been experiencing high labour cost due to slow speed of work. The management of the company wants to reduce the labour cost but without compromising with the quality of work. It wants to introduce a bonus scheme but is indifferent between the Halsey and Rowan scheme of bonus.

For the month of November 2019, the company budgeted for 24,960 hours of work. The workers are paid ₹80 per hour.

Required:

(i) CALCULATE and suggest the bonus scheme where the time taken (in %) to time allowed to complete the works is (a) 100% (b) 75% (c) 50% & (d) 25% of budgeted hours.

Answer

Time allowed	Time taken	Wages ₹	Bonus (₹)		Total wages (₹)		Earning per hour (₹)	
			Halsey*	Rowan**	Halsey	Rowan	Halsey	Rowan
(1)	(2)	(3) =(2)×₹80	(4)	(5)	(6) = (3)+(4)	(7) = (3)+(5)	(8) =(6) / (2)	(9) =(7) / (2)

24,960	24,960	19,96,800	--	--	19,96,800	19,96,800	80.00	80.00
24,960	18,720	14,97,600	2,49,600	3,74,400	17,47,200	18,72,000	93.33	100
24,960	12,480	9,98,400	4,99,200	4,99,200	14,97,600	18,72,000	120.00	120.00
24,960	6,240	4,99,200	7,48,800	3,74,400	12,48,000	8,73,600	200.00	140.00

* Bonus under Halsey Plan = 50% of (Time Allowed – Time Taken) × Rate per hour

** Bonus under Rowan Plan = $\frac{\text{Time taken}}{\text{Time allowed}} \times \text{Time saved} \times \text{Rate per hour}$

Rowan scheme of bonus keeps checks on speed of work as the rate of incentive increases only upto 50% of time taken to time allowed but the rate decreases as the time taken to time allowed comes below 50%. It provides incentives for efficient workers for saving in time but also puts check on careless speed. On implementation of Rowan scheme, the management of ADV Pvt. Ltd. would resolve issue of the slow speed work while maintaining the skill and precision required maintaining the quality of product.

Q25. May 2019, RTP

A Company is undecided as to what kind of wage scheme should be introduced. The following particulars have been compiled in respect of three workers. Which are under consideration of the management.

	I	II	III
Actual hours worked	380	100	540
Hourly rate of wages (in ₹)	40	50	60
Productions in units:			
- Product A	210	--	600
- Product B	360	--	1,350
- Product C	460	250	--
Standard time allowed per unit of each product is			
	A	B	C
Minutes	15	20	30

For the purpose of piece rate, each minute is valued at ₹ 1/-

You are required to CALCULATE the wages of each worker under:

- Guaranteed hourly rate basis
- Piece work earning basis, but guaranteed at 75% of basic pay (Guaranteed hourly rate if his earnings are less than 50% of basic pay.)
- Premium bonus basis where the worker received bonus based on Rowan scheme.

Answer

(i) Computation of wages of each worker under guaranteed hourly rate basis

Worker	Actual hours worked (Hours)	Hourly wage rate (₹)	Wages (₹)
I	380	40	15,200
II	100	50	5,000
III	540	60	32,400

(ii) Computation of Wages of each worker under piece work earning basis

Product	Piece rate per unit	Worker-I		Worker-II		Worker-III	
		Units	Wages (₹)	Units	Wages (₹)	Units	Wages (₹)
A	15	210	3,150	--	--	600	9,000
B	20	360	7,200	--	--	1,350	27,000
C	30	460	13,800	250	7,500	--	--
			24,150		7,500		36,000

Since each worker's earnings are more than 50% of basic pay. Therefore, worker-I, II and III will be paid the wages as computed i.e. ₹ 24,150, ₹ 7,500 and ₹ 36,000 respectively.

Working Notes:**1. Piece rate per unit**

Product	Standard time per unit in minute	Piece rate each minute (₹)	Piece rate per unit (₹)
A	15	1	15
B	20	1	20
C	30	1	30

2. Time allowed to each worker

Worker	Product-A	Product-B	Product-C	Total Time(Hours)
I	210 units × 15 = 3,150	360 units × 20 = 7,200	460 units × 30 = 13,800	24,150/60 = 402.50
II	--	--	250 units × 30 = 7,500	7,500/60 = 125
III	600 units × 15 = 9,000	1,350 units × 20 = 27,000	--	36,000/60 = 600

(iii) Computation of wages of each worker under Premium bonus basis (where each worker receives bonus based on Rowan Scheme)

Worker	Time Allowed (Hr.)	Time Taken (Hr.)	Time saved (Hr.)	Wage Rate per hour (₹)	Earnings (₹)	Bonus (₹)*	Total Earning (₹)
I	402.5	380	22.5	40	15,200	850	16,050
II	125	100	25	50	5,000	1,000	6,000
III	600	540	60	60	32,400	3,240	35,640

$$* \frac{\text{Time Taken}}{\text{Time Allowed}} \times \text{Time Saved} \times \text{Wage Rate}$$

$$\text{Worker-I} = \frac{380}{402.5} \times 22.5 \times 40 = 850$$

$$\text{Worker-II} = \frac{100}{125} \times 25 \times 50 = 1,000$$

$$\text{Worker-III} = \frac{540}{600} \times 60 \times 60 = 3,240$$

Q26. Nov 2018, RTP

A job can be executed either through workman A or B. A takes 32 hours to complete the job while B finishes it in 30 hours. The standard time to finish the job is 40 hours. The hourly wage rate is same for both the workers. In addition workman A is entitled to receive bonus according to Halsey plan (50%) sharing while B is paid bonus as per Rowan plan. The works overheads are absorbed on the job at ₹ 7.50 per labour hour worked. The

factory cost of the job comes to ₹ 2,600 irrespective of the workman engaged.

INTERPRET the hourly wage rate and cost of raw materials input. Also show cost against each element of cost included in factory cost.

Answer

Calculation of :

1. Time saved and wages:

Workmen	A	B
Standard time (hrs.)	40	40
Actual time taken (hrs.)	32	30
Time saved (hrs.)	8	10
Wages paid @ ₹ x per hr. (₹)	32x	30x

2. Bonus Plan:

	Halsey	Rowan
Time saved (hrs.)	8	10
Bonus (₹)	4x	7.5x

	$\frac{8 \text{ hrs} \times \text{Rs. } x}{2}$	$\frac{10 \text{ hrs}}{40 \text{ hrs}} \times 30 \text{ hrs} \times \text{Rs. } x$
--	--	--

3. Total wages:

Workman A: $32x + 4x = ₹ 36x$

Workman B: $30x + 7.5x = ₹ 37.5x$

Statement of factory cost of the job

Workmen	A (₹)	B (₹)
Material cost (assumed)	y	y
Wages (shown above)	36x	37.5x
Works overhead	240	225
Factory cost (given)	2,600	2,600

The above relations can be written as follows:

$$36x + y + 240 = 2,600 \text{ (i)}$$

$$37.5x + y + 225 = 2,600 \text{ (ii)}$$

Subtracting (i) from (ii) we get

$$1.5x - 15 = 0$$

$$\text{Or, } 1.5x = 15$$

$$\text{Or, } x = ₹ 10 \text{ per hour}$$

On substituting the value of x in (i) we get $y = ₹ 2,000$

Hence the wage rate per hour is ₹ 10 and the cost of raw material is ₹ 2,000 on the job.

Q27. May 2018, RTP

Jyoti Ltd. wants to ascertain the profit lost during the year 2017-18 due to increased labour turnover. For this purpose, it has given you the following information:

- 1) Training period of the new recruits is 50,000 hours. During this period their productivity is 60% of the experienced workers. Time required by an experienced worker is 10 hours per unit.
- 2) 20% of the output during training period was defective. Cost of rectification of a defective unit was ₹ 25.
- 3) Potential productive hours lost due to delay in recruitment were 1,00,000 hours.
- 4) Selling price per unit is ₹ 180 and P/V ratio is 20%.
- 5) Settlement cost of the workers leaving the organization was ₹ 1,83,480.
- 6) Recruitment cost was ₹ 1,56,340
- 7) Training cost was ₹ 1,13,180

Required:

CALCULATE the profit lost by the company due to increased labour turnover during the year 2017-18.

Answer

$$\text{Output by experienced workers in 50,000 hours} = \frac{50,000}{10} = 5,000 \text{ units}$$

$$\text{Output by new recruits} = 60\% \text{ of } 5,000 = 3,000 \text{ units}$$

$$\text{Loss of output} = 5,000 - 3,000 = 2,000 \text{ units}$$

$$\begin{aligned} \text{Total loss of output} &= \text{Due to delay recruitment} + \text{Due to inexperience} \\ &= 10,000 + 2,000 = 12,000 \text{ units} \end{aligned}$$

$$\text{Contribution per unit} = 20\% \text{ of } ₹ 180 = ₹ 36$$

$$\text{Total contribution lost} = ₹ 36 \times 12,000 \text{ units} = ₹ 4,32,000$$

$$\text{Cost of repairing defective units} = 3,000 \text{ units} \times 0.2 \times ₹ 25 = ₹ 15,000$$

Profit forgone due to labour turnover

	(₹)
Loss of Contribution	4,32,000
Cost of repairing defective units	15,000
Recruitment cost	1,56,340

Training cost	1,13,180
Settlement cost of workers leaving	1,83,480
Profit forgone in 2017-18	9,00,000

Q1. May 2024, 6 marks

The cost variance report was being discussed at a review meeting where in Cost Accountant of the company reported under-absorption of production overheads.

The following information was available from the cost records of the company at the end of financial year 2023-24:

- Actual production overheads incurred were ₹ 4,50,000 which included ₹ 42,000 on account of 'written off obsolete stores.
- 18,000 units were produced during the year out of which 10,000 units were sold and 8,000 units of finished goods were in stock.
- There were also 5,000 units in progress which may be reckoned as 40% complete.
- The actual machine hours worked during the period were 43,000.

ABC Ltd. absorbs the production overheads at a predetermined rate of ₹ 8 per machine hour. On investigation, it has been found that 20% of the under-absorption of production overheads was due to defective planning and the rest was attributable to normal increase in costs of indirect materials and indirect labour.

You are required to:

- (i) Calculate the amount of under-absorption of production overheads during the year 2023-24; and
- (ii) Show the treatment of under-absorption of production overheads in cost accounts.

Answer:

- (i) Amount of under-absorption of production overheads during the current year

Total production overheads actually incurred	4,50,000
during the current year	
Less : 'Written off' obsolete stores	<u>42,000</u>
Net production overheads actually incurred : (A)	4,08,000
Production overheads absorbed by 43,000 machine	
hours@ ₹8 per hour : (B)	<u>3,44,000</u>

Amount of under – absorption of production overheads :

[(A) – (B)] = 64,000

- (ii) Accounting treatment of under absorption of production overheads

It is given in the statement of the question that 18,000 units were produced, and 5,000 units were 40% complete, 20% of the under- absorbed overheads were due to defective planning and the rest were attributable to normal increase in costs of indirect materials and indirect labour.

1.	(20 % of ₹ 64,000) i.e., ₹ 12,800 of under-absorbed overheads were due to defective planning. This being abnormal, should be debited to the Costing Profit and Loss A/c.	₹12,800
2.	Balance (80% of ₹ 64,000) i.e., ₹ 51,200 of under-absorbed overheads should be distributed over work-in-progress, finished goods and cost of sales by using supplementary rate.	₹51,200
	Total under-absorbed overheads	₹64,000

Apportionment of unabsorbed overheads of ₹ 51,200 over, work-in progress, finished goods and cost of sales

	Equivalent Completed Units	(₹)
Work-in-Progress		
(5,000 units × 40% × ₹2.56)	2,000	5,120
(Refer to working note)		
Finished goods		
(8,000 units × ₹2.56)	8,000	20,480
Cost of sales		
(10,000 units × ₹2.56)	10,000	25,600
	20,000	51,200

Working Note

Supplementary rate per unit = $51,200 / 20,000 = ₹ 2.56$

Q2. Nov 2023, 10 marks

HCP Ltd. is a manufacturing company having two production departments, P and Q and two service departments, R and S. The budgeted cost information for the month of October 2023 is furnished below:

		Production Departments		Service Departments	
	(₹)	P (₹)	Q (₹)	R (₹)	S (₹)
Indirect material	1,77,500	94,750	49,750	18,270	14,730
Indirect Labour	1,55,000	35,000	75,000		
Factory Rent	75,000				
Depreciation on machinery	37,500				
Power	96,000				
Security Expenses for Factory Premises	24,000				
Insurance- machinery	12,000				
Supervisor Expenses	48,000				
Additional information					
Floor Area (Sq. meters)		1250	750	200	300
Net book value of machinery (₹)		21,00,000	5,00,000	1,00,000	3,00,000
H.P. of machines		800	200	80	120
Machine hours		4,000	1,000	600	800
Number of employees		10	30	6	4
Labour hours		2,000	6,000	1,200	600

The overhead costs of the two service department are distributed using step method in the same order viz. R and S respectively on the following basis:

Department R Number of employees

Department S Machine hours

Required:

- Prepare a statement showing distribution of overheads to various departments, clearly showing the basis of distribution.
- Calculate the total budgeted overheads for both production departments after the service departments have been re-apportioned to them.
- Calculate the most appropriate overhead absorption rate for each of the production department.

Answer:

Overhead Distribution Statement

Particular	Basis	Total Amount (₹)	Production Departments		Service Departments	
			P (₹)	Q (₹)	R (₹)	S (₹)
Indirect material	Direct	1,77,500	94,750	49,750	18,270	14,730
Indirect labour	Direct	1,55,000	35,000	75,000	15,000	30,000
Factory rent (125:75:20:30)	Floor Area	75,000	37,500	22,500	6,000	9,000
Depreciation of machinery (21:5:1:3)	Book value of machinery	37,500	26,250	6,250	1,250	3,750
Power (80:20:8:12)	H.P. of machines	96,000	64,000	16,000	6,400	9,600
Security expenses for factory premises (125:75:20:30)	Floor Area	24,000	12,000	7,200	1,920	2,880
Insurance-machinery (21:5:1:3)	Book value of machinery	12,000	8,400	2,000	400	1,200
Supervisor expenses (10:30:6:4)	Number of employees	48,000	9,600	28,800	5,760	3,840
Total		6,25,000	2,87,500	2,07,500	55,000	75,000

(ii) Redistribution of Service Department's Expenses

Particular	Production Departments		Service Departments	
	P (₹)	Q (₹)	R (₹)	S (₹)
Overhead as per primary distribution	2,87,500	2,07,500	55,000	75,000
Expenses of service department R is apportioned among other departments P, Q & S in the ratio of number of employees (10:30:4)	12,500	37,500	(55,000)	5,000
Expenses of service department S is apportioned among other departments P & Q in the ratio of Machine hours (40:10)	64,000	16,000	-	(80,000)
Total Budgeted overheads	3,64,000	2,61,000	-	-

(iv) Calculation of overhead rates for each of the production department

Particular	Production Departments	
	P (₹)	Q (₹)
Total Budgeted overheads	3,64,000	2,61,000
Actual machine hours	4000 hours	-
Actual labour hours	-	6000 hours
Actual machine/labour hour rate	91	43.5

Note: Department P is assumed to be machine oriented and Department Q is assumed to be labour oriented as per information available in the question

Q3. May 2023, 5 marks

Explain what is meant by Practical capacity and Normal capacity. How is normal capacity determined?

Answer:

Meaning of Practical capacity and Normal capacity

Practical capacity is defined as actually utilised capacity of a plant. It is also known as operating capacity. This capacity takes into account loss of time due to repairs, maintenance, minor breakdown, idle time, set up time, normal delays, Sundays and holidays, stock

taking etc. Generally, practical capacity is taken between 80 to 90% of the rated capacity. It is also used as a base for determining overhead rates. Practical capacity is also called net capacity or available capacity.

Normal capacity is the volume of production or services achieved or achievable on an average over a period under normal circumstances taking into account the reduction in capacity resulting from planned maintenance.

Normal capacity is determined as under:

Installed capacity		xxx
Adjustments for:		
(i) Time lost due to scheduled preventive or planned maintenance	xxx	
(ii) Number of shifts or machine hours or man hours		
(iii) Holidays, normal shut down days, normal idle time	xxx	
(iv) Normal time lost in batch change over	xxx	xxx
Normal Capacity		xxx

Q4. May 2023, 5 marks

The following information has been obtained from financial accounting and cost accounting records.

	Financial Accounting	Cost Accounting
	₹	₹
(i) Factory Overhead	94,750	90,000
(ii) Administrative Overhead	60,000	57,000
(iii) Selling Overhead	55,000	61,000
(iv) Opening Stock	17,500	22,500
(v) Closing Stock	12,500	15,000

Required

Indicate under-recovery and over-recovery and their effects on cost accounting profit. [Note: You are not required to prepare reconciliation statement.]

Answer:

	Financial Accounting	Cost Accounting	Difference	Under/Over-recovery	Effect on Cost Accounting Profit	Net Effect* on Cost Accounting Profit
	₹	₹	₹			
(i) Factory Overhead	94,750	90,000	4,750	Under-recovery	Increased	To be reduced/ deducted
(ii) Administrative Overhead	60,000	57,000	3,000	Under-recovery	Increased	To be reduced/ deducted
(iii) Selling Overhead	55,000	61,500	-6,500	Over-recovery	Decreased	To be added
(iv) Opening Stock	17,500	22,500	-5,000	Over valuation	Decreased	To be added
(v) Closing Stock	12,500	15,000	-2,500	Over valuation	Increased	To be reduced/ deducted

Taking Cost Accounting Profit as base

(Under recovery and over recovery with effect are answered by the candidate, or if under recovery and over recovery with treatment (net effect) are answered, due credit shall be given in both cases)

Q5. Nov 2022, 10 marks

USP Ltd. is the manufacturer of 'double grip motorcycle tyres'. In the manufacturing process, it undertakes three different jobs namely, Vulcanising, Brushing and Striping. All of these jobs require the use of a special machine and also the aid of a robot when necessary. The robot is hired from outside and the hire charges paid for every six months is ₹ 2,70,000. An estimate of overhead expenses relating to the special machine is given below:

- Rent for a quarter is ₹ 18,000.
- The cost of the special machine is ₹ 19,20,000 and depreciation is charged @10% per annum on straight line basis.
- Other indirect expenses are recovered at 20% of direct wages.

The factory manager has informed that in the coming year, the total direct wages will be ₹ 12,00,000 which will be incurred evenly throughout the year.

During the first month of operation, the following details are available from the job book:

Number of hours the special machine was used

Jobs	Without the aid of the robot	With the of the robot
Vulcanising	500	400
Brushing	1000	400
Striping	--	1200

You are required to :

- Compute the Machine Hour Rate for the company as a whole for a month (A) when the robot is used and (B) when the robot is not used.
- Compute the Machine Hour Rate for the individual jobs i.e. Vulcanising, Brushing and Striping.

Answer**Working notes:**

(I) Total machine hours use (500 + 1,000 + 400 + 400 + 1,200)	3,500
(II) Total machine hours without the use of robot (500 + 1,000)	1,500
(III) Total machine hours with the use of robot (400 + 400 + 1,200)	2,000
(IV) Total overheads of the machine per month	
Rent (₹ 18,000 ÷ 3 months)	6,000
Depreciation [(₹ 19,20,000 × 10%) ÷ 12 months]	16,000
Indirect expenses [(₹ 12,00,000 × 20%) ÷ 12 months]	<u>20,000</u>
Total	<u>42,000</u>
(V) Robot hire charges for a month (₹ 2,70,000 ÷ 6 months)	₹ 45,000
(VI) Overheads for using machines without robot	
$= \frac{₹ 42,000}{3,500 \text{ hrs.}} \times 1,500 \text{ hrs.} =$	₹ 18,000
(VII) Overheads for using machines with robot	
$= \frac{₹ 42,000}{3,500 \text{ hrs.}} \times 2,000 \text{ hrs.} + ₹ 45,000 =$	₹ 69,000

i. Computation of Machine hour rate for the firm as a whole for a month.

(A) When the robot was used: $\frac{₹ 69,000}{2,000 \text{ hours}} = ₹ 34.50 \text{ per hour}$

(B) When the robot was not used: $\frac{₹ 18,000}{1,500 \text{ hrs.}} = ₹ 12 \text{ per hour}$

ii. Computation of Machine hour rate for the individual job

	Rate per	Job		
		Vulcanising	Brushing	Striping

	hour						
	(₹)	Hrs.	(₹)	Hrs.	(₹)	Hrs.	(₹)
Overheads							
Without robot	12.00	500	6,000	1,000	12,000	-	-
With robot	34.50	400	13,800	400	13,800	1,200	41,400
Total		900	19,800	1,400	25,800	1,200	41,400
Machine hour rate			22		18.43		34.50

Q6. May 2022, 10 marks

In a manufacturing company, the overhead is recovered as follows:

Factory Overheads: a fixed percentage basis on direct wages and

Administrative overheads: a fixed percentage basis on factory cost.

The company has furnished the following data relating to two jobs undertaken by it in a period.

	Job 1 (₹)	Job 2 (₹)
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Selling price	3,33,312	2,52,000
Profit percentage on total cost	12%	20%

You are required to:

- Compute the percentage recovery rates of factory overheads and administrative overheads.
- Calculate the amount of factory overheads, administrative overheads and profit for each of the two jobs.
- Using the above recovery rates, determine the selling price to be quoted for job 3.

Additional data pertaining to Job 3 is as follows:

Direct materials	₹ 68,750
Direct wages	₹ 22,500
Profit percentage on selling price	15%

Answer

i. Computation of percentage recovery rates of factory overheads and administrative overheads.

Let the factory overhead recovery rate as percentage of direct wages be F and administrative overheads recovery rate as percentage of factory cost be A.

Factory Cost of Jobs:

Direct materials + Direct wages + Factory overhead

For Job 1 = ₹ 1,08,000 + ₹ 84,000 + ₹ 84,000F

For Job 2 = ₹ 75,000 + ₹ 60,000 + ₹ 60,000F

Total Cost of Jobs:

Factory cost + Administrative overhead

For Job 1 = (₹ 1,92,000 + ₹ 84,000F) + (₹ 1,92,000 + ₹ 84,000F) A = ₹ 2,97,600*

For Job-2 = (₹ 1,35,000 + ₹ 60,000F) + (₹ 1,35,000 + ₹ 60,000F) A = ₹ 2,10,000**

The value of F & A can be found using following equations

$$1,92,000 + 84,000F + 1,92,000A + 84,000AF = ₹ 2,97,600 \dots\dots\dots \text{eqn (i)}$$

$$1,35,000 + 60,000F + 1,35,000A + 60,000AF = ₹ 2,10,000 \dots\dots\dots \text{eqn (ii)}$$

Multiply equation (i) by 5 and equation (ii) by 7

$$9,60,000 + 4,20,000F + 9,60,000A + 4,20,000AF = ₹ 14,88,000 \dots\dots\dots \text{eqn (iii)}$$

$$9,45,000 + 4,20,000F + 9,45,000A + 4,20,000AF = ₹ 14,70,000 \dots\dots\dots \text{eqn (iv)}$$

$$15,000 + 15,000A = ₹ 18,000$$

$$15,000 A = 18,000 - 15,000$$

$$A = 0.20$$

Now putting the value of A in equation (i) to find the value of F

$$1,92,000 + 84,000F + (1,92,000 \times 0.20) + (84,000 F \times 0.20) = ₹ 2,97,600$$

Or

$$1,92,000 + 84,000F + 38,400 + 16,800 F = ₹ 2,97,600$$

$$1,00,800 F = 67,200$$

$$F = 0.667$$

On solving the above relations: $F = 0.667$ and $A = 0.20$

Hence, percentage recovery rates of:

Factory overheads = 66.7% or 2/3rd of wages and

Administrative overheads = 20% of factory cost.

Working note:

$$\text{Total Cost} = \frac{\text{Selling price}}{(100\% + \text{Percentage of profit})}$$

$$*\text{For Job 1} = \frac{\text{Rs. } 3,33,312}{(100\% + 12\%)} = ₹ 2,97,600$$

$$**\text{For Job 2} = \frac{2,52,000}{(100\% + 20\%)} = ₹ 2,10,000$$

ii. Statement of jobs, showing amount of factory overheads, administrative overheads and profit:

	Job 1	Job 2
	(₹)	(₹)
Direct materials	1,08,000	75,000
Direct wages	84,000	60,000
Prime cost	1,92,000	1,35,000
Factory overheads 2/3rd of direct wages	56,000	40,000
	2,48,000	1,75,000
Factory cost		
Administrative overheads	49,600	35,000
20% of factory cost	2,97,600	2,10,000
Total cost	35,712	42,000
Profit (12% & 20% respectively)	3,33,312	2,52,000
Selling price		

(iii) Selling price of Job 3

	(₹)
Direct materials	68,750
Direct wages	22,500
Prime cost	91,250
Factory overheads (2/3rd of Direct Wages)	15,000
Factory cost	1,06,250
Administrative overheads (20% of factory cost)	21,250
Total cost	1,27,500
Profit margin (balancing figure)	22,500
Selling price ($\frac{\text{Total Cost}}{85\%}$)	1,50,000

Q7. Dec 2021, 10 marks

XYZ Ltd. manufactures a single product. It recovers factory overheads at a pre - determined rate of ₹ 20 per man-day. During the year 2020-21, the total factory overheads incurred, and the man-days actually worked were ₹ 35.50 lakhs and 1.50 lakh days respectively. Out of the amount of ₹ 35.50 lakhs, ₹ 2.00 lakhs were in respect of wages for stick period and ₹ 1.00 lakh was in respect of expenses of previous year booked in this current year. During the period, 50,000 units were sold. At the end of the period, 12,000 completed units were held in stock but there was no opening stock of finished goods. Similarly, there was no stock of uncompleted units at the beginning of the period but at the end of the period there were 20,000 uncompleted units which may be treated as 65% complete in all respects.

On investigation, it was found that 40% of the unabsorbed overheads were due to factory inefficiency and the rest were attributable to increase in the cost of indirect materials and indirect labour. You are required to:

- Calculate the amount of unabsorbed overheads during the year 2020-21.
- Show the accounting treatment of unabsorbed overheads in cost accounts and pass journal entry

Answer

i. Amount of under-absorption of overheads during the year 2020-21

	(₹)
Total production overheads actually incurred during the year 2020-21	35,50,000
Less: Wages paid during strike period ₹2,00,000	
Wages of previous year booked in current year ₹ 1,00,000	3,00,000
Net production overheads actually incurred: (A)	32,50,000
Production overheads absorbed by 1.50 lakh man-days @ ₹ 20 per man-day: (B)	30,00,000
Amount of under-absorption of production overheads: [(A)–(B)]	2,50,000

ii. Accounting treatment of under absorption of production overheads: It is given in the statement of the

question that 62,000 units (50,000 sold + 12,000 closing stock – 0 opening stock) were completely finished and 20,000 units were 65% complete, 40% of the under-absorbed overheads were due to factory inefficiency and the rest were attributable to increase in cost of indirect materials and indirect labour.

	(₹)
1. (40% of ₹2,50,000) i.e. ₹ 1,00,000 of under – absorbed overheads were due to factory inefficiency. This being abnormal, should be debited to the Costing Profit and Loss A/c	1,00,000
2. Balance (60% of ₹ 2,50,000) i.e. ₹ 1,50,000 of under –absorbed overheads should be distributed over work-in-progress, finished goods and cost of sales by using supplementary rate	1,50,000
Total under-absorbed overheads	2,50,000

Apportionment of unabsorbed overheads of ₹1,50,000 over work-in-progress, finished goods and cost of sales.

	Equivalent Completed units	(₹)
Work-in-progress (13,000 units × ₹ 2) (Refer to Working Note)	20000 * 65% = 13,000	26,000
Finished goods (12,000 units × ₹ 2)	12,000	24,000
Cost of sales (50,000 units × ₹ 2)	50,000	1,00,000
	75,000	1,50,000

Journal entry:

Work-in-progress control A/c	Dr.	₹ 26,000
Finished goods control A/c	Dr.	₹ 24,000
Cost of Sales A/c	Dr.	₹ 1,00,000
Costing Profit & Loss A/c	Dr.	₹ 1,00,000
To Overhead control A/c		₹ 2,50,000

Working Note:

Supplementary overhead absorption rate = $\frac{₹ 1,50,000}{75,000 \text{ units}} = ₹ 2 \text{ per unit}$

Q8.July 2021, 5 marks

SNS Trading Company has three Main Departments and two Service Departments. The data for each department is given below:

Departments	Expenses (in ₹)	Area in (Sq. Mtr)	Number of Employees
Main Department:			
Purchase Department	5,00,000	12	800
Packing Department	8,00,000	15	700
Distribution Department	3,50,000	7	700
Service Departments:			
Maintenance Department	6,40,000	4	200
Personnel Department	3,20,000	6	250

The cost of Maintenance Department and Personnel Department is distributed on the basis of 'Area in Square Metres' and 'Number of Employees' respectively.

You are required to:

- Prepare a Statement showing the distribution of expenses of Service Departments to the Main Departments using the "Step Ladder method" of Overhead Distribution.
- Compute the Rate per hour of each Main Department, given that, the Purchase Department, Packing Department and Distribution Department works for 12 hours a day, 24 hours a day and 8 hours a day respectively. Assume that there are 365 days in a year and there are no holidays.

Answer**1. Schedule Showing the Distribution of Expenses of Service Departments using Step ladder method.**

	Main Department			Service Department	
	Purchase (₹)	Packing (₹)	Distribution (₹)	Maintenance (₹)	Personnel (₹)
Expenses	5,00,000	8,00,000	3,50,000	6,40,000	3,20,000
Distribution of Maintenance Department (12:15:7::6)	1,92,000	2,40,000	1,12,000	(6,40,000)	96,000
Distribution of Personnel Department (800:1700:700:-:-)	1,04,000	2,21,000	91,000	-	(4,16,000)
Total	7,96,000	12,61,000	5,53,000	-	-

(ii) Calculation of Expenses rate per hour of Main Department

	Purchase	Packing	Distribution
Total apportioned expenses (₹)	7,96,000	12,61,000	5,53,000
Total Hours worked	4,380 (12 x 365)	8,760 (24 x 365)	2,920 (8 x 365)
Expenses rate per hour (₹)	181.74	143.95	189.38

Q9.Jan 2021, 5 marks

A machine shop has 8 identical machines manned by 6 operators. The machine cannot work without an operator wholly engaged on it. The original cost of all the 8 machines works out to ₹ 32,00,000. The following particulars are furnished for a six months period:

Normal available hours per month per operator	208
Absenteeism (without pay) hours per operator	18
Leave (with pay) hours per operator	20
Normal unavoidable idle time-hours per operator	10
Average rate of wages per day of 8 hours per operator	₹ 100
Production bonus estimated	10% on wages
Power consumed	₹ 40,250
Supervision and Indirect Labour	₹ 16,500
Lighting and Electricity	₹ 6,000

The following particulars are given for a year:

Insurance	₹ 3,60,000
Sundry work Expenses	₹ 50,000
Management Expenses allocated	₹ 5,00,000
Depreciation	10% on the original cost
Repairs and Maintenance (including consumables):	5% of the value of all the machines.

Prepare a statement showing the comprehensive machine hour rate for the machine shop.

Answer

Workings:

Particulars	Six months 6 operators (Hours)
Normal available hours per month (208 x 6 months x 6 operators)	7,488
Less: Absenteeism hours (18 x 6 operators)	(108)
Paid hours (A)	7,380
Less: Leave hours (20 x 6 operators)	(120)
Less: Normal idle time (10 x 6 operators)	(60)
Effective working hours	7,200

Computation of Comprehensive Machine Hour Rate

Particulars	Amount for six months (₹)
Operators' wages (7,380/8 x 100)	92,250
Production bonus (10% on wages)	9,225
Power consumed	40,250
Supervision and indirect labour	16,500
Lighting and Electricity	6,000
Repair and maintenance {(5% × ₹ 32,00,000)/2}	80,000
Insurance (₹ 3,60,000/2)	1,80,000
Depreciation {(₹ 32,00,000 × 10%)/2}	1,60,000
Sundry Work expenses (₹ 50,000/2)	25,000
Management expenses (₹ 5,00,000/2)	2,50,000
Total Overheads for 6 months	8,59,225
Comprehensive Machine Hour Rate = ₹ 8,59,225/7,200 hours	₹ 119.33

(Note: Machine hour rate may be calculated alternatively. Further, presentation of figures may also be done on monthly or annual basis.)

Q10. Nov 2020, 10 marks

TEE Ltd. is a manufacturing company having three production departments 'P', 'Q' and 'R' and two service departments 'X' and 'Y' details pertaining to which are as under :

	P	Q	R	X	Y
Direct wages (₹)	5,000	1,500	4,500	2,000	800
Working hours	13,191	7,598	14,995	-	-
Value of machine (₹)	1,00,000	80,000	1,00,000	20,000	50,000
HP. of machines	100	80	100	20	50
Light points (Nos.)	20	10	15	5	10
Floor space (sq. ft.)	2,000	2,500	3,500	1,000	1,000

The expenses are as follows:

	(₹)
Rent and Rates	10,000
General Lighting	600
Indirect Wages	3,450
Power	3,500
Depreciation on Machines	70,000
Sundries (apportionment on the basis of direct wages)	13,800

The expenses of Service Departments are allocated as under :

	P	Q	R	X	Y
X	45%	15%	30%	-	10%
Y	35%	25%	30%	10%	-

Product 'A' is processed for manufacture in Departments P, Q and R for 6, 5 and 2 hours respectively.

Direct Costs of Product A are :

Direct material cost is ₹ 65 per unit and Direct labour cost is ₹ 40 per unit.

You are Required to:

- Prepare a statement showing distribution of overheads among the production and service departments.
- Calculate recovery rate per hour of each production department after redistributing the service departments costs.
- Find out the Total Cost of a 'Product A'.

Answer

(i) Statement showing distribution of Overheads

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (₹)	P (₹)	Q (₹)	R (₹)	X (₹)	Y (₹)
Direct wages	Actual	2,800	--	--	--	2,000	800
Rent and Rates	Floor area (4:5:7:2:2)	10,000	2,000	2,500	3,500	1,000	1,000
General lighting	Light points (4:2:3:1:2)	600	200	100	150	50	100
Indirect wages	Direct wages (50:15:45:20:8)	3,450	1,250	375	1,125	500	200
Power	Horse Power of machines used (10:8:10:2:5)	3,500	1,000	800	1,000	200	500
Depreciation of	Value of machinery	70,000	20,000	16,000	20,000	4,000	10,000

machinery	(10:8:10:2:5)						
Sundries	Direct wages (50:15:45:20:8)	13,800	5,000	1,500	4,500	2,000	800
Total		1,04,150	29,450	21,275	30,275	9,750	13,400

Secondary Distribution using simultaneous equation method:

Overheads of service cost centres

Let, X be the overhead of service cost centre X

Y be the overhead of service cost centre Y

$$X = 9,750 + 0.10 Y$$

$$Y = 13,400 + 0.10 X$$

Substituting the value of Y in X we get

$$X = 9,750 + 0.10 (13,400 + 0.10 X)$$

$$X = 9,750 + 1,340 + 0.01 X$$

$$0.99 X = 11,090$$

$$\square X = ₹ 11,202$$

$$\square Y = 13,400 + 0.10 \times 11,202$$

$$= ₹ 14,520.20$$

Secondary Distribution Summary

Particulars	Total (₹)	P (₹)	Q(₹)	R(₹)
Allocated and Apportioned over-heads as per primary distribution		29,450.00	21,275.00	30,275.00
X	11,202.00	5,040.90	1,680.30	3,360.60
Y	14,520.20	5,082.07	3,630.05	4,356.06
Total		39,572.97	26,585.35	37,991.66

(ii) Calculation of Overhead recovery rate per hour

	P (₹)	Q(₹)	R(₹)
Total overheads cost	39,572.97	26,585.35	37,991.66
Working hours	13,191	7,598	14,995
Rate per hour (₹)	3	3.50	2.53

(iii) Cost of Product A

	(₹)
Direct material	65.00
Direct labour	<u>40.00</u>
Prime cost	105.00
Production on overheads	
P 6 hours × ₹ 3 = ₹ 18	
Q 5 hours × ₹ 3.50 = ₹ 17.50	
R 2 hours × ₹ 2.53 = ₹ 5.06	
	<u>40.56</u>
Total Cost	145.56

Note: Secondary Distribution can also be done using repeated distribution Method

Q11. Nov 2019, 10 marks

ABS Enterprises produces a product and adopts the policy to recover factory overheads applying blanket rate based on machine hours. The cost records of the concern reveal the following information:

Budgeted production overheads	₹ 10,35,000
Budgeted machine hours	₹ 90,000
Actual machine hours worked	₹ 45,000
Actual production overheads	₹ 8,80,000
Production overheads (actual) include Paid to worker as per court's award	₹ 50,000
Wages paid for strike period	₹ 38,000

Stores written off	₹ 22,000
Expenses of previous year booked in current year	₹ 18,500
Production -	
Finished goods	30,000 units
Sale of finished goods	27,000 units

The analysis of cost information reveals that 1/3 of the under absorption of overheads was due to defective production planning and the balance was attributable to increase in costs.

You are required:

- To find out the amount of under absorbed production overheads.
- To give the ways of treating it in Cost Accounts.
- To apportion the under absorbed overheads over the items.

Answer

i. Amount of under absorption of production overheads:

Particular	Amount (₹)	Amount (₹)
Total production overheads actually incurred		8,80,000
Less: Amount paid to worker as per court order	50,000	
Wages paid for the strike period under an award	38,000	
Stores written off	22,000	
Expenses of previous year booked in the current year	18,500	1,28,500
		7,51,500
Less: Production overheads absorbed as per machine hour rate (45,000 hours × ₹11.50*)		5,17,500
Amount of under- absorbed production overheads		2,34,000

*Budgeted Machine hour rate (Blanket rate) = $\frac{₹ 10,35,000}{90,000} = ₹ 11.50$ per hour

ii. Accounting treatment of under absorbed production overheads:

- a) As 1/3rd of the under absorbed overheads were due to defective production planning, this being abnormal, hence should be debited to Costing Profit and Loss Account.

Amount to be debited to Costing Profit and Loss Account

$$= ₹ 2,34,000 \times \frac{1}{3} = ₹ 78,000.$$

- b) Balance of under absorbed production overheads should be distributed over Finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = ₹ 2,34,000 × 2/3 = ₹1,56,000

$$\text{*Supplementary rate} = \frac{₹ 1,56,000}{30,000 \text{ units}} = ₹ 5.20 \text{ per unit}$$

(iii) Apportionment of under absorbed production overheads over Finished goods and Cost of sales:

Particular	Units	Amount (₹)
Finished goods (3,000 units × ₹5.20)	3,000	15,600
Cost of sales (27,000 units × ₹5.20)	27,000	1,40,400
Total	30,000	1,56,000

Q12. May 2019, 5 marks

M/s Zaina Private Limited has purchased a machine costing ₹ 29,14,800 and it is expected to have a salvage value of ₹ 1,50,000 at the end of its effective life of 15 years. Ordinarily the machine is expected to run for 4,500 hours per annum but it is estimated that 300 hours per annum will be lost for normal repair & maintenance. The other details in respect of the machine are as follows :

- Repair & Maintenance during the whole life of the machine are expected to be ₹ 5,40,000.
- Insurance premium (per annum) 2% of the cost of the machine.
- Oil and Lubricants required for operating the machine (per annum) ₹ 87,384.
- Power consumptions: 10 units per hour @ ₹ 7 per unit. No power consumption during repair and maintenance.

- v. Salary to operator per month ₹ 24,000. The operator devotes one third of his time to the machine.

You are required to calculate comprehensive machine hour rate.

Answer

Effective machine hour = 4,500 – 300 = 4,200 hours

Calculation of Comprehensive machine hour rate

Elements of Cost and Revenue	Amount (₹) Per Annum
Repair and Maintenance (₹5,40,000 ÷ 15 years)	36,000
Power (4,200 hours × 10 units × ₹7)	2,94,000
Depreciation ($\frac{₹ 29,14,800 - ₹ 1,50,000}{15 \text{ years}}$)	1,84,320
Insurance (₹29,14,800 × 2%)	58,296
Oil and Lubricant	87,384
Salary to Operator {(₹24,000×12)/3}	96,000
Total Cost	7,56,000
Effective machine hour	4,200
Total Machine Rate Per Hour	180

Q13. Nov 2018, 5 marks

M/s. NOP Limited has its own power plant and generates its own power. Information regarding power requirements and power used are as follows:

	Production Dept.		Service Dept.	
	A	B	X	Y
	(Horse power hours)			
Needed capacity production	20,000	25,000	15,000	10,000
Used during the quarter ended September 2018	16,000	20,000	12,000	8,000

During the quarter ended September 2018, costs for generating power amounted to ₹ 12.60 lakhs out of which ₹ 4.20 lakhs was considered as fixed cost.

Service department X renders services to departments A, B, and Y in the ratio of 6:4:2

whereas department Y renders services to department A and B in the ratio of 4: 1.

The direct labour hours of department A and B are 67500 hours and 48750 hours respectively.

Required:

1. Prepare overheads distribution sheet.
2. Calculate factory overhead per labour hour for the dept. A and dept. B.

Answer

1) Overheads distribution Sheet

Item	Basis	Total Amount (₹)	Production Departments		Service Departments	
			A (₹)	B (₹)	X (₹)	Y (₹)
Variable overheads (₹ 12.60 lakhs - ₹ 4.20 lakhs)	Horse Power hours used	8,40,000	2,40,000	3,00,000	1,80,000	1,20,000
Fixed Overheads	Horse power for Capacity production	4,20,000	1,20,000	1,50,000	90,000	60,000

Total Overheads		12,60,000	3,60,000	4,50,000	2,70,000	1,80,000
Service dept X allocated to A, B & Y	As per the ratio given 6:4:2	(2,70,000)	1,35,000	90,000		45,000
Service dept Y allocated to A & B	As per the ratio of 4:1	(1,80,000+45000=2,25,000)	1,80,000	45,000		
			6,75,000	5,85,000		

2) Calculation of Factory overhead per labour hour

Item	Production Departments	
	A (₹)	B (₹)
Total overheads	6,75,000	5,85,000
Direct labour hours	67,500	48,750
Factory overheads per hour	10	12

Q14. Nov 2023 RTP,

The following particulars refer to process used in the treatment of material subsequently incorporated in a component forming part of an electrical appliance:

- The original cost of the machine used (Purchased in June 2018) was Rs. 10,00,000. Its estimated life is 10 years, the estimated scrap value at the end of its life is Rs. 10,000, and the estimated working time per year (50 weeks of 44 hours) is 2,200 hours. Out of which machine maintenance etc., is estimated to take up 200 hours. No other loss of working time expected, setting up time, estimated at 100 hours, is regarded as productive time. (Holiday to be ignored).
- Electricity used by the machine during production is 16 units per hour at cost of a Rs. 7 per unit. No power is consumed during maintenance or setting up.
- The machine required a chemical solution which is replaced at the end of week at a cost of Rs. 2,000 each time.
- The estimated cost of maintenance per year is Rs. 1,20,000.
- Two attendants control the operation of machine together with five other identical machines. Their combined weekly wages, insurance and the employer's contribution to holiday pay amount is Rs. 9,000.
- Departmental and general works overhead allocated to this machine for the current year amount to Rs. 20,000.

You are required to calculate the machine hour rate of operating the machine.

Answer:

Working Notes:

- Total Productive hours = Estimated Working hours – Machine Maintenance hours
= 2,200 hours – 200 hours = 2,000 hours
- Depreciation per annum = $[10,00,000 - 10,000] / 10$ = Rs. 99,000
- Chemical solution cost per annum = Rs. 2,000 × 50 weeks = Rs. 1,00,000
- Wages of attendants (per annum) = $9,000 \times 50 \text{ weeks} / 6 \text{ machines}$ = Rs. 75,000

Calculation of Machine hour rate

Particulars	Amount (per annum)	Amount (per hour)
A. Standing Charge		
(i) Wages of attendants	75,000	
(ii) Departmental and general works overheads	20,000	
Total Standing Charge	95,000	
Standing Charges per hour		47.50

B. Machine Expense		
(iii) Depreciation	99,000	49.50
(iv) Electricity (7 × 1,900 × 16 units) ÷ 2,000	-	106.40
(v) Chemical solution	1,00,000	50.00
(vi) Maintenance cost	1,20,000	60.00
Machine operating cost per hour (A + B)		313.40

Q15. May 2023 RTP,

SANDY Ltd. is a manufacturing company having three production departments, 'A', 'B' and 'C' and two service departments 'X' and 'Y'. The following is the budget for December 2022:

	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct material		1,60,000	3,20,000	6,40,000	3,20,000	1,60,000
Direct wages		8,00,000	3,20,000	12,80,000	1,60,000	3,20,000
Factory rent	6,40,000					
Power	4,00,000					
Depreciation	1,60,000					
Other overheads	14,40,000					
Additional information:						
Area (Sq. ft.)		800	400	800	400	800
Capital value of assets (₹) lakhs		32	64	32	16	16
Machine hours		1,600	3,200	6,400	1,600	1,600
Horse power of machines		80	64	32	24	40

Apportionment of expenses of service departments is as under:

	A	B	C	X	Y
Service Dept. 'X'	72	24	48	-	16
Service Dept. 'Y'	96	56	-	8	-

Required:

- PREPARE a statement showing distribution of overheads to various departments.
- PREPARE a statement showing re-distribution of service departments expenses to production departments using Repeated Distribution method. Also CALCULATE machine hour rate of the production departments 'A', 'B', 'C'.

Answer

i. Overhead Distribution Summary

	Basis	Total (₹)	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Direct materials	Direct	-	-	-	-	3,20,000	1,60,000
Direct wages	Direct	-	-	-	-	1,60,000	3,20,000
Factory rent	Area	6,40,000	1,60,000	80,000	1,60,000	80,000	1,60,000
(2:1:2:1:2)	H.P. ×	4,00,000	80,000	1,28,000	1,28,000	24,000	40,000
Power	Machine	1,60,000	32,000	64,000	32,000	16,000	16,000
(10:16:16:3:5)*	Hrs.						
Depreciation	Capital value of						
(2:4:2:1:1)	Assets	14,40,000	1,60,000	3,20,000	6,40,000	1,60,000	1,60,000
Other overheads							

(1:2:4:1:1)	Machine hrs.	26,40,000	4,32,000	5,92,000	9,60,000	7,60,000	8,56,000
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*{(1600×80) : (3200×64) : (6400×32) : (1600×24) : (1600×40)}

(1,28,000 : 2,04,800 : 2,04,800 : 38,400 : 64,000)

(10:16:16:3:5)

ii. Redistribution of service department's expense using repeated distribution Method:

	A (₹)	B (₹)	C (₹)	X (₹)	Y (₹)
Total overheads	4,32,000	5,92,000	9,60,000	7,60,000	8,56,000
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	3,42,000	1,14,000	2,28,000	-	76,000
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	5,59,200	3,26,200	-	7,60,000	-
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	20,970	6,990	13,980	46,600	9,32,000
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	2,796	1,631	-	-46,600	4,660
Dept. X overhead apportioned in the ratio (72:24:48: —:16)	105	35	70	233	-4,660
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)	15	8	-	-233	23
Dept. X overhead apportioned in the ratio (72:24:48: —:16)				-	-23
Dept. Y overhead apportioned in the ratio (96:56: —:8: —)					
	13,57,086	10,40,864	12,02,050	-	-

Calculation of machine hour rate

		A	B	C
A	Total overheads (₹)	13,57,086	10,40,864	12,02,050
B	Machine hour	1,600	3,200	6,400
C	Machine hour rate (₹) [A ÷ B]	848.18	325.27	187.82

Q16. Nov 2022 RTP,

SE Limited manufactures two products- A and B. The company had budgeted factory overheads amounting to ₹ 36,72,000 and budgeted direct labour hour of 1,80,000 hours. The company uses pre-determined overhead recovery rate for product costing purposes. The department-wise break-up of the overheads and direct labour hours were as follows:

Particulars	Budgeted overheads	Budgeted direct labour hours	Rate per direct labour hour
Department Pie	₹ 25,92,000	90,000 hours	₹ 28.80
Department Qui	₹ 10,80,000	90,000 hours	₹ 12.00
Total	₹ 36,72,000	1,80,000 hours	

Additional Information:

Each unit of product A requires 4 hours in department Pie and 1 hour in department Qui. Also, each unit of product B requires 1 hour in department Pie and 4 hours in department Qui.

This was the first year of the company's operation. There was no WIP at the end of the year. However, 1,800 and 5,400 units of Products A and B were on hand at the end of the year.

The budgeted activity has been attained by the company. You are required to:

- DETERMINE the production and sales quantities of both products 'A' and 'B' for the above year.
- ASCERTAIN the effect of using a pre-determined overhead rate instead of department-wise overhead rates on the company's income due to its effect on stock value.

- iii. CALCULATE the difference in the selling price due to the use of pre-determined overhead rate instead of using department-wise overhead rates. Assume that the direct costs (material and labour costs) per unit of products A and B were ₹ 25 and ₹ 40 respectively and the selling price is fixed by adding 40% over and above these costs to cover profit and selling and administration overhead.

Answer

(i) Computation of production and sales quantities:

The products processing times are as under –

Product	A	B	Total
Department Pie	4hours	1hour	90,000hours
Department Qui	1hour	4hours	90,000hours

Let X and Y be the number of units (production quantities) of the two products.

Converting these into equations, we have –

$$4X + Y = 90,000 \text{ \& } X + 4Y = 90,000$$

$$X + 4Y = 90,000$$

Solving the above, we get X = 18,000; Y = 18,000

Hence, the Production and Sales Quantities are determined as under –

Product	Production Quantity	Closing Stock (Given)	Sales Quantity (Balancing Figure)
A	18,000 units	1,800 units	16,200 units
B	18,000 units	5,400 units	12,600 units

(ii) Effect of using pre-determined rate of overheads on the company's profit

Product	Closing Stock	Quantity Overhead included using pre-determined rate	Overhead included using department rate	Difference in overhead in closing stock value / Effect on closing stock value
A	1,800 units	1,800 x 5 hours x ₹ 20.40 = ₹ 1,83,600	Pie = 1,800 units x 4 hours x ₹ 28.80 = ₹ 2,07,360 Qui = 1,800 units x 1 hour x ₹ 12 = ₹ 21,600	(-) ₹ 45,360
B	5,400 units	5,400 x 5 hours x ₹ 20.40 = ₹ 5,50,800	Pie = 5,400 units x 1 hour x ₹ 28.80 = ₹ 1,55,520 Qui = 5,400 units x 4 hours x ₹ 12 = ₹ 2,59,200	(+) ₹ 1,36,080
Total		₹ 7,34,400	₹ 6,43,680	(+) ₹ 90,720

Use of pre-determined overhead rate has resulted in over valuation of stock by ₹ 90,720 due to which the company's income would be affected (increase) by ₹ 90,720. Profit would be affected only to the extent of Overhead contained in closing finished goods and closing WIP, if any.

(iii) Effect of using pre-determined on the products' selling prices

Particulars	Product A	Product B
Selling Price per unit if pre-determined overhead rate is used	₹ 177.80	₹ 198.80
	₹ 213.08	₹ 163.52
Selling Price per unit if department wise rate is used	₹ 35.28	₹ 35.28

Difference	Under-Priced	Over-Priced
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Workings:

(1) **Pre-determined overhead recovery rate** = $\frac{\text{₹ } 36,72,000}{1,80,000 \text{ hours}} = \text{₹ } 20.40 \text{ per direct labour hour}$

(2) **If pre-determined recovery rate is used**

Particulars	Product A in ₹	Product B in ₹
Materials & Labour	25.00	40.00
Add: Production Overhead	102.00	102.00
A = 5 hours x ₹ 20.40 per hour		
B = 5 hours x ₹ 20.40 per hour		
Cost of production	127.00	142.00
Add: 40% of margin	50.80	56.80
	177.80	198.50

(3) **If department-wise recovery rate is used**

Particulars	Product A in ₹	Product B in ₹
Materials & Labour	25.00	40.00
Add: Production Overhead	127.20	76.80
A = Pie = 4 hours x ₹ 28.80		
Qui = 1 hour x ₹ 12		
B = Pie = 1 hour x ₹ 28.80		
Qui = 4 hours x ₹ 12		
Cost of production	152.20	116.80
Add: 40% of margin	60.88	46.72
Selling Price per unit	213.08	163.52

Q17. May 2022 RTP,

Pretz Ltd. is a manufacturing company having two production departments, 'A' & 'B' and two service departments 'X' & 'Y'. The following is the budget for March, 2022:

	Total (₹)	A (₹)	B (₹)	X (₹)	Y (₹)
Direct material		2,00,000	4,00,000	4,00,000	2,00,000
Direct wages		10,00,000	4,00,000	2,00,000	4,00,000
Factory rent	9,00,000				
Power (Machine)	5,10,000				
Depreciation	2,00,000				
General Lighting	3,00,000				
Perquisites	4,00,000				

Additional information:

Area (Sq. ft.)		500	250	250	500
Capital value of assets (₹ lakhs)		40	80	20	20
Light Points		10	20	10	10
Machine hours		1,000	2,000	1,000	1,000
Horse power of machines		50	40	15	25

A technical assessment of the apportionment of expenses of service departments is as under:

	A	B	X	Y
Service Dept. 'X' (%)	55	25	-	20
Service Dept. 'Y' (%)	60	35	5	-

You are required to:

- PREPARE a statement showing distribution of overheads to various departments.
- PREPARE a statement showing re-distribution of service departments expenses to production departments using-

- Simultaneous equation method
- Trial and error method
- Repeated Distribution Method.

Answer

a. Primary Distribution of Overheads

	Basis	Total (₹)	A (₹)	B (₹)	X (₹)	Y (₹)
Direct materials	Direct	6,00,000	-	-	4,00,000	2,00,000
Direct wages	Direct	6,00,000	-	-	2,00,000	4,00,000
Factory rent(2:1:1:2)	Area	9,00,000	3,00,000	1,50,000	1,50,000	3,00,000
Power (Machine) (10:16:3:5)*	H.P. × Machine Hrs.	5,10,000	1,50,000	2,40,000	45,000	75,000
Depreciation (2:4:1:1)	Capital value	2,00,000	50,000	1,00,000	25,000	25,000
General Lighting (1:2:1:1)	Light Points	3,00,000	60,000	1,20,000	60,000	60,000
Perquisites (5:2:1:2)	Direct Wages	4,00,000	2,00,000	80,000	40,000	80,000
		35,10,000	7,60,000	6,90,000	9,20,000	11,40,000
		0	0	0	0	0

*{(1000×50) : (2000×40) : (1000×15) : (1000×25)}

(50000 : 80000 : 15000 : 25000)

(10 : 16 : 3 : 5)

b. (i) Redistribution of Service Department's expenses using 'Simultaneous equation method'

$$X = 9,20,000 + 0.05 Y$$

Y = 11,40,000 + 0.20 X Substituting the value of X,

$$Y = 11,40,000 + 0.20 (9,20,000 + 0.05 Y)$$

$$= 13,24,000 + 0.01 Y$$

$$Y - 0.01 Y = 13,24,000$$

$$Y = \frac{13,24,000}{0.99}$$

$$Y = ₹ 13,37,374$$

The total expense of Y is ₹ 13,37,374 and that of X is ₹ 9,86,869 i.e., ₹ 9,20,000 + (0.05 × ₹ 13,37,374).

Distribution of Service departments' overheads to Production departments

	Production Departments	
	A (₹)	B (₹)
Overhead as per primary distribution	7,60,000	6,90,000
Dept- X (55% and 25% of ₹ 9,86,869)	5,42,778	2,46,717
Dept- Y (60% and 35% of ₹ 13,37,374)	8,02,424	4,68,081
	21,05,202	14,04,798

(ii) Redistribution of Service Department's expenses using 'Trial and Error Method':

	Service Departments	
	X (₹)	Y (₹)
Overheads as per primary distribution	9,20,000	11,40,000
(i) Apportionment of Dept-X expenses to Dept-Y (20% of ₹ 9,20,000)	--	1,84,000
	--	13,24,000
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of ₹ 13,24,000)	66,200	--

(i) Apportionment of Dept-X expenses to Dept-Y (20% of ₹ 66,200)	-- 662	13,240 --
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of ₹ 13,240)		
(i) Apportionment of Dept-X expenses to Dept-Y (20% of ₹ 662)		132
(ii) Apportionment of Dept-Y expenses to Dept-X (5% of ₹ 132)	7	
Total	9,86,869	13,37,372

Distribution of Service departments' overheads to Production departments

	Production Departments	
	A (₹)	B (₹)
Overhead as per primary distribution	7,60,000	6,90,000
Dept- X (55% and 25% of ₹ 9,86,869)	5,42,778	2,46,717
Dept- Y (60% and 35% of ₹ 13,37,374)	8,02,423	4,68,080
	21,05,201	14,04,797

(iii) Redistribution of Service Department's expenses using 'repeated distribution method':

	A (₹)	B (₹)	X (₹)	Y (₹)
Overhead as per primary distribution	7,60,000	6,90,000	9,20,000	11,40,000
Dept. X overhead apportioned in the ratio (55:25:—:20)	5,06,000	2,30,000	(9,20,000)	1,84,000
Dept. Y overhead apportioned in the ratio (60:35:5: —)	7,94,400	4,63,400	66,200	(13,24,000)
Dept. X overhead apportioned in the ratio (55:25:—:20)	36,410	16,550	(66,200)	13,240
Dept. Y overhead apportioned in the ratio (60:35:5: —)	7,944	4,634	662	(13,240)
Dept. X overhead apportioned in the ratio (55:25:—:20)	364	166	(662)	132
Dept. Y overhead apportioned in the ratio (60:35:5: —)	79	46	7	(132)
Dept. X overhead apportioned in the ratio (55:25:—:20)	4	3	(7)	-
	21,05,201	14,04,799	-	-

Q18. Nov 2021 RTP,

PL Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2. The following data are extracted from the records of the company for the month of October, 2020:

(₹)

Rent and rates 12,50,000

General lighting	1,50,000
Indirect Wages	3,75,000
Power	5,00,000
Depreciation on machinery	10,00,000
Insurance of machinery	4,00,000
Other Information:	

	P1	P2	P3	S1	S2
Direct wages (₹)	7,50,000	5,00,000	7,50,000	3,75,000	1,25,000
Horse Power of Machines used	60	30	50	10	-
Cost of machinery (₹)	60,00,000	80,00,000	1,00,00,000	5,00,000	5,00,000
Floor space (Sq. ft)	2,000	2,500	3,000	2,000	500
Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	-	-

Expenses of the service departments S1 and S2 are reapportioned as below:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

Required:

- COMPUTE overhead absorption rate per production hour of each production department.
- DETERMINE the total cost of product X which is processed for manufacture in department P1, P2 and P3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is ₹ 12,500 and direct labour cost is ₹ 7,500.

Answer

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)	S1 (₹)	S2 (₹)
Direct wages	Actual	5,00,000	--	--	--	3,75,000	1,25,000
Rent and Rates	Floor area (4 : 5 : 6 : 4 : 1)	12,50,000	2,50,000	3,12,500	3,75,000	2,50,000	62,500
General lighting	Light points (2 : 3 : 4 : 2 : 1)	1,50,000	25,000	37,500	50,000	25,000	12,500
Indirect wages	Direct wages (6 : 4 : 6 : 3 : 1)	3,75,000	1,12,500	75,000	1,12,500	56,250	18,750
Power	Horse Power of machines used (6 : 3 : 5 : 1)	5,00,000	2,00,000	1,00,000	1,66,667	33,333	-
Depreciation of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	10,00,000	2,40,000	3,20,000	4,00,000	20,000	20,000
Insurance of machinery	Value of machinery	4,00,000	96,000	1,28,000	1,60,000	8,000	8,000

	(12 : 16 : 20 : 1 : 1)						
		41,75,00 0	9,23,50 0	9,73,00 0	12,64,16 7	7,67,58 3	2,46,75 0

Overheads of service cost centres

Let S1 be the overhead of service cost centre S1 and S2 be the overhead of service cost centre S2.

$$S1 = 7,67,583 + 0.10 S2$$

$$S2 = 2,46,750 + 0.10 S1$$

Substituting the value of S2 in S1 we get

$$S1 = 7,67,583 + 0.10 (2,46,750 + 0.10 S1)$$

$$S1 = 7,67,583 + 24,675 + 0.01 S1$$

$$0.99 S1 = 7,92,258$$

$$\square S1 = ₹ 8,00,260$$

$$\square S2 = 2,46,750 + 0.10 \times 8,00,260$$

$$= ₹ 3,26,776$$

Secondary Distribution Summary

Particulars	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)
Allocated and Apportioned over-heads as per primary distribution	31,60,667	9,23,500	9,73,000	12,64,167
S1	8,00,260	1,60,052	2,40,078	3,20,104
S2	3,26,776	1,30,710	65,355	98,033
		12,14,262	12,78,433	16,82,304

i. Overhead rate per hour

	P1	P2	P3
Total overheads cost (₹)	12,14,262	12,78,433	16,82,304
Production hours worked	6,225	4,050	4,100
Rate per hour (₹)	195.06	315.67	410.32

ii. Cost of Product X

	(₹)
Direct material	12,500.00
Direct labour	7,500.00
Prime cost	20,000.00
Production on overheads	
P1 5 hours $\square ₹ 195.06 = 975.30$	
P2 3 hours $\square ₹ 315.67 = 947.01$	
P3 4 hours $\square ₹ 410.32 = 1,641.28$	
	3,563.59
Factory cost	23,563.59

Q19. May 2021 RTP,

A manufacturing unit has purchased and installed a new machine at a cost of ₹ 24,90,000 to its fleet of 5 existing machines. The new machine has an estimated life of 12 years and is expected to realise ₹ 90,000 as scrap value at the end of its working life.

Other relevant data are as follows:

- Budgeted working hours are 2,496 based on 8 hours per day for 312 days. Plant maintenance work is carried out on weekends when production is totally halted. The estimated maintenance hours are 416. During the production hours machine set-up and change over works are carried out. During the set-up hours no production is done. A total 312 hours are required for machine set-ups and change overs.
- An estimated cost of maintenance of the machine is ₹ 2,40,000 p.a.
- The machine requires a component to be replaced every week at a cost of ₹ 2,400.

- iv. There are three operators to control the operations of all the 6 machines. Each operator is paid ₹ 30,000 per month plus 20% fringe benefits.
- v. Electricity: During the production hours including set-up hours, the machine consumes 60 units per hour. During the maintenance the machine consumes only 10 units per hour. Rate of electricity per unit of consumption is ₹ 6.
- vi. Departmental and general works overhead allocated to the operation during last year was ₹ 5,00,000. During the current year it is estimated to increase by 10%.

Required:

COMPUTE the machine hour rate.

Answer

Working Note:

1. Effective machine hour:

= Budgeted working hours – Machine Set-up time

= 2,496 hours – 312 hours = 2,184 hours.

2. Operators' salary per annum:

Salary (3 operators × ₹30,000 × 12 months) ₹ 10,80,000

Add: Fringe benefits (20% of ₹10,80,000) ₹ 2,16,000

₹ 12,96,000

3. Depreciation per annum

$\frac{₹24,90,000 - ₹90,000}{12\text{years}} = ₹ 2,00,000$

Computation of Machine hour Rate

	Amount p.a. (₹)	Amount per hour (₹)
<u>Standing charges</u>		
Operators' Salary ($\frac{12,96,000}{6\text{machines}} \times \frac{1}{2,184\text{hours}}$)	12,96,000	98.90
Departmental and general overheads: (₹ 5,00,000 × 110%) ($\frac{₹5,50,000}{6\text{machines}} \times \frac{1}{2,184\text{hours}}$)	5,50,000	41.97
(A)	18,46,000	140.87
<u>Machine Expenses</u>		
Depreciation ($\frac{2,00,000}{2,184\text{hours}}$)	2,00,000	91.58
<u>Electricity:</u>		
During working hours (2,496 hours × 60 units × ₹6)	8,98,560	411.43
During maintenance hours (416 hours × 10 units × ₹6)	24,960	11.43
Component replacement cost (2,400 × 52 weeks)	1,24,800	57.14
	2,40,000	109.89
Machine maintenance cost	14,88,320	681.47
(B)		
Machine Hour Rate (A + B)		822.34

Q20. Nov 2020 RTP,

You are given the following information of the three machines of a manufacturing department of X Ltd.:

	Preliminary estimates of expenses (per annum)			
	Total (₹)	Machines		
		A (₹)	B (₹)	C (₹)
Depreciation	2,00,000	75,000	75,000	50,000

Spare parts	1,00,000	40,000	40,000	20,000\
Power	4,00,000			
Consumable stores	80,000	30,000	25,000	25,000
Insurance of machinery	80,000			
Indirect labour	2,00,000			
Building maintenance expenses	2,00,000			
Annual interest on capital outlay	1,00,000	40,000	40,000	20,000
Monthly charge for rent and rates	20,000			
Salary of foreman (per month)	42,000			
Salary of Attendant (per month)	12,000			

(The foreman and the attendant control all the three machines and spend equal time on them.)

The following additional information is also available:

	Machines		
	A	B	C
Estimated Direct Labour Hours	1,00,000	1,50,000	1,50,000
Ratio of K.W. Rating	3	2	3
Floor space (sq. ft.)	40,000	40,000	20,000

There are 12 holidays besides Sundays in the year, of which two were on Saturdays. The manufacturing department works 8 hours in a day but Saturdays are half days. All machines work at 90% capacity throughout the year and 2% is reasonable for breakdown.

You are required to :

CALCULATE predetermined machine hour rates for the above machines after taking into consideration the following factors:

- An increase of 15% in the price of spare parts.
- An increase of 25% in the consumption of spare parts for machine 'B' & 'C' only.
- 20% general increase in wages rates. □ □ □ □ □

Answer

a. Computation of Machine Hour Rate

	Basis of apportionment	Total (₹)	Machines		
			A (₹)	B (₹)	C (₹)
(A) Standing Charges					
Insurance	Depreciation Basis (3:3:2)	80,000	30,000	30,000	20,000
Indirect Labour	Direct Labour(2:3:3)	2,40,000	60,000	90,000	90,000
Building maintenance expenses	Floor Space(2:2:1)	2,00,000	80,000	80,000	40,000
Rent and Rates	Floor Space(2:2:1)	2,40,000	96,000	96,000	48,000
Salary of foreman	Equal	5,04,000	1,68,000	1,68,000	1,68,000
Salary of attendant	Equal	1,44,000	48,000	48,000	48,000
Total standing charges		14,08,000	4,82,000	5,12,000	4,14,000
Hourly rate for standing charges			247.43	262.83	212.53
(B) Machine Expenses:					
Depreciation	Direct	2,00,000	75,000	75,000	50,000
Spare parts	Final estimates	1,32,250	46,000	57,500	28,750
Power	K.W. rating(3:2:3)	4,00,000	1,50,000	1,00,000	1,50,000
Consumable Stores	Direct	80,000	30,000	25,000	25,000
Total Machine expenses		8,12,250	3,01,000	2,57,500	2,53,750

Hourly Rate for Machine expenses			154.52	132.19	130.26
Total (A + B)		22,20,250	7,83,000	7,69,500	6,67,750
Machine Hour rate			401.95	395.02	342.79

Working Notes:

i. Calculation of effective working hours:

No. of full off-days = No. of Sunday + No. of holidays

$$= 52 + 12 = 64 \text{ days}$$

No. of half working days = 52 days - 2 holidays = 50 days

No. of full working days = 365 days - 64 days - 50 days = 251 days

Total working Hours = {(251 days × 8 hours) + (50 days × 4 hours)}

$$= 2,008 \text{ hours} + 200 = 2,208 \text{ hours.}$$

Total effective hours = Total working hours × 90% - 2% for break-down

$$= 2,208 \text{ hours} \times 90\% - 2\% (2,208 \text{ hours} \times 90\%)$$

$$= 1,987.2 \text{ hours} - 39.74 \text{ hours}$$

$$= 1947.46 \text{ or Rounded up to 1948 hours.}$$

ii. Amount of spare parts is calculated as under:

	A (₹)	B (₹)	C (₹)
Preliminary estimates	40,000	40,000	20,000
Add: Increase in price @ 15%	6,000	6,000	3,000
	46,000	46,000	23,000
Add: Increase in consumption @ 25%	-	11,500	5,750
Estimated cost	46,000	57,500	28,750

iii. Amount of Indirect Labour is calculated as under:

	(₹)
Preliminary estimates	2,00,000
Add: Increase in wages @ 20%	40,000
	2,40,000

iv. Interest on capital outlay is a finance cost, therefore it has been excluded from the cost accounts.

Q21. May 2020 RTP,

ABC Ltd. has three production departments P1, P2 and P3 and two service departments S1 and S2. The following data are extracted from the records of the company for the month of January, 2020:

(₹)

Rent and rates	6,25,000
General lighting	7,50,000
Indirect Wages	1,87,500
Power	25,00,000
Depreciation on machinery	5,00,000
Insurance of machinery	2,00,000

Other Information:

	P1	P2	P3	S1	S2
Direct wages (₹)	3,75,000	2,50,000	3,75,000	1,87,500	62,500
Horse Power of Machines used	60	30	50	10	-
Cost of machinery (₹)	30,00,000	40,00,000	50,00,000	2,50,000	2,50,000
Floor space (Sq. ft)	2,000	2,500	3,000	2,000	500

Number of light points	10	15	20	10	5
Production hours worked	6,225	4,050	4,100	-	-

Expenses of the service departments S1 and S2 are reapportioned as below:

	P1	P2	P3	S1	S2
S1	20%	30%	40%	-	10%
S2	40%	20%	30%	10%	-

Required:

- iii. COMPUTE overhead absorption rate per production hour of each production department.
- iv. DETERMINE the total cost of product X which is processed for manufacture in department P1, P2 and P3 for 5 hours, 3 hours and 4 hours respectively, given that its direct material cost is ₹ 6,250 and direct labour cost is ₹ 3,750.

Answer

Primary Distribution Summary

Item of cost	Basis of apportionment	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)	S1 (₹)	S2 (₹)
Direct wages	Actual	2,50,000	--	--	--	1,87,500	62,500
Rent and Rates	Floor area (4 : 5 : 6 : 4 : 1)	6,25,000	1,25,000	1,56,250	1,87,500	1,25,000	31,250
General lighting	Light points (2 : 3 : 4 : 2 : 1)	7,50,000	1,25,000	1,87,500	2,50,000	1,25,000	62,500
Indirect wages	Direct wages (6 : 4 : 6 : 3 : 1)	1,87,500	56,250	37,500	56,250	28,125	9,375
Power	Horse Power of machines used (6 : 3 : 5 : 1)	25,00,000	10,00,000	5,00,000	8,33,333	1,66,667	-
Depreciation of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	5,00,000	1,20,000	1,60,000	2,00,000	10,000	10,000
Insurance of machinery	Value of machinery (12 : 16 : 20 : 1 : 1)	2,00,000	48,000	64,000	80,000	4,000	4,000
		50,12,500	14,74,250	11,05,250	16,07,083	6,46,292	1,79,625

Overheads of service cost centres:

Let S1 be the overhead of service cost centre S1 and S2 be the overhead of service cost centre S2.

$$S1 = 6,46,292 + 0.10 S2$$

$$S2 = 1,79,625 + 0.10 S1$$

Substituting the value of S2 in S1 we get

$$S1 = 6,46,292 + 0.10 (1,79,625 + 0.10 S1)$$

$$S1 = 6,46,292 + 17,962.5 + 0.01 S1$$

$$0.99 S1 = 6,64,254.5$$

$$\square S1 = ₹6,70,964$$

$$\square S2 = 1,79,625 + 0.10 \times 6,70,964$$

$$= ₹2,46,721.4$$

Secondary Distribution Summary

Particulars	Total (₹)	P1 (₹)	P2 (₹)	P3 (₹)
Allocated and Apportioned over-heads	41,86,583	14,74,250	11,05,250	16,07,083

as per primary distribution				
S1	6,70,964	1,34,192.8	2,01,289.2	2,68,385.6
S2	2,46,721.4	98,688.6	49,344.3	74,016.5
		17,07,131.4	13,55,83.5	19,49,485.1

iii. Overhead rate per hour

	P1	P2	P3
Total overheads cost (₹)	17,07,131.4	13,55,83.5	19,49,485.1
Production hours worked	6,225	4,050	4,100
Rate per hour (₹)	274.24	334.79	475.48

iv. Cost of Product X

	(₹)
Direct material	6,250.00
Direct labour	3,750.00
Prime cost	10,000.00
Production on overheads	
P1 5 hours @ ₹ 274.24 = 1,371.20	
P2 3 hours @ ₹ 334.79 = 1,004.37	
P3 4 hours @ ₹ 475.48 = 1,901.92	
	4,277.49
Factory cost	14,277.49

Q22. Nov 2019 RTP,

PLR Ltd. manufactures a single product and recovers the overheads by adopting a single blanket rate based on machine hours. The budgeted production overheads of the factory for the FY 2019-20 are ₹50,40,000 and budgeted machine hours are 6,000.

For a period of first six months of the financial year 2019-20, following information were extracted from the books:

Actual production overheads ₹34,08,000

Amount included in the production overheads:

Paid as per court's order	₹4,50,000
Expenses of previous year booked in current year	₹1,00,000
Paid to workers for strike period under an award	₹4,20,000
Obsolete stores written off	₹36,000

Production and sales data of the concern for the first six months are as under:

Production:

Finished goods	1,10,000 units
Works-in-progress	
(50% complete in every respect)	80,000 units

Sale:

Finished goods	90,000 units
----------------	--------------

The actual machine hours worked during the period were 3,000 hours. It is revealed from the analysis of information that 40% of the over/under-absorption was due to defective production policies and the balance was attributable to increase in costs.

You are required:

- to determine the amount of over/ under absorption of production overheads for the period,
- to show the accounting treatment of over/ under-absorption of production overheads, and
- to apportion the over/ under-absorbed overheads over the items.

Answer

i. Amount of over/ under absorption of production overheads during the period of first six months of the year 2019-20:

	Amount(₹)	Amount (₹)

Total production overheads actually incurred during the period		34,08,000
Less: Amount paid to worker as per court order	4,50,000	
Expenses of previous year booked in the current year	1,00,000	
Wages paid for the strike period under an award	4,20,000	
Obsolete stores written off	36,000	10,06,000
		24,02,000
Less: Production overheads absorbed as per machine hour rate (3,000 hours × ₹840*)		25,20,000
Amount of over absorbed production overheads		1,18,000

*Budgeted Machine hour rate (Blanket rate) = $\frac{₹ 50,40,000}{6,000 \text{ hours}} = ₹ 840 \text{ per hour}$

ii. **Accounting treatment of over absorbed production overheads:** As, 40% of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be credited to Costing Profit and Loss Account.

Amount to be credited to Costing Profit and Loss Account

= ₹1,18,000 × 40% = ₹47,200.

Balance of over absorbed production overheads should be distributed over Works in progress, Finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = ₹1,18,000 × 60% = ₹70,800

Supplementary rate = $\frac{₹ 70,800}{1,50,000} = ₹ 0.472 \text{ per unit}$

iii. **Apportionment of over absorbed production overheads over WIP, Finished goods and Cost of sales:**

	Equivalent completed units	Amount (₹)
Work-in-Progress (80,000 units × 50% × 0.472)	40,000	18,880
Finished goods (20,000 units × 0.472)	20,000	9,440
Cost of sales (90,000 units × 0.472)	90,000	42,480
Total	1,50,000	70,800

Q23. May 2019 RTP,

The Union Ltd. has the following account balances and distribution of direct charges on 31st March, 2019.

	Total	Production Depts.		Service Depts.	
		Machine Shop	Packing	General Plant	Stores
Allocated Overheads:	(₹)	(₹)	(₹)	(₹)	(₹)
Indirect labour	29,000	8,000	6,000	4,000	11,000
Maintenance Material	9,900	3,400	1,600	2,100	2,800
Misc. supplies	5,900	1,500	2,900	900	600
Supervisor's salary	16,000	-	-	16,000	-
Cost & payroll salary	80,000	-	-	80,000	-

Overheads to be apportioned:

Power	78,000
Rent	72,000
Fuel and Heat	60,000
Insurance	12,000
Taxes	8,400
Depreciation	1,20,000

The following data were compiled by means of the factory survey made in the previous year:

	Floor Space	Radiator Section	No. employees	Investment	H.P. hours
Machine Shop	2,000 Sq.	45	20	8,00,000	3,500

	ft.				
Packing	800 Sq. ft.	90	12	2,40,000	500
General Plant	400 Sq. ft.	30	4	80,000	-
Stores & maintenance	1,600 Sq. ft.	60	8	1,60,000	1,000

Expenses charged to the stores departments are to be distributed to the other departments by the following percentages:

Machine shop 50%; Packing 20%; General Plant 30%;

General Plant overheads is distributed on the basis of number of employees.

- PREPARE an overhead distribution statement with supporting schedules to show computations and basis of distribution.
- DETERMINE the service department distribution by simultaneous equation method.

Answer

a) Overhead Distribution Statement

	Production Depts.		Service Depts.	
	Machine Shop	Packing	General Plant	Stores
Allocated Overheads:	(₹)	(₹)	(₹)	(₹)
Indirect labour	8,000	6,000	4,000	11,000
Maintenance Material	3,400	1,600	2,100	2,800
Misc. supplies	1,500	2,900	900	600
Supervisor's salary	-	-	16,000	-
Cost & payroll salary	-	-	80,000	-
Total allocated overheads	12,900	10,500	1,03,000	14,400
Add: Apportioned Overheads (As per Schedule below)	1,84,350	70,125	22,775	73,150
	1,97,250	80,625	1,25,775	87,550

Schedule of Apportionment of Overheads

Item of Cost	Basis	Production Depts.		Service Depts.	
		Machine Shop	Packing	General Plant	Stores
Power	HP hours (7 : 1 : - : 2)	54,600	7,800	--	15,600
Rent	Floor space (5 : 2 : 1 : 4)	30,000	12,000	6,000	24,000
Fuel & Heat	Radiator sec. (3 : 6 : 2 : 4)	12,000	24,000	8,000	16,000
Insurance	Investment (10 : 3 : 1 : 2)	7,500	2,250	750	1,500
Taxes	Investment (10 : 3 : 1 : 2)	5,250	1,575	525	1,050
Depreciation	Investment (10 : 3 : 1 : 2)	75,000	22,500	7,500	15,000
		1,84,350	70,125	22,775	73,150

(b) Re-distribution of Overheads of Service Departments to Production Departments:

Let, the total overheads of General Plant = 'a' and the total overheads of Stores = 'b'

$$a = 1,25,775 + 0.3b \text{(i)}$$

$$b = 87,550 + 0.2a \text{(ii)}$$

Putting the value of 'b' in equation no. (i)

$$a = 1,25,775 + 0.3 (87,550 + 0.2a)$$

$$\text{Or } a = 1,25,775 + 26,265 + 0.06a$$

$$\text{Or } 0.94a = 1,52,040 \quad \text{Or } a = 1,61,745 \text{ (appx.)}$$

Putting the value of a = 1,61,745 in equation no. (ii) to get the value of 'b'

$$b = 87,550 + 0.2 \times 1,61,745 = 1,19,899$$

Secondary Distribution Summary

Particulars	Total (₹)	Machine Shops (₹)	Packing (₹)
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Allocated and Apportioned overheads as per Primary distribution	2,77,875	1,97,250.00	80,625.00
- General Plant	1,61,745	80,872.50 $(1,61,745 \times \frac{5}{10})$	48,523.50 $(1,61,745 \times \frac{3}{10})$
- Stores	1,19,899	59,949.50 $(1,19,899 \times 50\%)$	23,979.80 $(1,19,899 \times 20\%)$
		3,38,072.00	1,53,128.30

Q24. Nov 2018 RTP,

Sree Ajeet Ltd. having fifteen different types of automatic machines furnishes information as under for 20X8-20X9

(i) Overhead expenses: Factory rent ₹ 1,80,000 (Floor area 1,00,000 sq. ft.), Heat and gas ₹ 60,000 and supervision ₹ 1,50,000.

(ii) Wages of the operator are ₹ 200 per day of 8 hours. Operator attends to one machine when it is under set up and two machines while they are under operation.

In respect of machine B (one of the above machines) the following particulars are furnished:

(i) Cost of machine ₹1,80,000, Life of machine- 10 years and scrap value at the end of its life ₹ 10,000

(ii) Annual expenses on special equipment attached to the machine are estimated as ₹ 12,000

(iii) Estimated operation time of the machine is 3,600 hours while set up time is 400 hours per annum

(iv) The machine occupies 5,000 sq. ft. of floor area.

(v) Power costs ₹ 5 per hour while machine is in operation.

ESTIMATE the comprehensive machine hour rate of machine B. Also find out machine costs to be absorbed in respect of use of machine B on the following two work orders

	Work order- 1	Work order-2
Machine set up time (Hours)	15	30
Machine operation time (Hours)	100	190

Answer

Sree Ajeet Ltd.

Statement showing comprehensive machine hour rate of Machine B

	(₹)
Standing Charges:	
Factory rent $\{(\text{₹ } 1,80,000 / 1,00,000 \text{ sq. ft.}) \times 5,000 \text{ Sq. ft.}\}$	9,000
Heat and Gas $(\text{₹ } 60,000 / 15 \text{ machines})$	4,000
Supervision $(\text{₹ } 1,50,000 / 15 \text{ machines})$	10,000
Depreciation $[(\text{₹ } 1,80,000 - \text{₹ } 10,000) / 10 \text{ years}]$	17,000
Annual expenses on special equipment	12,000
	52,000
Fixed cost per hour $(\text{₹ } 52,000 / 4,000 \text{ hrs.})$	13/-

	Set up rate Per hour (₹)	Operational rate Per hour (₹)
Fixed cost	13.00	13.00
Power	--	5.00
Wages	25.00	12.50
Comprehensive machine hour rate per hr.	38.00	30.50

Statement of 'B' machine costs to be absorbed on the two work orders

	Work order-1			Work order-2		
	Hours	Rate	Amount	Hours	Rate	Amount
		₹	₹		₹	₹
Set up time cost	15	38	570	30	38	1,140
Operation time cost	100	30.5	3,050	190	30.5	5,795
Total cost			3,620			6,935

Q25. May 2018 RTP,

PQR manufacturers – a small scale enterprise, produces a single product and has adopted a policy to recover the production overheads of the factory by adopting a single blanket rate based on machine hours. The annual budgeted production overheads for the year 2017-18 are ₹ 44,00,000 and budgeted annual machine hours are 2,20,000.

For a period of first six months of the financial year 2017-18, following information were extracted from the books:

Actual production overheads ₹ 24,88,200

Amount included in the production overheads:

Paid as per court's order ₹ 1,28,000
 Expenses of previous year booked in current year ₹ 1,200
 Paid to workers for strike period under an award ₹ 44,000
 Obsolete stores written off ₹ 6,700

Production and sales data of the concern for the first six months are as under:

Production:

Finished goods 24,000 units
 Works-in-progress
 (50% complete in every respect) 18,000 units

Sale:

Finished goods 21,600 units

The actual machine hours worked during the period were 1,16,000 hours. It is revealed from the analysis of information that ¼ of the under/ over absorption was due to defective production policies and the balance was attributable to increase/decrease in costs.

Required:

- DETERMINE the amount of under/over absorption of production overheads for the six-month period of 2017-18.
- EXAMINE the accounting treatment of under/ over absorption of production overheads, and
- CALCULATE the apportionment of the under/ over absorbed overheads over the items.

Answer

- Amount of over/ under absorption of production overheads during the period of first six months of the year 2017-18:**

	Amount (₹)	Amount (₹)
Total production overheads actually incurred during the period		24,88,200
Less: Amount paid to worker as per court order	1,28,000	
Expenses of previous year booked in the current year	1,200	
Wages paid for the strike period under an award	44,000	
Obsolete stores written off	6,700	(1,79,900)
		23,08,300
Less: Production overheads absorbed as per machine hour rate (1,16,000 hours × ₹20*)		23,20,000
Amount of over absorbed production overheads		11,700

*Budgeted Machine hour rate (Blanket rate) = $\frac{₹ 44,00,000}{2,20,000 \text{ hours}} = ₹ 20 \text{ per hour}$

- ii. **Accounting treatment of over absorbed production overheads:** As, one fourth of the over absorbed overheads were due to defective production policies, this being abnormal, hence should be credited to Costing Profit and Loss Account.

Amount to be credited to Costing Profit and Loss Account

$$= ₹11,700 \times 1/4 = ₹8,775.$$

Balance of over absorbed production overheads should be distributed over Works in progress, Finished goods and Cost of sales by applying supplementary rate*.

$$\text{Amount to be distributed} = ₹11,700 \times 3/4 = ₹8,775$$

$$\text{Supplementary rate} = \frac{₹8,775}{2,20,000 \text{ hours}} = ₹0.2659 \text{ per unit}$$

- iii. **Apportionment of over absorbed production overheads over WIP, Finished goods and Cost of sales:**

	Equivalent completed units	Amount (₹)
Work-in-Progress (18,000 units × 50% × ₹0.2659)	9,000	2,393
Finished goods (2,400 units × ₹0.2659)	2,400	638
Cost of sales (21,600 units × ₹0.2659)	21,600	5,744
Total	33,000	8,775

ACTIVITY BASED COSTING
Past Exams and RTP Questions Compiler

Q1. May 2024, 8 marks

Luxury Designer Pvt. Ltd. is a manufacturing company, which manufactures readymade designer shirts. It has four customers: two wholesale category customers and two retail category customers. It has developed the following Activity- Based Costing system:

Activity	Cost Driver Rate (₹)
Order Processing	1,260 per purchase order
Customer Visits	1,500 per customer visit
Regular Delivery	30 per delivery Km. travelled
Expedited Delivery	4,490 per expedited delivery

List selling price per shirt is ₹ 1,000 and average cost per shirt is ₹ 600. CEO of Luxury Designer Pvt. Ltd. wants to evaluate the profitability of each of the four customers for the year 2023, to explore opportunities for increasing profitability of his Company in the next year 2024. The following data in context of four customers are available for 2023:

	Wholesale Customers		Retail Customers	
	WC-1	WC-2	RC-1	RC-2
Number of Purchase orders	50	65	224	245
Number of Customer visits	10	13	25	22
Regular Deliveries	46	52	175	198
Kilometers travelled per delivery	20	15	10	25
Expedited Deliveries	5	16	50	62
Average Number of Shirts per Shirt	215	110	18	15
Average Selling Price per Shirt	₹ 700	₹ 800	₹ 900	₹ 950

You are required to:

Calculate the customer-level operating income and operating income as a % of revenues in 2023 and rank them on the basis of relative profitability.

Answer:

Working note:

Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

	Wholesale Category Customers		Retail Category Customers	
	WC-1	WC-2	RC-1	RC-2
Number of shirtssold (a)	10,750 (215x50)	7,150 (110x65)	4,032 (18x224)	3,675 (15x245)
Revenues (at listedprice) (₹): (b) {(a) × ₹1,000}	1,07,50,000	71,50,000	40,32,000	36,75,000
Discount (₹): (c) {(a) × Discount pershirt}	32,25,000	14,30,000	4,03,200	1,83,750
Cost of shirts (₹) : (d) {(a) × ₹600}	64,50,000	42,90,000	24,19,200	22,05,000
Order taking costs(₹):	63,000	81,900	2,82,240	3,08,700

(No. of purchase × ₹1,260)				
Customer visits costs (₹) (No. of customer visits × ₹ 1,500)	15,000	19,500	37,500	33,000
Delivery vehicles travel costs (₹) (Kms travelled by delivery vehicles × ₹ 30 per km.)	27,600	23,400	52,500	1,48,500
Cost of expediting deliveries (₹) {No. of expedited deliveries × ₹ 4,490}	22,450	71,840	2,24,500	2,78,380
Total cost of customer level operating activities (₹)	1,28,050	1,96,640	5,96,740	7,68,580

Computation of Customer level operating income

	Wholesale Category Customers		Retail Category Customers	
	WC-1	WC-2	RC-1	RC-2
Revenues (At list price) (Refer to workingnote)	1,07,50,000	71,50,000	40,32,000	36,75,000
Less: Discount (Refer to workingnote)	32,25,000	14,30,000	4,03,200	1,83,750
Revenue (At actual price)	75,25,000	57,20,000	36,28,800	34,91,250
Less: Cost of shirts (Refer to working note)	64,50,000	42,90,000	24,19,200	22,05,000
Gross margin	10,75,000	14,30,000	12,09,600	12,86,250
Less: Customer level operating activities costs (Refer to working note)	1,28,050	1,96,640	5,96,740	7,68,580
Customer level operating income	9,46,950	12,33,360	6,12,860	5,17,670
Operating income as a % of revenues	12.584%	21.562%	16.889%	14.828%
Rank	IV	I	II	III

Q2. Nov 2023, 10 marks

JH Plastics Limited manufactures three products S, M and L. To date, simple traditional absorption costing system has been used to allocate overheads to products. Total production overheads are allocated on the basis of machine hours. The machine hour rate for allocating production overheads is ₹ 240 per machine hour under the traditional absorption costing

system. Selling prices are calculated by adding mark up of 40% of the product cost. Information related to products for the most recent year is as under:

	Products		
	S	M	L
Units produced and sold	7,500	12,500	9,000
Direct material cost per unit (₹)	158	179	250
Direct labour cost per unit (₹)	40	45	60
Machine hours per unit	0.30	0.45	0.50
Number of Machine setups	120	120	160
Number of purchase orders	90	135	125
Number of inspections	100	160	140

The management wishes to introduce activity-based method (ABC) system of attributing production overheads to products and has identified major cost pools for production overheads and their associated cost drivers as follows:

Cost pool	Amount	Cost driver
Purchasing Department Cost	₹ 7,00,000	Number of Purchase orders
Machine setup Cost	₹ 9,00,000	Number of Machine setups
Quality Control Cost	₹ 6,56,000	Number of inspections
Machining Cost	₹ 5,64,000	Machine hours

- (i) Calculate the total cost per unit and selling price per unit for each of the three products using:
 - (a) The traditional costing approach currently used by JH Plastics Limited;
 - (b) Activity based costing (ABC) approach.
- (ii) Calculate the difference in selling price per unit as per (a) and (b) above and show which product is under-priced or over-priced.

Answer:

(i)

- (a) Statement showing 'Cost per unit & Selling price per unit – Traditional Method'.

Particular	Products		
	S (₹)	M (₹)	L (₹)
Direct material cost per unit	158	179	250
Direct labour cost per unit	40	45	60
Production overhead @ ₹ 240per machine hour	72 (₹ 240 x 0.3)	96 (₹ 240 x 0.4)	120 (₹ 240 x 0.5)
Cost per unit	270	320	430
Add: Profit @ 40%	108	128	172
Selling price per unit	378	448	602

- (b) Statement showing 'Cost per unit & Selling price per unit – Activity Based Costing'.

Particular	Activity Drivers	Total Amount(₹)	Products		
			S	M	L
Production (units)	-	-	7500	12500	9000
Machine hours	-	-	2250 (7500 x 0.3)	5000 (12500 x 0.4)	4500 (9000 x 0.5)
			(₹)	(₹)	(₹)
Direct material costper unit			158	179	250

(i)					
Direct labour cost per unit (ii)			40	45	60
Overheads					
Purchasing department cost (90:135:125)	Number of purchase orders	7,00,000	1,80,000	2,70,000	2,50,000
Machine setup cost (120:120:160)	Number of machine setups	9,00,000	2,70,000	2,70,000	3,60,000
Quality control cost (100:160:140)	Number of inspections	6,56,000	1,64,000	2,62,400	2,29,600
Machining cost (225:500:450)	Machine hours	5,64,000	1,08,000	2,40,000	2,16,000
Total Overhead			7,22,000	10,42,400	10,55,600
Overhead Cost per unit (iii)			96.27	83.39	117.29
Total Cost per unit (i+ii+iii)			294.27	307.39	427.29
Add: Profit @ 40%			117.71	122.96	170.92
Selling price per unit			411.98	430.35	598.21

Note: The question may also be solved by calculating cost driver rate & allocating various cost based on cost driver rate. However, there will be no change in any of the answer.

Particular	Products		
	S (₹)	M (₹)	L (₹)
Selling price per unit as per Traditional Costing	378	448	602
Selling price per unit as per Activity Based Costing	411.98	430.35	598.21
Difference	(33.98)	17.65	3.79

Product S is underpriced while product M and L is overpriced using Traditional costing approach.

Q3. May 2023, 5 marks

What is meant by Activity Based Management (ABM) and discuss how Activity Based Management can be used in the business?

Answer:

Meaning of Activity Based Management (ABM)

The term Activity based management (ABM) is used to describe the cost management application of ABC. The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers. ABM utilizes cost information gathered through ABC.

Activity based management can be used in the following ways:

- Cost Reduction:** ABM helps the organisation to identify costs against activities and to find opportunities to streamline or reduce the costs or eliminate the entire activity, especially if there is no value added.
- Business Process Re-engineering:** Business process re-engineering involves examining business processes and making substantial changes to how organisation currently operates. ABM is a powerful tool for measuring business performance, determining the cost of business output and is used as a means of identifying opportunities to improve process efficiency and effectiveness.
- Benchmarking:** Benchmarking is a process of comparing of ABC-derived activity costs of one segment of company with those of other segments. It requires uniformity in the definition of activities and measurement of their costs.

- (iv) Performance Measurement: Many organisations are now focusing on activity performance as a means of facing competitors and managing costs by monitoring the efficiency and effectiveness of activities.

Q4. May 2023, 5 marks

Beta Limited produces 50,000 Units, 45,000 Units and 62,000 Units of product 'A', 'B' and 'C' respectively. At present the company follows absorption costing method and absorbs overhead on the basis of direct labour hours. Now, the company wants to adopt Activity Based Costing. The information provided by Beta Limited is follows:

	Product A	Product B	Product C
Floor Space Occupied	5,000 Sq.Ft.	4,500 Sq.Ft.	6,200 Sq.Ft.
Direct Labour Hours	7,500 Hours	7,200 Hours	7,800 Hours
Direct Machine Hours	6,000 Hours	4,500 Hours	4,650 Hours
Power consumption	32%	28%	40%

Overhead for year are as follows:

	₹
Rent & Taxes	8,63,500
Electricity Expenses	10,66,475
Indirect labour	13,16,250
Repair & Maintenance	<u>1,28,775</u>
	33,75,000

Required:

- Calculate the overhead rate per labour hour under Absorption Costing.
- Prepare a cost statement showing overhead cost per unit for each product - 'A', 'B' and 'C' as per Activity based Costing.

Answer:

- Calculation of Overhead rate per hour
Total Overheads / Total hours
 $33,75,000 / 22,500 = ₹ 150$ per hour
- Statement showing overhead cost per unit as per Activity Based Costing

Overheads	Cost Driver	Total	Product		
			A	B	C
		₹	₹	₹	₹
Rent & Taxes	Floor space (50:45:62)	8,63,500	2,75,000	2,47,500	3,41,000
Electricity	Power Consumption (32:28:40)	10,66,475	3,41,272	2,98,613	4,26,590
Indirect labour	Labour hours (75:72:78)	13,16,250	4,38,750	4,21,200	4,56,300
Repair & Maintenance	Machine hours (600:450:465)	1,28,775	51,000	38,250	39,525
Total Cost		33,75,000	11,06,022	10,05,563	12,63,415
Units			50,000	45,000	62,000
Cost per Unit			22.12	22.35	20.38

Q5. Nov 2022, 4 marks

XYZ Ltd. is engaged in manufacturing two products- Express Coffee and Instant Coffee. It furnishes the following data for a year:

Product	Actual Output (units)	Total Machine hours	Total Number of Purchase orders	Total Number of set ups
Express Coffee	5,000	20,000	160	20
Instant Coffee	60,000	1,20,000	384	44

The annual overheads are as under:

Particulars	₹
Machine Processing costs	7,00,000
Set up related costs	7,68,000
Purchase related costs	6,80,000

You are required to:

- Compute the costs allocated to each product – Express Coffee and Instant Coffee From each activity on the basis of Activity- Based Costing (ABC) method.
- Find out the overhead cost per unit of each product – Express coffee and Instant Coffee based on (i) above.

Answer

(i) Estimation of Cost-Driver rate

Activity	Overhead cost	Cost-driver level	Cost driver rate
Machine processing	7,00,000	1,40,000 Machine hours	5
Set up Costs	7,68,000	64 Number of set up	12,000
Purchase related Costs	6,80,000	544 Number of purchase order	1250

Cost Allocation under Activity based Costing

Overhead Cost		
Machine processing (Cost Driver rate - ₹ 5) (or 20,000:1,20,000)	$5 \times 20,000$ = 1,00,000	$5 \times 1,20,000$ = 6,00,000
Set up Costs (Cost Driver rate - ₹12,000)) (or 20:44)	$12,000 \times 20$ = 2,40,000	$12,000 \times 44$ = 5,28,000
Purchase related costs(Cost Driver rate - ₹1250) (or 160:384)	$1,250 \times 160$ = 2,00,00	$1,250 \times 384$ = 4,80,000
Total overhead cos	5,40,000	16,08,000

(ii) Overhead Cost per unit

Per unit Overhead cost	(₹)	(₹)
5,40,000 /5,000	108	
16,08,000/60,000		26.80

Q6. May 2022, 10 marks

Star Limited manufacture three products using the same production methods. A conventional product costing system is being used currently. Details of the three products for a typical period are:

Product	Labour Hrs. Per unit	Machine Hrs. Per Unit	Materials per Unit	Volume in Units
AX	1.00	2.00	35	7,500
BX	0.90	1.50	25	12,500
CX	1.50	2.50	45	25,000

Direct Labour costs ₹20 per hour and production overheads are absorbed on a machine hour basis. The overhead absorption rate for the period is ₹30 per machine hour.

Management is considering using Activity Based Costing system to ascertain the cost of the products. Further analysis shows that the total production overheads can be divided as follows:

Particulars	%
Cost relating to set-up	40
Cost relating to machinery	10
Cost relating to material handling	30
Costs relating to inspection	20

Total production overhead	100
---------------------------	-----

The following activity volumes are associated with the product line for the period as a whole. Total activities for the period:

Product	No. of set-ups	No. of movements of Material	No. of inspections
AX	350	200	200
BX	450	280	400
CX	740	675	900
Total	1540	1,155	1,500

Required:

- Calculate the cost per unit for each product using the conventional method.
- Calculate the cost per unit for each product using activity based costing method.

Answer

(i) **Statement showing "Cost per unit" using "conventional method"**

Particulars of Cost	AX (₹)	BX (₹)	CX (₹)
Direct Materials	35	25	45
Direct Labour	20	18	30
Production Overheads	60	45	75
Cost per unit	115	88	150

(ii) **Statement Showing "Cost per unit using "Activity Based Costing"**

Products	AX	BX	CX
Production (units)	7,500	12,500	25,000
	(₹)	(₹)	(₹)
Direct Materials	2,62,500	3,12,500	11,25,000
Direct Labour	1,50,000	2,25,000	7,50,000
Machine Related Costs	45 000	56,250	1,87,500

Product	AX	BX	CX
Setup Costs	2,62,500	3,37,000	5,55,000
Material handling Cost	1,50,000	2,10,000	5,06,250
Inspection Cost	77,000	1,54,000	3,46,500
Total Cost	9,47,000	12,95,250	34,70,250
Cost per unit (Total Cost +Units)	126.267	103.62	138.81

Working notes

Calculation of Total Machine hours

Particulars	AX	BX	CX
Machine hours per unit	2	1.5	2.5
Production (units)	7,500	12,500	25,000
Total Machine hours (A× B)	15,000	18,750	62,500

Total Machine hours = 96,250

Total Production overheads = 96,250 × 30 = ₹ 28,87,500

Calculation of Cost Driver Rate

Cost Pool	%	Overheads(₹)	Cost Driver(basis)	Cost Driver(Units)	Cost Driver Rate(₹)
Set up	40	11,55,000	No of set ups	1,540	750 per set up
Machine operation	10	2,88,750	Machine hours	96,250	3 per machine hour
Material Handling	30	8,66,250	No of material movement	1,155	750 material movement
Inspection	20	5,77,500	No of inspections	1,500	385 per inspection

Q7. Dec 2021, 10 marks

A Drug Store is presently selling three types of drugs namely 'Drug A', 'Drug B' and 'Drug C'. Due to some constraints, it has decided to go for only one product line of drugs. It has provided the following data for year 2020-21 for each product line:

	Drug Types		
	A	B	C
Revenues (in ₹)	74,50,000	1,11,75,000	1,86,25,000
Cost of goods sold (in ₹)	41,44,500	68,16,750	1,20,63,750
Number of purchase orders placed (in nos.)	560	810	630
Number of deliveries received	950	1,000	850
Hours of shelf-stocking time	900	1,250	2,350
Units sold (in Nos.)	1,72,500	1,50,300	1,44,500

Following additional information is also provided:

Activity	Description of activity	Total Cost (₹)	Cost-allocation base
Drug Licence fee	Drug Licence fee	5,00,000	To be distributed in ratio 2:3:5 between A,B and C
Ordering	Placing of orders for purchases	8,30,000	2,000 purchase order
Delivery	Physical delivery and receipt of foods	18,20,000	2,800 deliveries
Shelf stocking	Stocking of goods	32,40,000	4,500 hours of shelf-stocking time
Customer Support	Assistance provided to customers	28,20,000	4,70,000 units sold

You are required to:

- Calculate the operating income and operating income as a percentage (%) of revenue of each product line if:
 - All the support costs (Other than cost of goods sold) are allocated in the ratio of cost of goods sold.
 - All the support costs (Other than cost of goods sold) are allocated using activity-based costing system.
- Give your opinion about choosing the product line on the basis of operating income as a percentage (%) of revenue of each product line under both the situations as above.

Answer

Statement of Operating income and Operating income as a percentage of revenues for each product line

(When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Drug A(₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Revenues: (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
Cost of Goods sold (COGS): (B)	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Support cost (40% of COGS): (C)	16,57,800	27,26,700	48,25,500	92,10,000
Total cost: (D) = {(B) + (C)}	58,02,300	95,43,450	1,68,89,250	3,22,35,000
Operating income: E = {(A)-(D)}	16,47,700	16,31,550	17,35,750	50,15,000
Operating income as a % of revenues: (E/A) × 100)	22.12%	14.60%	9.32%	13.46%

Working notes:

- Total support cost:

	(₹)
Drug Licence Fee	5,00,000

Ordering	8,30,000
Delivery	18,20,000
Shelf stocking	32,40,000
Customer support	28,20,000
Total support cost	92,10,000

2. Percentage of support cost to cost of goods sold (COGS):

$$= \frac{\text{Total support cost}}{\text{Total cost of goods sold}} \times 100$$

$$= \frac{\text{₹ 92,10,000}}{\text{₹ 2,30,25,000}} \times 100 = 40\%$$

3. Cost for each activity cost driver:

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	8,30,000	2,000 purchase orders	₹ 415 per purchase order
Delivery	18,20,000	2,800 deliveries	₹ 650 per delivery
Shelf-stocking	32,40,000	4,500 hours	₹ 720 per stocking hour
Customer support	28,20,000	4,70,000 units sold	₹ 6 per unit sold

(b) Statement of Operating income and Operating income as a percentage of revenues for each product line (When support costs are allocated to product lines using an activity-based Costing system)

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Revenues: (A)	74,50,000	1,11,75,000	1,86,25,000	3,72,50,000
Cost & Goods sold	41,44,500	68,16,750	1,20,63,750	2,30,25,000
Drug Licence Fee	1,00,000	1,50,000	2,50,000	5,00,000
Ordering cost* (560:810:630)	2,32,400	3,36,150	2,61,450	8,30,000
Delivery cost* (950:1000:850)	6,17,500	6,50,000	5,52,500	18,20,000
Shelf stocking cost* (900:1250:2350)	6,48,000	9,00,000	16,92,000	32,40,000
Customer Support cost* (175200:150300:144500)	10,51,200	9,01,800	8,67,000	28,20,000
Total cost: (B)	67,93,600	97,54,700	1,56,86,700	3,22,35,000
Operating income C: {(A) –(B)}	6,56,400	14,20,300	29,38,300	50,15,000
Operating income as a % of Revenues	8.81%	12.71%	15.78%	13.46%

* Refer to working note 3

(ii) Comparison on the basis of operating income as per the percentage (%) of Revenue:

a) When support costs are allocated to product lines on the basis of cost of goods sold of each product

	Drug A (₹)	Drug B (₹)	Drug B (₹)	Total (₹)
Operating income as A % of revenues	22.12%	14.60%	9.32%	13.46%

On comparing the operating income as a % of revenue of each product, Drug A is the most profitable product line, though its revenue is least but with Highest units sold.

(b) When support costs are allocated to product lines using an activity -based Costing system

	Drug A (₹)	Drug B (₹)	Drug C (₹)	Total (₹)
Operating income as A % of revenues	8.81%	12.71%	15.78%	13.46%

On comparing the operating income as a % of revenue of each product, Drug C is the most profitable product line, though its unit sold is least but with highest revenue.

Q8. July 2021, 10 marks

PQR Ltd. Is engaged in the production of three products P, Q and R. The company calculates Activity Cost Rates on the basis of Cost Driver capacity which is provided as below:

Activity	Cost Driver	Cost Driver Capacity	Cost (₹)
Direct Labour hours	Labour hours	30,000 Labour hours	3,00,000
Production runs	No. of Production runs	600 Production runs	1,80,000
Quality Inspections	No. Of Inspection	8000 Inspections	2,40,000

The consumption of activities during the period is as under:

Activity / Products	P	Q	R
Direct Labour hours	10,000	8,000	6,000
Production runs	200	180	160
Quality Inspection	3,000	2,500	1,500

You are required to:

- Compute the costs allocated to each Product from each Activity.
- Calculate the cost of unused capacity for each Activity.
- A potential customer has approached the company for supply of 12,000 units of a New product. 'S' to be delivered in lots of 1500 units per quarter. This will involve an Initial design cost of ₹ 30,000 and per quarter production will involve the following:

Direct Material	₹ 18,000
Direct Labour hours	1,500 hours
No. of Production runs	15
No. of Quality Inspection	250

Prepare cost sheet segregating Direct and Indirect costs and compute the Sales value per quarter of product 'S' using ABC system considering a markup of 20% on cost.

Answer

(i) Statement of cost allocation to each product from each activity Product

	P (₹)	Q (₹)	R (₹)	Total (₹)
Direct Labour hours (Refer to working note)	1,00,000 (10,000 Labour hours × ₹10)	80,000 (8,000 Labour hours × ₹10)	60,000 (6,000 Labour hours × ₹10)	2,40,000
Production runs (Refer to working note)	60,000 (200 Production runs × ₹ 300)	54,000 (180 Production runs × ₹ 300)	48,000 (160 Production runs × ₹ 300)	1,62,000
Quality Inspections (Refer to working note)	90,000 (3,000 Inspections × ₹30)	75,000 (2,500 Inspections × ₹ 30)	45,000 (1,500 Inspections × ₹ 30)	2,10,000

Working note:

Rate per unit of cost driver

Direct Labour hours	(₹ 3,00,000/30,000 Labour hours)	₹ 10 per Labour hour
Production runs	(₹ 1,80,000/600 Production runs)	₹ 300 per Production run
Quality Inspection	(₹ 2,40,000/8,000 Inspections)	₹ 30 per Inspection

(ii) Computation of cost of unused capacity for each activity

Particulars	(₹)
Direct Labour hours [(₹ 3,00,000 – ₹ 2,40,000) or (6,000 × ₹ 10)]	60,000
Production runs [(₹ 1,80,000 – ₹ 1,62,000) or (60 × ₹ 300)]	18,000
Quality Inspection [(₹ 2,40,000 – ₹ 2,10,000) or (1,000 × ₹ 30)]	30,000
Total cost of unused capacity	1,08,000

(iii) Cost sheet and Computation of Sales value per quarter of product 'S' using ABC system

Particulars	(₹)
1500 units of product 'S' to be delivered per quarter	
Initial design cost per quarter (₹ 30,000 / 8 quarters)	3,750
Direct Material Cost	18,000
Direct Labour Cost (1,500 Labour hours × ₹ 10)	15,000
Direct Costs (A)	36,750
Set up Cost (15 Production runs × ₹ 300)	4,500
Inspection Cost (250 Inspections × ₹ 30)	7,500
Indirect Costs (B)	12,000
Total Cost (A + B)	48,750

Add: Mark-up (20% on cost)	9,750
Sale Value	58,500
Selling Price per unit 'S' (₹ 58,500/1500 units)	39

Q9. Jan 2021, 10 marks

ABC Ltd. manufactures three products X, Y and Z using the same plant and resources. It has given the following information for the year ended on 31st March, 2020:

	X	Y	Z
Production Quantity (units)			
Cost per unit:	1,200	1,440	1,968
Direct Material (₹)	90	84	176
Direct Labour (₹)	18	20	30

Budgeted direct labour rate was ₹ 4 per hour and the production overheads, shown in table below, were absorbed to products using direct labour hour rate. Company followed Absorption Costing Method. However, the company is now considering adopting Activity Based Costing Method.

Answer

	Budgeted Overheads (₹)	Cost Driver	Remarks
Material Procurement	50,000	No. of orders	No. of orders was 25 units for each product.
Set-up	40,000	No. of production Runs	All the three products are produced in production runs of 48 units.
Quality Control	28,240	No. of Inspections	Done for each production run.
Maintenance	1,28,000	Maintenance hours	Total maintenance hours were 6,400 and was allocated in the ratio of 1:1:2 between X, Y & Z.

Required:

- Calculate the total cost per unit of each product using the Absorption Costing Method.
- Calculate the total cost per unit of each product using the Activity Based Costing Method

Answer

Traditional Absorption Costing

	X	Y	Z	Total
(a) Quantity (units)	1,200	1,440	1,968	4,608
(b) Direct labour per unit (₹)	18	20	30	-
(c) Direct labour hours (a × b)/₹ 4	5,400	7,200	14,760	27,360

Overhead rate per direct labour hour:

= Budgeted overheads ÷ Budgeted labour hours

= (₹ 50,000 + ₹ 40,000 + ₹ 28,240 + ₹ 1,28,000) ÷ 27,360 hours

= ₹ 2,46,240 ÷ 27,360 hours

= ₹ 9 per direct labour hour

Unit Costs:

	X	Y	Z
Direct Costs:			
- Direct Labour (₹)	18.00	20.00	30.00
- Direct Material (₹)	90.00	84.00	176.00
Production Overhead:	40.50	45.00	67.50
(₹)	$\frac{9 \times 18}{4}$	$\frac{9 \times 20}{4}$	$\frac{9 \times 30}{4}$
	148.50	149.00	273.50
Total cost per unit (₹)			

2. Calculation of Cost-Driver level under Activity Based Costing

	X	Y	Z	Total
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Quantity (units)	1,200	1,440	1,968	-
No. of orders (to be rounded off for fraction)	48 (1200 / 25)	58 (1440 / 25)	79 (1968 / 25)	185
No. of production runs	25 (1200 / 48)	30 (1440 / 48)	41 (1968 / 48)	96
No. of Inspections (done for each production run)	25	30	41	96
Maintenance hours	1,600	1,600	3,200	6,400

Calculation of Cost-Driver rate

Activity	Budgeted Cost (₹) (a)	Cost-driver level (b)	Cost Driver rate (₹) (c) = (a) / (b)
Material procurement	50,000	185	270.27
Set-up	40,000	96	416.67
Quality control	28,240	96	294.17
Maintenance	1,28,000	6,400	20.00

Calculation of total cost of products using Activity Based Costing

Particulars	Product		
	X (₹)	Y (₹)	Z (₹)
Direct Labour	18.00	20.00	30.00
Direct Material	90.00	84.00	176.00
Prime Cost per unit (A)	108.00	104.00	206.00
Material procurement	10.81 [(48 x 270.27)/1200]	10.89 [(58 x 270.27)/1440]	10.85 [(79 x 270.27)/1968]
Set-up	8.68 [(25 x 416.67)/1200]	8.68 [(30 x 416.67)/ 1440]	8.68 [(41 x 416.67)/ 1968]
Quality control	6.13 [(25 x 294.17)/1200]	6.13 [(30 x 294.17)/ 1440]	6.13 [(41 x 294.17)/ 1968]
Maintenance	26.67 [(1,600 x 20)/1200]	22.22 [(1,600 x 20)/ 1440]	32.52 [(3,200 x 20)/ 1968]
Overhead Cost per unit (B)	52.29	47.92	58.18
Total Cost per unit (A + B)	160.29	151.92	264.18

Note: Question may also be solved assuming no. of orders for material procurement to be 25 for each product

Q10. Nov 2020, 6 marks

ABC Ltd. is engaged in production of three types of Fruit Juices:

Apple, Orange and Mixed Fruit.

The following cost data for the month of March 2020 are as under:

Particulars	Apple	Orange	Mixed Fruit
Units produced and sold	10,000	15,000	20,000
Material per unit (₹)	8	6	5
Direct Labour per unit (₹)	5	4	3
No. of Purchase Orders	34	32	14
No. of Deliveries	110	64	52
Shelf Stocking Hours	110	160	170

Overheads incurred by the company during the month are as under :

	(₹)
Ordering costs	64,000
Delivery costs	1,58,200
Shelf Stocking costs	87,560

Required:

- Calculate cost driver's rate.
- Calculate total cost of each product using Activity Based Costing.

Answer**(i) Calculation Cost-Driver's rate**

Activity	Overhead cost (₹) (A)	Cost-driver level (B)	Cost driver rate (₹) (C) = (A)/(B)
Ordering	64,000	34 + 32 + 14 = 80 no. of purchase orders	800
Delivery	1,58,200	110 + 64 + 52 = 226 no. of deliveries	700
Shelf stocking	87,560	110 + 160 + 170 = 440 shelf stocking hours	199

(ii) Calculation of total cost of products using Activity Based Costing

Particulars	Fruit Juices		
	Apple (₹)	Orange (₹)	Mixed Fruit (₹)
Material cost	80,000 (10,000 x ₹ 8)	90,000 (15,000 x ₹ 6)	1,00,000 (20,000 x ₹ 5)
Direct labour cost	50,000 (10,000 x ₹ 5)	60,000 (15,000 x ₹ 4)	60,000 (20,000 x ₹ 3)
Prime Cost (A)	1,30,000	1,50,000	1,60,000
Ordering cost	27,200 (800 x 34)	25,600 (800 x 32)	11,200 (800 x 14)
Delivery cost	77,000 (700 x 110)	44,800 (700 x 64)	36,400 (700 x 52)
Shelf stocking cost	21,890 (199 x 110)	31,840 (199 x 160)	33,830 (199 x 170)
Overhead Cost (B)	1,26,090	1,02,240	81,430
Total Cost (A + B)	2,56,090	2,52,240	2,41,430

Q11. Nov 2020, 4 marks

Describe the various levels of activities under 'ABC' methodology.

Answer**Various Level of Activities under ABC Methodology**

Level of Activities	Meaning
1. Unit level activities	These are those activities for which the consumption of resources can be identified with the number of units produced.
2. Batch level activities	Activities such as setting up of a machine or processing a purchase order are performed each time a batch of goods is produced. The cost of batch related activities varies with number of batches made but is common (or fixed) for all units within the batch.
3. Product level activities	These are the activities which are performed to support different products in product line.
4. Facilities level activities	These are the activities which cannot be directly attributed to individual products. These activities are necessary to sustain the manufacturing process and are common and joint to all products manufactured.

Q12. Nov 2019, 10 marks**Answer****Working note:**

Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:

Particular	Customers				
	A	B	C	D	E
Cases sold: (a)	9,360	14,200	62,000	38,000	9,800

Revenues (at listed price) (₹): (b) {(a) × ₹ 54}	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Discount (₹): (c) {(a) × Discount per case}	-	8,520 (14,200 cases × ₹ 0.6)	3,10,000 (62,000 cases × ₹ 5)	1,44,400 (38,000 cases × ₹ 3.80)	52,920 (9,800 cases × ₹ 5.40)
Cost of goods sold (₹): (d) {(a) × ₹ 45}	4,21,200	6,39,000	27,90,000	17,10,000	4,41,000
Customer level operating activities costs					
Order taking costs (₹): (No. of purchase × ₹ 200)	6,000	10,000	12,000	10,000	12,000
Customer visits costs (₹) (No. of customer visits × ₹ 300)	1,200	1,800	3,600	1,200	1,800
Delivery vehicles travel costs (₹) (Kms travelled by delivery vehicles × ₹ 4 per km.)	3,200	2,880	4,800	6,400	9,600
Product handling costs (₹) {(a) × ₹ 2}	18,720	28,400	1,24,000	76,000	19,600
Cost of expediting deliveries (₹) {No. of expedited deliveries × ₹ 100}	-	-	-	-	200
Total cost of customer level operating activities (₹)	29,120	43,080	1,44,400	93,600	43,200

(i) Computation of Customer level operating income

Particular	Customers				
	A(₹)	B(₹)	C(₹)	D(₹)	E(₹)
Revenues (At list price) (Refer to working note)	5,05,440	7,66,800	33,48,000	20,52,000	5,29,200
Less: Discount (Refer to working note)	-	8,520	3,10,000	1,44,400	52,920
Revenue (At actual price)	5,05,440	7,58,280	30,38,000	19,07,600	4,76,280
Less: Cost of goods sold (Refer to working note)	4,21,200	6,39,000	27,90,000	17,10,000	4,41,000
Gross margin	84,240	1,19,280	2,48,000	1,97,600	35,280
Less: Customer level operating activities costs (Refer to working note)	29,120	43,080	1,44,400	93,600	43,200
Customer level operating income	55,120	76,200	1,03,600	1,04,000	(7,920)

(ii) Comments

Customer D in comparison with Customer C: Operating income of Customer D is more than of Customer C, despite having only 61.29% (38,000 units) of the units volume sold in comparison to Customer C (62,000 units). Customer C receives a higher percent of discount i.e. 9.26% (₹ 5) while Customer D receive a discount of 7.04% (₹ 3.80). Though the gross margin of customer C (₹ 2,48,000) is more than Customer D (₹ 1,97,600) but total cost of customer level operating activities of C (₹ 1,44,400) is more in comparison to Customer D (₹ 93,600). As a result, operating income is more in case of Customer D.

Customer E in comparison with Customer A: Customer E is not profitable while Customer A is profitable. Customer E receives a discount of 10% (₹ 5.4) while Customer A doesn't receive any discount. Sales Volume of Customer A and E is almost same. However, total cost of customer level operating activities of E is far more (₹ 43,200) in comparison to Customer A (₹ 29,120). This has resulted in occurrence of loss in case of Customer E.

Q13. May 2019, 10 marks

MNO Ltd. manufactures two types of equipment, A and B and absorbs overheads on the basis of direct labour hours. The budgeted overheads and direct labour hours for the month of March 2019 are ₹ 15,00,000 and 25,000 hours respectively. The information about the company's products is as follows:

	Equipment	
	A	B
Budgeted Production Volume	3,200 units	3,850 units
Direct Material Cost	₹ 350 per unit	₹ 400 per unit
Direct Labour Cost		
A: 3 hours @ ₹ 120 per hour	₹ 360	
B: 4 hours @ ₹ 120 per hour		₹ 480

Overheads of ₹ 15,00,000 can be identified with the following three major activities:

Order Processing: ₹ 3,00,000

Machine Processing: ₹ 10,00,000

Product Inspection: ₹ 2,00,000

These activities are driven by the number of orders processed, machine hours worked and inspection hours respectively. The data relevant to these activities is as follows:

	Orders processed	Machine hours worked	Inspection hours
A	400	22,500	5,000
B	200	27,500	15,000
Total	600	50,000	20,000

Required:

- Prepare a statement showing the manufacturing cost per unit of each product using the absorption costing method assuming the budgeted manufacturing volume is attained.
- Determine cost driver rates and prepare a statement showing the manufacturing cost per unit of each product using activity based costing, assuming the budgeted manufacturing volume is attained.
- MNO Ltd.'s selling prices are based heavily on cost. By using direct labour hours as an application base, calculate the amount of cost distortion (under costed or over costed) for each equipment.

Answer

(i) Overheads application base: Direct labour hours

	Equipment	
	A (₹)	B (₹)
Direct material cost	350	400
Direct labour cost	360	480
Overheads*	180	240
	890	1,120

$$\text{*Pre-determined rate} = \frac{\text{Budgeted overheads}}{\text{Budgeted direct labour hours}} = \frac{15,00,000}{25,000} = 60$$

(ii) Estimation of Cost-Driver rate

Activity	Overhead cost	Cost-driver level	Cost driver rate
	(₹)		(₹)
Order processing	3,00,000	600 Orders processed	500
Machine processing	10,00,000	50,000 Machine hours	20
Inspection	2,00,000	15,000 Inspection hours	10

	Equipment	Equipment
	A (₹)	B (₹)
Direct material cost	350	400
Direct labour cost	360	480
Prime Cost(A)	710	880
Overhead Cost		
Order processing 400: 200	2,00,000	1,00,000
Machine processing 22,500: 27,500	4,50,000	5,50,000
Inspection 5,000: 15,000	50,000	1,50,000
Total overhead cost	7,00,000	8,00,000

(Overheads cost per unit for each overhead can also be calculated)

Per unit cost	A (₹)	B (₹)
7,00,000 / 3,200 (B)- A	218.75	
8,00,000 / 3,850 (B)- B		207.79
Unit manufacturing cost (A+B)	928.75	1,087.79

(iii) Calculation of Cost Distortion

	Equipment	Equipment
	A (₹)	B (₹)
Unit manufacturing cost-using direct labour hours as an application base	890.00	1,120.00
Unit manufacturing cost-using activity based costing	928.75	1,087.79
Cost distortion	-38.75	32.21

Q14. Nov 2018, 10 marks

M/s. HMB Limited is producing a product in 10 batches each of 15000 units in a year and incurring following overheads their on:

	Amount (₹)
Material procurement	22,50,000
Maintenance	17,30,000
Set-up	6,84,500
Quality control	5,14,800

The prime costs for the year amounted to ₹ 3,01,39,000.

The company is using currently the method of absorbing overheads on the basis of prime cost. Now it wants to shift to activity-based costing. Information relevant to Activity drivers for a year are as under:

Activity Driver	Activity Volume
No. of purchase orders	1,500
Maintenance hours	9,080
No. of set-ups	2,250
No. of inspections	2,710

The company has produced a batch of 15000 units and has incurred ₹ 26,38,700 and ₹ 3,75,200 on materials and wages respectively.

The usage of activities of the said batch are as follows:

Materials orders	48 orders
Maintenance hours	810 hours
No. of set-ups	40
No. of inspections	25

You are required to:

- find out cost of product per unit on absorption costing basis for the said batch.
- determine cost driver rate, total cost and cost per unit of output of the said batch on the basis of activity based costing.

Answer

Working Note:

$$\text{Overhead Absorption Rate} = \frac{51,79,300}{3,01,39,000} \times 100 = 17.18\%$$

(i) Cost of Product Under Absorption Costing

Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Overheads: $\frac{51,79,300}{3,01,39,000} \times 30,13,900$	5,17,930
Total Cost	35,31,830
Units	15,000
Cost per unit	235.46

(ii) Cost driver rate, total cost and cost per unit on the basis of activity-based costing method

Absorption Costing

Calculation of Cost Driver rate:

Activity	₹.	Activity Volume	Cost Driver Rate
Material	22,50,000	1,500	1,500
Procurement	17,30,000	9,080	190.53
Maintenance	6,84,500	2,250	304.22
Setup	5,14,800	2,710	189.96
Quality Control			

Calculation of total Cost and cost per unit:

Item of Cost	Amount (₹)
Material	26,38,700
Wages	3,75,200
Prime Cost	30,13,900
Material Purchase $\frac{22,50,000}{1,500} \times 48$	72,000
Maintenance $\frac{17,30,000}{9,080} \times 810$	1,54,328
Setup $\frac{6,84,500}{2,250} \times 40$	12,169
Quality Control $\frac{5,14,800}{2,710} \times 25$	4,749
Total Cost	32,57,146
Units	15,000
Cost per unit	217.14

Q15. May 2018, 10 marks

PQR Pens Ltd. manufactures two products - 'Gel Pen' and 'Ball Pen'. It furnishes the following data for the year 2017:

Product	Annual Output (Units)	Total Machine Hours	Total number of Purchase orders	Total number of set-ups
Gel Pen	5,500	24,000	240	30
Ball Pen	24,000	54,000	448	56

The annual overheads are as under:

Particulars	₹
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Volume related activity costs	4,75,020
Set up related costs	5,79,988
Purchase related costs	5,04,992

Calculate the overhead cost per unit of each Product - Gel Pen and Ball Pen on the basis of:

- Traditional method of charging overheads
- Activity based costing method and
- Find out the difference in cost per unit between both the methods.

Answer

(i) Statement Showing Overhead Cost per unit "Traditional Method"

	Gel Pen (₹)	Ball Pen (₹)
Units	5,500	24,000
Overheads (₹) (Refer to W.N.)	4,80,000 (20 x 24,000 hrs.)	10,80,000 (20 x 54,000 hrs.)
Overhead Rate per unit (₹)	87.27 (₹ 4,80,000 / 5,500 units)	45 (₹ 10,80,000 / 24,000 units)

Working Notes:

Overhead Rate per Machine Hour

$$= \frac{\text{Total Overhead incurred by the Company}}{\text{Total Machine Hours}}$$

$$= \frac{₹ 4,75,020 + 5,79,988 + 5,04,992}{24,000 \text{ hours} + 54,000 \text{ hours}}$$

$$= \frac{₹ 15,60,000}{78,000 \text{ hours}} = ₹ 20 \text{ per machine hour}$$

(ii) Statement Showing "Activity Based Overhead Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	Gel Pen (₹)	Ball Pen (₹)
Volume Related Activity Costs	Machine hours	24:54	4,75,020	1,46,160	3,28,860
Setup Related Costs	No. of Setups	30:56	5,79,988	2,02,321	3,77,667
Purchase Related Costs	No. of Purchase Orders	240:448	5,04,992	1,76,160	3,28,832
Total Cost				5,24,641	10,35,359
Output (units)				5,500	24,000
Unit Cost (Overheads)				95.39	43.13

(iii)

	Gel Pen (₹)	Ball Pen (₹)
Overheads Cost per unit (₹) (Traditional Method)	87.27	45
Overheads Cost per unit (₹) (ABC)	95.39	43.13
Difference per unit	-8.12	+1.87

(Volume related activity cost, set up related costs and purchase related cost can also be calculated under Activity Base Costing using Cost driver rate. However, there will be no changes in the final answer.)

Q16. May 2024, RTP

The sales department of A Limited is analysing the customer profitability for its Product Z. It has decided to analyse the profitability of its five new customers using activity-based costing method. It buys Product Z at ₹ 5,400 per unit and sells to retail customers at a listed price of ₹ 6,480 per unit. The data pertaining to five customers are:

	Customers				
	A	B	C	D	E
Units sold	4,500	6,000	9,500	7,500	12,750
Listed Selling Price	₹6,480	₹6,480	₹6,480	₹6,480	₹6,480
Actual Selling Price	₹6,480	₹6,372	₹5,940	₹6,264	₹5,832
Number of Purchase orders	15	25	30	25	30
Number of Customer visits	2	3	6	2	3
Number of deliveries	10	30	60	40	20
Kilometers travelled per delivery	20	6	5	10	30
Number of expedited deliveries	0	0	0	0	1

After a detailed analysis and computation, the following activities has been identified and respective cost has been calculated:

Activity	Cost Driver Rate
Order taking	₹4,500 per purchase order
Customer visits	₹ 3,600 per customer visit
Deliveries	₹ 7.50 per delivery Km travelled
Product handling	₹ 22.50 per case sold
Expedited deliveries	₹ 13,500 per expedited delivery

You are required to COMPUTE the customer-level operating income of each of five retail customers.

Answer:

Working note:

- Computation of revenues (at listed price), discount, cost of goods sold and customer level operating activities costs:**

	Customers				
	A	B	C	D	E
Units sold: (a)	4,500	6,000	9,500	7,500	12,750
Revenues (at listed price) (₹): (b) {(a) × ₹6,480}	2,91,60,000	3,88,80,000	6,15,60,000	4,86,00,000	8,26,20,000
Revenues (at listed price) (₹): (c) {(a) × Actual selling price}	2,91,60,000 (4,500 × 6,480)	3,82,32,000 (6,000 × 6,372)	5,64,30,000 (9,500 × 5,940)	4,69,80,000 (7,500 × 6,264)	7,43,58,000 (12,750 × 5,832)
Discount (₹) (d) {(b) – (c)}	0	6,48,000	51,30,000	16,20,000	82,62,000
Cost of goods sold (₹) : (e) {(a) × ₹5,400}	2,43,00,000	3,24,00,000	5,13,00,000	4,05,00,000	6,88,50,000
Customer level operating activities costs					
Order taking costs(₹): (No. of purchase orders × ₹ 4,500)	67,500	1,12,500	1,35,000	1,12,500	1,35,000
Customer visits costs (₹) (No. of customer visits × ₹ 3,600)	7,200	10,800	21,600	7,200	10,800

Delivery vehicles travel costs (₹) (Kms travelled by delivery vehicles x ₹ 7.50 per km.)	1,500	1,350	2,250	3,000	4,500
Product handling costs (₹) {(a) x ₹ 22.50}	1,01,250	1,35,000	2,13,750	1,68,750	2,86,875
Cost of expediting deliveries (₹) {No. of expedited deliveries x ₹ 13,500}	-	-	-	-	13,500
Total cost of customer level operating activities(₹)	1,77,450	2,59,650	3,72,600	2,91,450	4,50,675

Computation of Customer level operating income

	Customers				
	A	B	C	D	E
	(₹)	(₹)	(₹)	(₹)	(₹)
Revenues (At list price) (Refer to working note)	2,91,60,000	3,82,32,000	5,64,30,000	4,69,80,000	7,43,58,000
Less: Cost of goods sold (Refer to working note)	(2,43,00,000)	(3,24,00,000)	(5,13,00,000)	(4,05,00,000)	(6,88,50,000)
Gross margin	48,60,000	58,32,000	51,30,000	64,80,000	55,08,000
Less: Customer level operating activities costs (Refer to working note)	(1,77,450)	(2,59,650)	(3,72,600)	(2,91,450)	(4,50,675)
Customer level operating income	46,82,550	55,72,350	47,57,400	61,88,550	50,57,325

Q17. Nov 2023, RTP

L Limited manufactures three products P, Q and R which are similar in nature and are usually produced in production runs of 100 units. Product P and R require both machine hours and assembly hours, whereas product Q requires only machine hours. The overheads incurred by the company during the first quarter are as under:

	Rs.
Machine Department expenses	18,48,000
Assembly Department expenses	6,72,000
Setup costs	90,000
Stores receiving cost	1,20,000
Order processing and dispatch	1,80,000

Inspect and Quality control cost	36,000
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The data related to the three products during the period are as under:

	P	Q	R
Units produced and sold	15,000	12,000	18,000
Machine hours worked	30,000 hrs.	48,000 hrs.	54,000 hrs.
Assembly hours worked (direct labour hours)	15,000 hrs.	-	27,000 hrs.
Customers' orders executed (in numbers)	1,250	1,000	1,500
Number of requisitions raised on the stores	40	30	50

Prepare a statement showing details of overhead costs allocated to each product type using activity-based costing.

Answer:

Calculation of "Activity Rate"

Cost Pool	Cost (Rs.) [A]	Cost Driver [B]	Cost Driver Rate (Rs.) [C] = [A]÷[B]
Machine Department Expenses	18,48,000	Machine Hours (1,32,000 hrs.)	14.00
Assembly Department Expenses	6,72,000	Assembly Hours (42,000 hrs.)	16.00
Setup Cost	90,000	No. of Production Runs (450*)	200.00
Stores Receiving Cost	1,20,000	No. of Requisitions Raised on the Stores (120)	1,000.00
Order Processing and Dispatch	1,80,000	No. of Customers Orders Executed (3,750)	48.00
Inspection and Quality Control Cost	36,000	No. of Production Runs (450*)	80.00
Total (Rs.)	29,46,000		

*Number of Production Run is 450 (150 + 120 + 180)

Statement Showing "Overheads Allocation"

Particulars of Cost	Cost Driver	P	Q	R	Total
Machine Department Expenses	Machine Hours	4,20,000 (30,000 × Rs.14)	6,72,000 (48,000 × Rs.14)	7,56,000 (54,000 × Rs.14)	18,48,000
Assembly Department Expenses	Assembly Hours	2,40,000 (15,000 × Rs.16)	---	4,32,000 (27,000 × Rs.16)	6,72,000
Setup Cost	No. of Production Runs	30,000 (150 × Rs.200)	24,000 (120 × Rs.200)	36,000 (180 × Rs.200)	90,000
Stores Receiving Cost	No. of Requisitions Raised on the Stores	40,000 (40 × Rs.1,000)	30,000 (30 × Rs.1,000)	50,000 (50 × Rs.1,000)	1,20,000
Order Processing and Dispatch	No. of Customers Orders Executed	60,000 (1,250 × Rs.48)	48,000 (1,000 × Rs.48)	72,000 (1,500 × Rs.48)	1,80,000

Inspection and Quality Control Cost	No. of Production Runs	12,000 (150 × Rs.80)	9,600 (120 × Rs.80)	14,400 (180 × Rs.80)	36,000
Overhead (Rs.)		8,02,000	7,83,600	13,60,400	29,46,000

Q18. May 2023, RTP

Hygiene Care Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Hand Wash	Detergent Powder	Dishwasher
Direct Materials (₹ / Pu)	150	120	120
Direct Labour @₹10/ hour (₹ / Pu)	45	60	75
Production Overheads (₹ / Pu)	40	50	40
Total Cost (₹ / Pu)	235	230	235
Quantity Produced (Units)	30,000	60,000	90,000

Hygiene Care Ltd. was absorbing overheads on the basis of direct labour hours. Management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (₹)
Goods Receiving	Number of Dispatch Order	8,88,000
Inspecting and Testing costs	Number of Production Runs	26,82,000
Dispatching	Number of dispatch order	6,30,000
Storage Cost	Number of Batches of material	36,00,000

The following information is also supplied:

Details	Hand Wash	Detergent Powder	Dishwasher
Batches of material	720	780	900
Number of dispatch order	360	540	600
No. of Production Runs	1,500	2,100	2,400
Number of Dispatch Orders	600	900	1,000

Required:

CALCULATE activity-based production cost of all the three products.

Answer

1. The Total Production Overhead are 78,00,000

Items	Labour Hour	Overheads allocation on the basis of direct Labour Hour (₹)
Labour Hour Ratio	(4.5:6:7.5)	
Hand Wash	1,35,000	9,00,000
Detergent Powder	3,60,000	24,00,000
Dishwasher	6,75,000	45,00,000
Total	11,70,000	78,00,000

2. On the basis of ABC analysis this amount will be apportioned as follows:

Statement Showing "Activity Based Production Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	Hand Wash (₹)	Detergent Powder (₹)	Dish Washer (₹)
Goods Receiving	Dispatch order	06:09:10	8,88,000	2,13,120	3,19,680	3,55,200
Inspecting and Testing costs	Production Runs	05:07:08	26,82,000	6,70,500	9,38,700	10,72,800
Dispatching	Dispatch Order	06:09:10	6,30,000	1,51,200	2,26,800	2,52,000
Storage Cost	Batch of material	12:13:15	36,00,000	10,80,000	11,70,000	13,50,000

Total Activity Cost				21,14,820	26,55,180	30,30,000
Quantity Produced				30,000	60,000	90,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				195	180	195
Total				265.49	224.25	228.67

Note: This question can also be solved by using cost driver rate

Q19. Nov 2022, RTP

The profit margin of BABY Hair clips Company were over 20% of sales producing BROWN and BLACK hair clips.

During the last year, GREEN hair clips had been introduced at 10% premium in selling price after the introduction of YELLOW hair clips earlier five years back at 10/3% premium. However, the manager of the company is disheartened with the sales figure for the current financial year as follows:

Traditional Income Statement (in ₹)

	Brown	Black	Yellow	Green	Total
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Direct Labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Overhead (3 times of direct labour)	60,00,000	48,00,000	10,80,000	1,20,000	1,20,00,000
Total Operating Income	20,00,000	16,00,000	4,14,000	60,000	40,74,000
Return on Sales (in %)	13.3%	13.3%	14.8%	18.2%	13.5%

It is a known fact that customers are ready to pay premium amount for YELLOW and GREEN hairclips for their attractiveness; and the percentage returns are also high on new products.

At present, all of the Plant's indirect expenses are allocated to the products at 3 times of the direct labour expenses. However, the manager is interested in allocating indirect expenses on the basis of activity cost to reveal real earner.

He provides support expenses category-wise as follows:

Support Expenses	(₹)
Indirect Labour	40,00,000
Labour Incentives	32,00,000
Computer Systems	20,00,000
Machinery depreciation	16,00,000
Machine maintenance	8,00,000
Energy for machinery	4,00,000
Total	1,20,00,000

He provides following additional information for accomplishment of his interest:

Incentives to be allocated @ 40% of labour expenses (both direct and indirect).

Indirect labours are involved mainly in three activities. About half of indirect labour is involved in handling production runs. Another 40% is required just for the physical changeover from one color hairclip to another because YELLOW hair clips require substantial labour for preparing the machine as compared to other colour hair clips. Remaining 10% of the time is spend for maintaining records of the products in four parts.

Another amount spent on computer system of ₹ 20,00,000 is for maintenance of documents relating to production runs and record keeping of the four products. In aggregate, approx.. 80% of the amount expend is involved in the production run activity and approx.. 20% is used to keep records of the products in four parts.

Other overhead expenses i.e. machinery depreciation, machine maintenance and energy for machinery are incurred to supply machine capacity to produce all the hairclips (practical capability of 20,000 hours).

Activity Cost Drivers:

Particulars	Brown	Black	Yellow	Green	Total
Sales Volume (units)	1,00,000	80,000	18,000	2,000	2,00,000
Selling Price (₹)	150	150	155	165	
Material cost (₹)	50	50	52	55	
Machine hours per unit (Hrs)	0.10	0.10	0.10	0.10	20,000
Production runs	100	100	76	24	300
Setup time per run (Hrs)	4	1	6	4	

You are required to –

- CALCULATE operating income and operating income as per percentage of sales using activity-based costing system.
- STATE the reasons for different operating income under traditional income system and activity-based costing system.

Answer

(i) Calculation of operating income using Activity Based Costing

Calculation of Cost-Driver rate

Activity	Overhead cost (₹)	Allocation	Overhead cost (₹)	Cost-driver level	Cost driver rate (₹)
Indirect labour + 40% for incentives	56,00,000	50%	28,00,000	300 Production runs	9,333.33
		40%	22,40,000	1052* Setup hours	2,129.28
		10%	5,60,000	4 Number of parts	1,40,000
Computer Systems	20,00,000	80%	16,00,000	300 Production runs	5,333.33
		20%	4,00,000	4 Number of parts	1,00,000
Machinery depreciation	16,00,000	100%	16,00,000	20,000 Machine hours	80
Machine Maintenance	8,00,000	100%	8,00,000	20,000 Machine hours	40
Energy for Machinery	4,00,000	100%	4,00,000	20,000 Machine hours	20

* $(100 \times 4) + (100 \times 1) + (76 \times 6) + (24 \times 4)$

= $(400 + 100 + 456 + 96)$

= 1052 setup hours

Activity Based Costing

	Brown	Black	Red	Green	Total
Quantity (units)	1,00,000	80,000	18,000	2,000	2,00,000
	(₹)	(₹)	(₹)	(₹)	(₹)
Sales	1,50,00,000	1,20,00,000	27,90,000	3,30,000	3,01,20,000
Less: Material Costs	50,00,000	40,00,000	9,36,000	1,10,000	1,00,46,000
Less: Direct labour	20,00,000	16,00,000	3,60,000	40,000	40,00,000
Less: 40% incentives on direct labour	8,00,000	6,40,000	1,44,000	16,000	16,00,000
(A)	72,00,000	57,60,000	13,50,000	1,64,000	1,44,74,000
Overheads Indirect labour + incentives					
- 50% based on Production runs	9,33,333 (9,333.33 x 100)	9,33,333 (9,333.33 x 100)	7,09,334 (9,333.33 x 76)	2,24,000 (9,333.33 x 24)	28,00,000

- 40% based on Setup hours	8,51,711 (2,129.28 x 400)	2,12,928 (2,129.28 x 100)	9,70,951 (2,129.28 x 456)	2,04,410 (2,129.28 x 96)	22,40,000
- 10% based on number of parts	1,40,000 (1,40,000 x 1)	1,40,000	1,40,000	1,40,000	5,60,000
Computer Systems					
- 80% based on Production runs	5,33,333 (5,333.33 x 100)	5,33,333 (5,333.33 x 100)	4,05,334 (5,333.33 x 76)	1,28,000 (5,333.33 x 24)	16,00,000
- 20% based on number of parts	1,00,000 (1,00,000 x 1)	1,00,000	1,00,000	1,00,000	4,00,000
Machinery depreciation	8,00,000 (80 x 0.1 x 1,00,000)	6,40,000 (80 x 0.1 x 80,000)	1,44,000 (80 x 0.1 x 18,000)	16,000 (80 x 0.1 x 2,000)	16,00,000
Machine Maintenance	4,00,000 (40 x 0.1 x 1,00,000)	3,20,000 (40 x 0.1 x 80,000)	72,000 (40 x 0.1 x 18,000)	8,000 (40 x 0.1 x 2,000)	8,00,000
Energy for Machinery	2,00,000 (20 x 0.1 x 1,00,000)	1,60,000 (20 x 0.1 x 80,000)	36,000 (20 x 0.1 x 18,000)	4,000 (20 x 0.1 x 2,000)	4,00,000
Total Overheads (B)	39,58,377	30,39,594	25,77,619	8,24,410	1,04,00,000
Operating Income (A-B)	32,41,623	27,20,406	(12,27,619)	(6,60,410)	40,74,000
Return on Sales (%)	21.61	22.67	(44.00)	(200.12)	13.53

(ii) The difference in the operating income under the two systems is due to the differences in the overheads borne by each of the products. The Activity Based Costs appear to be more accurate.

Q20. May 2022, RTP

PCP Limited belongs to the apparel industry. It specializes in the distribution of fashionable garments. It buys from the industry and resells the same to the following two different supermarkets:

(i) Supermarket A dealing in Adults' garments (Age group 15 - 30)

(ii) Supermarket B dealing in Kids' garments (Age group 5 - 10)

The following data for the month of April in respect of PCP Limited has been reported:

	Supermarket A (₹)	Supermarket B (₹)
Average revenue per delivery	1,69,950	57,750
Average cost of goods sold per delivery	1,65,000	55,000
Number of deliveries	660	1,650

In the past, PCP Limited has used gross margin percentage to evaluate the relative profitability of its supermarket segments.

The company plans to use activity-based costing for analysing the profitability of its supermarket segments. The April month's operating costs (other than cost of goods sold) of PCP Limited are ₹ 16,55,995. These operating costs are assigned to five activity areas. The cost in each area and Activity analysis including cost driver for the month of April are as follows:

Activity Area	Total costs (₹)	Cost Driver
Store delivery	3,90,500	Store deliveries
Cartons dispatched to store	4,15,250	Cartons dispatched to a store per delivery
Shelf-stocking at customer store	64,845	Hours of shelf-stocking
Line-item ordering	3,45,400	Line-items per purchase order

Customer purchase order processing	4,40,000	Purchase orders by customers
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Other data for the month of April include the following:

	Supermarket A	Supermarket B
Total number of store deliveries	1,100	2,805
Average number of cartons shipped per store delivery	250	50
Average number of hours of shelf-stocking per store delivery	6	1.5
Average number of line items per order	14	12
Total number of orders	770	1,980

Required:

- COMPUTE gross-margin percentage for each of its supermarket segments and compute PCP Limited's operating income.
- COMPUTE the operating income of each supermarket segments using the activity based costing information.

Answer

(i)

**PCP Limited's
Statement of operating income and gross margin percentage
for each of its supermarket segments**

Particulars	Supermarket A	Supermarket B	Total
Revenues: (₹)	11,21,67,000 (660 × ₹ 1,69,950)	9,52,87,500 (1,650 × ₹ 57,750)	20,74,54,500
Less: Cost of goods sold: (₹)	10,89,00,000 (660 × ₹ 1,65,000)	9,07,50,000 (1,650 × ₹ 55,000)	19,96,50,000
Gross Margin: (₹)	32,67,000	45,37,500	78,04,500
Less: Other operating costs: (₹)			16,55,995
Operating income: (₹)			61,48,505
Gross Margin	2.91%	4.76 %	3.76%
Operating income %			2.96%

(ii)

**Operating Income Statement of each distribution channel in April
(Using the Activity based Costing information)**

	Supermarket A	Supermarket B
Gross margin (₹) : (A) (Refer to (i) part of the answer)	32,67,000	45,37,500
Operating cost (₹): (B) (Refer to working note)	6,55,600	10,00,395
Operating income (₹): (A-B)	26,11,400	35,37,105
Operating income (in %) (Operating income/Revenue) ×100	2.33	3.71

Working note:

**Computation of rate per unit of the cost allocation base
for each of the five activity areas for the month of April**

	(₹)
Store delivery [₹ 3,90,500/ (1,100 + 2,805 store deliveries)]	100 per delivery
Cartons dispatched [₹ 4,15,250/ {(250×1,100) + (50×2,805)} carton dispatches]	1 per carton dispatch
Shelf-stocking at customer store (₹) [₹ 64,845/ {(6×1,100) + (1.5×2,805)} hours]	6 per hour
Line item ordering [₹ 3,45,400/ {(14×770) + (12×1,980)} line items]	10 per line item order

Customer purchase order processing [₹ 4,40,000/ (770 + 1,980 orders)]	160 per order
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Computation of operating cost of each distribution channel:

	Supermarket A (₹)	Supermarket B (₹)
Store delivery	1,10,000 (₹ 100 × 1,100 deliveries)	2,80,500 (₹ 100 × 2,805 deliveries)
Cartons dispatched	2,75,000 (₹ 1 × 250 cartons × 1,100 deliveries)	1,40,250 (₹ 1 × 50 cartons × 2,805 deliveries)
Shelf stocking	39,600 (₹ 6 × 1,100 deliveries × 6 Av. hrs.)	25,245 (₹ 6 × 2,805 deliveries × 1.5 Av. hrs)
Line item ordering	1,07,800 (₹ 10 × 14 line item × 770 orders)	2,37,600 (₹ 10 × 12 line item × 1,980 orders)
Customer purchase order processing	1,23,200 (₹ 160 × 770 orders)	3,16,800 (₹ 160 × 1,980 orders)
Operating cost	6,55,600	10,00,395

Q21. Nov 2021, RTP | May 2020 RTP | Nov 2018 RTP

Family Store wants information about the profitability of individual product lines: Soft drinks, Fresh produce and Packaged food. Family store provides the following data for the year 2020-21 for each product line:

	Soft drinks	Fresh produce	Packaged food
Revenues	₹ 39,67,500	₹ 1,05,03,000	₹ 60,49,500
Cost of goods sold	₹ 30,00,000	₹ 75,00,000	₹ 45,00,000
Cost of bottles returned	₹ 60,000	₹ 0	₹ 0
Number of purchase orders placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family store also provides the following information for the year 2020-21:

Activity	Description of activity	Total Cost (₹)	Cost-allocation base
Bottles returns	Returning of empty bottles	60,000	Direct tracing to soft drink line
Ordering	Placing of orders for purchases	7,80,000	1,560 purchase orders
Delivery	Physical delivery and receipt of goods	12,60,000	3,150 deliveries
Shelf stocking	Stocking of goods on store shelves and ongoing restocking	8,64,000	8,640 hours of shelf stocking time
Customer Support	Assistance provided to customers including check-out	15,36,000	15,36,000 items sold

Required:

- Family store currently allocates support cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. CALCULATE the operating income and operating income as a % of revenues for each product line.
- If Family Store allocates support costs (all costs other than cost of goods sold) to product lines using an activity-based costing system, CALCULATE the operating income and operating income as a % of revenues for each product line.

Answer

Working notes:

1. Total support cost:

	(₹)
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Bottles returns	60,000
Ordering	7,80,000
Delivery	12,60,000
Shelf stocking	8,64,000
Customer support	15,36,000
Total support cost	45,00,000

2. Percentage of support cost to cost of goods sold (COGS):

$$= \frac{\text{Total support cost}}{\text{Total cost of goods sold}} \times 100$$

$$= \frac{\text{Rs.45,00,000}}{\text{Rs.1,50,00,000}} \times 100 = 30\%$$

3. Cost for each activity cost driver:

Activity (1)	Total cost (₹) (2)	Cost allocation base (3)	Cost driver rate (4) = [(2) ÷ (3)]
Ordering	7,80,000	1,560 purchase orders	₹ 500 per purchase order
Delivery	12,60,000	3,150 deliveries	₹ 400 per delivery
Shelf-stocking	8,64,000	8,640 hours	₹ 100 per stocking hour
Customer support	15,36,000	15,36,000 items sold	₹ 1 per item sold

(i) Statement of Operating income and Operating income as a percentage of revenues for each product line (When support costs are allocated to product lines on the basis of cost of goods sold of each product)

	Soft Drinks (₹)	Fresh Produce (₹)	Packaged Foods (₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost of Goods sold (COGS): (B)	30,00,000	75,00,000	45,00,000	1,50,00,000
Support cost (30% of COGS): (C) (Refer working notes)	9,00,000	22,50,000	13,50,000	45,00,000
Total cost: (D) = {(B) + (C)}	39,00,000	97,50,000	58,50,000	1,95,00,000
Operating income: (E) = {(A)-(D)}	67,500	7,53,000	1,99,500	10,20,000
Operating income as a percentage of revenues: (F) = {(E)/(A) × 100}	1.70%	7.17%	3.30%	4.97%

(ii) Statement of Operating income and Operating income as a percentage of revenues for each product line (When support costs are allocated to product lines using an activity -based costing system)

	Soft drinks (₹)	Fresh Produce (₹)	Packaged Food (₹)	Total (₹)
Revenues: (A)	39,67,500	1,05,03,000	60,49,500	2,05,20,000
Cost & Goods sold	30,00,000	75,00,000	45,00,000	1,50,00,000
Bottle return costs	60,000	0	0	60,000
Ordering cost* (360:840:360)	1,80,000	4,20,000	1,80,000	7,80,000
Delivery cost* (300:2,190:660)	1,20,000	8,76,000	2,64,000	12,60,000
Shelf stocking cost* (540:5,400:2,700)	54,000	5,40,000	2,70,000	8,64,000
Customer Support cost* (1,26,000:11,04,000:3,06,000)	1,26,000	11,04,000	3,06,000	15,36,000
Total cost: (B)	35,40,000	1,04,40,000	55,20,000	1,95,00,000
Operating income: (C) = {(A)- (B)}	4,27,500	63,000	5,29,500	10,20,000
Operating income as a % of revenues: (D) = {(C)/(A) × 100}	10.78%	0.60%	8.75%	4.97%

* Refer to working note 3

Q22. May 2021, RTP

The following budgeted information relates to N Ltd. for the year 2021:

	Products		
	X	Y	Z
Production and Sales (units)	1,00,000	80,000	60,000
	(₹)	(₹)	(₹)
Selling price per unit	90	180	140
Direct cost per unit	50	90	95
	Hours	Hours	Hours
Machine department (machine hours per unit)	3	4	5
Assembly department (direct labour hours per unit)	6	4	3

The estimated overhead expenses for the year 2021 will be as below:

Machine Department ₹ 73,60,000

Assembly Department ₹ 55,00,000

Overhead expenses are apportioned to the products on the following basis:

Machine Department On the basis of machine hours

Assembly Department On the basis of labour hours

After a detailed study of the activities the following cost pools and their respective cost drivers are found:

Cost Pool	Amount (₹)	Cost Driver	Quantity
Machining services	64,40,000	Machine hours	9,20,000 hours
Assembly services	44,00,000	Direct labour hours	11,00,000 hours
Set-up costs	9,00,000	Machine set-ups	9,000 set-ups
Order processing	7,20,000	Customer orders	7,200 orders
Purchasing	4,00,000	Purchase orders	800 orders

As per an estimate the activities will be used by the three products:

	Products		
	X	Y	Z
Machine set-ups	4,500	3,000	1,500
Customer orders	2,200	2,400	2,600
Purchase orders	300	350	150

You are required to PREPARE a product-wise profit statement using:

(i) Absorption costing method;

(ii) Activity-based method.

Answer

(i) Profit Statement using Absorption costing method:

	Particulars	Product			Total
		X	Y	Z	
A	Sales Quantity	1,00,000	80,000	60,000	2,40,000
B	Selling price per unit (₹)	90	180	140	
C	Sales Value (₹) [A×B]	90,00,000	1,44,00,000	84,00,000	3,18,00,000
D	Direct cost per unit (₹)	50	90	95	
E	Direct Cost (₹) [A×D]	50,00,000	72,00,000	57,00,000	1,79,00,000
F	Overheads:				
	(i) Machine department (₹)	24,00,000	25,60,000	24,00,000	73,60,000
	(Working note-1)	30,00,000	16,00,000	9,00,000	55,00,000
	(ii) Assembly department (₹)	1,04,00,000	1,13,60,000	90,00,000	3,07,60,000
H	(Working note-1)	(14,00,000)	30,40,000	(6,00,000)	10,40,000
	Total Cost (₹) [E+F]				

	Profit (C-G)				
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(ii) Profit Statement using Activity based costing (ABC) method:

	Particulars	Product			Total
		X	Y	Z	
A	Sales Quantity	1,00,000	80,000	60,000	2,40,000
B	Selling price per unit (₹)	90	180	140	
C	Sales Value (₹) [A×B]	90,00,000	1,44,00,000	84,00,000	3,18,00,000
D	Direct cost per unit (₹)	50	90	95	
E	Direct Cost (₹) [A×D]	50,00,000	72,00,000	57,00,000	1,79,00,000
F	Overheads: (Refer working note-3)	21,00,000	22,40,000	21,00,000	64,40,000
	(i) Machining services (₹)	24,00,000	12,80,000	7,20,000	44,00,000
	(ii) Assembly services (₹)	4,50,000	3,00,000	1,50,000	9,00,000
	(iii) Set-up costs (₹)	2,20,000	2,40,000	2,60,000	7,20,000
	(iv) Order processing (₹)	1,50,000	1,75,000	75,000	4,00,000
G	(v) Purchasing (₹)	1,03,20,000		90,05,000	3,07,60,000
H	Total Cost (₹) [E+F]	(13,20,000)	1,14,35,000	(6,05,000)	10,40,000
	Profit (₹) (C-G)		29,65,000		

Working Notes:

1.

	Particulars	Product			Total
		X	Y	Z	
A	Production (units)	1,00,000	80,000	60,000	
B	Machine hours per unit	3	4	5	
C	Total Machine hours [A×B]	3,00,000	3,20,000	3,00,000	9,20,000
D	Rate per hour (₹)	8	8	8	
E	Machine Dept. cost [C×D]	24,00,000	25,60,000	24,00,000	73,60,000
F	Labour hours per unit	6	4	3	
G	Total labour hours [A×F]	6,00,000	3,20,000	1,80,000	11,00,000
H	Rate per hour (₹)	5	5	5	
I	Assembly Dept. cost [G×H]	30,00,000	16,00,000	9,00,000	55,00,000

$$\text{Machine hour rate} = \frac{\text{Rs. } 73,60,000}{9,20,000 \text{ hours}} = ₹ 8$$

$$\text{Labour hour rate} = \frac{\text{Rs. } 55,00,000}{11,00,000 \text{ hours}} = ₹ 5$$

2. Calculation of cost driver rate

Cost Pool	Amount (₹)	Cost Driver	Quantity	Driver rate (₹)
Machining services	64,40,000	Machine hours	9,20,000 hours	7.00
Assembly services	44,00,000	Direct labour	11,00,000 hours	4.00
Set-up costs	9,00,000	hours	9,000 set-ups	100.00
Order processing	7,20,000	Machine set-ups	7,200 orders	100.00
Purchasing	4,00,000	Customer orders	800 orders	500.00
		Purchase orders		

3. Calculation of activity-wise cost

	Particulars	Product			Total
		X	Y	Z	
A	Machining hours (Refer Working note-1)	3,00,000	3,20,000	3,00,000	9,20,000
B		7	7	7	
C	Machine hour rate (₹) (Refer Working note-2)	21,00,000	22,40,000	21,00,000	64,40,000
D		6,00,000	3,20,000	1,80,000	11,00,000
E	Machining services cost (₹) [A×B]	4	4	4	
F	Labour hours (Refer Working note-1)	24,00,000	12,80,000	7,20,000	44,00,000
G	Labour hour rate (₹) (Refer Working note-2)	4,500	3,000	1,500	9,000
H		100	100	100	
I	Assembly services cost (₹) [D×E]	4,50,000	3,00,000	1,50,000	9,00,000
J	Machine set-ups	2,200	2,400	2,600	7,200
K		100	100	100	

L	Rate per set-up (₹) (Refer Working note-2)	2,20,000	2,40,000	2,60,000	7,20,000
M		300	350	150	800
N	Set-up cost (₹) [G×H]	500	500	500	
O	Customer orders	1,50,000	1,75,000	75,000	4,00,000
	Rate per order (₹) (Refer Working note-2)				
	Order processing cost (₹) [J×K]				
	Purchase orders				
	Rate per order (₹) (Refer Working note-2)				
	Purchasing cost (₹) [M×N]				

Q23. Nov 2020, RTP

KD Ltd. is following Activity based costing. Budgeted overheads, cost drivers and volume are as follows:

Cost pool	Budgeted overheads (₹)	Cost driver	Budgeted volume
Material procurement	18,42,000	No. or orders	1,200
Material handling	8,50,000	No. of movement	1,240
Maintenance	24,56,000	Maintenance hours	17,550
Set-up	9,12,000	No. of set-ups	1,450
Quality control	4,42,000	No. of inspection	1,820

The company has produced a batch of 7,600 units, its material cost was ₹24,62,000 and wages ₹4,68,500. Usage activities of the said batch are as follows:

Material orders	56
Material movements	84
Maintenance hours	1,420 hours
Set-ups	60
No. of inspections	18

Required:

- CALCULATE cost driver rates.
- CALCULATE the total and unit cost for the batch

Answer

(i) Calculation of cost driver rate:

Cost pool	Budgeted overheads (₹)	Cost driver	Budgeted volume
Material procurement	18,42,000	1,200	1,535.00
Material handling	8,50,000	1,240	685.48
Maintenance	24,56,000	17,550	139.94
Set-up	9,12,000	1,450	628.97
Quality control	4,42,000	1,820	242.86

(ii) Calculation of cost for the batch:

Particulars	Amount (₹)	Amount (₹)
Material cost		24,62,000.00
Wages		4,68,500.00
Overheads:		
- Material procurement (₹1,535×56 orders)	85,960.00	
- Material handling movements (₹685.48×84)	57,580.32	
- Maintenance (₹139.94×1,420 hours)	1,98,714.80	
- Set-up (₹628.97×60 set-ups)	37,738.20	
- Quality control (₹242.86×18 inspections)	<u>4,371.48</u>	<u>3,84,364.80</u>
Total Cost		<u>33,14,864.80</u>
No. of units		<u>7,600</u>

Cost per units		436.17
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Q24. Nov 2019, RTP

SMP Pvt. Ltd. manufactures three products using three different machines. At present the overheads are charged to products using labour hours. The following statement for the month of September 2019, using the absorption costing method has been prepared:

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Production units	45,000	52,500	30,000
Material cost per unit (₹)	350	460	410
Wages per unit @ ₹80 per hour	240	400	560
Overhead cost per unit (₹)	830	1,260	1,530
Total cost per unit (₹)	1,037.50	1,575	1,912.50
Selling price (₹)			

The following additional information is available relating to overhead cost drivers.

Cost driver	Product X	Product Y	Product Z	Total
No. of machine set-ups	40	160	400	600
No. of purchase orders	400	800	1,200	2,400
No. of customers	1,000	2,200	4,800	8,000

Actual production and budgeted production for the month is same. Workers are paid at standard rate. Out of total overhead costs, 30% related to machine set-ups, 30% related to customer order processing and customer complaint management, while the balance proportion related to material ordering.

Required:

- COMPUTE overhead cost per unit using activity based costing method.
- DETERMINE the selling price of each product based on activity-based costing with the same profit mark-up on cost.

Answer

Workings:

Total labour hours and overhead cost:

Particulars	Product X	Product Y	Product Z	Total
Production units	45,000	52,500	30,000	1,27,500
Hour per unit	3	5	7	
Total hours	1,35,000	2,62,500	2,10,000	6,07,500
Rate per hour				₹ 80.00
Total overhead				₹ 4,86,00,000

Cost per activity and driver

Activity	Machine Set-up	Customer order Processing	Customer complaint management	Total
Total overhead (₹)	1,45,80,000	1,45,80,000	1,94,40,000	4,86,00,000
No. of drivers	600	2,400	8,000	
Cost per driver (₹)	24,300	6,075	2,430	

(i) Computation of Overhead cost per unit:

Particulars	Product X	Product Y	Product Z
No. of machine set-ups	40	160	400
Cost per driver (₹)	24,300	24,300	24,300
Total Machine set-up cost (₹) [A]	9,72,000	38,88,000	97,20,000
No. of purchase orders	400	800	1,200
Cost per driver (₹)	6,075	6,075	6,075
Total order processing cost (₹) [B]	24,30,000	48,60,000	72,90,000

No. of customers	1,000	2,200	4,800
Cost per driver (₹)	2,430	2,430	2,430
Total customer complaint management cost (₹) [C]	24,30,000	53,46,000	1,16,64,000
Total Overhead cost (₹) [A+B+C]	58,32,000	1,40,94,000	2,86,74,000
Production units	45,000	52,500	30,000
Cost per unit (₹)	129.60	268.46	955.80

(ii) Determination of Selling price per unit

Particulars	Product X (using machine A)	Product Y (using machine B)	Product Z (using machine C)
Material cost per unit (₹)	350.00	460.00	410.00
Wages per unit @ ₹80 per hour	240.00	400.00	560.00
Overhead cost per unit (₹)	129.60	268.46	955.80
Total cost per unit (₹)	719.60	1,128.46	1,925.80
Profit (25% profit mark-up) (₹)	179.90	282.11	481.45
Selling price (₹)	899.50	1,411.57	2,407.25

Q25. May 2019, RTP

MST Limited has collected the following data for its two activities. It calculates activity cost rates based on cost driver capacity.

Activity	Cost Driver	Capacity	Cost (₹)
Power	kilowatt hours	50,000 kilowatt hours	40,00,000
Quality Inspections	Number of Inspections	10,000 Inspections	60,00,000

The company makes three products M, S and T. For the year ended March 31, 20X9, the following consumption of cost drivers was reported:

Product	Kilowatt hours	Quality Inspections
M	10,000	3,500
S	20,000	2,500
T	15,000	3,000

Required:

- PREPARE a statement showing cost allocation to each product from each activity.
- CALCULATE the cost of unused capacity for each activity.
- STATE the factors the management considers in choosing a capacity level to compute the budgeted fixed overhead cost rate.

Answer

(i) Statement of cost allocation to each product from each activity

	Product			Total (₹)
	M (₹)	S (₹)	T (₹)	
Power (Refer to working note)	8,00,000 (10,000 kWh × ₹80)	16,00,000 (20,000 kWh × ₹80)	12,00,000 (15,000 kWh × ₹80)	36,00,000
Quality Inspections (Refer to working note)	21,00,000 (3,500 inspections × ₹600)	15,00,000 (2,500 inspections × ₹600)	18,00,000 (3,000 inspections × ₹600)	54,00,000

Working Note:

Rate per unit of cost driver:

Power : (₹40,00,000 ÷ 50,000 kWh) = ₹80/kWh

Quality Inspection : (₹60,00,000 ÷ 10,000 inspections) = ₹600 per inspection

(ii) Calculation of cost of unused capacity for each activity:

	(₹)
Power (₹40,00,000 – ₹36,00,000)	4,00,000
Quality Inspections (₹60,00,000 – ₹54,00,000)	6,00,000

Total cost of unused capacity	10,00,000
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(iii) Factors management consider in choosing a capacity level to compute the budgeted fixed overhead cost rate:

- Effect on product costing & capacity management
- Effect on pricing decisions.
- Effect on performance evaluation
- Effect on financial statements
- Regulatory requirements.
- Difficulties in forecasting for any capacity level.

Q26. May 2018, RTP

G-2020 Ltd. is a manufacturer of a range of goods. The cost structure of its different products is as follows:

Particulars	Product A	Product B	Product C	
Direct Materials	50	40	40	₹/u
Direct Labour @ ₹ 10/ hour	30	40	50	₹/u
Production Overheads	30	40	50	₹/u
Total Cost	110	120	140	₹/u
Quantity Produced	10,000	20,000	30,000	₹/u

UnitsG-2020 Ltd. was absorbing overheads on the basis of direct labour hours. A newly appointed management accountant has suggested that the company should introduce ABC system and has identified cost drivers and cost pools as follows:

Activity Cost Pool	Cost Driver	Associated Cost (₹)
Stores Receiving	Purchase Requisitions	2,96,000
Inspection	Number of Production Runs	8,94,000
Dispatch	Orders Executed	2,10,000
Machine Setup	Number of Setups	12,00,000

The following information is also supplied:

Details	Product A	Product B	Product C
No. of Setups	360	390	450
No. of Orders Executed	180	270	300
No. of Production Runs	750	1,050	1,200
No. of Purchase Requisitions	300	450	500

Required

CALCULATE activity based production cost of all the three products.

Answer

The total production overheads are ₹26,00,000:

Product A: $10,000 \times ₹ 30 = ₹ 3,00,000$

Product B: $20,000 \times ₹ 40 = ₹ 8,00,000$

Product C: $30,000 \times ₹ 50 = ₹ 15,00,000$

On the basis of ABC analysis this amount will be apportioned as follows:

Statement Showing "Activity Based Production Cost"

Activity Cost Pool	Cost Driver	Ratio	Total Amount (₹)	A (₹)	B (₹)	C (₹)
Stores Receiving	Purchase Requisition	6:9:10	2,96,000	71,040	1,06,560	1,18,400
Inspection	Production Runs	5:7:8	8,94,000	2,23,500	3,12,900	3,57,600
Dispatch	Orders Executed	6:9:10	2,10,000	50,400	75,600	84,000

Machine Setups	Setups	12:13:15	12,00,000	3,60,000	3,90,000	4,50,000
Total Activity Cost				7,04,940	8,85,060	10,10,000
Quantity Produces				10,000	20,000	30,000
Unit Cost (Overheads)				70.49	44.25	33.67
Add: Conversion Cost (Material + Labour)				80	80	90
Total				150.49	124.25	123.67

COST SHEET
Past Exams and RTP Questions Compiler

Q1. Nov 2023, 6 marks

The following data relate to the manufacture of a product 'VD-100*' during the month of October 2023:

Good units produced	12,600
Units Sold	11,800
Direct wages	₹ 8,82,000
Administrative Overheads	₹ 4,72,000
Selling price per unit	₹ 416

Each unit produced requires 2 kg. of material 'Z'. Cost of material 'Z' is ₹ 72 per kg. 10% of the production has been scrapped as bad and fetches ₹ 45 per unit. Factory overheads are 80% of wages. Selling and distribution overheads are ₹ 54 per unit sold. There is no opening or closing stock of material and work in progress.

You are required to find out total cost of sales and profit for the month of October 2023.

Answer:

Since 10% units are scrapped.

Units produced (total) is 14,000 (12,600/90%)

Calculation of cost of sales and profit

Particulars	₹
Raw Material (28,000 × ₹ 72)	20,16,000
Wages	8,82,000
Prime Cost	28,98,000
Factory overheads	7,05,600
Factory Cost	36,03,600
Sale of Scrap (1,400 × ₹ 45)	(63,000)
Cost of Production	35,40,600
Less: Closing Stock of finished goods (35,40,600 / 12,600 X 800)	2,24,800
Cost of goods sold	33,15,800
Add: Administration overheads	4,72,000
Add: Selling & Distribution overheads (₹ 54 x 11,800)	6,37,200
Cost of Sales	44,25,000
Sales (11,800 × ₹ 416)	49,08,800
Profit	4,83,800

Q2. Nov 2023, 10 marks

The following data relates to the manufacture of product BXE for the year ended 31st March, 2023:

	Amount (₹)
Value of stock as on 1 st April, 2022	
Raw materials	27,00,000

Work in progress	10,60,000
Finished Goods	25,00,000
Material purchased	2,48,00,000
Freight inward	7,50,000
Direct wages	42,00,000
Power & Fuel	18,75,000
Cost of special drawings	3,60,000
Trade Discount	4,50,000
Insurance on material procured	15,000
Rent of Factory Building (1/5 th used for office purpose)	7,00,000
Depreciation on machinery	6,25,000
Depreciation on Delivery Vans	1,20,000
Consumable stores and indirect wages	15,20,000
Quality Control cost	9,00,000
Primary packing cost	12,90,000
General Administrative overheads (excluding rent of building)	17,50,000
Salary paid to Marketing Staff	9,60,000
Packing cost for transportation	1,84,000
Value of stock as on 31st March, 2023	
Raw materials	32,60,000
Work in progress	11,80,000
Finished Goods	28,38,000

Additional Information:

- Further, some of the finished product was found defective and the defective products were rectified by incurring expenditure of additional factory overheads to the extent of ₹ 33,600. The cost of rectification is not included in details mentioned above.
- An amount of ₹ 1,20,600 was realised by selling scrap and waste generated during the year.

Prepare Cost sheet for the year ended 31st March, 2023 showing:

- Prime cost,
- Factory cost,
- Cost of production.
- Cost of goods sold, and
- Cost of sales.

Answer:

Cost Sheet for the product BXE

Sl. No.	Particulars	(₹)	(₹)
(i)	Material Consumed:		
	Raw materials purchased	2,48,00,000	
	Freight inwards	7,50,000	
	Insurance on material procured	15,000	
	Less: Trade discount	(4,50,000)	

	Add: Opening stock of raw materials	27,00,000	
	Less: Closing stock of raw materials	(32,60,000)	2,45,55,000
(ii)	Direct wages		42,00,000
(iii)	Direct expenses:		
	Power & fuel	18,75,000	
	Cost of special drawings	3,60,000	22,35,000
	Prime Cost		3,09,90,000
(iv)	Works/ Factory overheads:		
	Rent of factory building (4/5 th of 7,00,000)	5,60,000	
	Depreciation on machinery	6,25,000	
	Defective rectification cost	33,600	
	Consumable stores & indirect wages	15,20,000	27,38,600
	Gross works cost		3,37,28,600
	Add: Opening work in process		10,60,000
	Less: Closing work in process		(11,80,000)
	Factory cost		3,36,08,600
(v)	Quality control cost		9,00,000
(vi)	Primary packing cost		12,90,000
(vii)	Less: Amount realised from scrap sale		(1,20,600)
	Cost of production		3,56,78,000
	Add: Opening stock of finished goods		25,00,000
	Less: Closing stock of finished goods		(28,38,000)
	Cost of Goods Sold		3,53,40,000
	Administrative overheads:		
(viii)	Rent of factory building (1/5 th of 7,00,000)		1,40,000
	General administrative overheads		17,50,000
	Selling and Distribution overheads:		
(x)	Salary paid to marketing staff		9,60,000
(xi)	Packing cost for transportation		1,84,000
(xii)	Depreciation on delivery vans		1,20,000
	Cost of Sales		3,84,94,000

Alternatively, Power and fuel expenses of ₹ 18,75,000 can be taken as a part of factory overhead. Accordingly, prime cost will be 2,91,15,000. However, there will be no change in factory cost, cost of production, cost of goods sold and cost of sales.

Q3. May 2023, 10 marks

The following information is available from SN Manufacturing Limited's for the month of April 2023.

	April 1	April 30
Opening and closing inventories data:		
Stock of finished goods	2,500 units	?
Stock of raw materials	₹ 42,500	₹ 38,600
Work-in progress	₹ 42,500	₹ 42,800
Other data are:		
Raw materials Purchased		₹ 6,95,000
Carriage inward		₹ 36,200
Direct wages paid		₹ 3,22,800
Royalty paid for production		₹ 35,800

Purchases of special designs, moulds and patterns (estimated life 12 Production cycles)	₹ 1,53,600
Power, fuel and haulage (factory)	₹ 70,600
Research and development costs for improving the production process (amortized)	₹ 31,680
Primary packing cost (necessary to maintain quality)	₹ 6,920
Administrative Overhead	₹ 46,765
Salary and wages for supervisor and foremen	₹ 28,000

Other information:

- Opening stock of finished goods is to be valued at ₹ 8.05 per unit.
- During the month of April, 1,52,000 units were produced and 1,52,600 units were sold. The closing stock of finished goods is to be valued at the relevant month's cost of production. The company follows the FIFO method.
- Selling and distribution expenses are to be charged at 20 paise per unit.
- Assume that one production cycle is completed in one month.

Required:

- Prepare a cost sheet for the month ended on April 30, 2023, showing the various elements of cost (raw material consumed, prime cost, factory cost, cost of production, cost of goods sold, and cost of sales).
- Calculate the selling price per unit if profit is charged at 20 percent on sales.

Answer:

Cost Sheet for the month of April 2023

Particulars	Amount (₹)	Amount (₹)
Raw materials consumed:		
Raw materials purchased	6,95,000	
Add: Carriage inward	36,200	
Add: Value of opening stock of raw materials	42,500	
Less: Value of closing stock of raw materials	(38,600)	7,35,100
Direct wages paid		3,22,800
Royalty paid for production		35,800
Amortised cost of special designs, moulds and patterns (₹153,600 ÷ 12)		12,800
Power, fuel and haulage (factory)*		70,600
Prime Cost*		11,77,100
Salary and wages of supervisor and foremen		28,000
Gross Works Cost		12,05,100
Add: Opening stock of WIP		42,500
Less: Closing stock of WIP		(42,800)
Factory/ Works Cost		12,04,800
Research and development cost	31,680	
Primary packing cost	6,920	38,600
Cost of Production		12,43,400

Add: Opening stock of finished goods ($\text{₹ } 8.05 \times 2,500 \text{ units}$)		20,125
Less: Value of closing stock $[(2,500+152,000 -1,52,600) \times (12,43,400 \div 152,000)]$		(15,542)
Cost of Goods Sold		12,47,983
Add: Administrative overheads		46,765
Add: Selling and distribution expenses ($\text{₹ } 0.20 \times 1,52,600$)		30,520
Cost of Sales		13,25,268
Add: Profit (20% on Sales or 25% on cost of sales)		3,31,317
Sales value		16,56,585
Selling price per unit ($\text{₹ } 16,56,585 \div 1,52,600 \text{ units}$)		10.86

May be taken as part of Factory / Works cost, however Total Factory Cost will remain the same.
If taken as part of factory cost then prime cost will be ₹ 11,06,500.

Alternative Solution (Based on work-in-progress figure of ₹ 45,500 as on 1st April 2023 as per Hindi part of Question paper)

Particulars	Amount (₹)	Amount (₹)
Raw materials consumed:		
Raw materials purchased	6,95,000	
Add: Carriage inward	36,200	
Add: Value of opening stock of raw materials	42,500	
Less: Value of closing stock of raw materials	(38,600)	7,35,100
Direct wages paid		3,22,800
Royalty paid for production		35,800
Amortised cost of special designs, moulds and patterns ($\text{₹ } 153,600 \div 12$)		12,800
Power, fuel and haulage (factory)*		70,600
Prime Cost		11,77,100
Salary and wages of supervisor and foremen		28,000
Gross Works Cost		12,05,100
Add: Opening stock of WIP		45,500
Less: Closing stock of WIP		(42,800)
Factory/ Works Cost		12,07,800
Research and development cost	31,680	
Primary packing cost	6,920	38,600
Cost of Production		12,46,400
Add: Opening stock of finished goods ($\text{₹ } 8.05 \times 2,500 \text{ units}$)		20,125
Less: Value of closing stock $[(2,500+1,52,000 -1,52,600) \times (12,46,400 \div 1,52,000)]$		(15,580)
Cost of Goods Sold		12,50,945
Add: Administrative overheads		46,765
Add: Selling and distribution expenses ($\text{₹ } 0.20 \times 1,52,600$)		30,520
Cost of Sales		13,28,230
Add: Profit (20% on Sales or 25% on cost of sales)		3,32,058
Sales value		16,60,288
Selling price per unit ($\text{₹ } 16,60,288 \div 1,52,600 \text{ units}$)		10.88

*May be taken as part of Factory / Works cost, however Total Factory Cost will remain the same. If taken as part of factory cost then prime cost will be ₹ 11,06,500.

Q4. Nov 2022, 10 marks

PNME Ltd. manufactures two types of masks- 'Disposable Masks' and 'Cloth Masks'. The cost data for the year ended 31st March, 2022 is as follows:

	₹
Direct Materials	12,50,000
Direct Wages	7,00,000
Production Overhead	4,00,000
Total	23,50,000

It is further ascertained that:

1. Direct material cost per unit of Cloth Mask was twice as much of Direct material cost per unit of Disposable Mask.
2. Direct wages per unit for Disposable Mask were 60% of those for Cloth Mask.
3. Production overhead per unit was at same rate for both the types of the masks.
4. Administration overhead was 50% of Production overhead for each type of mask.
5. Selling cost was ₹ 2 per Cloth Mask.
6. Selling Price was ₹ 35 per unit of Cloth Mask.
7. No. of units of Cloth Masks sold- 45,000
8. No. of units of Production of
Cloth Masks: 50,000
Disposable Masks: 1,50,000

You are required to prepare a cost sheet for Cloth Masks showing:

- i. Cost per unit and Total Cost.
- ii. Profit per unit and Total Profit.

Answer

Preparation of Cost Sheet for Cloth Masks

No. Of units produced = 50,000 units

No. Of units sold = 45,000 units

Particulars	Per unit (₹)	Total (₹)
Direct materials (Working note- (i))	10.00	5,00,000
Direct wages (Working note- (ii))	5.00	2,50,000
Prime cost	15.00	7,50,000
Production overhead (Working note- (iii))	2.00	1,00,000
Factory Cost	17.00	8,50,000
Administration Overhead* (50% of Production Overhead)	1.00	50,000
Cost of production	18.00	9,00,000
Less: Closing stock (50,000 units – 45,000 units)	-	(90, 000)
Cost of goods sold i.e. 45,000 units	18.00	8,10,000
Selling cost	2.00	90,000
Cost of sales/ Total cost	20.00	9,00,000
Profit	15.00	6,75,000
Sales value (₹ 35 × 45,000 units)	35.00	15,75,000

Working Notes:

I. Direct material cost per unit of Disposable Mask = M

Direct material cost per unit of Cloth Mask = 2M

Total Direct Material cost = 2M × 50,000 units + M × 1,50,000 units

Or, ₹ 12,50,000 = 1,00,000 M + 1,50,000 M

Or, $M = \frac{₹ 12,50,000}{2,50,000} = ₹ 5$

Therefore, Direct material Cost per unit of Cloth Mask = 2 × ₹ 5 = ₹ 10

II. Direct wages per unit for Cloth Mask = W

Direct wages per unit for Disposable Mask = 0.6W

So, (W × 50,000) + (0.6W × 1,50,000) = ₹ 7,00,000

W = ₹5 per unit

Therefore, Direct material Cost per unit of Cloth Mask = ₹ 5

III. Production overhead per unit = $\frac{₹ 4,00,000}{(50,000+1,50,000)} = ₹ 2$

Production overhead for Cloth Mask = ₹ 2 × 50,000 units = ₹ 1,00,000

- Administration overhead is related to production overhead in the question and hence to be considered in cost of production only.

Q5. May 2022, 10 marks

The following data are available from the books and records of A Ltd. For the month of April 2022:

Particulars	Amount (₹)
Stock of raw materials on 1 st April 2022	10,000
Raw materials purchased	2,80,000
Manufacturing wages	70,000
Depreciation on plant	15,000
Expenses paid for quality control check activities	4,000
Lease Rent of Production Assets	10,000
Administrative Overheads (Production)	15,000
Expenses paid for pollution control and engineering & maintenance	1,000
Stock of raw materials on 30 th April 2022	40,000
Primary packing cost	8,000
Research & development cost (Process related)	5,000
Packing cost for redistribution of finished goods	1,500
Advertisement expenses	1,300

Stock of finished goods as on 1st April 2022 was 200 units having a total cost of ₹ 28,000. The entire opening stock of finished goods has been sold during the month. Production during the month of April, 2022 was 3,000 units. Closing stock of finished goods as on 30th April 2022 was 400 units.

You are required to:

- Prepare a Cost Sheet for the above period showing the:
 - Cost of Raw Material consumed
 - Prime Cost
 - Factory Cost
 - Cost of Production
 - Cost of goods sold
 - Cost of Sales
- Calculate selling price per unit, if sale is made at a profit of 20% on sales.

Answer

I. Statement of Cost (for the month of April, 2022)

S. No.	Particulars	Amount (₹)	Amount (₹)
	Opening stock of Raw material	10,000	
	Add: Purchase of Raw material	2,80,000	
	Less: Closing stock of raw materials	(40, 000)	
(i)	Raw material consumed		2,50,000
	Manufacturing wages		70,000
(ii)	Prime Cost		3,20,000
	Factory/work overheads:		
	Depreciation on plant	15,000	
	Lease rent of production Asset	10,000	

(iii)	Expenses paid for pollution control and Engineering & Maintenance	1,000	26,000
	Factory/Work Cost		3,46,000
	Expenses paid for quality control check Activity		4,000
	Research and Development Cost		5,000
	Administration Overheads (Production)		15,000
(iv)	Primary Packing Cost		8,000
	Cost of Production		3,78,000
	Add: Opening stock of finished goods		28,000
(v)	Less: Closing stock of finished goods		(50, 400)
	Cost of Goods Sold		3,55,600
	Advertisement expenses		1,300
(vi)	Packing cost for re-distribution of Finished goods sold		1,500
	Cost of Sales		3,58,400

Note: Valuation of Closing stock of finished goods

$$= \frac{3,78,000}{3000 \text{ units}} \times 400 \text{ units} = ₹ 50,400$$

$$\text{II. Cost per unit sold} = \frac{3,58,400}{200+3,000-400} = ₹ 128 \text{ per unit}$$

$$\square \text{ Selling Price} = 128 \div 80\% = ₹ 160 \text{ per unit}$$

Q6. Dec 2021, 10 marks | Nov 2019 RTP

G Ltd. manufactures leather bags for office and school purposes. The following information is related with the production of leather bags for the month of September, 2021.

- 1) Leather sheets and cotton clothes are the main inputs and the estimated requirement per bag is two metres of leather sheets and one metre of cotton cloth. 2,000 metre of leather sheets and 1,000 metre of cotton cloths are purchased at ₹ 3,20,000 and ₹ 15,000 respectively. Freight paid on purchases is ₹ 8,500.
- 2) Stitching and finishing need 2,000-man hours at ₹ 80 per hour.
- 3) Other direct costs of ₹ 10 per labour hour is incurred.
- 4) G Ltd. Have 4 machines at a total cost of ₹ 22,00,000. Machines have a life of 10 Years with a scrap value of 10% of the original cost. Depreciation is charged on a Straight-line method.
- 5) The monthly cost of administration and sales office staffs are ₹ 45,000 and ₹ 72,000 Respectively. G Ltd. Pays ₹ 1,20,000 per month as rent for a 2,400 sq. Feet factory Premises. The administrative and sales office occupies 240 sq. Feet and 200 sq. Feet Respectively of factory space.
- 6) Freight paid on delivery of finished bags is ₹ 18,000.
- 7) During the month, 35 kgs of scrap (cuttings of leather and cotton) are sold at ₹ 150 Per kg.
- 8) There are no opening and closing stocks of input materials. There is a finished Stock of 100 bags in stock at the end of the month.

You are required to prepare a cost sheet in respect of above for the month of September 2021 showing:

- i. Cost of Raw Material Consumed
- ii. Prime Cost
- iii. Works/Factory Cost
- iv. Cost of Production
- v. Cost of Goods Sold
- vi. Cost of Sales

Answer

No. Of bags manufactured= 1,000 units

Cost sheet for the month of September 2021

	Particulars	Total Cost (₹)	Cost per unit (₹)
1.	Direct materials consumed:		
	- Leather sheets	3,20,000	320.00

	- Cotton cloths	15,000	15.00
	Add: Freight paid on purchase	8,500	8.50
	(i) Cost of material consumed	3,43,000	343.50
2.	Direct wages (₹80 × 2,000 hours)	1,60,000	160.00
3.	Direct expenses (₹10 × 2,000 hours)	20,000	20.00
4.	(ii) Prime Cost	5,23,500	523.50
5.	Factory Overheads: Depreciation on machines {(₹ 22,00,000 × 90%) ÷ 120 months}	16,500	16.50
	Apportioned cost of factory rent	98,000	98.00
6.	(iii) Works/ Factory Cost	6,38,000	638.00
7.	Less: Realisable value of cuttings (₹150×35 Kg.)	(5, 250)	(5.25)
8.	(iv) Cost of Production	6,32,750	632.75
9.	Add: Opening stock of bags	0	
10.	Less: Closing stock of bags (100 bags × ₹632.75)	(63,275)	
11.	(v) Cost of Goods Sold	5,69,475	632.75
12.	Add: Administrative Overheads:		
	- Staff salary	45,000	50.00
	- Apportioned rent for administrative Office	12,000	13.33
13.	Add: Selling and Distribution Overheads		
	- Staff salary	72,000	80.00
	- Apportioned rent for sales office	10,000	11.11
	- Freight paid on delivery of bags	18,000	20.00
14.	(vi) Cost of Sales	7,26,475	807.19

Apportionment of Factory rent:

To factory building {(₹ 1,20,000 ÷ 2400 sq. feet) × 1,960 sq. feet} = ₹ 98,000

To administrative office {(₹ 1,20,000 ÷ 2400 sq. feet) × 240 sq. feet} = ₹ 12,000

To sale office {(₹ 1,20,000 ÷ 2400 sq. feet) × 200 sq. feet} = ₹ 10,000

Q7. July 2021, 10 marks

The following data relates to manufacturing of a standard product during the month of March, 2021:

Particular	Amount (in ₹)
Stock of Raw material as on 01-03-2021	80,000
Work in Progress as on 01-03-2021	50,000
Purchase of Raw material	2,00,000
Carriage Inwards	20,000
Direct Wages	1,20,000
Cost of special drawing	30,000
Hire charges paid for Plant	24,000
Return of Raw Material	40,000
Carriage on return	6,000
Expenses for participation in Industrial exhibition	8,000
Legal charges	2,500
Salary to office staff	25,000
Maintenance of office building	2,000
Depreciation on Delivery van	6,000
Warehousing charges	1,500
Stock of Raw material as on 31-03-2021	30,000
	24,000

Stock of Work in Progress as on 31-03-2021	
--	--

- Store overheads on materials are 10% of material consumed.
- Factory overheads are 20% of the Prime cost.
- 10% of the output was rejected and a sum of ₹ 5,000 was realized on sale of scrap.
- 10% of the finished product was found to be defective and the defective products Were rectified at an additional expenditure which is equivalent to 20% of proportionate Direct wages.
- The total output was 8000 units during the month.

You are required to prepare a Cost Sheet for the above period showing the:

- Cost of Raw Material consumed.
- Prime Cost
- Work Cost
- Cost of Production
- Cost of Sales

Answer

Statement of Cost for the month of March, 2021

Particulars	Amount (₹)	Amount (₹)
(i) Cost of Material Consumed:		
Raw materials purchased (₹ 2,00,000 – ₹ 40,000)	1,60,000	
Carriage inwards	20,000	
Add: Opening stock of raw materials	80,000	
Less: Closing stock of raw materials	(30, 000)	
		2,30,000
Direct Wages		1,20,000
Direct expenses:		
Cost of special drawing	30,000	
Hire charges paid for Plant	24,000	
		54,000
(ii) Prime Cost		4,04,000
Carriage on return	6,000	
Store overheads (10% of material consumed)	23,000	
Factory overheads (20% of Prime cost)	80,800	
Additional expenditure for rectification of defective	2,160	
		1,11,960
Products (refer working note)		5,15,960
Gross factory cost		50,000
Add: Opening value of W-I-P		(24, 000)
Less: Closing value of W-I-P		5,41,960
(iii) Works/ Factory Cost		(5, 000)
Less: Realisable value on sale of scrap		5,36,960
(iv) Cost of Production		-
Add: Opening stock of finished goods		-
Less: Closing stock of finished goods		5,36,960
Cost of Goods Sold		
Administrative overheads:		
Maintenance of office building	2,000	
Salary paid to Office staff	25,000	
Legal Charges	2,500	
		29,500
Selling overheads:		
Expenses for participation in Industrial exhibition	8,000	
		8,000
Distribution overheads:		
Depreciation on delivery van	6,000	
Warehousing charges	1,500	
		7,500
(v) Cost of Sales		5,81,960

Alternative Solution
(considering Hire charges paid for Plant as indirect expenses)

Statement of Cost for the month of March, 2021

Particulars	Amount (₹)	Amount (₹)
(i) Cost of Material Consumed:		
Raw materials purchased (₹ 2,00,000 – ₹ 40,000)	1,60,000	
Carriage inwards	20,000	
Add: Opening stock of raw materials	80,000	
Less: Closing stock of raw materials	(30, 000)	2,30,000
Direct Wages		1,20,000
Direct expenses:		
Cost of special drawing	30,000	30,000
(ii) Prime Cost		3,80,000
Hire charges paid for Plant	24,000	
Carriage on return	6,000	
Store overheads (10% of material consumed)	23,000	
Factory overheads (20% of Prime cost)	76,000	
Additional expenditure for rectification of defective	2,160	1,31,160
Products (refer working note)		50,000
Gross factory cost		(24, 000)
Add: Opening value of W-I-P		5,37,160
Less: Closing value of W-I-P		(5, 000)
(iii) Works/ Factory Cost		5,32,160
Less: Realisable value on sale of scrap		-
(iv) Cost of Production		-
Add: Opening stock of finished goods		5,36,960
Less: Closing stock of finished goods		
Cost of Goods Sold		
Administrative overheads:	2,000	
Maintenance of office building	25,000	
Salary paid to Office staff	2,500	29,500
Legal Charges		
Selling overheads:	8,000	8,000
Expenses for participation in Industrial exhibition	6,000	
Distribution overheads:	1,500	7,500
Depreciation on delivery van		5,77,160
Warehousing charges		
(v) Cost of Sales		

Working Notes:

1. Number of Rectified units

Total Output	8,000 units
Less: Rejected 10%	<u>800 units</u>
Finished product	<u>7,200 units</u>
Rectified units (10% of finished product)	<u>720 units</u>

2. Proportionate additional expenditure on 720 units

= 20% of proportionate direct wages
= 0.20 x (₹ 1,20,000/8,000) x 720
= ₹ 2,160

Q8. Jan 2021, 10 marks

The following data are available from the books and records of Q Ltd. for the month of April 2020:

Direct Labour Cost	= ₹ 1,20,000 (120% of Factory Overheads)
Cost of Sales	= ₹ 4,00,000

Sales = ₹ 5,00,000

Accounts show the following figures:

	1st April, 2020 (₹)	30th April, 2020 (₹)
Inventory:		
Raw material	20,000	25,000
Work-in-progress	20,000	30,000
Finished goods	50,000	60,000
Other details:		
Selling expenses		22,000
General & Admin. expenses		18,000

You are required to prepare a cost sheet for the month of April 2020 showing:

- Prime Cost
- Works Cost
- Cost of Production
- Cost of Goods sold
- Cost of Sales and Profit earned.

Answer

Cost Sheet for the Month of April 2020

Particulars	(₹)
Opening stock of Raw Material	20,000
Add: Purchases [Refer Working Note-2]	1,65,000
Less: Closing stock of Raw Material	(25, 000)
Raw material consumed	1,60,000
Add: Direct labour cost	1,20,000
Prime cost	2,80,000
Add: Factory overheads	1,00,000
Gross Works cost	3,80,000
Add: Opening work-in-progress	20,000
Less: Closing work-in-progress	(30, 000)
Works Cost	3,70,000
Cost of Production	3,70,000
Add: Opening stock of finished goods	50,000
Less: Closing stock of finished goods	(60, 000)
Cost of goods sold	3,60,000
Add: General and administration expenses*	18,000
Add: Selling expenses	22,000
Cost of sales	4,00,000
Profit {Balancing figure (₹ 5,00,000 – ₹ 4,00,000)}	1,00,000
Sales	5,00,000

*General and administration expenses have been assumed as not relating to the Production activity.

Working Note:

1. Computation of the raw material consumed

Particulars	₹
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Cost of Sales	4,00,000
Less: General and administration expenses	(18, 000)
Less: Selling expenses	(22, 000)
Cost of goods sold	3,60,000
Add: Closing stock of finished goods	60,000
Less: Opening stock of finished goods	(50, 000)
Cost of production/Gross works cost	3,70,000
Add: Closing stock of work-in-progress	30,000
Less: Opening stock of work-in-progress	(20, 000)
Works cost	3,80,000
Less: Factory overheads (1, 20,000÷120*100)	(1, 00,000)
Prime cost	2,80,000
Less: Direct labour	(1, 20,000)
Raw material consumed	1,60,000

2. Computation of the raw material purchased

Particulars	(₹)
Closing stock of Raw Material	25,000
Add: Raw Material consumed	1,60,000
Less: Opening stock of Raw Material	(20, 000)
Raw Material purchased	1,65,000

Q9. Nov 2020, 10 marks

X Ltd. Manufactures two types of pens 'Super Pen' and 'Normal Pen'. The cost data for the year ended 30th September, 2019 is as follows:

	(₹)
Direct Materials 8,00,000	8,00,000
Direct Wages 4,48,000	4,48,000
Production Overhead 1,92,000	1,92,000
Total 14,40,000	14,40,000

It is further ascertained that :

1. Direct materials cost in Super Pen was twice as much of direct material in Normal Pen.
2. Direct wages for Normal Pen were 60% of those for Super Pen.
3. Production overhead per unit was at same rate for both the types.
4. Administration overhead was 200% of direct labour for each.
5. Selling cost was ₹ 1 per Super pen.
6. Production and sales during the year were as follow :

Production		Sales	
	No. Of units		No. Of units
Super Pen	40,000	Super Pen	36,000
Normal Pen	1,20,000		

7. Selling price was ₹ 30 per unit for Super Pen.

Prepare a Cost Sheet for 'Super Pen' showing:

- i. Cost per unit and Total Cost
- ii. Profit per unit and Total Profit

Answer

Preparation of Cost Sheet for Super Pen

No. Of units produced = 40,000 units

No. Of units sold = 36,000 units

Particulars	Per Unit (₹)	Total (₹)
Direct materials (Working note- (i))	8.00	3,20,000
Direct wages (Working note- (ii))	4.00	1,60,000
Prime cost	12.00	4,80,000
Production overhead (Working note- (iii))	1.20	48,000
Factory Cost	13.20	5,28,000

Administration Overhead* (200% of Production Overhead)	8.00	3,20,000
	21.20	8,48,000
Cost of production	-	(84, 800)
Less: Closing stock (40,000 units – 36,000 units)	21.20	7,63,200
Cost of goods sold i.e. 36,000 units	1.20	36,000
Selling cost	22.20	7,99,200
Cost of sales/ Total cost	7.80	2,80,800
Profit	30.00	10,80,000
Sales value (₹ 30 × 36,000 units)		

Working Notes:

I. Direct material cost per unit of Disposable Mask = M

Direct material cost per unit of Cloth Mask = 2M

Total Direct Material cost = 2M × 40,000 units + M × 1,20,000 units

Or, ₹ 8,00,000 = 80,000 M + 1,20,000 M

Or, $M = \frac{₹8,00,000}{₹2,00,000} = ₹ 5$

Therefore, Direct material Cost per unit of Cloth Mask = 2 × ₹ 4 = ₹ 8

II. Direct wages per unit for Cloth Mask = W

Direct wages per unit for Disposable Mask = 0.6W

So, (W × 40,000) + (0.6W × 1,20,000) = ₹ 4,48,000

W = ₹4 per unit

Therefore, Direct material Cost per unit of Cloth Mask = ₹ 5

III. Production overhead per unit = $\frac{₹ 1,92,000}{40,000 + 1,20,000} = ₹ 1.2$

Production overhead for Cloth Mask = ₹ 1.2 × 40,000 units = ₹ 48,000 units

Administration overhead is specific to the product as it is directly related to direct labour as mentioned in the question and hence to be considered in cost of production only.

Assumption: It is assumed that in point (1) and (2) of the Question, direct materials cost and direct wages respectively is related to per unit only.

Note: Direct Material and Direct wages can be calculated in alternative ways.

Q10. Nov 2019, 10 marks

XYZ a manufacturing firm, has revealed following information for September ,2019:

September	1st September	30th
	(₹)	(₹)
Raw Materials	2,42,000	2,92,000
Works-in-progress	2,00,000	
5,00,000		

The firm incurred following expenses for a targeted production of 1,00,000 units during the month :

Consumable Stores and spares of factory	3,50,000
Research and development cost for process improvements	2,50,000
Quality control cost	2,00,000
Packing cost (secondary) per unit of goods sold	2
Lease rent of production asset	2,00,000
Administrative Expenses (General)	2,24,000
Selling and distribution Expenses	4,13,000
Finished goods (opening)	Nil
Finished goods (closing)	5000 units

Defective output which is 4% of targeted production, realizes ₹ 61 per unit.

Closing stock is valued at cost of production (excluding administrative expenses)

Cost of goods sold, excluding administrative expenses amounts to ₹ 78,26,000.

Direct employees cost is 1/2 of the cost of material consumed.

Selling price of the output is ₹ 110 per unit.

You are required to :

- (i) Calculate the Value of material purchased
(ii) Prepare cost sheet showing the profit earned by the firm.

Answer

Workings:

1. Calculation of Sales Quantity:

Particular	Units
Production units	1,00,000
Less: Defectives (4%×1,00,000 units)	4,000
Less: Closing stock of finished goods	5,000
No. of units sold	91,000

2. Calculation of Cost of Production

Particular	Amount (₹)
Cost of Goods sold (given)	78,26,000
Add: Value of Closing finished goods Rs 78,26,000 91,000 units × 5,000 units	4,30,000
Cost of Production	82,56,000

3. Calculation of Factory Cost

Particular	Amount (₹)
Cost of Production	82,56,000
Less: Quality Control Cost	(2,00,000)
Less: Research and Development Cost	(2,50,000)
Add: Credit for Recoveries/Scrap/By-Products/ misc. income (1,00,000 units × 4% × ₹ 61)	2,44,000
Factory Cost	80,50,000

4. Calculation of Gross Factory Cost

Particular	Amount (₹)
Cost of Factory Cost	80,50,000
Less: Opening Work in Process	(2,00,000)
Add: Closing Work in Process	5,00,000
Cost of Gross Factory Cost	83,50,000

5. Calculation of Prime Cost

Particular	Amount (₹)
Cost of Gross Factory Cost	83,50,000
Less: Consumable stores & spares	(3,50,000)
Less: Lease rental of production assets	(2,00,000)
Prime Cost	78,00,000

6. Calculation of Cost of Materials Consumed & Labour cost

Let Cost of Material Consumed = M and Labour cost = 0.5M

Prime Cost = Cost of Material Consumed + Labour Cost

$$78,00,000 = M + 0.5M$$

$$M = 52,00,000$$

Therefore, Cost of Material Consumed = ₹ 52,00,000 and

Labour Cost = ₹ 26,00,000

(i) Calculation of Value of Materials Purchased

Particular	Amount (₹)
Cost of Material Consumed	52,00,000
Add: Value of Closing stock	2,92,000
Less: Value of Opening stock	(2,42,000)
Value of Materials Purchased	52,50,000

Cost Sheet

Sl.	Particulars	Total Cost (₹)
1.	Direct materials consumed:	
	Opening Stock of Raw Material	2,42,000
	Add: Additions/ Purchases [balancing figure as per requirement (i)]	52,50,000
	Less: Closing stock of Raw Material	(2,92,000)
	Material Consumed	52,00,000
2.	Direct employee (labour) cost	26,00,000
3.	Prime Cost (1+2)	78,00,000
4.	Add: Works/ Factory Overheads	
	Consumable stores and spares	3,50,000
	Lease rent of production asset	2,00,000
5.	Gross Works Cost (3+4)	83,50,000
6.	Add: Opening Work in Process	2,00,000
7.	Less: Closing Work in Process	(5,00,000)
8.	Works/ Factory Cost (5+6-7)	80,50,000
9.	Add: Quality Control Cost	2,00,000
10.	Add: Research and Development Cost	2,50,000
11.	Less: Credit for Recoveries/Scrap/By-Products/misc. income	(2,44,000)
12.	Cost of Production (8+9+10-11)	82,56,000
13.	Add: Opening stock of finished goods	-
14.	Less: Closing stock of finished goods (5000 Units)	(4,30,000)
15.	Cost of Goods Sold (12+13-14)	78,26,000
16.	Add: Administrative Overheads (General)	2,24,000
17.	Add: Secondary packing	1,82,000
18.	Add: Selling Overheads& Distribution Overheads	4,13,000
19.	Cost of Sales (15+16+17+18)	86,45,000
20.	Profit	13,65,000
21.	Sales 91,000 units@ ₹ 110 per unit	1,00,10,000

Q11. May 2019, 10 marks

M/s Areeba Private Limited has a normal production capacity of 36,000 units of toys per annum. The estimated costs of production are as under:

- i. Direct Material ₹ 40 per unit
- ii. Direct Labour ₹ 30 per unit (subject to a minimum of ₹ 48,000 p.m.)
- iii. Factory Overheads:
 - a) Fixed ₹ 3,60,000 per annum
 - b) Variable ₹ 10 per unit

- c) Semi-variable ₹ 1,08,000 per annum up to 50% capacity and additional ₹ 46,800 for every 20% increase in capacity or any part thereof.
- iv. Administrative Overheads ₹ 5, 18,400 per annum (fixed)
- v. Selling overheads are incurred at ₹ 8 per unit.
- vi. Each unit of raw material yields scrap which is sold at the rate of ₹ 5 per unit.
- vii. In year 2019, the factory worked at 50% capacity for the first three months but it was expected that it would work at 80% capacity for the remaining nine months.
- viii. During the first three months, the selling price per unit was ₹ 145.

You are required to:

- (i) Prepare a cost sheet showing Prime Cost, Works Cost, Cost of Production and Cost of Sales.
- (ii) Calculate the selling price per unit for remaining nine months to achieve the total annual profit of ₹ 8,76,600.

Answer

Cost Sheet of M/s Areeba Pvt. Ltd. for the year 2019.

Normal Capacity: 36,000 units p.a.

Particulars	3 Months 4,500 Units		9 Months 21,600 units	
	Amount (₹)	Cost per unit (₹)	Amount (₹)	Cost per unit (₹)
Direct material	1,80,000			8,64,000
Less: Scrap	(22, 500)			(1, 08,000)
Materials consumed	1,57,500	35	7,56,000	35
Direct Wages	1,44,000	32	6,48,000	30
Prime Cost	3,01,500	67	14,04,000	65
Factory overheads:				
- Fixed	90,000			2,70,000
- Variable	45,000			2,16,000
- Semi variable	27,000	36	1,51,200	29.50
Works Cost	4,63,500	103	20,41,200	94.50
Add: Administrative overheads	1,29,600	28.80	3,88,800	18
Cost of Production	5,93,100	131.80	24,30,000	112.5
Selling Overheads	36,000	8	1,72,800	8
Cost of Sales	6,29,100	139.80	26,02,800	120.5

Working Notes:

1. Calculation of Costs

Particular	4,500 units Amount (₹)	21,600 units Amount (₹)
Material	1,80,000 (₹ 40 × 4,500 units)	8,64,000 (₹40 × 21,600 units)
Wages	1,44,000 (Max. of ₹ 30 × 4,500 units = ₹1,35,000 and ₹ 48,000 × 3 months = ₹1,44,000)	6,48,000 (21600 Units×30)
Variable Cost	45,000 (₹10 × 4,500 units)	2,16,000 (₹10 × 21,600 units)
Semi-variable Cost	27,000 ($\frac{₹ 1,08,000}{12 \text{ months}} \times 3 \text{ months}$)	27,000 ($\frac{₹ 1,08,000}{12 \text{ months}} \times 9 \text{ months}$)
		+46,800(for 20 % increase) +23,400(for 10% increase)
Selling Overhead	36,000 (₹8 × 4,500 units)	1,72,800(₹ 8 × 21,600 units)

Notes:

- Alternatively scrap of raw material can also be reduced from Work cost.
- Administrative overhead may be treated alternatively as a part of general overhead. In that case, Works Cost as well as Cost of Production will be same i.e. ₹ 4,63,500 and Cost of Sales will remain same as ₹ 6,29,100.

(ii) Calculation of Selling price for nine months period

Particulars	Amount (₹)
Total Cost of sales ₹ (6,29,100+26,02,800)	32,31,900
Add: Desired profit	8,76,600
Total sales value	41,08,500
Less: Sales value realised in first three months (₹145 × 4,500 units)	(6, 52,500)
Sales Value to be realised in next nine months	34,56,000
No. of units to be sold in next nine months	21,600
Selling price per unit (₹ 34,56,000 ÷ 21,600 units)	160

Q12. Nov 2018, 10 marks

Following details are provided by M/s ZIA Private Limited for the quarter ending 30 September, 2018:

(i)	Direct expenses	₹ 1,80,000
(ii)	Direct wages being 175% of factory overheads	₹ 2,57,250
(iii)	Cost of goods sold	₹ 18,75,000
(iv)	Selling & distribution overheads	₹ 60,000
(v)	Sales	₹ 22,10,000
(vi)	Administration overheads are 10% of factory overheads	

Stock details as per Stock Register:

Particulars	30.06.2018 (₹)	30.06.2018 (₹)
Raw material	2,45,600	2,08,000
Work-in-progress	1,70,800	1,90,000
Finished goods	3,10,000	2,75,000

You are required to prepare a cost sheet showing:

- Raw material consumed
- Prime cost
- Factory cost
- Cost of goods sold
- Cost of sales and profit

Answer

Cost Sheet
(for the quarter ending 30 September 2018)

	Amount(₹)
(i) Raw materials consumed	
Opening stock of raw material	2,45,600
Add: Purchase of materials	12,22,650*
Less: Closing stock of raw materials	(2, 08,000)
Raw materials consumed	12,60,250
Add: Direct wages (1,47,000×175%)	2,57,250
Direct Expenses	1,80,000
(ii) Prime cost	16,97,500
Add: Factory overheads (2,57,250/175%)	1,47,000
Gross Factory cost	18,44,500
Add: Opening work-in-process	1,70,800
Less: Closing work-in-process	(1, 90,000)
(iii) Factory cost	18,25,300
Add: Administration overheads (10% of factory overheads)	14,700
Add: Opening stock of finished goods	3,10,000
Less: Closing stock of finished goods	(2, 75,000)
(iv) Cost of goods sold	18,75,000
Add: Selling & distribution overheads	60,000
Cost of sales	19,35,000
(v) Net Profit	2,75,000
Sales	22,10,000

$$*(18,75,000 + 2,75,000 - 3,10,000 - (1,47,000 \times 10\%) + 1,90,000 - 1,70,800 - (2,57,250 \times 100/175\%) - 1,80,000 - 2,57,250 + 2,08,000 - 2,45,600) = 12,22,650$$

Working notes

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material

Raw material consumed = Prime cost - Direct wages - Direct expenses

Factory Overheads = $2,57,250 \times 100/175$

Prime cost = Factory cost + Closing WIP - Opening WIP - Factory overheads

Factory Cost = Cost of Production goods sold + Closing stock of Finished goods - Opening stock of finished goods - Administrative overheads

Net Profit = Sales - Cost of sales

Alternative solution

Cost Sheet (for the quarter ending 30 September 2018)

	Amount (₹)
(i) Raw materials consumed	
Opening stock of raw material	2,45,600
Add: Purchase of materials	12,37,350*
Less: Closing stock of raw materials	(2, 08,000)
Raw materials consumed	12,74,950
Add: Direct wages (1,47,000×175%)	2,57,250
Direct Expenses	<u>1,80,000</u>
(ii) Prime cost	17,12,200
Add: Factory overheads (2,57,250/175%)	1,47,000
Gross Factory cost	18,59,200
Add: Opening work-in-process	1,70,800
Less: Closing work-in-process	<u>(1, 90,000)</u>
(iii) Factory cost/ work cost / cost of production	18,40,000
Add: Opening stock of finished goods	3,10,000
Less: Closing stock of finished goods	<u>(2, 75,000)</u>
(iv) Cost of goods sold	18,75,000
Add: Administration overheads (10% of factory overheads)	14,700
Add: Selling & distribution overheads	<u>60,000</u>
Cost of sales	19,49,700
(v) Net Profit	<u>2,60,300</u>
Sales	22,10,000

$$*(18,75,000 + 2,75,000 - 3,10,000 + 1,90,000 - 1,70,800 - 1,47,500 - 1,80,000 - 2,57,250 + 2,08,000 - 2,45,600) = 12,37,350$$

Working notes

Purchase of raw materials = Raw material consumed + Closing stock - opening stock of raw material

Raw material consumed = Prime cost - Direct wages - Direct expenses

Factory Overheads = $257250 \times 100/175$

Prime cost = Factory cost + Closing WIP - Opening WIP - Factory overheads

Factory Cost = Cost of Production goods sold + Closing stock of Finished goods - Opening stock of finished goods

Net Profit = Sales - Cost of sales

Q13. May 2018, 10 marks | May 2019 RTP

Following information relate to a manufacturing concern for the year ended 31st March, 2018:

	₹
--	---

Raw Material (opening)	2,28,000
Raw Material (closing)	3,05,000
Purchases of Raw Material	42,25,000
Freight Inwards	1,00,000
Direct wages paid	12,56,000
Direct wages-outstanding at the end of the year	1,50,000
Factory Overheads	20% of prime cost
Work-in-progress (opening)	1,92,500
Work-in-progress (closing)	1,40,700
Administrative Overheads (related to production)	1,73,000
Distribution Expenses	₹16 per unit
Finished Stock (opening)-1217 Units	6,08,500
Sale of scrap of material	8,000

The firm produced 14000 units of output during the year. The stock of finished goods at the end of the year is valued at cost of production. The firm sold 14153 units at a price of ₹ 618 per unit during the year.

Prepare cost sheet of the firm.

Answer

Cost sheet for the year ended 31st March, 2018.

Units produced - 14,000 units

Units sold - 14,153 units

Particulars	Amount (₹)
Raw materials purchased	42,25,000
Add: Freight Inward	1,00,000
Add: Opening value of raw materials	2,28,000
Less: Closing value of raw materials	(3, 05,000)
	42,48,000
Less: Sale of scrap of material	8,000
Materials consumed	42,40,000
Direct Wages (12,56,000 + 1,50,000)	14,06,000
Prime Cost	56,46,000
Factory overheads (20% of ₹ Prime Cost)	11,29,200
Add: Opening value of W-I-P	1,92,500
Less: Closing value of W-I-P	(1,40,700)
Factory Cost	68,27,000
Add: Administrative overheads	1,73,000
Cost of Production	70,00,000
Add: Value of opening finished stock	6,08,500
Less: Value of closing finished stock	
[₹ 500 (70,00,000/14,000) × 1,064]	
(1,217 + 14,000 – 14,153 = 1,064 units)	(5, 32,000)
Cost of Goods Sold	70,76,500
Distribution expenses (₹ 16 × 14,153 units)	2,26,448
Cost of Sales	73,02,948
Profit (Balancing figure)	14,43,606
Sales (₹ 618 × 14,153 units)	87,46,554

Q14. May 2023 RTP | May 2020 RTP | Nov 2018 RTP

From the following data of Motilal Ltd., CALCULATE Cost of production:

		(₹)
(i)	Repair & maintenance paid for plant & machinery	9,80,500
(ii)	Insurance premium paid for inventories	26,000
(iii)	Insurance premium paid for plant & machinery	96,000
(iv)	Raw materials purchased	64,00,000

(v)	Opening stock of raw materials	2,88,000
(vi)	Closing stock of raw materials	4,46,000
(vii)	Wages paid	23,20,000
(viii)	Value of opening Work-in-process	4,06,000
(ix)	Value of closing Work-in-process	6,02,100
(x)	Quality control cost for the products in manufacturing process	86,000
(xi)	Research & development cost for improvement in production	92,000
(xii)	Process	
	Administrative cost for:	9,00,000
	- Factory & production	11,60,000
(xiii)	- Others	9,200
(xiv)	Amount realised by selling scrap generated during the	10,200
(xv)	manufacturing process	8,90,000
	Packing cost necessary to preserve the goods for further Processing	
	Salary paid to Director (Technical)	

Answer

Calculation of Cost of Production of Motilal Ltd for the period.....

Particulars	(₹)
Raw materials purchased	64,00,000
Add: Opening stock	2,88,000
Less: Closing stock	(4, 46,000)
Material consumed	62,42,000
Wages paid	23,20,000
Prime cost	85,62,000
Repair and maintenance cost of plant & machinery	9,80,500
Insurance premium paid for inventories	26,000
Insurance premium paid for plant & machinery	96,000
Quality control cost	86,000
Research & development cost	92,600
Administrative overheads related with factory and production	9,00,000
	1,07,43,100
Add: Opening value of W-I-P	4,06,000
Less: Closing value of W-I-P	(6, 02,100)
	1,05,47,000
Less: Amount realised by selling scrap	(9, 200)
Add: Primary packing cost	10,200
Cost of Production	1,05,48,000

Notes:

- Other administrative overhead does not form part of cost of production.
- Salary paid to Director (Technical) is an administrative cost.

Q15. Nov 2022 RTP

CT Limited is engaged in producing medical equipment. It has furnished following details related to its products produced during a month:

	Units	Amount(₹)
Raw materials		
Opening stock	1,000	90,00,000
Purchases	49,000	44,10,00,000
Closing stock	1,750	1,57,50,000
Works-in-progress		
Opening	2,000	1,75,50,000
Closing	1,000	94,50,000
Direct employees' wages, allowances etc.		6,88,50,000
Primary packaging cost (per unit)		1,440

R&D expenses & Quality control expenses		2,10,60,000
Consumable stores, depreciation on plant		3,42,00,000
Administrative overheads related to production		3,15,00,000
Selling expenses		4,84,30,800
Royalty paid for production		3,64,50,000
Cost of web-site (for online sale) maintenance		60,75,000
Secondary packaging cost (per unit)		225

There was a normal scrap of 250 units of direct material which realized ₹ 5,400 per unit. The entire finished product was sold at a profit margin of 20% on sales.

You are required to PREPARE a cost sheet showing:

- Prime cost
- Gross works cost
- Factory costs
- Cost of production
- Profit
- Sales

Answer

Cost Sheet

Particulars	Units	Amount (₹)
Material		
Opening stock	1,000	90,00,000
Add: Purchases	49,000	44,10,00,000
Less: Closing stock	(1,750)	(1,57,50,000)
	48,250	43,42,50,000
Less: Normal wastage of materials realized @ ₹ 5,400 per unit	(250)	(13,50,000)
Material consumed		43,29,00,000
Direct employee's wages and allowances		6,88,50,000
Direct expenses- Royalty paid for production		3,64,50,000
Prime cost	48,000	53,82,00,000
Factory overheads - Consumable stores, depreciation etc.		3,42,00,000
Gross Works Cost	48,000	57,24,00,000
Add: Opening WIP	2,000	1,75,50,000
Less: Closing WIP	(1,000)	(94,50,000)
Factory/Works Cost	49,000	58,05,00,000
Administration Overheads related to production		3,15,00,000
R&D expenses and Quality control cost		2,10,60,000
Add: Primary packaging cost @ ₹ 1,440 per unit		7,05,60,000
Cost of production	49,000	70,36,20,000
Selling expenses		4,84,30,800
Cost of maintaining website for online sale		60,75,000
Secondary packaging cost @ ₹ 225 per unit 49,000		1,10,25,000
Cost of sales		76,91,50,800
Add: Profit @ 20% on sales or 25% of cost		19,22,87,700
Sales value		96,14,38,500

Q16. May 2022 RTP | Nov 2023 RTP

A Ltd. produces a single product X. During the month of December 2021, the company has produced 14,560 tonnes of X. The details for the month of December 2021 are as follows:

- Materials consumed ₹ 15,00,000
- Power consumed 13,000 Kwh @ ₹ 7 per Kwh
- Diesels consumed 1,000 litres @ ₹ 93 per litre
- Wages & salary paid – ₹ 64,00,000
- Gratuity & leave encashment paid – ₹ 44,20,000
- Hiring charges paid for HEMM- ₹ 13,00,000

- vii. Hiring charges paid for cars used for official purpose – ₹ 80,000
- viii. Reimbursement of diesel cost for the cars – ₹ 20,000
- ix. The hiring of cars attracts GST under RCM @5% without credit.
- x. Maintenance cost paid for weighing bridge (used for weighing of final goods at the time of despatch) – ₹7,000
- xi. AMC cost of CCTV installed at weighing bridge (used for weighing of final goods at the time of despatch) and factory premises is ₹ 6,000 and ₹ 18,000 per month respectively.
- xii. TA/ DA and hotel bill paid for sales manager- ₹ 16,000
- xiii. The company has 180 employees works for 26 days in a month.

Required:

- a) PREPARE a Cost sheet for the month of December 2021.
- b) COMPUTE Earnings per manshift (EMS) and Output per manshift (OMS) for the month of December 2021.

Answer

Cost Sheet of A Ltd. for the month of December 2021

Particulars	Amount (₹)	Amount (₹)
Materials consumed		15,00,000
Wages & Salary	64,00,000	
Gratuity & leave encashment	44,20,000	1,08,20,000
Power cost (13,000 kwh × ₹ 7)	91,000	
Diesel cost (1,000 ltr × ₹ 93)	93,000	1,84,000
HEMM hiring charges		13,00,000
Prime Cost		1,38,04,000
AMC cost of CCTV installed at factory premises		18,000
Cost of Production/ Cost of Goods Sold		1,38,22,000
Hiring charges of cars	80,000	
Reimbursement of diesel cost	20,000	
	1,00,000	
Add: GST @5% on RCM basis	5,000	1,05,000
Maintenance cost for weighing bridge	7,000	
AMC cost of CCTV installed at weigh bridge	6,000	
		13,000
TA/ DA & hotel bill of sales manager		16,000
Cost of Sales		1,39,56,000

Q17. Nov 2021 RTP | May 2024 RTP

Impact Ltd. provides you the following details of its expenditures for the year ended 31st March, 2021:

S. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Raw materials purchased		5,00,00,000
(ii)	GST paid under Composition scheme		10,00,000
(iii)	Freight inwards		5,20,600
(iv)	Trade discounts received		10,00,000
(v)	Wages paid to factory workers		15,20,000
(vi)	Contribution made towards employees' PF & ESIS		1,90,000
(vii)	Production bonus paid to factory workers		1,50,000
(viii)	Fee for technical assistance		1,12,000
(ix)	Amount paid for power & fuel		2,62,000
(x)	Job charges paid to job workers		4,50,000
(xi)	Stores and spares consumed		1,10,000
(xii)	Depreciation on:		
	Factory building	64,000	
	Office building	46,000	

	Plant & Machinery	86,000	1,96,000
(xiii)	Salary paid to supervisors		1,20,000
(xiv)	Repairs & Maintenance paid for:		
	Plant & Machinery	58,000	
	Sales office building	50,000	
	Vehicles used by directors	20,600	1,28,600
(xv)	Insurance premium paid for:		
	Plant & Machinery	31,200	
	Factory building	28,100	59,300
(xvi)	Expenses paid for quality control check activities		25,000
(xvii)	Research & development cost paid for improvement in production process		48,200
(xviii)	Expenses paid for administration of factory work		1,38,000
(xix)	Salary paid to functional managers:		
	Production control	4,80,000	
	Finance & Accounts	9,60,000	
	Sales & Marketing	12,00,000	26,40,000
(xx)	Salary paid to General Manager		13,20,000
(xxi)	Packing cost paid for:		
	Primary packing necessary to maintain quality	1,06,000	
	For re-distribution of finished goods	1,12,000	
(xxii)	Interest and finance charges paid (for usage of non-equity fund)		2,18,000
(xxiii)	Fee paid to auditors		3,50,000
(xxiv)	Fee paid to legal advisors		1,80,000
(xxv)	Fee paid to independent directors		1,20,000
(xxvi)	Payment for maintenance of website for online sales		2,40,000
(xxvii)	Performance bonus paid to sales staffs		
	Value of stock as on 1st April, 2020:	9,00,000	
	Raw materials	4,00,000	
	Work-in-process	7,00,000	
(xxviii)	Finished goods		20,00,000
	Value of stock as on 31st March, 2021:		
	Raw materials	5,60,000	
	Work-in-process	2,50,000	
	Finished goods	11,90,000	20,00,000

Amount realized by selling of waste generated during manufacturing process – ₹ 66,000/-

From the above data, you are required to PREPARE Statement of cost of Impact Ltd. for the year ended 31st March, 2021, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Answer

Statement of Cost of Impact Ltd. for the year ended 31st March, 2021:

Sl. No.	Particulars		Amount (₹)
(i)	Material Consumed:		
	Raw materials purchased	5,00,00,000	
	GST paid under Composition scheme*	10,00,000	
	Freight inwards	5,20,600	
	Less: Trade discounts received	(10,00,000)	
	Add: Opening stock of raw materials	9,00,000	
	Less: Closing stock of raw materials	(5,60,000)	5,08,60,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers	15,20,000	
	Contribution made towards employees' PF & ESIS	1,90,000	
	Production bonus paid to factory workers	1,50,000	18,60,000
(iii)	Direct expenses:		

	Fee for technical assistance	1,12,000	
	Amount paid for power & fuel	2,62,000	
	Job charges paid to job workers	4,50,000	8,24,000
	Prime Cost		5,35,44,600
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,10,000	
	Depreciation on factory building	64,000	
	Depreciation on plant & machinery	86,000	
	Repairs & Maintenance paid for plant & machinery	58,000	
	Insurance premium paid for plant & machinery	31,200	
	Insurance premium paid for factory building	28,100	
	Salary paid to supervisors	1,20,000	4,97,300
	Gross factory cost		5,40,41,900
	Add: Opening value of W-I-P		4,00,000
	Less: Closing value of W-I-P		(2,50,000)
	Factory Cost		5,41,91,900
(v)	Quality control cost:		
	Expenses paid for quality control check activities		25,000
(vi)	Research & development cost paid for improvement in production process		48,200
(vii)	Administration cost related with production:		
	-Expenses paid for administration of factory work	1,38,000	
	-Salary paid to Production control manager	4,80,000	6,18,000
(viii)	Less: Realisable value on sale of scrap and waste		(66,000)
(ix)	Add: Primary packing cost		1,06,000
	Cost of Production		
	Add: Opening stock of finished goods		5,49,23,100
	Less: Closing stock of finished goods		7,00,000
	Cost of Goods Sold		(11,90,000)
(x)	Administrative overheads:		5,44,33,100
	Depreciation on office building	46,000	
	Repairs & Maintenance paid for vehicles used by directors	20,600	
	Salary paid to Manager- Finance & Accounts	9,60,000	
	Salary paid to General Manager	13,20,000	
	Fee paid to auditors	1,80,000	
	Fee paid to legal advisors	1,20,000	
	Fee paid to independent directors	2,40,000	28,86,600
(xi)	Selling overheads:		
	Repairs & Maintenance paid for sales office Building	50,000	
	Salary paid to Manager- Sales & Marketing	12,00,000	
	Payment for maintenance of website for online sales	1,80,000	
(xii)		2,40,000	16,70,000
(xiii)	Performance bonus paid to sales staffs		
	Packing cost paid for re-distribution of finished goods		1,12,000
	Interest and finance charges paid		3,50,000
	Cost of Sales		5,94,51,700

* GST paid under Composition scheme would be included under cost of material as it is not eligible for input tax credit

Q18. May 2021 RTP

RTA Ltd. has the following expenditures for the year ended 31st December, 2020:

S. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Raw materials purchased		5,00,00,000
(ii)	Freight inwards		9,20,600

(iii)	Wages paid to factory workers		25,20,000
(iv)	Royalty paid for production		1,80,000
(v)	Amount paid for power & fuel		3,50,000
(vi)	Job charges paid to job workers		3,10,000
(vii)	Stores and spares consumed		1,10,000
(viii)	Depreciation on Office building		50,000
(ix)	Repairs & Maintenance paid for:		
	Plant & Machinery	40,000	
	Sales office building	20,000	60,000
(x)	Insurance premium paid for:		
	Plant & Machinery	28,200	
	Factory building	18,800	47,000
(xi)	Expenses paid for quality control check activities		18,000
(xii)	Research & development cost paid for improvement in production process		20,000
(xiii)	Expenses paid for pollution control and maintenance service		36,000
(xiv)	Salary paid to Sales & Marketing managers		5,60,000
(xv)	Salary paid to General Manager		6,40,000
(xvi)	Packing cost paid for:		
	Primary packing necessary to maintain quality	46,000	
(xvii)	For re-distribution of finished goods	80,000	1,26,000
(xviii)	Fee paid to independent directors		1,20,000
(xix)	Performance bonus paid to sales staffs		1,20,000
	Value of stock as on 1st January, 2020:		
	Raw materials	10,00,000	
	Work-in-process	8,60,000	
	Finished goods	12,00,000	30,60,000
(xx)	Value of stock as on 31st December, 2021:		
	Raw materials		
	Work-in-process	8,40,000	
	Finished goods	6,60,000	
		10,50,000	25,50,000

Amount realized by selling of scrap and waste generated during manufacturing process – ₹ 48,000/-

From the above data you are requested to PREPARE Statement of Cost for RTA Ltd. for the year ended 31st December, 2020, showing (i) Prime cost, (ii) Factory cost, (iii) Cost of Production, (iv) Cost of goods sold and (v) Cost of sales.

Answer

Statement of Cost of RTA Ltd. for the year ended 31st December, 2020:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	Raw materials purchased	5,00,00,000	
	Freight inwards	9,20,600	
	Add: Opening stock of raw materials	10,00,000	
	Less: Closing stock of raw materials	(8,40,000)	5,10,80,600
(ii)	Direct employee (labour) cost:		
	Wages paid to factory workers		25,20,000
(iii)	Direct expenses:		
	Royalty paid for production	1,80,000	
	Amount paid for power & fuel	3,50,000	
	Job charges paid to job workers	3,10,000	8,40,000
	Prime Cost		5,44,40,600
(iv)	Works/ Factory overheads:		
	Stores and spares consumed	1,10,000	

	Repairs & Maintenance paid for plant & machinery	40,000	
	Insurance premium paid for plant & machinery	28,200	
	Insurance premium paid for factory building	18,800	
	Expenses paid for pollution control and maintenance service	36,000	2,33,000
	Gross factory cost		5,46,73,600
	Add: Opening value of W-I-P		8,60,000
	Less: Closing value of W-I-P		(6,60,000)
(v)	Factory Cost		5,48,73,600
	Quality control cost:		18,000
(vi)	Expenses paid for quality control check activities		
(vii)	Research & development cost paid for improvement in production process		20,000
(viii)	Less: Realisable value on sale of scrap and waste		(48,000)
	Add: Primary packing cost		46,000
	Cost of Production		5,49,09,600
	Add: Opening stock of finished goods		12,00,000
	Less: Closing stock of finished goods		(10,50,000)
(ix)	Cost of Goods Sold		5,50,59,600
	Administrative overheads:		
	Depreciation on office building	50,000	
	Salary paid to General Manager	6,40,000	
(x)	Fee paid to independent directors	1,20,000	8,10,000
	Selling overheads:		
	Repairs & Maintenance paid for sales office Building	20,000	
	Salary paid to Manager- Sales & Marketing	5,60,000	
(xi)	Performance bonus paid to sales staffs	1,20,000	7,00,000
	Distribution overheads:		
	Packing cost paid for re-distribution of finished goods		80,000
	Cost of Sales		5,66,49,600

Q19. Nov 2020 RTP

The following details are available from the books of R Ltd. for the year ending 31st March 2020:

Particulars	Amount (₹)
Purchase of raw materials	84,00,000
Consumable materials	4,80,000
Direct wages	60,00,000
Carriage inward	1,72,600
Wages to foreman and store-keeper	8,40,000
Other indirect wages to factory staffs	1,35,000
Expenditure on research and development on new production technology	9,60,000
Salary to accountants	7,20,000
Employer's contribution to EPF & ESI	28,00,000
Cost of power & fuel	12,60,000
Production planning office expenses	14,30,000
Salary to delivery staffs	2,80,000
Income tax for the assessment year 2019-20	1,80,000
Fees to statutory auditor	80,000
Fees to cost auditor	9,40,000
Fees to independent directors	1,10,000
Donation to PM-national relief fund	2,82,60,000
Value of sales	
Position of inventories as on 01-04-2019:	
- Raw Material	6,20,000
- W-I-P	7,84,000

- Finished goods	14,40,000
Position of inventories as on 31-03-2020:	
- Raw Material	4,60,000
- W-I-P	6,64,000
- Finished goods	9,80,000

From the above information PREPARE a cost sheet for the year ended 31st March 2020.

Answer

Statement of Cost of R Ltd. for the year ended 31st March, 2020:

Sl. No.	Particulars	Amount (₹)	Amount (₹)
(i)	Material Consumed:		
	- Raw materials purchased	84,00,000	
	- Carriage inward	1,72,600	
	Add: Opening stock of raw materials	6,20,000	
	Less: Closing stock of raw materials	(4,60,000)	87,32,600
(ii)	Direct employee (labour) cost:		
	- Direct wages	60,00,000	
	- Employer's Contribution towards PF & ESIS	7,20,000	67,20,000
(iii)	Direct expenses:		
	- Consumable materials	4,80,000	
	- Cost of power & fuel	28,00,000	32,80,000
	Prime Cost		1,87,32,600
(iv)	Works/ Factory overheads:		
	- Wages to foreman and store keeper	8,40,000	
	Other indirect wages to factory staffs	1,35,000	9,75,000
	Gross factory cost		1,97,07,600
	Add: Opening value of W-I-P		7,84,000
	Less: Closing value of W-I-P		(6,64,000)
	Factory Cost		1,98,27,600
(v)	Research & development cost paid for improvement in production process		9,60,000
(vi)	Production planning office expenses		12,60,000
	Cost of Production		2,20,47,600
	Add: Opening stock of finished goods		14,40,000
	Less: Closing stock of finished goods		(9,80,000)
	Cost of Goods Sold		2,25,07,600
(vii)	Administrative overheads:		
	- Salary to accountants	7,20,000	
	- Fees to statutory auditor	1,80,000	
	- Fees to cost auditor	80,000	
	- Fee paid to independent directors	9,40,000	19,20,000
(viii)	Selling overheads & Distribution overheads:		
	- Salary to delivery staffs		14,30,000
	Cost of Sales		2,58,57,600
	Profit (balancing figure)		24,02,400
	Sales		2,82,60,000

Note: Income tax and Donation to PM National Relief Fund is avoided in the cost sheet.

Q20. May 2018 RTP

From the following figures, CALCULATE cost of production and profit for the month of March 2018.

	Amount (₹)		Amount (₹)
Stock on 1st March, 2018		Purchase of raw materials	28,57,000
- Raw materials	6,06,000	Sale of finished goods	1,34,00,000
- Finished goods	3,59,000	Direct wages	37,50,000

Stock on 31st March, 2018	7,50,000	Factory expenses	21,25,000
- Raw materials	3,09,000	Office and administration Expenses	10,34,000
- Finished goods		Selling and distribution expenses	7,50,000
Work-in-process:	12,56,000		
- On 1st March, 2018	14,22,000	Sale of scrap	26,000
- On 31st March, 2018			

Answer

Calculation of Cost of Production and Profit for the month ended April 2018:

Particulars	Amount (₹)	Amount (₹)
Materials consumed:		
- Opening stock	6,06,000	
Add: Purchases	28,57,000	
	34,63,000	
- Less: Closing stock	(7,50,000)	27,13,000
Direct wages		37,50,000
Prime cost		64,63,000
Factory expenses		21,25,000
		85,88,000
Add: Opening W-I-P		12,56,000
Less: Closing W-I-P		(14,22,000)
Factory cost		84,22,000
Less: Sale of scrap 5		(26,000)
Cost of Production		83,96,000
Add: Opening stock of finished goods		6,06,000
Less: Closing stock of finished goods		(3,59,000)
Cost of Goods Sold		86,43,000
Office and administration expenses		10,34,000
Selling and distribution expenses		7,50,000
Cost of Sales		1,04,27,000
Profit (balancing figure)		29,73,000
Sales		1,34,00,000

Q1. Nov 2023, 7 marks:

S.K. Manufacturing Co. Ltd. showed a net profit of ₹ 5,40,400 as per their cost accounts for the year ended 31.03.2004. However, the financial books disclosed a net profit of ₹ 2,60,500 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of books:

	₹
Factory overheads under absorbed	84,800
Administrative overheads over absorbed	24,000
Interest paid on bank borrowings	50,000
Interest & Dividend received	65,200
Notional rent of own premises charged in cost accounts	60,000
Losses on the sales of fixed assets and investments	48,000
Donations and subscriptions	18,800
Overvaluation of closing stock of finished goods in Costaccounts	1,25,000
Store adjustments (credited in financial books)	7,500
Depreciation over charged in cost accounts	40,000
Income tax provided	1,50,000

You are required to:

- (i) Prepare a reconciliation statement taking net profit as per cost accounts as base.
- (ii) State when is the reconciliation statement of Cost and Financial accounts not required?

Answer:

Statement of Reconciliation of profit as obtained under Cost and Financial Accounts

	(₹)	(₹)
Profit as per Cost Records		5,40,400
Add: Administrative Overhead overabsorbed	24,000	
Interest & Dividend Received	65,200	
Notional rent of own premises	60,000	
Stores adjustments (credited in financial books)	7,500	
Depreciation over charged in costaccounts	40,000	1,96,700
		7,37,100
Less: Factory overheads under absorbed	84,800	
Interest paid on bank borrowings	50,000	
Losses on sale of fixed assets and investments	48,000	
Donations and subscriptions	18,800	
Over-valuation of closing stock offinished goods in cost accounts	1,25,000	
Income tax	1,50,000	(4,76,600)
Profit as per Financial Records		2,60,500

Circumstances where reconciliation statement can be avoided: When the Cost and Financial Accounts are integrated - there is no need to have a separate reconciliation statement between

the two sets of accounts. Integration means that the same set of accounts fulfil the requirement of both i.e., Cost and Financial Accounts.

Q2. Nov 2023, 4 marks:

Construct journal entries in the following situations assuming that cost and financial transactions are integrated:

- (i) Purchase of raw material ₹ 4,40,000
- (ii) Direct Material issued to production ₹ 3,60,000
- (iii) Wages charged to production ₹ 80,000
- (iv) Manufacturing overheads charged to production ₹ 1,32,000

Answer:

Journal entries are as follows

		DR. (₹)	Cr. (₹)
Stores Ledger Control A/c	Dr.	4,40,000	
To Payables (Creditors)/ Bank A/c			4,40,000
(Materials purchased)			
Work-in-Process Control A/c	Dr.	3,60,000	
To Stores Ledger Control A/c (Materials issued to production)			3,60,000
Work-in-Process Control A/c To	Dr.	80,000	
Wages Control A/c			80,000
(Direct wages charged to production)			
Work-in-Process Control A/c	Dr.	1,32,000	
To Factory Overhead Control A/c (Manufacturing overhead charged to production)			1,32,000

Q3. Nov 2022, 5 marks:

X Ltd. follows Non-Integrated Accounting System. Financial Accounts of the company show a Net Profit of ₹ 5,50,000 for the year ended 31st March, 2022. The chief accountant of the company has provided following information from the Financial Accounts and Cost Accounts:

Sr. No.	Particulars	(₹)
i.	Legal Charges Provided in Financial accounts	15,250
ii.	Interim Dividend received credited in financial accounts	4,50,000
iii.	Preliminary Expenses written off in financial accounts	25,750
iv.	Over recovery of selling overheads in cost accounts	11,380
v.	Profit on sale of capital asset credited in financial accounts	30,000
vi.	Under valuation of closing stock in cost accounts	25,000
vii.	Over recovery of production overheads in cost accounts	10,200
viii.	Interest paid on Debentures shown in financial accounts	50,000

Required:

Find out the Profit (Loss) as per Cost Accounts by preparing a Reconciliation Statement.

Answer

Reconciliation Statement

(Reconciliation the profit as per financial records with the profit as per costing records)

Particulars	(₹)	Total (₹)
Profit as per Financial Accounts		5,50,000
Add:		
Legal Charges	15,250	
Preliminary expenses written off	25,750	
Interest paid	50,000	91,000
		6,41,000
Less:		
Under-valuation of closing stock in cost book	25,000	
Interim Dividend Received	4,50,000	
Over recovery of selling overheads in cost accounts	11,380	
Over recovery of production overhead in cost accounts	10,200	
Profit on sale of Assets	30,000	5,26,580
Profit as per Cost Accounts		1,14,420

Q4. May 2022, 5 marks

Journalize the following transactions assuming the cost and financial accounts are integrated:

Particulars	Amount (₹)
Direct Materials issued to production	₹ 5,88,000
Allocation of Wages (Indirect)	₹ 7,50,000
Factory Overheads (Over absorbed)	₹ 2,25,000
Administrative Overheads (Under absorbed)	₹ 1,55,000
Deficiency found in stock of Raw material (Normal)	₹ 2,00,000

Answer

Particulars	(₹)	(₹)
(i) Work-in-Progress Ledger Control A/c Dr. To Stores Ledger Control A/c (Being issue of direct materials to production)	5,88,000	5,88,000
(ii) Factory Overhead control A/c Dr. To Wages Control A/c (Being allocation of Indirect wages)	7,50,000	7,50,000
(iii) Factory Overhead Control A/c Dr. To Costing Profit & Loss A/c (Being transfer of over absorption of Factory overhead)	2,25,000	2,25,000
(iv) Costing Profit & Loss A/c Dr. To Administration Overhead Control A/c (Being transfer of under absorption of Administration overhead)	1,55,000	1,55,000
(v) Factory Overhead Control A/c Dr. To Stores Ledger Control A/c (Being transfer of deficiency in stock of raw material)	2,00,000	2,00,000

(Note: Costing P/L = P/L and SLC = MLC)

Q5. Dec 2021, 5 marks

R Ltd. showed a Net Profit of ₹ 3,60,740 as per their cost accounts for the year ended 31st March, 2021.

The following information was revealed as a result of scrutiny of the figures from the both sets of accounts:

Sr. No.	Particulars	(₹)
---------	-------------	-----

i.	Over recovery of selling overheads in cost accounts	10,250
ii.	Over valuation of closing stock in cost accounts	7,300
iii.	Rent received credited in financial accounts	5,450
iv.	Bad debts provided in financial accounts	3,250
v.	Income tax provided in financial accounts	15,900
vi.	Loss on sale of capital asset debited in financial accounts	5,800
vii.	Under recovery of administration overheads in cost accounts	3,600

Required:

Prepare a reconciliation statement showing the profit as per financial records.

Answer

Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Net Profit as per Cost Accounts		3,60,740
Add:		
Over recovery of selling overheads in cost accounts	10,250	
Rent received credited in financial accounts	5,450	15,700
		376,440
Less:		
Over valuation of closing stock in cost accounts	7,300	
Bad debts provided in financial accounts	3,250	
Income tax provided in financial accounts	15,900	
Loss on sale of capital asset debited in financial accounts	5,800	
Under recovery of administration overheads in cost accounts	3,600	35,850
Profit as per Financial Accounts		3,40,590

Q6. July 2021, 10 marks

The Profit and Loss account of ABC Ltd. for the year ended 31st March, 2021 is given below:

Profit and Loss account
(for the year ended 31st March, 2021)

To Direct Material	6,50,000	By Sales (15000 units)	15,00,000
To Direct Wages	3,50,000	By Dividend received	9,000
To Factory overheads	2,60,000		
To Administrative overheads	1,05,000		
To Selling overheads	85,000		
To Loss on sale of investments	2,000		
To Net Profit	57,000		
	15,09,000		15,09,000

- Factory overheads are 50% fixed and 50% variable.
- Administrative overheads are 100% fixed.
- Selling overheads are completely variable.
- Normal production capacity of ABC Ltd. is 20,000 units.
- Indirect Expenses are absorbed in the cost accounts on the basis of normal production capacity.
- Notional rent of own premises charged in Cost Accounts is amounting to ₹ 12,000.

You are required to:

(i) Prepare a Cost Sheet and ascertain the Profit as per Cost Records for the year ended 31st March, 2021.

(ii) Reconcile the Profit as per Financial Records with Profit as per Cost Records.

Answer

i. Cost Sheet (for the year ended 31st March, 2021)

	(₹)	(₹)
Direct material		6,50,000
Direct wages		3,50,000
Prime cost		10,00,000
Factory Overheads:		

Variable (50% of ₹ 2,60,000)	1,30,000	
Fixed (₹ 1,30,000 × 15,000/20,000)	97,500	2,27,500
Works cost		12,27,500
Administrative Overheads (₹ 1,05,000 × 15,000/20,000)		78,750
Notional Rent		12,000
Cost of production		13,18,250
Selling Overheads		85,000
Cost of Sales		14,03,250
Profit (Balancing figure)		96,750
Sales revenue		15,00,000

**ii. Statement of Reconciliation
(Reconciling profit shown by Financial and Cost Accounts)**

	(₹)	(₹)
Profit as per Cost Account		96,750
Add: Dividend received	9,000	
Add: Notional Rent	12,000	21,000
Less: Factory Overheads under-charged in Cost Accounts (₹ 2,60,000 – ₹ 2,27,500)	32,500	
Less: Administrative expenses under-charged in Cost Accounts (₹ 1,05,000 – ₹ 78,750)	26,250	
Less: Loss on sale of Investments	2,000	(60,750)
Profit as per Financial Accounts		57,000

(Note: Solution can be done considering base profit as per Financial Accounts)

Q7. Nov 2020, 5 marks

Explain what the pre-requisites of integrated accounting are.

Answer

The essential pre-requisites for integrated accounts include the following steps:

- The management's decision about the extent of integration of the two sets of books. Some concerns find it useful to integrate up to the stage of prime cost or factory cost while other prefer full integration of the entire accounting records.
- A suitable coding system must be made available so as to serve the accounting purposes of financial and cost accounts.
- An agreed routine, with regard to the treatment of provision for accruals, prepaid expenses, other adjustment necessary for preparation of interim accounts.
- Perfect coordination should exist between the staff responsible for the financial and cost aspects of the accounts and an efficient processing of accounting documents should be ensured.
- Under this system there is no need for a separate cost ledger. Of course, there will be a number of subsidiary ledgers; in addition to the useful Customers' Ledger and the Bought Ledger, there will be: (a) Stores Ledger; (b) Stock Ledger and (c) Job Ledger.

Q8. Nov 2019, 10 marks

ABS Enterprises produces a product and adopts the policy to recover factory overheads applying blanket rate based on machine hours. The cost records of the concern reveal the following information:

Budgeted production overheads	₹ 10,35,000
Budgeted machine hours	₹ 90,000
Actual machine hours worked	₹ 45,000
Actual production overheads	₹ 8,80,000
Production overheads (actual)	-
Paid to worker as per court's award	₹ 50,000
Wages paid for strike period	₹ 38,000
Stores written off	₹ 22,000
Expenses of previous year booked in current year	₹ 18,500

Production -

Finished goods 30,000 units

Sale of finished goods 27,000 units

The analysis of cost information reveals that 1/3 of the under absorption of overheads was due to defective production planning and the balance was attributable to increase in costs.

You are required:

- To find out the amount of under absorbed production overheads.
- To give the ways of treating it in Cost Accounts.
- To apportion the under absorbed overheads over the items.

Answer

(i) Amount of under absorption of production overheads:

Particular	Amount (₹)	Amount (₹)
Total production overheads actually incurred		8,80,000
Less: Amount paid to worker as per court order	50,000	
Wages paid for the strike period under an award	38,000	
Stores written off	22,000	
Expenses of previous year booked in the current year	18,500	1,28,500
		7,51,500
Less: Production overheads absorbed as per machine hour rate (45,000 hours × ₹11.50*)		5,17,500
Amount of under- absorbed production overheads		2,34,000

*Budgeted Machine hour rate (Blanket rate) = $\frac{₹ 10,35,000}{90,000} = ₹ 11.50$ per hour

(ii) Accounting treatment of under absorbed production overheads:

- a. As 1/3rd of the under absorbed overheads were due to defective production planning, this being abnormal, hence should be debited to Costing Profit and Loss Account.

Amount to be debited to Costing Profit and Loss Account

= ₹ 2,34,000 × 1/3 = **₹ 78,000.**

- b. Balance of under absorbed production overheads should be distributed over Finished goods and Cost of sales by applying supplementary rate*.

Amount to be distributed = ₹ 2,34,000 × 2/3 = **₹ 1,56,000**

*Supplementary rate = $\frac{₹ 1,56,000}{30,000 \text{ units}} = ₹ 5.20$ per unit

(iii) Apportionment of under absorbed production overheads over Finished goods and Cost of sales:

Particular	Units	Amount (₹)
Finished goods (3,000 units × ₹5.20)	3,000	15,600
Cost of sales (27,000 units × ₹5.20)	27,000	1,40,400
Total	30,000	1,56,000

Q9. May 2019, 10 marks

M/s Abid Private Limited disclosed a net profit of ₹ 48,408 as per cost books for the year ending 31st March 2019. However, financial accounts disclosed net loss of ₹ 15,000 for the same period. On scrutinizing both the set of books of accounts, the following information was revealed:

Works Overheads under-recovered in Cost Books	48,600
Office Overheads over-recovered in Cost Books	11,500
Dividend received on Shares	17,475
Interest on Fixed Deposits	21,650
Provision for doubtful debts	17,800
Obsolescence loss not charged in Cost Accounts	17,200
Stores adjustments (debited in Financial Accounts)	35,433
Depreciation charged in financial accounts	30,000
Depreciation recovered in Cost Books	35,000

Prepare a Memorandum Reconciliation Account.

Answer

Memorandum Reconciliation Account

Dr.

Cr.

Particulars	(₹)	Particulars	(₹)
To Works overheads under recovered in Cost Accounts	48,600	By Net profit as per Costing books	48,408
To Provision for doubtful debts	17,800	By Office overheads over recovered in cost accounts	11,500
To Obsolescence loss	17,200	By Dividend received on shares	17,475
To Store adjustment (Debit)	35,433	By Interest on fixed deposit	5,000
		By Depreciation over-charged	21,650
	1,19,033	By Net loss as per financial accounts	15,000
			1,19,033

[Note: This question may also be solved by taking net loss as per financial accounts as basis.]

Q10. Nov 2018, 10 marks

The following balances were extracted from a Company's ledger as on 30th June, 2018:

Particulars	Debit (₹)	Credit (₹)
Raw material control a/c	2,82,450	
Work-in-progress control a/c	2,38,300	
Finished stock control a/c	3,92,500	
General ledger adjustment a/c		9,13,250
Total	9,13,250	9,13,250

The following transactions took place during the quarter ended 30th September, 2018:

		₹
i.	Factory overheads - allocated to work-in-progress	1,36,350
ii.	Goods furnished - at cost	13,76,200
iii.	Raw materials purchased	12,43,810
iv.	Direct wages - allocated to work-in-progress	2,56,800
v.	Cost of goods sold	14,56,500
vi.	Raw materials - issued to production	13,60,430
vii.	Raw materials - credited by suppliers	27,200
viii.	Raw materials losses - inventory audit	6,000
ix.	Raw materials losses - inventory audit	12,300
	Work-in-progress rejected (with no scrap value)	45,900
	Customer's returns (at cost) of finished goods	

You are required to prepare:

- Raw material control a/c
- Work-in-progress control a/c
- Finished stock control a/c
- General ledger adjustment a/c

Answer

(i) Raw Material Control A/c

	(₹)		(₹)
To Balance b/d	2,82,450	By General Ledger Adjustment A/c	27,200
To General Ledger Adjustment A/c	12,43,810	By Work-in-progress Control A/c	13,60,430
		By Costing P&L A/c (Loss) (OR GLA)	6,000
		By Balance c/d	1,32,630
	15,26,260		15,26,260

(ii) Work-in-Progress Control A/c

	(₹)		(₹)
To Balance b/d	2,38,300	By Finished Goods Control A/c	13,76,200
To Raw Material Control A/c	13,60,430	By Costing P&L A/c (OR GLA)	12,300
To Wages Control A/c	2,56,800	By Balance c/d	6,03,380
To Factory OH Control A/c	1,36,350		
	19,91,880		19,91,880

(iii) Finished Goods Control A/c

	(₹)		(₹)
To Balance b/d	3,92,500	By Cost of goods sold A/c (OR GLA)	14,56,500
To General Ledger Adjustment A/c	45,900	By Balance c/d	3,58,100
To Work-in-process Control A/c	13,76,200		
	18,14,600		18,14,600

(iv) General Ledger Adjustment A/c

	(₹)		(₹)
To Costing P&L A/c (sales)	25,68,910	By Balance b/d	9,13,250
(Balancing figure)		By Raw Material Control A/c	12,43,810
To Raw Material Control A/c	27,200	By Wages Control A/c	2,56,800
		By Factory OH Control A/c	1,36,350
		By Finished Goods Control A/c	45,900
	25,96,110		25,96,110

OR

General ledger adjustment account

	(₹)		(₹)
To Raw Material Control A/c	27,200	By Balance b/d	9,13,250
" Raw Material control account(loss)	6,000	By Raw Material Control A/c	12,43,810
" WIP control Account (rejection)	12,300	By Wages Control A/c	2,56,800
" Finished stock Control Account	14,56,500	By Factory OH Control A/c	1,36,350
" Balance c/d	10,94,110	By Finished Goods Control A/c	45,900
	25,96,110		25,96,110

Working:

Factory Overhead Control A/c

	(₹)		(₹)
To General Ledger Adjustment A/c	1,36,350	By Work-in-progress A/c	1,36,350
	1,36,350		1,36,350

Q11. May 2018, 5 marks

GK Ltd. showed net loss of ₹ 2,43,300 as per their financial accounts for the year ended 31st March, 2018. However, cost accounts disclosed net loss of ₹ 2,48,300 for the same period. On scrutinizing both the set of books of accounts, the following information were revealed:

		₹
i.	Works overheads over recovered	30,400
ii.	Selling overheads under recovered	20,300
iii.	Administrative overheads under recovered	27,700
iv.	Depreciation over charged in cost accounts	35,100
v.	Bad debts w/off in financial accounts	15,000
vi.	Preliminary Exp. w/off in financial accounts	5,000
vii.	Interest credited during the year in financial accounts	7,500

Prepare a reconciliation statement reconciling losses shown by financial and cost accounts by taking costing net loss as base.

Answer

Reconciliation Statement

Particulars	₹	₹
Loss as per Cost Accounts		(2,48,300)
Add: Works overheads over recovered	30,400	
Depreciation over charged in cost accounts	35,100	
Interest credited during the year in financial accounts	7,500	73,000
Less: Selling overheads under recovered	20,300	
Administrative overheads under recovered	27,700	

Bad debts w/off in financial accounts	15,000	
Preliminary Exp. w/off in financial accounts	5,000	(68,000)
Loss as per Financial Accounts		(2,43,300)

Q12. May 2023 RTP

The financial records of Riva Private Limited showed a net profit of ₹1,69,500 for the year ended 31st March, 2022. The cost accounts, however, disclosed a net loss of ₹ 88,500 for the same period. The following information were revealed as a result of scrutiny of the figures of cost accounts and financial accounts:

		(₹)
i.	(Administrative overhead under recovered	63,750.0
ii.	Factory overhead over recovered	3,37,500.0
iii.	Depreciation under charged in Cost Accounts	65,000.0
iv.	Dividend received	50,000.0
v.	Loss due to obsolescence charged in Financial Accounts	42,000.0
vi.	Income tax provided	1,09,000.0
vii.	Bank interest credited in Financial Accounts	34,000.0
viii.	Value of opening stock:	
	In Cost Accounts	4,12,500.0
	In Financial Accounts	3,62,500.0
ix.	Value of closing stock:	
	In Cost Accounts	3,13,750.0
	In Financial Accounts	3,30,000.0
x.	Goodwill written-off in Financial Accounts	62,500.0
xi.	Notional rent of own premises charged in Cost Accounts	1,50,000.0
xii.	Provision for doubtful debts in Financial Accounts	37,500.0

Prepare a reconciliation statement by taking costing net loss as base.

Answers

Statement of Reconciliation

Sl. No.	Particulars	(₹)	(₹)
	Net loss as per Cost Accounts		(88,500)
	Additions		
1.	Factory O/H over recovered	3,37,500	
2.	Dividend Received	50,000	
3.	Bank Interest received	34,000	
4.	Difference in Value of Opening Stock(4,12,500 - 3,62,500)	50,000	
5.	Difference in Value of Closing Stock(3,30,000 - 3,13,7500)	16,250	
6.	Notional Rent of own Premises	1,50,000	6,37,750
	Deductions		
1.	Administration O/H under recovered	63,750	
2.	Depreciation under charged	65,000	
3.	Loss due to obsolescence	42,000	
4.	Income tax Provided	1,09,000	
5.	Goodwill written-off	62,500	
6.	Provision for doubtful debts	37,500	(3,79,750)
	Net Profit as per Financial A/c.		1,69,500

Q13. Nov 2022 RTP | Nov 2023 RTP | May 2024

The financial books of a company reveal the following data for the financial year ending on 31st March, 2022:

	(₹)
Opening Stock:	
Finished goods 875 units	1,48,750
Work-in-process	64,000
01.04.2021 to 31.3.2022	
Raw materials consumed	15,60,000
Direct Labour	9,00,000
Factory overheads	6,00,000
Goodwill written off	2,00,000
Administration overheads	5,90,000
Dividend paid	1,70,000
Bad Debts	24,000
Selling and Distribution Overheads	1,22,000
Interest received	90,000
Rent received	36,000
Sales 14,500 units	41,60,000
Closing Stock: Finished goods 375 units	82,500
Work-in-process	77,334

The cost records provide as under:

- Factory overheads are absorbed at 60% of direct wages.
- Administration overheads are recovered at 20% of factory cost.
- Selling and distribution overheads are charged at ₹ 8 per unit sold.
- Opening Stock of finished goods is valued at ₹ 208 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

- PREPARE statements for the year ended 31st March, 2022 showing-
 - the profit as per financial records
 - the profit as per costing records.
- PRESENT a statement reconciling the profit as per costing records with the profit as per Financial Records.

Answer

**Statement of Profit as per financial records
(for the year ended March 31, 2022)**

	(₹)		(₹)
To Opening stock:		By Sales	41,60,000
Finished Goods	1,48,750	By Closing stock:	
Work-in-process	64,000	Finished Goods	82,500
To Raw materials consumed	15,60,000	Work-in-Process	77,334
To Direct labour	9,00,000	By Rent received	36,000
To Factory overheads	6,00,000	By Interest received	90,000
To Goodwill written off	2,00,000		
To Administration overheads	5,90,000		
To Selling & distribution overheads	1,22,000		
To Dividend paid	1,70,000		
To Bad debts	24,000		
To Profit	67,084		
	44,45,834		44,45,834

**Statement of Profit as per costing records
(for the year ended March 31,2022)**

	(₹)	(₹)
Sales revenue (14,500 units) (A)		41,60,000
Cost of Sales:		
Opening stock (875 units x ₹ 208)	1,82,000	
Add: Cost of production of 14,000 units (Refer to Working Note 1 & 2)	35,84,000	
Less: Closing stock ($\frac{₹ 35,84,000 \times 375 \text{ units}}{14,000 \text{ units}}$)	(96,000)	
Production cost of goods sold (14,500 units)	36,70,000	
Selling & distribution overheads (14,500 units x ₹ 8)	1,16,000	
Cost of sales: (B)		37,86,000
Profit: {(A) - (B)}		3,74,000

(ii) Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Profit as per Cost Accounts		3,74,000
Add: Admin. overheads over absorbed (₹ 5,97,333 - ₹ 5,90,000)	7,333	
Opening stock overvalued (₹ 1,82,000 - ₹ 1,48,750)	33,250	
Interest received	90,000	
Rent received	36,000	1,66,583
		5,40,583
Less: Factory overheads under recovery (₹ 6,00,000 - ₹ 5,40,000)	60,000	
Selling & distribution overheads under recovery (₹ 1,22,000 - ₹ 1,16,000)	6,000	
Closing stock overvalued (₹ 96,000 - ₹ 82,500)	13,500	
Goodwill written off	2,00,000	
Dividend	1,70,000	
Bad debts	24,000	4,73,500
Profit as per financial accounts		67,083

Working Notes:

1. Number of units produced

	Units
Sales	14,500
Add: Closing stock	<u>375</u>
Total	14,875
Less: Opening stock	<u>875</u>
Number of units produced	<u>14,000</u>

2. Cost Sheet

	(₹)
Raw materials consumed	15,60,000
Direct labour	9,00,000
Prime cost	24,60,000
Factory overheads (60% of direct wages)	5,40,000
Factory cost	30,00,000
Add: Opening work-in-process	64,000
Less: Closing work-in-process	77,334
Factory cost of goods produced	29,86,666
Administration overheads (20% of factory cost)	5,97,333
Cost of production of 14,000 units	35,83,999

Cost of production per unit: $= \frac{\text{Total Cost of Production}}{\text{No. of units produced}} = \frac{₹ 35,83,999}{14,000 \text{ units}} = ₹ 256$

X Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2021-22:

Particulars	Amount ('000)
Opening balances:	
- Stores ledger control A/c	48,000
- Work-in-process control A/c	12,000
- Finished goods control A/c	2,58,000
- Building construction A/c	6,000
- Cost ledger control A/c	3,24,000
During the year following transactions took place:	
Materials:	
- Purchased	24,000
- Issued to production	30,000
- Issued to general maintenance	3,600
- Issued to building construction	2,400
Wages:	
- Gross wages paid	90,000
- Indirect wages paid	24,000
- For building construction	6,000
Factory overheads:	
- Actual amount incurred (excluding items shown above)	96,000
- Absorbed in building construction	12,000
- Under-absorbed	4,800
Royalty paid	3,000
Selling distribution and administration overheads	15,000
Sales	2,70,000

At the end of the year, the stock of raw material and work-in-process was ₹3,30,00,000 and ₹15,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required:

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

Answer

Cost Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c	2,70,000	By Balance b/d	3,24,000
To Building Construction A/c	26,400	By Stores Ledger Control A/c	24,000
To Balance c/d	2,89,800	By Wages Control A/c	90,000
		By Factory overhead control A/c	96,000
		By Royalty A/c	3,000
		By Selling, Distribution and Administration overheads	15,000
		By Costing P&L A/c	34,200
	5,86,200		5,86,200

Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
-------------	-------------	-------------	-------------

To Balance b/d	48,000	By WIP control A/c	30,000
To Cost Ledger control A/c	24,000	By Factory overheads control A/c	3,600
		By Building construction A/c	2,400
		By Factory overhead control A/c (loss) (Bal. fig)	3,000
		By Balance c/d	33,000
	72,000		72,000

Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	12,000	By Finished goods control A/c	1,99,800
To Stores Ledger control A/c	30,000	By Balance c/d	15,000
To Wages Control A/c	60,000		
To Factory overhead control A/c	1,09,800		
To Royalty A/c	3,000		
	2,14,800		2,14,800

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	2,58,000	By Cost of Goods Sold A/c (Refer working note)	2,16,000
To WIP control A/c	1,99,800	By Balance c/d	2,41,800
	4,57,800		4,57,800

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	2,16,000	By Costing P&L A/c	2,31,000
To Selling, Distribution and Administration A/c	15,000		
	2,31,000		2,31,000

Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	2,31,000	By Cost Ledger control A/c	2,70,000
To Factory overhead control A/c	4,800		
To Cost Ledger control A/c	34,200		
	2,70,000		2,70,000

Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Cost Ledger control A/c	26,400
To Stores Ledger control A/c	2,400		
To Wages Control A/c	6,000		
To Factory overhead control A/c	12,000		
	26,400		26,400

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	3,600	By Building Construction A/c	12,000
To Wages Control A/c	24,000	By WIP Control A/c	1,09,800
To Cost Ledger control A/c	96,000	By Costing P&L A/c	4,800
To Stores Ledger control A/c (loss)	3,000		

	1,26,600	1,26,600
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Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	90,000	By Factory overhead control A/c	24,000
		By Building Construction A/c	6,000
		By WIP Control A/c	60,000
	90,000		90,000

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	3,000	By WIP Control A/c	3,000
	3,000		3,000

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods control A/c	2,16,000	By Cost of sales A/c	2,16,000
	2,16,000		2,16,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	7,500	By Cost of sales A/c	7,500
	7,500		7,500

Trial Balance

Particulars	Dr. (₹ in '000)	Cr. (₹ in '000)
Stores Ledger Control A/c	33,000	
WIP Control A/c	7,500	
Finished Goods Control A/c	2,41,800	
Cost Ledger Control A/c		2,89,800
	2,89,800	2,89,800

Working Note: Cost of Goods sold = $2,70,000 \times 80/100 = ₹ 2,16,000$

Q15. Nov 2021 RTP

X Ltd. maintains a non-integrated accounting system for the purpose of management information. The following are the data related with year 2020-21:

Particulars	Amount ('000)
Opening balances:	
- Stores ledger control A/c	24,000
- Work-in-process control A/c	6,000
- Finished goods control A/c	1,29,000
- Building construction A/c	3,000
- Cost ledger control A/c	1,62,000
During the year following transactions took place:	
Materials:	
- Purchased	12,000
- Issued to production	15,000
- Issued to general maintenance	1,800
- Issued to building construction	1,200
Wages:	
- Gross wages paid	45,000
- Indirect wages paid	12,000
- For building construction	3,000

Factory overheads:	
- Actual amount incurred (excluding items shown above)	48,000
- Absorbed in building construction	6,000
- Under-absorbed	2,400
Royalty paid	1,500
Selling distribution and administration overheads	7,500
Sales	1,35,000

At the end of the year, the stock of raw material and work-in-process was ₹ 1,65,00,000 and ₹ 75,00,000 respectively. The loss arising in the raw material account is treated as factory overheads. The building under construction was completed during the year. Gross profit margin is 20% on sales.

Required:

PREPARE the relevant control accounts to record the above transactions in the cost ledger of the company.

Answer

Cost Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Costing P&L A/c	1,35,000	By Balance b/d	1,62,000
To Building Construction A/c	13,200	By Stores Ledger Control A/c	12,000
To Balance c/d	1,44,900	By Wages Control A/c	45,000
		By Factory overhead control A/c	48,000
		By Royalty A/c	1,500
		By Selling, Distribution and Administration overheads	7,500
		By Costing P&L A/c	17,100
	2,93,100		2,93,100

Stores Ledger Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	24,000	By WIP control A/c	15,000
To Cost Ledger control A/c	12,000	By Factory overheads control A/c	1,800
		By Building construction A/c	1,200
		By Factory overhead control A/c (loss) (Bal. fig)	1,500
		By Balance c/d	16,500
	36,000		36,000

Work-in-process Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	6,000	By Finished goods control A/c	99,900
To Stores Ledger control A/c	15,000	By Balance c/d	7,500
To Wages Control A/c	30,000		
To Factory overhead control A/c	54,900		
To Royalty A/c	1,500		
	1,07,400		1,07,400

Finished Goods Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	1,29,000	By Cost of Goods Sold A/c (Refer working note)	1,08,000

To WIP control A/c	99,900	By Balance c/d	1,20,900
	2,28,900		2,28,900

Cost of Sales Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Goods Sold A/c	1,08,000	By Costing P&L A/c	1,15,500
To Selling, Distribution and Administration A/c	7,500		
	1,15,500		1,15,500

Costing P&L Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost of Sales A/c	1,15,500	By Cost Ledger control A/c	1,35,000
To Factory overhead control A/c	2,400		
To Cost Ledger control A/c	17,100		
	1,35,000		1,35,000

Building Construction Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Balance b/d	3,000	By Cost Ledger control A/c	13,200
To Stores Ledger control A/c	1,200		
To Wages Control A/c	3,000		
To Factory overhead control A/c	6,000		
	13,200		13,200

Factory Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Stores Ledger control A/c	1,800	By Building Construction A/c	6,000
To Wages Control A/c	12,000	By WIP Control A/c	54,900
To Cost Ledger control A/c	48,000	By Costing P&L A/c	2,400
To Stores Ledger control A/c (loss)	1,500		
	63,300		63,300

Wages Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	45,000	By Factory overhead control A/c	12,000
		By Building Construction A/c	3,000
		By WIP Control A/c	30,000
	45,000		45,000

Royalty Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	1,500	By WIP Control A/c	1,500
	1,500		1,500

Cost of Goods Sold Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Finished Goods control A/c	1,08,000	By Cost of sales A/c	1,08,000
	1,08,000		1,08,000

Selling, Distribution and Administration Overhead Control Account

Particulars	(₹ in '000)	Particulars	(₹ in '000)
To Cost Ledger control A/c	15,000	By Cost of sales A/c	15,000
	15,000		15,000

Trial Balance

Particulars	Dr. (₹ in '000)	Cr. (₹ in '000)
Stores Ledger Control A/c	16,500	
WIP Control A/c	7,500	
Finished Goods Control A/c	1,20,900	
Cost Ledger Control A/c		1,44,900
	1,44,900	1,44,900

Working Note: Cost of Goods sold = $13,50,000 \times 80/100 = ₹ 10,08,000$

Q16. May 2021 RTP

The financial books of a company reveal the following data for the financial year ending on 31st March, 2020:

	(₹)
Opening Stock:	
Finished goods 625 units	1,06,250
Work-in-process	92,000
01.04.2019 to 31.3.2020	
Raw materials consumed	16,80,000
Direct Labour	12,20,000
Factory overheads	8,40,000
Administration overheads	3,96,000
Dividend paid	2,44,000
Bad Debts	36,000
Selling and Distribution Overheads	1,44,000
Interest received	76,000
Rent received	92,000
Sales 12,615 units	45,60,000
Closing Stock: Finished goods 415 units	91,300
Work-in-process	82,400

The cost records provide as under:

- Factory overheads are absorbed at 70% of direct wages.
- Administration overheads are recovered at 15 % of factory cost.
- Selling and distribution overheads are charged at ₹ 6 per unit sold.
- Opening Stock of finished goods is valued at ₹ 240 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

- PREPARE statements for the year ended 31st March, 2020 showing-
 - the profit as per financial records
 - the profit as per costing records.
- PRESENT a statement reconciling the profit as per costing records with the profit as per Financial Records.

Answer

**Statement of Profit as per financial records
(for the year ended March 31, 2020)**

	(₹)		(₹)
To Opening stock:		By Sales	45,60,000
Finished Goods	1,06,250	By Closing stock:	
Work-in-process	92,000	Finished Goods	91,300
To Raw materials consumed	16,80,000	Work-in-Process	82,400
To Direct labour	12,20,000	By Rent received	92,000

To Factory overheads	8,44,000	By Interest received	76,000
To Administration overheads	3,96,000		
To Selling & distribution overheads	1,44,000		
To Dividend paid	2,44,000		
To Bad debts	36,000		
To Profit	1,39,450		
	49,01,700		49,01,700

**Statement of Profit as per costing records
(for the year ended March 31,2020)**

	(₹)	(₹)
Sales revenue (12,615 units) (A)		45,60,000
<u>Cost of Sales:</u>		
Opening stock (625 units x ₹ 240)	1,50,000	
Add: Cost of production of 12,405 units (Refer to Working Note 1 & 2)	43,28,140	
Less: Closing stock ($\frac{₹ 43,28,140 \times 415 \text{ units}}{12,405 \text{ units}}$)	(1,44,795)	
Production cost of goods sold (12,615 units)	43,33,345	
Selling & distribution overheads (12,615 units x ₹ 6)	75,690	
Cost of sales: (B)		44,09,035
Profit: {(A) - (B)}		1,50,965

(ii) Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Profit as per Cost Accounts		1,50,965
Add: Admin. overheads over absorbed (₹ 5,64,540 - ₹ 3,96,000)	1,68,540	
Opening stock overvalued (₹ 1,50,000 - ₹ 1,06,250)	43,750	
Interest received	76,000	
Rent received	92,000	
Factory overheads over recovery (₹ 8,54,000 - ₹ 8,44,000)	10,000	3,90,290
		5,41,255
Less: Selling & distribution overheads under recovery (₹ 1,44,000 - ₹ 75,690)	68,310	
Closing stock overvalued (₹ 1,44,795 - ₹ 91,300)	53,495	
Dividend	2,44,000	
Bad debts	36,000	(4,01,805)
Profit as per financial accounts		1,39,450

Working Notes:

1. Number of units produced

	Units
Sales	12,615
Add: Closing stock	<u>415</u>
Total	13,030
Less: Opening stock	<u>625</u>
Number of units produced	<u>12,405</u>

2.

Cost Sheet

	(₹)
Raw materials consumed	16,80,000
Direct labour	12,20,000
Prime cost	29,00,000
Factory overheads (70% of direct wages)	8,54,000
Factory cost	37,54,000
Add: Opening work-in-process	92,000

Less: Closing work-in-process	82,400
Factory cost of goods produced	37,63,600
Administration overheads (15% of factory cost)	5,64,540
Cost of production of 12,405 units	43,28,140

Cost of production per unit: = $\frac{\text{Total Cost of Production}}{\text{No. of units produced}} = \frac{₹ 43,28,140}{12,405 \text{ units}} = ₹ 348.90$

Q17. Nov 2020 RTP

A manufacturing company disclosed a net loss of ₹6,94,000 as per their cost accounts for the year ended March 31, 2020. The financial accounts however disclosed a net loss of ₹10,20,000 for the same period. The following information was revealed as a result of scrutiny of the figures of both the sets of accounts.

	(₹)
(i) Factory Overheads under-absorbed	80,000
(ii) Administration Overheads over-absorbed	1,20,000
(iii) Depreciation charged in Financial Accounts	6,50,000
(iv) Depreciation charged in Cost Accounts	5,50,000
(v) Interest on investments not included in Cost Accounts	1,92,000
(vi) Income-tax provided	1,08,000
(vii) Interest on loan funds in Financial Accounts	4,90,000
(viii) Transfer fees (credit in financial books)	48,000
(ix) Stores adjustment (credit in financial books)	28,000
(x) Dividend received	64,000

PREPARE a memorandum Reconciliation Account.

Answer

Memorandum Reconciliation Accounts

Dr.	(₹)		Cr.	(₹)
To Net Loss as per Costing books	6,94,000	By Administration overheads over recovered in cost accounts	1,20,000	
To Factory overheads under absorbed in Cost Accounts	80,000	By Interest on investment not included in Cost accounts	1,92,000	
To Depreciation under charged in Cost Accounts	1,00,000	By Transfer fees in Financial books	48,000	
To Income-Tax not provided in Cost Accounts	1,08,000	By Stores adjustment (Credit in financial books)	28,000	
To Interest on Loan Funds in Financial Accounts	4,90,000	By Dividend received in financial books	64,000	
		By Net loss as per Financial books	10,20,000	
	14,72,000		14,72,000	

Q18. May 2020 RTP

The following are the balances existed in the books of JPG Ltd. for the year ended, 31st March, 2019:

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	30,00,000	
WIP Control A/c	15,00,000	
Finished Goods Control A/c	25,00,000	
Manufacturing Overheads Control A/c		1,50,000

Cost Ledger Control A/c		68,50,000
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During the year 2019-20, the following transactions took place:

Particulars	Amount (₹)
Finished product (at cost)	22,50,000
Manufacturing Overhead incurred	8,50,000
Raw material purchased	12,50,000
Factory wages	4,00,000
Indirect labour	2,00,000
Cost of sales	17,50,000
Materials issued to production	13,50,000
Sales returned (at cost)	90,000
Material returned to suppliers	1,30,000
Manufacturing overhead charged to production	8,50,000

Required:

PREPARE the following control accounts and Trial balance at the end of the year:

Cost Ledger, Stores Ledger, Work-in-process, Finished Stock, Manufacturing Overhead, Wages and Cost of Sales.

Answer

Cost Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Stores Ledger control A/c	1,30,000	By Balance b/d	68,50,000
To Costing Profit & Loss A/c	17,10,000	By Stores Ledger control A/c	12,50,000
To Balance c/d	77,10,000	By Wages Control A/c	6,00,000
		By Manufacturing overhead control A/c	8,50,000
	95,50,000		95,50,000

Store Ledger Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	30,00,000	By WIP Control A/c	13,50,000
To Cost Ledger control A/c	12,50,000	By Cost Ledger control A/c (return)	1,30,000
		By Balance c/d	27,70,000
	42,50,000		42,50,000

WIP Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	15,00,000	By Finished Stock Control A/c	22,50,000
To Wages Control A/c	4,00,000	By Balance c/d	18,50,000
To Stores Ledger control A/c	13,50,000		
To Manufacturing overhead control A/c	8,50,000		
	41,00,000		41,00,000

Finished Stock Control Account

Particulars	(₹)	Particulars	(₹)
To Balance b/d	25,00,000	By Cost of Sales A/c	17,50,000
To WIP Control A/c	22,50,000	By Balance c/d	30,90,000
To Cost of Sales A/c (sales return)	90,000		
	48,40,000		48,40,000

Manufacturing Overhead Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	8,50,000	By Balance b/d	1,50,000

To Wages Control A/c	2,00,000	By WIP Control A/c	8,50,000
		By Costing P&L A/c (under recovery)	50,000
	10,50,000		10,50,000

Wages Control Account

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	6,00,000	By WIP Control A/c	4,00,000
		By Manufacturing overhead control A/c	2,00,000
	6,00,000		6,00,000

Cost of Sales Account

Particulars	(₹)	Particulars	(₹)
To Finished Stock Control A/c	17,50,000	By Finished Stock Control A/c (sales return)	90,000
		By Costing Profit & Loss A/c	16,60,000
	17,50,000		17,50,000

Trial Balance

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	27,70,000	
WIP Control A/c	18,50,000	
Finished Goods Control A/c	30,90,000	
Cost Ledger Control A/c		77,10,000
	77,10,000	77,10,000

Working:

Costing P&L Account

Particulars	(₹)	Particulars	(₹)
To Cost of Sales A/c	16,60,000	By Cost Ledger control A/c	17,10,000
To Manufacturing overhead control A/c	50,000		
	17,10,000		17,10,000

Q19. Nov 2019 RTP

As of 30th September, 2019, the following balances existed in a firm's cost ledger, which is maintained separately on a double entry basis:

	Debit(₹)	Credit(₹)
Stores Ledger Control A/c	15,00,000	-
Work-in-progress Control A/c □	7,50,000	-
Finished Goods Control A/c	12,50,000	-
Manufacturing Overhead Control A/c □	-	75,000
Cost Ledger Control A/c □	-	34,25,000
	35,00,000	35,00,000

During the next quarter, the following items arose:

	(₹)
Finished Product (at cost)	11,25,000
Manufacturing overhead incurred	4,25,000
Raw material purchased	6,25,000
Factory wages	2,00,000
Indirect labour	1,00,000
Cost of sales	8,75,000

Materials issued to production	6,75,000
Sales returned (at cost)	45,000
Materials returned to suppliers	65,000
Manufacturing overhead charged to production	4,25,000

Required:

PREPARE

- Cost Ledger Control A/c,
- Stores Ledger Control A/c,
- Work-in-progress Control A/c,
- Finished Stock Ledger Control A/c,
- Manufacturing Overhead Control A/c ,
- Wages Control A/c, Cost of Sales A/c and
- the Trial Balance at the end of the quarter.

Answer

Cost Ledger Control Account

Dr.	(₹)		Cr.	(₹)
To Store Ledger Control A/c	65,000	By Opening Balance	34,25,000	
To Balance c/d	47,10,000	By Store ledger control A/c	6,25,000	
		By Manufacturing Overhead Control A/c	4,25,000	
		By Wages Control A/c 3,00,000	3,00,000	
	47,75,000		47,75,000	

Stores Ledger Control Account

Dr.	(₹)		Cr.	(₹)
To Opening Balance	15,00,000	By WIP Control A/c	6,75,000	
To Cost ledger control A/c	6,25,000	By Cost ledger control A/c (Returns)	65,000	
		By Balance c/d	13,85,000	
	21,25,000		21,25,000	

WIP Control Account

Dr.	(₹)	Particulars	Cr.	(₹)
To Balance b/d	7,50,000	By Finished Stock Control A/c	11,25,000	
To Wages Control A/c	2,00,000	By Balance c/d	9,25,000	
To Stores Ledger control A/c	6,75,000			
To Manufacturing overhead control A/c	4,25,000			
	20,50,000		20,50,000	

Finished Stock Control Account

Dr.	(₹)	Particulars	Cr.	(₹)
To Balance b/d	12,50,000	By Cost of Sales A/c	8,75,000	
To WIP Control A/c	11,25,000	By Balance c/d	15,45,000	
To Cost of Sales A/c (sales return)	45,000			
	24,20,000		24,20,000	

Manufacturing Overhead Control Account

Dr.	(₹)	Particulars	Cr.	(₹)
Particulars		Particulars		

To Cost Ledger Control A/c	4,25,000	By Balance b/d	75,000
To Wages Control A/c	1,00,000	By WIP Control A/c	4,25,000
		By Costing P&L A/c (under recovery)	25,000
	5,25,000		5,25,000

Wages Control Account

Dr.

Cr

Particulars	(₹)	Particulars	(₹)
To transfer to Cost Ledger Control A/c	3,00,000	By WIP Control A/c	2,00,000
		By Manufacturing overhead control A/c	1,00,000
	3,00,000		3,00,000

Cost of Sales Account

Dr.

Cr

Particulars	(₹)	Particulars	(₹)
To Finished Stock Control A/c	8,75,000	By Finished Stock Control A/c (sales return)	45,000
		By Costing Profit & Loss A/c	8,30,000
	8,75,000		8,75,000

Trial Balance

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	13,85,000	
WIP Control A/c	9,25,000	
Finished Goods Control A/c	15,45,000	
Manufacturing Overhead Control Account	25,000	
Cost of Sales Account	8,30,000	
Cost Ledger Control A/c		47,10,000
	47,10,000	47,10,000

Q20. May 2019 RTP

The following is the summarised Trading and Profit and Loss Account of XYZ Ltd. for the year ended 31st March 2019:

Particulars	Amount (₹)	Particulars	Amount (₹)
Direct Material	14,16,000	Sales (30,000 units)	30,00,000
Direct wages	7,42,000	Finished stock (2,000 units)	1,67,500
Works overheads	4,26,000	Work-in-progress:	
		- Materials	34,000
		- Wages	16,000
		- Works-overhead	4,000
			54,000
Administration overheads	1,50,000		
Selling and distribution overheads	1,65,000		
Net profit for the year	3,22,500		
	32,21,500		32,21,500

The company's cost records show that in course of manufacturing a standard unit

(i) works overheads have been charged @ 20% on prime cost,

(ii) administration overheads are related with production activities and are recovered at ₹5 per finished unit, and (iii) selling and distribution overheads are recovered at ₹6 per unit sold.

You are required to PREPARE:

(i) Costing Profit and Loss Account indicating the net profits,

(ii) A Statement showing reconciliation between profit as disclosed by the Cost Accounts and Financial Accounts.

Answer

(i) Costing Profit and Loss Account for the year ended 31st March 2019:

Particulars	Amount (₹)	Particulars	Amount (₹)
Material consumed	14,16,000	Sales (30,000 units)	30,00,000
Direct wages	7,42,000		
Prime Cost	21,58,000		
Works overheads (20% of Prime cost)	4,31,600		
	25,89,600		
Less: Work in progress	(54,000)		
Factory cost	25,35,600		
Administration overheads (₹5 × 32,000 units)	1,60,000		
Cost of production	26,95,600		
Less: Finished stock	(1,68,475)		
Cost of goods sold	25,27,125		
Selling and distribution overheads (₹6 × 30,000 unit)	1,80,000		
Cost of sales	27,07,125		
Profit (balancing figure)	2,92,875		
	30,00,000		30,00,000

(ii) Statement reconciling the profit as per costing profit and loss account with the profit as per financial accounts

Particulars	Amount (₹)	Amount (₹)
Profit as per cost records		2,92,875
Add: Overheads over-absorbed:		
- Works overheads (₹ 4,31,600 – ₹ 4,26,000)	5,600	
- Administration OH (₹ 1,60,000 – ₹ 1,50,000)	10,000	
- Selling and Distribution (₹ 1,80,000 – ₹ 1,65,000)	15,000	30,600
Less: Closing stock overvalued (₹ 1,68,475 – ₹ 1,67,500)		(975)
Profit as per financial accounts		3,22,500

*It is assumed that the number of units Produced

= Number of units sold + Finished stock = 30,000 + 2,000 = 32,000 units.

Q21. Nov 2018 RTP

The financial books of a company reveal the following data for the financial year ending on 31st March, 2018:

	(₹)
Opening Stock:	
Finished goods 625 units	53,125
Work-in-process	46,000
01.04.2017 to 31.3.2018	
Raw materials consumed	8,40,000

Direct Labour	6,10,000
Factory overheads	4,22,000
Administration overheads	1,98,000
Dividend paid	1,22,000
Bad Debts	18,000
Selling and Distribution Overheads	72,000
Interest received	38,000
Rent received	46,000
Sales 12,615 units	22,80,000
Closing Stock: Finished goods 415 units	4,650
Work-in-process	41,200

The cost records provide as under:

- Factory overheads are absorbed at 70% of direct wages.
- Administration overheads are recovered at 15 % of factory cost.
- Selling and distribution overheads are charged at ₹ 3 per unit sold.
- Opening Stock of finished goods is valued at ₹ 120 per unit.
- The company values work-in-process at factory cost for both Financial and Cost Profit Reporting.

Required:

- PREPARE statements for the year ended 31st March, 2018 showing-
 - the profit as per financial records
 - the profit as per costing records.
- PRESENT a statement reconciling the profit as per costing records with the profit as per Financial Records.

Answer

**Statement of Profit as per financial records
(for the year ended March 31, 2018)**

	(₹)		(₹)
To Opening stock:		By Sales	22,80,000
Finished Goods	53,125	By Closing stock:	
Work-in-process	46,000	Finished Goods	45,650
To Raw materials consumed	8,40,000	Work-in-Process	41,200
To Direct labour	6,10,000	By Rent received	46,000
To Factory overheads	4,22,000	By Interest received	38,000
To Administration overheads	1,98,000		
To Selling & distribution overheads	72,000		
To Dividend paid	1,22,000		
To Bad debts	18,000		
To Profit	69,725		
	24,50,850		24,50,850

**Statement of Profit as per costing records
(for the year ended March 31, 2018)**

	(₹)	(₹)
Sales revenue (12,615 units) (A)		22,80,000
<u>Cost of Sales:</u>		
Opening stock (625 units x ₹ 120)	75,000	
Add: Cost of production of 12,405 units (Refer to Working Note 1 & 2)	21,63,350	
Less: Closing stock ($\frac{₹21,63,350 \times 415 \text{ units}}{12,405 \text{ units}}$)	(72,372)	
Production cost of goods sold (12,615 units)	21,65,978	

Selling & distribution overheads (12,615 units x ₹ 6)	37,845	
Cost of sales: (B)		22,03,823
Profit: {(A) – (B)}		76,177

(ii) Statement of Reconciliation

(Reconciling the profit as per costing records with the profit as per financial records)

	(₹)	(₹)
Profit as per Cost Accounts		76,177
Add: Admin. overheads over absorbed (₹ 2,81,550 - ₹ 1,98,000)	83,550	
Opening stock overvalued (₹ 75,000 - ₹ 53,125)	21,875	
Interest received	38,000	
Rent received	46,000	
Factory overheads over recovery (₹ 4,27,000 - ₹ 4,22,000)	5,000	1,94,425
		2,70,262
Less: Selling & distribution overheads under recovery (₹ 72,000 - ₹ 37,845)	34,155	
Closing stock overvalued (₹ 72,372 - ₹ 45,450)	26,722	
Dividend	1,22,000	
Bad debts	18,000	(2,00,877)
Profit as per financial accounts		69,725

Working Notes:

1. Number of units produced

	Units
Sales	12,615
Add: Closing stock	<u>415</u>
Total	13,030
Less: Opening stock	<u>625</u>
Number of units produced	<u>12,405</u>

2.

Cost Sheet

	(₹)
Raw materials consumed	8,40,000
Direct labour	6,10,000
Prime cost	14,50,000
Factory overheads (70% of direct wages)	4,27,000
Factory cost	18,77,000
Add: Opening work-in-process	46,000
Less: Closing work-in-process	41,200
Factory cost of goods produced	18,81,800
Administration overheads (15% of factory cost)	2,81,550
Cost of production of 12,405 units	21,63,350

Cost of production per unit: = $\frac{\text{Total Cost of Production}}{\text{No. of units produced}} = \frac{₹ 21,63,350}{12,405 \text{ units}} = ₹ 174.39$

Q22. May 2018 RTP

As of 31st March, 2018, the following balances existed in a firm's cost ledger, which is maintained separately on a double entry basis:

	Debit(₹)	Credit(₹)
Stores Ledger Control A/c	3,20,000	-
Work-in-progress Control A/c □	1,52,000	-
Finished Goods Control A/c	2,56,000	-
Manufacturing Overhead Control A/c □	-	28,000

Cost Ledger Control A/c □	-	7,00,000
	7,28,000	7,28,000

During the next quarter, the following items arose:

	(₹)
Finished Product (at cost)	2,35,500
Manufacturing overhead incurred	91,000
Raw material purchased	1,36,000
Factory wages	48,000
Indirect labour	20,600
Cost of sales	1,68,000
Materials issued to production	1,26,000
Sales returned (at cost)	8,000
Materials returned to suppliers	11,000
Manufacturing overhead charged to production	86,000

Required:

PREPARE the Cost Ledger Control A/c, Stores Ledger Control A/c, Work-in-progress Control A/c, Finished Stock Ledger Control A/c, Manufacturing Overhead Control A/c, Wages Control A/c, Cost of Sales A/c and the Trial Balance at the end of the quarter.

Answer

Cost Ledger Control Account

Dr.	(₹)		Cr.
To Store Ledger Control A/c	11,000	By Opening Balance	7,00,000
To Balance c/d	9,84,600	By Store ledger control A/c	1,36,000
		By Manufacturing Overhead Control A/c	91,000
		By Wages Control A/c 3,00,000	68,600
	9,95,600		9,95,600

Stores Ledger Control Account

Dr.	(₹)		Cr.
To Opening Balance	3,20,000	By WIP Control A/c	1,26,000
To Cost ledger control A/c	1,36,000	By Cost ledger control A/c (Returns)	11,000
		By Balance c/d	3,19,000
	4,56,000		4,56,000

WIP Control Account

Dr.	(₹)	Cr.	(₹)
To Balance b/d	1,52,000	By Finished Stock Control A/c	2,35,500
To Wages Control A/c	48,000	By Balance c/d	1,76,500
To Stores Ledger control A/c	1,26,000		
To Manufacturing overhead control A/c	86,000		
	4,12,000		4,12,000

Finished Stock Control Account

Dr.	(₹)	Cr.	(₹)
To Balance b/d	2,56,000	By Cost of Sales A/c	1,68,000
To WIP Control A/c	2,35,500	By Balance c/d	3,31,500

To Cost of Sales A/c (sales return)	8,000		
	4,99,500		4,99,500

Manufacturing Overhead Control Account

Dr.

Cr

Particulars	(₹)	Particulars	(₹)
To Cost Ledger Control A/c	91,000	By Balance b/d	28,000
To Wages Control A/c	20,600	By WIP Control A/c	86,000
To Costing P&L A/c (over recovery)	2,400		
	1,14,000		1,14,000

Wages Control Account

Dr.

Cr

Particulars	(₹)	Particulars	(₹)
To transfer to Cost Ledger Control A/c	68,600	By WIP Control A/c	48,000
		By Manufacturing overhead control A/c	20,600
	68,600		68,600

Cost of Sales Account

Dr.

Cr

Particulars	(₹)	Particulars	(₹)
To Finished Stock Control A/c	1,68,000	By Finished Stock Control A/c (sales return)	8,000
		By Costing Profit & Loss A/c	1,60,000
	1,68,000		1,68,000

Trial Balance

Particulars	Dr. (₹)	Cr. (₹)
Stores Ledger Control A/c	3,19,000	
WIP Control A/c	1,76,500	
Finished Goods Control A/c	3,31,500	
Manufacturing Overhead Control Account		2,400
Cost of Sales Account	1,60,000	
Cost Ledger Control A/c		9,84,600
	9,87,000	9,87,000

Q1. May 2024, 4 marks

Describe Unit Costing and Batch Costing. Give three examples of industries for each method where these are used.

Answer:

Unit costing is that method of costing where the output produced is identical and each unit of output requires identical cost. Under this method costs, are collected and analysed element wise and then total cost per unit is ascertained by dividing the total cost with the number of units produced.

Such a method of costing is used in the industries like paper, cement, steel works, mining, breweries etc.

Batch Costing: Batch Costing is a type of specific order costing where articles are manufactured in predetermined lots, known as batch. Cost per unit in a batch is ascertained by dividing the total cost of a batch by the number of units produced in that batch.

Such a method of costing is used in the case of pharmaceutical or drug industries, readymade garment industries, industries, manufacturing electronic parts of T.V. radio sets etc.

Q2. Nov 2022, 5 marks

A Ltd. is a pharmaceutical company which produces vaccines for diseases like Monkey Pox, Covid-19 and Chickenpox. A distributor had given an order for 1,600 Monkey Pox Vaccines. The company can produce 80 vaccines at a time. To process a batch of 80 Monkey Pox vaccines, the following costs would be incurred:

	₹
Direct Materials	4,250
Direct wages	500
Lab set-up cost	1,400

The Production Overheads are absorbed at a rate of 20% of direct wages and 20% of total production cost is charged in each batch for Selling, distribution and administration Overheads. The company is willing to earn profit of 25% on sales value.

You are required to determine:

- Total Sales value for 1,600 Monkey Pox Vaccines
- Selling price per unit of the Vaccine.

Answer

a) (i) & (ii) Calculation of Sales value and Selling price per unit of Monkey Pox vaccine

Particulars	Amount (₹) per Batch	Amount (₹) for 1600 units or 20 batches	Amount (₹) per unit
Direct materials	4,250	85,000	53.125
Direct wages	500	10,000	6.250
Lab set-up cost	1,400	28,000	17.500
Production overheads (20% of direct wages)	100	2,000	1.250
Production Cost	6,250	1,25,000	78.125
Selling, distribution and administration cost (20% of Production cost)	1,250	25,000	15.625
Total Cost	7,500	1,50,000	93.75
Add: Profit (1/3rd of Total cost or 25% of Sales value)	2,500	50,000	31.25
Sales value	10,000	2,00,000	125.00

Q3. Jan 2021, 10 marks

XYZ Ltd. is engaged in the manufacturing of toys. It can produce 4,20,000 toys at its 70% capacity on per annum basis. Company is in the process of determining sales price for the financial year 2020-21. It has provided the following information:

Direct Material ₹ 60 per unit

Direct Labour ₹ 30 per unit

Indirect Overheads:

Fixed ₹ 65,50,000 per annum

Variable ₹ 15 per unit

Semi-variable ₹ 5,00,000 per annum up to 60% capacity and ₹ 50,000 for every 5% increase in capacity or part thereof up to 80% capacity and thereafter ₹ 75,000 for every 10% increase in capacity or part thereof.

Company desires to earn a profit of ₹ 25,00,000 for the year. Company has planned that the factory will operate at 50% of capacity for first six months of the year and at 75% of capacity for further three months and for the balance three months, factory will operate at full capacity.

You are required to :

- 1) Determine the average selling price at which each of the toy should be sold to earn the desired profit.
- 2) Given the above scenario, advise whether company should accept an offer to sell each Toy at:
 - a. ₹ 130 per Toy
 - b. ₹ 129 per Toy

Answer

(1)

Statement of Cost

	For first 6 months	For further 3 months	For remaining 3 months	Total
	6,00,000x6/12x50% = 1,50,000 units	6,00,000x3/12x75% = 1,12,500 units	6,00,000 x3/12 = 1,50,000 units	4,12,500 units
Direct Material	90,00,000	67,50,000	90,00,000	2,47,50,000
Direct labour	45,00,000	33,75,000	45,00,000	1,23,75,000
Indirect - Variable Expenses	22,50,000	16,87,500	22,50,000	61,87,500
Indirect - Fixed Expenses	32,75,000	16,37,500	16,37,500	65,50,000
Indirect Semi-variable expenses				
- For further three months @ 6,50,000* per annum	2,50,000			
- For further three months @ 8,50,000** per annum		1,62,500		
- For first six months @ 5,00,000 per annum			2,12,500	6,25,000
Total Cost	1,92,75,000	1,36,12,500	1,76,00,000	5,04,87,500
Desired Profit				25,00,000
Sales value				5,29,87,500
Average Sales price per Toy				128.45

* ₹ 5,00,000+ [3 times (from 60% to 75%) x 50,000] = ₹ 6,50,000

** ₹ 6,50,000+ [1 time (from 75% to 80%) × 50,000] + [2 times (from 80% to 100%) × 75,000] = ₹ 8,50,000

(2) (a) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

(b) Company Should accept the offer as it is above its targeted sales price of ₹ 128.45 per toy.

Q4. May 2024, RTP

Arnav Ltd. operates in beverages industry where it manufactures soft- drink in three sizes of Large (3 litres), Medium (1.5 litres) and Small (600 ml) bottles. The products are processed in batches. The 5,000 litres capacity processing plant consumes electricity of 90 Kilowatts per hour and a batch takes 1 hour 45 minutes to complete. Only symmetric size of products can be processed at a time. The machine set-up takes 15 minutes to get ready for next batch processing. During the set-up power consumption is only 20%.

- (i) The current price of Large, Medium and Small are ₹ 150, ₹ 90 and ₹ 50 respectively.
- (ii) To produce a litre of beverage, 14 litres of raw material-W and 25 ml of Material-C are required which costs ₹ 0.50 and ₹ 1,000 per litre respectively.
- (iii) 20 direct workers are required. The workers are paid ₹ 880 for 8 hours shift of work.
- (iv) The average packing cost per bottle is ₹ 3
- (v) Power cost is ₹ 7 per Kilowatt -hour (Kwh)
- (vi) Other variable cost is ₹ 30,000 per batch.
- (vii) Fixed cost (Administration and marketing) is ₹ 4,90,00,000.
- (viii) The holding cost is ₹ 1 per bottle per annum.

The marketing team has surveyed the following demand (bottle) of the product:

Large	Medium	Small
3,00,000	7,50,000	20,00,000

You are required to CALCULATE profit/ loss per batch and also COMPUTE Economic Batch Quantity (EBQ).

Answer:

Workings:

1. Maximum number of bottles that can be processed in a batch:

$$= 5,000 \text{ ltrs} / \text{Bottle volume}$$

Large		Medium		Small	
Qty (ltr)	Max bottles	Qty (ltr)	Max bottles	Qty (ltr)	Max bottles
3	1,666	1.5	3,333	0.6	8,333

*For simplicity of calculation small fractions has been ignored.

2. Number of batches to be run:

		Large	Medium	Small	Total
A	Demand	3,00,000	7,50,000	20,00,000	
B	Bottles per batch (Refer WN-1)	1,666	3,333	8,333	
C	No. of batches [A÷B]	180	225	240	645

*For simplicity of calculation small fractions has been ignored.

3. Quantity of Material-W and Material C required to meet demand:

	Particulars	Large	Medium	Small	Total
A	Demand (bottle)	3,00,000	7,50,000	20,00,000	

B	Qty per bottle (Litre)	3	1.5	0.6	
C	Output (Litre) [A×B]	9,00,000	11,25,000	12,00,000	32,25,000
D	Material-W perlitre of output(Litre)	14	14	14	
E	Material-W required (Litre) [C×D]	1,26,00,000	1,57,50,000	1,68,00,000	4,51,50,000
F	Material-C required per litreof output (ml)	25	25	25	
G	Material-C required (Litre) [(C×F) ÷ 1000]	22,500	28,125	30,000	80,625

4. No. of Man-shift required:

		Large	Medium	Small	Total
A	No. of batches	180	225	240	645
B	Hours required per batch (Hours)	2	2	2	
C	Total hours required (Hours) [A×B]	360	450	480	1,290
D	No. of shifts required [C÷8]	45	57	60	162
E	Total manshift [D×20 workers]	900	1,140	1,200	3,240

4. Power consumption in Kwh

		Large	Medium	Small	Total
For processing					
A	No. of batches	180	225	240	645
B	Hours required per batch (Hours)	1.75	1.75	1.75	1.75
C	Total hours required (Hours) [A×B]	315	393.75	420	1,128.75
D	Power consumption perhour	90	90	90	90
E	Power consumption inKwh [C×D]	28,350	35,437.5	37,800	1,01,587.5
F	Per batch consumption(Kwh) [E÷A]	157.5	157.5	157.5	157.5
For set-up					
G	Hours required perbatch (Hours)	0.25	0.25	0.25	0.25
H	Total hours required (Hours) [A×G]	45	56.25	60	161.25
I	Power consumption perhour [20%×90]	18	18	18	18
J	Power consumption inKwh [H×I]	810	1,012.5	1,080	2,902.5
K	Per batch consumption(Kwh) [J÷A]	4.5	4.5	4.5	4.5

5. Calculation of Profit/ loss per batch:

	Particulars	Large	Medium	Small	Total
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A	Demand (bottle)	3,00,000	7,50,000	20,00,000	30,50,000
B	Price per bottle(₹)	150	90	50	
C	Sales value (₹) [A×B]	4,50,00,000	6,75,00,000	10,00,00,000	21,25,00,000
	Direct Material cost:				
E	Material-W (₹) [Qty in WN-3 × ₹ 0.50]	63,00,000	78,75,000	84,00,000	2,25,75,000
F	Material-C (₹) [Qty in WN-3 × ₹1,000]	2,25,00,000	2,81,25,000	3,00,00,000	8,06,25,000
G	[E+F]	2,88,00,000	3,60,00,000	3,84,00,000	10,32,00,000
H	Direct Wages (₹) [Man-shift in WN-4 × × ₹ 880]	7,92,000	10,03,200	10,56,000	28,51,200
I	Packing cost (₹)[A×₹3]	9,00,000	22,50,000	60,00,000	91,50,000
	Power cost (₹)				
J	For processing (₹) [WN-5 × ₹7]	1,98,450	2,48,062.5	2,64,600	7,11,112.5
K	For set-up time(₹) [WN-5 × ₹7]	5,670	7,087.5	7,560	20,317.5
L	[J+K]	2,04,120	2,55,150	2,72,160	7,31,430
M	Other variablecost (₹) [No. of batch in WN-2 × ₹ 30,000]	54,00,000	67,50,000	72,00,000	1,93,50,000
N	Total Variable cost per batch [G+H+I+L+M]	3,60,96,120	4,62,58,350	5,29,28,160	13,52,82,630
O	Profit/ loss before fixed cost [C-N]	89,03,880	2,12,41,650	4,70,71,840	7,72,17,370
P	Fixed Cost				4,90,00,000
Q	Total Cost [O-P]				2,82,17,370

Computation of Economic Batch Quantity (EBQ):

$$EBQ = \sqrt{\frac{2DS}{C}}$$

D= Annual Demand for the Product = Refer A below

S= Set-up cost per batch = Refer D below

C = Carrying cost per unit per annum =Refer E below

	Particulars	Large	Medium	Small
A	Annual Demand (bottle)	3,00,000	7,50,000	20,00,000
	Set-up Cost:			

B	Power cost for set-up time (₹) [Consumption per batch in WN-5 × ₹7]	31.50	31.50	31.50
C	Other variable cost (₹) *	30,000	30,000	30,000
D	Total Set-up cost [B+C]	30,031.50	30,031.50	30,031.50
E	Holding cost:	1.00	1.00	1.00
F	EBQ (Bottle)	1,34,234	2,12,243	3,46,592

* Other variable cost is assumed to be part of set-up cost.

Q5. NOV 2022, RTP

PS Ltd. manufactures articles in predetermined lots simultaneously. The following costs have been incurred for Batch No. 'PS143' in the month of March, 2022:

Units produced 1,000 units

Direct materials cost ₹ 2,00,000

Direct Labour -

Department A 800 labour hours @ ₹ 100 per hour.

Department B 1,400 labour hours @ ₹ 120 per hour.

Factory overheads are absorbed on labour hour basis and the rates are:

Department A @ ₹ 140 per hour.

Department B @ ₹ 80 per hour.

Administrative overheads are absorbed at 10% of selling price.

The firm expects 25% gross profit (sales value minus factory cost) for determining the selling price.

You are required to CALCULATE the selling price per unit of Batch No. 'PS143'.

Answer

Statement showing selling price per unit of Batch number 'PS143'

Particulars	Amount (₹)	Amount (₹)
Direct Material		2,00,000
Direct Labour		
Department A 800 labour hours @ ₹100 per hour	80,000	
Department B 1400 labour hours @ ₹120 per hour	1,68,000	2,48,000
Factory overheads		
Department A 800 labour hours @ ₹140 per hour	1,12,000	
Department B 1400 labour hours @ ₹80 per hour	1,12,000	2,24,000
Factory Cost		6,72,000
Add: Administrative overheads (10% of selling price) (6,72,000/75% x 10%)		89,600
Cost of production		7,61,600
Add: Profit (15% of selling price) (6,72,000/75% x 15%)		1,34,400
Selling price of batch no 'PS143'		8,96,000
Selling price per unit (8,96,000 / 1000 units)		896

Alternatively, selling price calculation:- Selling price assume X

$$25\% = (X - \text{factory cost}) / X$$

$$\text{or } 0.25 X = X - 6,72,000$$

$$\text{or } 0.75 X = 6,72,000$$

$$\text{hence } X = ₹ 8,96,000$$

Q6. MAY 2022, RTP

Brostrom Ltd. manufactures 'Stent' that is used by hospitals in angioplasty, a procedure used to open blocked coronary arteries without open-heart surgery. As per the estimates provided by Pharmaceutical Industry Bureau, there will be a demand of 1 crore 'Stents' in the coming year. Brostrom Ltd. is having a market share of 10% of the total market demand of the Stents. It is estimated that it costs ₹ 3.00 as inventory holding cost per stent per month and that the set-up cost per run of stent manufacture is ₹ 450.

Required:

- WHAT would be the optimum run size for Stent manufacture?

ii. WHAT is the minimum inventory holding cost?

Answer

(i) Computation of Optimum Run size of 'Stents' or Economic Batch Quantity (EBQ)

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2DS}{C}}$$

Where, D = Annual demand for the Stents
 $= 1,00,00,000 \times 10\% = 10,00,000$ units
 S = Set- up cost per run
 $= ₹ 450$
 C = Carrying cost per unit per annum
 $= ₹ 3 \times 12 = ₹ 36$

$$\text{EBQ} = \sqrt{\frac{2 \times 10,00,000 \times ₹ 450}{₹ 36}} = 5,000 \text{ units of Stents}$$

(ii) Minimum inventory holding cost

Minimum Inventory Cost = Average Inventory $\times$ Inventory Carrying Cost per unit per annum
 $= (5,000 \div 2) \times ₹ 36$
 $= ₹ 90,000$

(iii) Calculation of the extra cost due to manufacturing policy

	When run size is 6,000 units	When run size is 5,000 units i.e. at EBQ
Total set up cost	$= \frac{10,00,000}{6,000} \times ₹ 450$ $= ₹ 75,000$	$= \frac{10,00,000}{5,000} \times ₹ 450$ $= ₹ 90,000$
Total Carrying cost	$\frac{1}{2} \times 6,000 \times ₹ 36$ $= ₹ 1,08,000$	$\frac{1}{2} \times 5,000 \times ₹ 36$ $= ₹ 90,000$
Total Cost	₹ 1,83,000	₹ 1,80,000

Extra cost = ₹ 1,83,000 - ₹ 1,80,000 = ₹ 3,000

Q7. NOV 2021, RTP

Rollon Ltd. is committed to supply 96,800 bearings per annum to Racing Ltd. on steady basis. It is estimated that it costs 25 paise as inventory carrying cost per bearing per month and the set-up cost per run of bearing manufacture is ₹ 588.

- COMPUTE what would be the optimum run size for bearing manufacture?
- Assuming that the company has a policy of manufacturing 8,800 bearings per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (a) above?

Answer

(a) Optimum production run size (Q)

$$= \sqrt{\frac{2DS}{C}} = \sqrt{\frac{2 \times 96,800 \times ₹ 588}{0.25 \times 12}} = 6,160 \text{ bearings.}$$

(b) Calculation of Extra Cost

Total Cost (of maintaining the inventories) when production run size (Q) are 6,160 and 8,800 bearings respectively.

Total cost = Total set-up cost + Total carrying cost.

Particulars	When run size is 6,160 bearings	When run size is 8,800 bearings i.e. at EBQ
Total set up cost	$= \frac{96,800}{6,160} \times ₹ 588 = ₹ 9,240$ Or, No. of setups = 15.71 (16 setups) $= 16 \times ₹ 588 = ₹ 9,408$	$= \frac{96,800}{8,800} \times ₹ 588 = ₹ 6,468$
Total Carrying cost	$\frac{1}{2} \times 6,160 \times 0.25 \times 12$ $= ₹ 9,240$	$\frac{1}{2} \times 8,800 \times 0.25 \times 12$ $= ₹ 13,200$
Total Cost	₹ 18,480/ ₹ 18,648	₹ 19,668

₹ 1,188/ ₹ 1,020 is the extra cost incurred by the company due to run size not being optimum run size.

Q8. NOV 2020, RTP

A Ltd. manufactures mother boards used in smart phones. A smart phone requires one mother board. As per the study conducted by the Indian Cellular Association, there will be a demand of 180 million smart phones in the coming year. A Ltd. is expected to have a market share of 5.5% of the total market demand of the mother boards in the coming year. It is estimated that it costs ₹6.25 as inventory holding cost per board per month and that the set-up cost per run of board manufacture is ₹33,500.

- COMPUTE the optimum run size for board manufacturing?
- Assuming that the company has a policy of manufacturing 80,000 boards per run, CALCULATE how much extra costs the company would be incurring as compared to the optimum run suggested in (i) above?

Answer

(i) Computation of optimum run size

$$\text{Optimum run size or Economic Batch Quantity (EBQ)} = \sqrt{\frac{2DS}{C}}$$

Where, D = Annual demand i.e. 5.5% of 18,00,00,000 = 99,00,000 units

S = Set-up cost per run = ₹33,500

C = Inventory holding cost per unit per annum

= ₹6.25 × 12 months = ₹75

$$\text{EBQ} = \sqrt{\frac{2 \times 99,00,000 \times ₹33,500}{₹75}} = 94,042.5 \text{ units or } 94,043 \text{ units}$$

(ii) Calculation of Total Cost of set-up and inventory holding

	Batch size	No. of set-up	Set-up Cost (₹)	Inventory holding cost (₹)	Total Cost (₹)
A	80,000 units	124 ($\frac{99,00,000}{80,000}$)	41,54,000 (124 × ₹33,500)	30,00,000 ($\frac{80,000 \times ₹75}{2}$)	71,54,000
B	94,043 units	106 ($\frac{99,00,000}{94,043}$)	35,51,000 (106 × ₹33,500)	35,26,612.5 ($\frac{94,043 \times ₹75}{2}$)	70,77,612.50
	Extra Cost (A – B)				76,387.506

Q9. NOV 2019, RTP

BTL LLP. manufactures glass bottles for HDL Ltd., a pharmaceutical company, which is in ayurvedic medicines business.. BTL can produce 2,00,000 bottles in a month. Set-up cost of each production run is ₹ 5,200

and the cost of holding one bottle for a year is ₹ 1.50. As per an estimate HDL Ltd. can order as much as 19,00,000 bottles in a year spreading evenly throughout the year.

At present the BTL manufactures 1,60,000 bottles in a batch.

Required:

- COMPUTE the Economic Batch Quantity for bottle production.
- COMPUTE the annual cost saving to BTL by adopting the EBQ of a production.

Answer

$$\text{Economic Batch Quantity (EBQ)} = \sqrt{\frac{2DS}{C}}$$

Where, D = Annual demand for the product

S = Setting up cost per batch

C = Carrying cost per unit of production

(i) Computation of EBQ :

$$= \sqrt{\frac{2 \times 19,00,000 \times ₹5,200}{₹1.5}} = 1,14,775 \text{ bottles}$$

(ii) Computation of savings in cost by adopting EBQ:

Batch size	No. of Batch	Set-up Cost (₹)	Carrying cost (₹)	Total Cost (₹)
1,60,000 bottles	12	62,400 (₹5,200 × 12)	1,20,000 (₹1.5 × ½ × 1,60,000)	1,82,400
1,14,775 bottles	17	88,400 (₹5,200 × 17)	86,081.25 (₹1.5 × ½ × 1,14,775)	1,74,481.25
Saving				7,918.75

Q10. NOV 2018, RTP

Arnav Confectioners (AC) owns a bakery which is used to make bakery items like pastries, cakes and muffins. AC use to bake at least 50 units of any item at a time. A customer has given an order for 600 cakes. To process a batch, the following cost would be incurred:

Direct materials - ₹ 5,000

Direct wages - ₹ 500 (irrespective of units)

Oven set-up cost - ₹750 (irrespective of units)

AC absorbs production overheads at a rate of 20% of direct wages cost. 10% is added to the total production cost of each batch to allow for selling, distribution and administration overheads.

AC requires a profit margin of 25% of sales value.

Required:

- DETERMINE the price to be charged for 600 cakes.
- CALCULATE cost and selling price per cake.
- DETERMINE what would be selling price per unit If the order is for 605 cakes.

Answer:

Statement of cost per batch and per order

No. of batch = 600 units ÷ 50 units = 12 batches

Particulars	Cost per batch (₹)	Total Cost (₹)
Direct Material Cost	5,000.00	60,000
Direct Wages	500.00	6,000
Oven set-up cost	750.00	9,000
Add: Production Overheads (20% of Direct wages)	100.00	1,200
Total Production cost	6,350.00	76,200
Add: S&D and Administration overheads (10% of Total production cost)	635.00	7,620
Total Cost	6,985.00	83,820
Add: Profit (1/3rd of total cost)	2,328.33	27,940
(i) Sales price	9,313.33	1,11,760
No. of units in batch	50 units	
(ii) Cost per unit (₹6,985 ÷ 50 units)	139.70	
Selling price per unit (9,313.33 ÷ 50 units)	186.27	

(iii) If the order is for 605 cakes, then selling price per cake would be as below:

Particulars	Total Cost (₹)
Direct Material Cost	60,500
Direct Wages(₹500 × 13 batches)	6,500
Oven set-up cost(₹750 × 13 batches)	9,750
Add: Production Overheads (20% of Direct wages)	1,300
Total Production cost	78,050
Add: S&D and Administration overheads (10% of Total production cost)	7,805
Total Cost	85,855
Add: Profit (1/3rd of total cost)	28,618
(i) Sales price	1,14,473
No. of units	605 units
Selling price per unit (₹1,14,473 ÷ 605 units)	189.21

CHAPTER 9:JOB COSTING
Past Exams and RTP Questions Compiler

Q1. May 2022 Exam, 5 Marks

Distinguish between Job costing and Process Costing. (Any five points of differences)

Answer

Job Costing	Process Costing
(i) A Job is carried out or a product is produced by specific orders.	The process of producing the product has a continuous flow and the product produced is homogeneous.
(ii) Costs are determined for each job.	Costs are compiled on time basis i.e., for production of a given accounting period for each process or department.
(iii) Each job is separate and independent of other jobs.	Products lose their individual identity as they are manufactured in a continuous flow.
(iv) Each job or order has a number and costs are collected against the same job number.	The unit cost of process is an average cost for the period.
(v) Costs are computed when a job is completed. The cost of a job may be determined by adding all costs against the job.	Costs are calculated at the end of the cost period. The unit cost of a process may be computed by dividing the total cost for the period by the output of the process during that period.
(vi) As production is not continuous and each job may be different, so more managerial attention is required for effective control.	Process of production is usually standardized and is therefore, quite stable. Hence control here is comparatively easier.

Q2. Nov 2019 Exam, 5 Marks

The following data is presented by the supervisor of a factory for a Job:

	₹ per unit
Direct Material	120
Direct Wages @ ₹ 4 per hour	
(Departments A-4 hrs, B-7 hrs, C-2 hrs & D-2 hrs)	60
Chargeable Expenses	20
Total	200

Analysis of the Profit and Loss Account for the year ended 31st March, 2019

Material		2,00,000	Sales	4,30,000
Direct Wages				
Dept. A	12,000			
Dept. B	8,000			
Dept. C	10,000			
Dept. D	20,000	50,000		
Special Store items		6,000		
Overheads	12,000			
Dept. A	6,000			
Dept. B	9,000			
Dept. C	17,000	44,000		
Dept. D		1,30,000		
Gross Profit c/d		4,30,000		4,30,000
Selling Expenses	90,000		Gross Profit b/d	1,30,000
Net Profit	40,000			
	1,30,000			1,30,000

It is also to be noted that average hourly rates for all the four departments are similar.

Required:

- Prepare a Job Cost Sheet.
- Calculate the entire revised cost using the above figures as the base.
- Add 20% profit on selling price to determine the selling price.

Answer

Job Cost Sheet

Customer Details ——— Job No. _____

Date of commencement ——— Date of completion _____

Particulars		Amount (₹)
Direct materials		120
Direct wages:		
Deptt. A ₹ 4.00 × 4 hrs.	₹ 16.00	
Deptt. B ₹ 4.00 × 7 hrs.	₹ 28.00	
Deptt. C ₹ 4.00 × 2 hrs.	₹ 8.00	
Deptt. D ₹ 4.00 × 2 hrs.	₹ 8.00	60
Chargeable expenses		20
Prime cost		200
Overheads		
Deptt. A = $\frac{12,000}{12,000} \times 100 = 100\%$ of ₹ 16	₹ 16	
Deptt. B = $\frac{6,000}{8,000} \times 100 = 75\%$ of ₹ 28	₹ 21	
Deptt. C = $\frac{9,000}{10,000} \times 100 = 90\%$ of ₹ 8	₹ 7.20	
Deptt. D = $\frac{17,000}{20,000} \times 100 = 85\%$ of ₹ 8	₹ 6.80	51.00
Works cost		251.00
Selling expenses		
Total cost		326.30
Profit (20% profit on selling price i.e 25% of total cost)		81.58
Selling price		407.88

Q3. May 2018 Exam, 5 Marks

Explain 'Job Costing' and 'Batch Costing'.

Answer

Job costing: In this method of costing, cost of each job is ascertained separately. It is suitable in all cases where work is undertaken on receiving a customer's order like a printing press, motor work shop, etc. This method of costing is used for non- standard and non- repetitive products produced as per customer specifications and against specific orders. Jobs are different from each other and independent of each other. Each Job is unique.

Batch Costing: It is the extension of Job costing. Homogeneous products are produced in a continuous production flow in lots. A batch may represent a number of small orders passed through the factory in batch. Each batch here is treated as a unit of cost and thus separately costed. Here cost per unit is determined by dividing the cost of the batch by number of units produced in the batch.

Q4. MAY 2023 RTP

A jobbing factory has undertaken to supply 200 pieces of a component per month for the ensuing six months. Every month a batch order is opened against which materials and labour hours are booked at actual. Overheads are levied at a rate per labour hour. The selling price contracted for is ₹ 80 per piece. From the following data.

COMPUTE the cost and profit per piece of each batch order and overall position of the order for 1,200 pieces.

Month	Batch Output (Pieces)	Material cost (₹)	Direct wages (₹)	Direct labour (Hours)
-------	-----------------------	-------------------	------------------	-----------------------

January	200	6,500	1,200	240
February	200	6,400	1,400	280
March	220	6,800	1,500	280
April	180	6,300	1,400	270
May	200	7,000	1,500	300
June	220	7,200	1,600	320

The other details are:

Month	Chargeable expenses (₹)	Direct labour (Hours)
January	1,20,000	4,800
February	1,05,600	4,400
March	1,20,000	5,000
April	1,05,800	4,600
May	1,30,000	5,000
June	1,20,000	4,800

Answer

Particulars	Jan.(₹)	Feb.(₹)	March (₹)	April (₹)	May (₹)	June (₹)	Total (₹)
Batch output (in pieces)	210	200	220	180	200	220	1,230
Sale value @ ₹80	16,80	16,00	17,60	14,40	16,00	17,60	98,40
Material cost	6,500	6,400	6,800	6,300	7,000	7,200	8,600
Direct wages	1,200	1,400	1,500	1,400	1,500	1,600	8,600
Chargeable expenses*	6,000	6,720	6,720	6,210	7,800	8,000	41,45
Total cost	13,70	14,52	15,02	13,91	16,30	16,80	90,25
Profit per batch	3,100	1,480	2,580	490	(300)	800	8,150
Total cost per piece	65.2	72.6	68.3	77.3	81.5	76.4	73.4
Profit per piece	14.8	7.4	11.7	2.7	(1.5)	3.6	6.6

Overall position of the order for 1,200 pieces

Sales value of 1,200 pieces @ ₹ 80 per piece ₹ 96,000

Total cost of 1,200 pieces @ ₹ 73.4 per piece ₹ 88,080

Profit ₹ 7,920

* Chargeable expenses × Direct labour hours for batch ÷ Direct labour hour for the month

Q5. MAY 2022 RTP | MAY 2021 RTP | Nov 2023 RTP

KJ Motors Ltd. is a manufacturer of auto components. Following are the details of expenses for the year 2020-21:

	(₹)
(i) Opening Stock of Material	15,00,000
(ii) Closing Stock of Material	20,00,000
(iii) Purchase of Material	1,80,50,000
(iv) Direct Labour	90,50,000
(v) Factory Overhead	30,80,000
(vi) Administrative Overhead	20,50,400

During the FY 2021-22, the company has received an order from a car manufacturer where it estimates that the cost of material and labour will be ₹ 80,00,000 and ₹ 40,50,000 respectively. The company charges factory overhead as a percentage of direct labour and administrative overheads as a percentage of factory cost based on previous year's cost. Cost of delivery of the components at customer's premises is estimated at ₹ 9,50,000.

You are required to:

(i) CALCULATE the overhead recovery rates based on actual costs for 2020-21.

Answer

Calculation of Overhead Recovery Rate:

$$\text{Factory Overhead Recovery Rate} = \frac{\text{Factory Overhead in 2020-21}}{\text{Direct labour cost in 2020-21}} \times 100$$

$$= \frac{30,80,000}{90,50,000} \times 100 = 34\% \text{ of Direct labour}$$

$$\text{Administrative Overhead Recovery Rate} = \frac{\text{Administrative Overhead in 2020-21}}{\text{Factory cost in 2020-21 (W.N)}} \times 100$$

$$= \frac{20,50,400}{2,96,80,000} \times 100 = 6.91\% \text{ of Factory Cost}$$

Working Note: Calculation of Factory Cost in 2020-21

Particulars	Amount (₹)
Opening Stock of Material	15,00,000
Add: Purchase of Material	1,80,50,000
Less: Closing Stock of Material	(20,00,000)
Material Consumed	1,75,50,000
Direct Labour	90,50,000
Prime Cost	2,66,00,000
Factory Overhead	30,80,000
Factory Cost	2,96,80,000

(ii) Job Cost Sheet for the order received in 2021-22

Particulars	Amount (₹)
Material	80,00,000
Labour	40,50,000
Factory Overhead (34% of ₹ 40,50,000)	13,77,000
Factory Cost	1,34,27,000
Administrative Overhead (6.91% of ₹ 1,34,27,000)	9,27,806
Cost of delivery	9,50,000
Total Cost	1,53,04,806
Add: Profit @ 25% of Sales or 33.33% of cost	51,01,602
Sales value (Price to be quoted for the order)	2,04,06,408

Hence the price to be quoted is ₹ 2,04,06,408.

Q6. Nov 2020 RTP

AP Ltd. received a job order for supply and fitting of plumbing materials. Following are the details related with the job work:

Direct Materials

AP Ltd. uses a weighted average method for the pricing of materials issues.

Opening stock of materials as on 12th August 2020:

- 15mm GI Pipe, 12 units of (15 feet size) @ ₹600 each
- 20mm GI Pipe, 10 units of (15 feet size) @ ₹ 660 each
- Other fitting materials, 60 units @ ₹ 26 each
- Stainless Steel Faucet, 6 units @ ₹ 204 each
- Valve, 8 units @ ₹ 404 each

Purchases:

On 16th August 2020:

- 20mm GI Pipe, 30 units of (15 feet size) @ ₹ 610 each
- 10 units of Valve @ ₹ 402 each

On 18th August 2020:

- Other fitting materials, 150 units @ ₹ 28 each
- Stainless Steel Faucet, 15 units @ ₹ 209 each

On 27th August 2020:

- 15mm GI Pipe, 35 units of (15 feet size) @ ₹ 628 each
- 20mm GI Pipe, 20 units of (15 feet size) @ ₹ 660 each
- Valve, 14 units @ ₹ 424 each

Issues for the hostel job:

On 12th August 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- Other fitting materials, 18 units

On 17th August 2020:

- 15mm GI Pipe, 8 units of (15 feet size)
- Other fitting materials, 30 units

On 28th August 2020:

- 20mm GI Pipe, 2 units of (15 feet size)
- 15mm GI Pipe, 10 units of (15 feet size)
- Other fitting materials, 34 units
- Valve, 6 units

On 30th August 2020:

- Other fitting materials, 60 units
- Stainless Steel Faucet, 15 units

Direct Labour:

Plumber: 180 hours @ ₹100 per hour (includes 12 hours overtime)

Helper: 192 hours @ ₹70 per hour (includes 24 hours overtime)

Overtimes are paid at 1.5 times of the normal wage rate.

Overheads:

Overheads are applied @ ₹26 per labour hour.

Pricing policy:

It is company's policy to price all orders based on achieving a profit margin of 25% on sales price.

You are required to

- CALCULATE the total cost of the job.
- CALCULATE the price to be charged from the customer.

Answer

(a) Calculation of Total Cost for the Job:

Particulars	Amount (₹)	Amount (₹)
Direct Material Cost:		
- 15mm GI Pipe (Working Note- 1)	11,051.28	
- 20mm GI Pipe (Working Note- 2)	2,588.28	
- Other fitting materials (Working Note- 3)	3,866.07	
- Stainless steel faucet 15 units $\times (\frac{6 \times 204 + 15 \times 209}{21 \text{ units}})$	3,113.57	
- Valve 6 units $\times (\frac{8 \times 404 + 10 \times 402 + 14 \times 424}{32 \text{ units}})$	2,472.75	23,091.95
Direct Labour:		
- Plumber [(180 hours $\times$ ₹100) + (12 hours $\times$ ₹50)]	18,600.00	
- Helper [(192 hours $\times$ ₹70) + (24 hours $\times$ ₹35)]	14,280.00	32,880.00
- Overheads [₹26 $\times$ (180 + 192) hours]		9,672.00
Total Cost		65,643.95

(b) Price to be charged for the job work:

	Amount (₹)
Total Cost incurred on the job	65,643.95
Add: 25% Profit on Job Price $\frac{65,643.95}{75\%} \times 25\%$	21,881.32
	87,525.27

Working Note:

1. Cost of 15mm GI Pipe

Date		Amount (₹)
17-08-2020	8 units $\times$ ₹ 600	4,800.00
28-08-2020	10 units $\times \frac{4 \times 600 + 35 \times 628}{39 \text{ units}}$	6,251.28
		11,051.28

2. Cost of 20mm GI Pipe

Date		Amount (₹)
12-08-2020	2 units $\times$ ₹ 660	1,320.00
28-08-2020	2 units $\times (\frac{8 \times 660 + 30 \times 610 + 20 \times 660}{58 \text{ units}})$	1,268.28
		2,588.28

3. Cost of Other fitting materials

Date		Amount (₹)
------	--	------------

12-08-2020	18 units × ₹ 26	468.00
17-08-2020	30 units × ₹ 26	780.00
28-08-2020	34 units × $\left(\frac{12 \times 26 + 150 \times 28}{162 \text{ units}}\right)$	946.96
30-08-2020	60 units × $\left(\frac{12 \times 26 + 150 \times 28}{162 \text{ units}}\right)$	1,671.11
		3,866.07

Q7. May 2020 RTP

A factory uses costing system. The following data are obtained from its books for the year ended 31st March, 2020:

	Amount (₹)
Direct materials	18,00,000
Direct wages	15,00,000
Selling and distribution overheads	10,50,000
Administration overheads	8,40,000
Factory overheads	9,00,000
Profit	12,18,000

- PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.
- In 2019-20, the factory received an order for a job. It is estimated that direct materials required will be ₹4,80,000 and direct labour will cost ₹3,00,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory overheads is recovered as percentage of wages paid, whereas, other overheads as a percentage of cost of production, based on cost rates prevailing in the previous year.

Answer

(i) Production Statement For the year ended 31st March, 2020

	Amount (₹)
Direct materials	18,00,000
Direct wages	15,00,000
Prime Cost	33,00,000
Factory overheads	9,00,000
Cost of Production	42,00,000
Administration overheads	8,40,000
Selling and distribution overheads	10,50,000
Cost of Sales	60,90,000
Profit	12,18,000
Sales value	73,08,000

Calculation of Rates:

- Percentage of factory overheads to direct wages = $\frac{9,00,000}{15,00,000} \times 100 = 60\%$
- Percentage of administration overheads to Cost of production = $\frac{8,40,000}{42,00,000} \times 100 = 20\%$
- Selling and distribution overheads = ₹10,50,000 × 115% = ₹12,07,500
Selling and distribution overhead % to Cost of production = $\frac{12,07,500}{42,00,000} \times 100 = 28.75\%$
- Percentage of profit to sales = $\frac{12,18,000}{73,08,000} \times 100 = 16.67\% \text{ or, } 1/6$

(ii) Calculation of price for the job received in 2019-20

	Amount (₹)
Direct materials	4,80,000
Direct wages	3,00,000
Prime Cost	7,80,000
Factory overheads (60% of ₹3,00,000)	1,80,000
Cost of Production	9,60,000
Administration overheads (20% of ₹9,60,000)	1,92,000
Selling and distribution overheads (28.75% of ₹9,60,000)	2,76,000
Cost of Sales	14,28,000

Profit (1/5 of ₹14,28,000)	2,85,600
Sales value	17,13,600

Q8. Nov 2019 RTP

Ispat Engineers Limited (IEL) undertook a plant manufacturing work for a client. It will charge a profit mark up of 20% on the full cost of the jobs. The following are the information related to the job:

Direct materials utilised – ₹1,87,00,000

Direct labour utilised – 2,400 hours at ₹80 per hour

Budgeted production overheads are Rs. 48,00,000 for the period and are recovered on the basis of 24,000 labour hours.

Budgeted selling and administration overheads are ₹18,00,000 for the period and recovered on the basis of total budgeted total production cost of ₹36,00,00,000.

Required:

CALCULATE the price to be charged for the job.

Answer

Calculation of job price

Particulars	Amount (₹)
Direct materials	1,87,00,000
Direct wages (₹80 × 2,400 hours)	1,92,000
Production overheads $\frac{48,00,000}{24,000\text{hrs}} \times 2,400\text{hrs}$	4,80,000
Production cost	1,93,72,000
Selling and administration overheads $\frac{18,00,000}{36,00,00,000} \times 1,93,72,000$	96,860
Total cost of sales	1,94,68,860
Profit mark-up @ 20%	38,93,772
Price for the job	2,33,62,632

Q9. Nov 2018 RTP

A company has been asked to quote for a job. The company aims to make a net profit of 30% on sales. The estimated cost for the job is as follows:

Direct materials 10 kg @ ₹10 per kg

Direct labour 20 hours @ ₹5 per hour

Variable production overheads are recovered at the rate of ₹ 2 per labour hour.

Fixed production overheads for the company are budgeted to be ₹1,00,000 each year and are recovered on the basis of labour hours. There are 10,000 budgeted labour hours each year. Other costs in relation to selling, distribution and administration are recovered at the rate of ₹50 per job.

DETERMINE quote for the job by the Company.

Answer

Determination of quotation price for the job

Cost	(₹)
Direct Material (10kg × ₹10)	100
Direct Labour (20hrs × ₹5)	100
Variable production overhead (20hrs × ₹2)	40
Fixed Overhead $(\frac{1,00,000}{10,000 \text{ budgeted hours}} \times 20 \text{ hours})$	200
Other costs	50
Total costs	490

Net profit is 30% of sales, therefore total costs represent 70% ($₹ 490 \times 100$) ÷ 70 = ₹ 700 price to quote for job.

To check answer is correct; profit achieved will be ₹ 210 (₹ 700 - ₹ 490)

= ₹ 210 ÷ ₹ 700 = 30%

Q10. May 2018 RTP

A factory uses costing system. The following data are obtained from its books for the year ended 31st March, 2018:

	Amount (₹)
Direct materials	9,00,000
Direct wages	7,50,000
Selling and distribution overheads	5,25,000
Administration overheads	4,20,000
Factory overheads	4,50,000
Profit	6,09,000

- PREPARE a Job Cost sheet indicating the Prime cost, Cost of Production, Cost of sales and the Sales value.
- In 2018-19, the factory received an order for a job. It is estimated that direct materials required will be ₹2,40,000 and direct labour will cost ₹1,50,000. DETERMINE what should be the price for the job if factory intends to earn the same rate of profit on sales assuming that the selling and distribution overheads have gone up by 15%. The factory overheads is recovered as percentage of wages paid, whereas, other overheads as a percentage of cost of production, based on cost rates prevailing in the previous year.

Answer

(i) Production Statement For the year ended 31st March, 2018

	Amount (₹)
Direct materials	9,00,000
Direct wages	7,50,000
Prime Cost	16,50,000
Factory overheads	4,50,000
Cost of Production	21,00,000
Administration overheads	4,20,000
Selling and distribution overheads	5,25,000
Cost of Sales	30,45,000
Profit	6,09,000
Sales value	36,54,000

Calculation of Rates:

- Percentage of factory overheads to direct wages = $\frac{4,50,000}{7,50,000} \times 100 = 60\%$
- Percentage of administration overheads to Cost of production = $\frac{4,20,000}{21,00,000} \times 100 = 20\%$
- Selling and distribution overheads = ₹5,25,000 × 115% = ₹6,03,750
Selling and distribution overhead % to Cost of production = $\frac{6,03,750}{21,00,000} = 28.75\%$
- Percentage of profit to sales = $\frac{6,09,000}{36,54,000} = 16.67\%$ or, 1/6

(ii) Calculation of price for the job received in 2018-19

	Amount (₹)
Direct materials	2,40,000
Direct wages	1,50,000
Prime Cost	3,90,000
Factory overheads (60% of ₹1,50,000)	90,000
Cost of Production	4,80,000
Administration overheads (20% of ₹4,80,000)	96,000
Selling and distribution overheads (28.75% of ₹4,80,000)	138,000
Cost of Sales	7,14,000
Profit (20% of 7,14,000)	1,42,800
Sales value	8,56,800

PROCESS AND OPERATION COSTING
Past Exams and RTP Questions Compiler

Q1. May 2024, 5 marks

Distinguish between Waste and Scrap. Discuss the treatment of normal and abnormal scrap in Cost Accounts.

Answer:

Difference between Waste and Scrap

Waste	Scrap
1. The portion of raw material which is lost during storage/production and discarded.	1. The output which is discarded and disposed off without further treatment.
2. It is connected with raw material or inputs to the production process.	2. It is the loss connected with the output
3. Waste of materials may be visible or invisible.	3. Scraps are generally identifiable and has physical substance.
4. Generally, waste has no recoverable value.	4. Scraps are termed as by-products and has small recoverable value.

Treatment of Scrap

Normal- The cost of scrap is borne by good units and income arises on account of realisable value is deducted from the cost.

Abnormal- The scrap account should be charged with full cost. The credit is given to the job or process concerned. The profit or loss in the scrap account, on realisation, will be transferred to the Costing Profit and Loss Account.

Q2. May 2024, 8 marks

Meta Company Ltd. is engaged in the production of product 'Trio' which passes through two different processes Process P and Process Q. Other information obtained from books of account for the year is as follows:

Particulars	Process P	Process Q
Raw material used	10,000	---
Raw material cost per unit	₹ 80	---
Direct wages	₹ 52,000	₹ 78,000
Direct Expenses	₹ 8,600	₹ 11,100
Selling price per unit of output	₹ 130	₹ 190

Production overheads of ₹ 3,00,000 are recovered as percentage of direct wages.

Actual output of the two processes was:

P-9,200 units and Q-6,400 units. $\frac{3}{4}$ th of the output of Process P was passed on to the Process Q and the balance was sold. The entire output of process Q was sold.

Management & Selling expenses during the year were ₹ 1,70,000. These are not allocable to the processes.

The normal loss of the two processes, calculated on the input of every process was:

Process P- 6% and Process Q-10%

The Loss of Process P was sold at ₹ 5 per unit and that of Q at ₹ 8 per unit. Assume that Process P and Process Q are not the responsibility centres.

You are required to prepare:

- (i) Process P Account
- (ii) Process Q Account
- (iii) Abnormal Loss and Abnormal Gain Account
- (iv) Costing Profit & Loss Account.

Answer:

(a) Process- P Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Material	10,000	8,00,000	By Normal Loss	600	3,000
To Wages		52,000	By Process Q		
To Direct Exp.		8,600	(9,200 × 3/4)	6,900	7,17,600
To Production Overheads (3,00,000 × 2/5)		1,20,000	By Costing Profit and Loss (P&L) (9,200 × 1/4)	2,300	2,39,200
			By Abnormal Loss	200	20,800
	10,000	9,80,600		10,000	9,80,600

Cost per unit = $9,80,600 - 3,000 / 10,000 - 600 = ₹ 104$ per unit

Process- Q Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process P	6,900	7,17,600	By Normal Loss	690	5,520
To Wages		78,000			
To Direct Exp.		11,100	By Costing P&L	6,400	10,11,200
To Production Overheads (3,00,000 × 3/5)		180,000			
To Abnormal Gain	190	30,020			
	7,090	10,16,720		7,090	10,16,720

Cost per unit = $9,86,700 - 5,520 / 6900 - 690 = ₹ 158$ per unit

Abnormal Loss Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Process- P	200	20,800	By Bank	200	1,000
			By Costing P&L		19,800
	200	20,800		200	20,800

Abnormal Gain Account

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Normal Loss	190	1,520	By ProcessQ	190	30,020
To Costing Profit andLoss		28,500			
	190	30,020		190	30,020

Costing Profit & Loss Account for the year

Particulars	Amount (₹)	Particulars	Amount (₹)
To Cost of Sales P - 2,39,200 Q - 10,11,200	12,50,400	By Sales P 2300 @ 130 Q 6400 @ 190	15,15,000
To Abnormal Loss	19,800	By Abnormal Gain	28,500
To Selling Expense	1,70,000		
To Net Profit	1,03,300		
	15,43,500		15,43,500

Q3. Nov 2023, 5 marks

A product passes through two processes; Process A and Process B. The output of Process A is treated as input of Process B.

The following information has been furnished:

	Process A	Process B
Input Material	₹ 3,90,000	-
78,000 Kg.@ ₹ 5		
Indirect Material	-	₹34,320
Wages	₹ 2,85,000	₹ 3,30,000
Overhead	₹ 1,67,400	₹ 1,11,600
Output transferred to Process B	68,640 kgs	
Transfer to Finished Stock	-	69,000 kgs
Normal loss of input material (weight in kgs.)	7,800 kgs	240 kgs

There is no realisable value for normal loss. No stock of raw materials on work-in-process was left at the end.

You are required to prepare the Process account for each Process.

Answer:

Process A Account

Particulars	Units	₹	Particulars	Units	₹
To Material	78,000	3,90,000	By Normal Loss	7,800	-
To Wages		2,85,000	By Abnormal Loss	1,560	18,720
To Overheads		1,67,400	By Process B A/c	68,640	8,23,680
Total	78,000	8,42,400	Total	78,000	8,42,400

Cost per unit of completed units and abnormal loss = $8,42,400 / (78,000 \text{ units} - 7,800 \text{ units}) = ₹ 12$ unit

Process B Account

Particulars	Units	₹	Particulars	Units	₹
To Process A A/c	68,640	8,23,680	By Normal loss	240	-
To Indirect Material		34,320	By Finished stock	69,000	13,11,000
To Wages		3,30,000			
To Overheads		1,11,600			
To Abnormal gain	600	11,400			
Total	69,240	13,11,000	Total	69,240	13,11,000

Cost per unit of completed units and abnormal gains:

Total cost / Inputs - Normal loss = $₹12,99,600 / (68,640 \text{ units} - 240 \text{ units}) = ₹19$

Q4. May 2023, 5 marks

How will you treat normal loss, abnormal loss and abnormal gain in process costing? Explain

Answer:

Treatment of normal loss, abnormal loss and abnormal gain in process costing

Treatment of Normal loss in Cost Accounts: The cost of normal process loss in practice is absorbed by good units produced under the process. The amount realised by the sale of normal process loss units should be credited to the process account.

Treatment of Abnormal loss in Cost Accounts: The cost of an abnormal process loss unit is equal to the cost of a good unit. The total cost of abnormal process loss is credited to the process account from which it arises. Cost of abnormal process loss is not treated as a part of the cost of the product. In fact, the total cost of abnormal process loss is debited to costing profit and loss account.

Treatment of Abnormal Gain in Cost Accounts: The process account under which abnormal gain arises is debited with the abnormal gain and credited to abnormal gain account which will be closed by transferring to the Costing Profit and Loss account. The cost of abnormal gain is computed on the basis of normal production.

Q5. Nov 2022, 10 marks

N Ltd. produces a product which passes through two processes – Process – I and Process-II. The company has provided following information related to the Financial Year 2021-22:

	Process-I	Process -II
Raw Material @₹ 65 per unit	6,500 units	-
Direct Wages	₹ 1,40,000	₹ 1,30,000
Direct Expenses	30% of Direct Wages	35% of Direct Wages
Manufacturing Overheads	₹ 21,500	₹ 24,500
Realisable value of scrap per unit	₹ 4.00	₹ 16.00
Normal Loss	250 units	500 units
Units transferred to Process-II / finished stock	6,000 units	5,500 units
Sales	-	5,000 units

There was no opening or closing stock of work-in progress.

You are required to prepare:

- Process-I Account
- Process -II Account

iii. Finished Stock Account

Answer

Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Raw material used (₹ 65 × 6,500 units)	6,500	4,22,500	By Normal loss (250 units × ₹ 4)	250	1,000
To Direct wages	-	1,40,000	By Process- II A/c (₹ 100 × 6,000 units)	6,000	6,00,000
To Direct expenses (30% of ₹ 1,40,000)	-	42,000	By Abnormal loss (₹ 100 × 250 units)	250	25,000
To Manufacturing overhead		21,500			
	6,500	6,26,000		6,500	6,26,000

Cost per unit of completed units and abnormal loss:

$$\begin{aligned}
 &= \frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs Units} - \text{Normal loss units}} \\
 &= \frac{₹ 6,26,000 - ₹ 1,000}{6,500 \text{ units} - 250 \text{ units}} \\
 &= \frac{₹ 6,25,000}{6,250 \text{ units}} = ₹ 100
 \end{aligned}$$

Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process - I A/c	6,000	6,00,000	By Normal loss (500 units × ₹16)	500	8,000
To Direct wages	-	1,30,000	By Finished Stock A/c (₹ 144 × 5,500 units)	5,500	₹ 7,92,000
To Direct expenses (30% of ₹ 1,30,000)	-	45,500			
To Manufacturing overhead		24,500			
	6,000	8,00,000		6,000	8,00,000

Cost per unit of completed units and abnormal loss:

$$\begin{aligned}
 &= \frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs Units} - \text{Normal loss units}} \\
 &= \frac{₹ 8,00,000 - ₹ 8,000}{6,000 \text{ units} - 500 \text{ units}} \\
 &= \frac{₹ 7,92,000}{5,500 \text{ units}} = ₹ 144
 \end{aligned}$$

Finished Goods Stock A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process II A/c	5,500	7,92,000	By Cost of Sales (₹144 × 5,000 units)	5,000	7,20,000
			By Balance c/d	500	72,000
	5,500	7,92,000		5,500	7,92,000

Q6. May 2022, 10 marks

STG Limited is a manufacturer of Chemical 'GK', which is required for industrial use. The complete production operation requires two processes. The raw material first passes through Process I, where Chemical 'G' is produced. Following data is furnished for the month April 2022:

Particulars	(in kgs.)
Opening work-in-progress quantity (Material 100% and conversion 50% complete)	9,500
Material input quantity	1,05,000
Work Completed quantity	83,000
Closing work-in-progress quantity (Material 100% and conversion 60% complete)	16,500

You are further provided that:

Particulars	(in ₹)
-------------	--------

Opening work-in-progress cost	
Material cost	29,500
Processing cost	14,750
Material input cost	3,34,500
Processing cost	2,53,100

Normal process loss may be estimated to be 10% of material input. It has no realizable value. Any loss over and above normal loss is considered to be 100% complete in material and processing. The Company transfers 60,000 kgs. of output (Chemical G) from Process I to Process II for producing Chemical 'GK'. Further materials are added in Process II which yield 1.20 kg. of Chemical 'GK' for every kg. of Chemical 'G' introduced. The chemicals transferred to Process II for further processing are then sold as Chemical 'GK' for ₹ 10 per kg. Any quantity of output completed in Process I, are sold as Chemical 'G' @ ₹ 9 per kg.

The monthly costs incurred in Process II (other than the cost of Chemical 'G') are:

Input 60,000 kg. of Chemical 'G'

Materials Cost ₹ 85,000

Processing Costs ₹ 50,000

You are required:

(i) Prepare Statement of Equivalent production and determine the cost per kg. of Chemical 'G' in Process I using the weighted average cost method.

(ii) Prepare a statement showing cost of Chemical 'G' transferred to Process II, cost of abnormal loss and cost of closing work-in progress.

(iii) STG is considering the option to sell 60,000 kg. of Chemical 'G' of Process I without processing it further in Process-II. Will it be beneficial for the company over the current pattern of processing 60,000 kg in process-II?

(Note: You are not required to prepare Process Accounts)

Answer

(i) Statement of Equivalent Production

Particulars	Input quantity	Particulars	Total	Material		Processing Cost	
				%	Units	%	Units
Opening WIP	9,500	Units completed	83,000	100	83,000	100	83,000
Material Input	1,05,000	Normal loss (10% of 1,05,000)	10,500	-	-	-	-
		Abnormal loss (Bal. fig.)	4,500	100	4,500	100	4,500
		Closing WIP	16,500	100	16,500	100	9,900
	1,14,500		1,14,500		1,04,000		97,400

Statement of Cost for each element

Particulars	Material (₹)	Processing (₹)	Total cost (₹)
Cost of opening WIP	29,500	14,750	44,250
Cost incurred during the month	3,34,500	2,53,100	5,87,600
Total cost (A)	3,64,000	2,67,850	6,31,850
Equivalent production (B)	1,04,000	97,400	
Cost per kg of Chemical 'G' (A/B)	3.5	2.75	6.25

Alternative Presentation

Statement showing cost per kg of each statement

	(₹)	(₹)
Material	29,500 + 3,34,500 1,04,000	3.5
Processing cost	14,750 + 2,53,100 97,400	2.75

Total Cost per kg		6.25
-------------------	--	------

(ii) Statement showing cost of Chemical 'G' transferred to Process II, cost of abnormal loss and cost of closing work-in- progress

	(₹)
Units transferred (60,000 × 6.25)	3,75,000
Abnormal loss (4,500 × 6.25)	28,125
Closing work in progress:	
Material (16,500 × 3.5)	57,750
Processing cost (9,900 × 2.75)	27,225
	84,975

(ii) Calculation of Incremental Profit / Loss after further processing

Particulars	(₹)	(₹)
Sales if further processed (A) (60,000 × 1.20 × ₹ 10)		7,20,000
Calculation of cost in Process II		
Chemical transferred from Process I	3,75,000	
Add: Material cost	85,000	
Add: Process cost	50,000	
Total cost of finished stock (B)		5,10,000
Profit, if further processed (C = A – B)		2,10,000
If sold without further processing then,		
Sales (60,000 × ₹ 9)	5,40,000	
Less: Cost of input without further processing	3,75,000	
Profit without further processing (D)		1,65,000
Incremental Profit after further processing (C – D)		45,000

Additional net profit on further processing in Process II is 45,000. Therefore, it is advisable to process further chemical 'G'.

Alternative Presentation

Calculation of Incremental Profit / Loss after further processing

	(₹)
If 60,000 units are sold @	₹ 95,40,000
If 60,000 units are processed in process II (60,000 × 1.2 × ₹ 10)	7,20,000
Incremental Revenue (A)	1,80,000
Incremental Cost: (B)	
Material Cost	85,000
Processing Cost	50,000
	1,35,000
Incremental Profit (A-B)	45,000

Additional net profit on further processing in Process II is 45,000. Therefore, it is advisable to process further chemical 'G'.

Q7. Dec 2021, 5 marks

A product passes through Process-I and Process-II.

Particulars pertaining to the Process-I are:

Materials issued to Process-I amounted to ₹ 80,000, Wages ₹ 60,000 and manufacturing overheads were ₹ 52,500. Normal Loss anticipated was 5% of input, 9,650 units of output were produced and transferred out from Process-I to Process-II. Input raw materials issued to Process-I were 10,000 units.

There were no opening stocks.

Scrap has realizable value of ₹ 5 per unit.

You are required to prepare:

(i) Process-I Account

(ii) Abnormal Gain/Loss Account

Answer

(i) Process - I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	10,000	80,000	By Normal loss (5% of 10,000)	500	2,500
To Wages	-	60,000	By Process-II A/c (₹20 × 9,650 units)	9,650	1,93,000
To Manufacturing OH		52,500			
To Abnormal Gain A/c (₹20 × 150 units)	150	3,000			
	10,150	1,95,500		10,150	1,95,500

$$\frac{*(80,000 + 60,000 + 52,500) - 2,500}{10,000 - 500} = ₹ 20$$

(ii) Abnormal Gain - Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Normal loss A/c	150	750	By Process-I A/c	150	3,000
To Costing P&L A/c	-	2,250			
	150	3,000		150	3,000

Q8. July 2021, 10 marks

A Manufacturing unit manufactures a product 'XYZ' which passes through three distinct Processes - X, Y and Z. The following data is given:

	Process X	Process Y	Process Z
Material consumed (in ₹)	2,600	2,250	2,000
Direct wages (in ₹)	4,000	3,500	3,000

- The total Production Overhead of ₹ 15,750 was recovered @ 150% of Direct wages.
- 15,000 units at ₹ 2 each were introduced to Process 'X'.
- The output of each process passes to the next process and finally, 12,000 units were transferred to Finished Stock Account from Process 'Z'.
- No stock of materials or work in progress was left at the end.

The following additional information is given:

Process	% of wastage to normal input	Value of Scrap per unit (₹)
X	6%	1.10
Y	?	2.00
Z	5%	1.00

You are required to:

- Find out the percentage of wastage in process 'Y', given that the output of Process 'Y' is transferred to Process 'Z' at ₹ 4 per unit.
- Prepare Process accounts for all the three processes X, Y and Z.

Answer

Process-X Account			Cr.		
Particulars	Units	(₹)	Particulars	Units	(₹)
To Material introduced	15,000	30,000	By Normal Loss A/c	900	990
To Additional material	-	2,600	[(6% of 15,000 units) × ₹ 1.1]	14,100	41,610
To Direct wages	-	4,000	By Process-Y A/c		
To Production OH	-	6,000	(₹ 2.951 × 14,100 units)		
	15,000	42,600		15,000	42,600

*Cost per unit of completed units

$$= \frac{\text{Total Cost} - \text{Realisable value from normal loss}}{\text{Inputs Units} - \text{Normal loss units}}$$

$$= \frac{₹ 42,600 - ₹ 990}{15,000 \text{ units} - 900 \text{ units}} = ₹ 2.951$$

Process-Y Account			Cr.		
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Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-X A/c	14,100	41,610	By Normal Loss A/c	1,895	3,790
To Additional material	--	2,250	[(#13.44% of 14,100 units) x ₹ 2]	12,205	48,820
To Direct wages	--	3,500	By Process-Z A/c	5	
To Production OH	--	5,250	(₹ 4 × 12,205 units)		
	14,100	52,610		14,100	52,610

#Calculation for % of wastage in process 'Y'

Q9. Jan 2021, 5 marks

MNO Ltd has provided following details:

- Opening work in progress is 10,000 units at ₹ 50,000 (Material 100%, Labour and overheads 70% complete).
- Input of materials is 55,000 units at ₹ 2,20,000. Amount spent on Labour and Overheads is ₹ 26,500 and ₹ 61,500 respectively.
- 9,500 units were scrapped; degree of completion for material 100% and for labour & overheads 60%.
- Closing work in progress is 12,000 units; degree of completion for material 100% and for labour & overheads 90%.
- Finished units transferred to next process are 43,500 units.

Normal loss is 5% of total input including opening work in progress. Scrapped units would fetch ₹ 8.50 per unit.

You are required to prepare using FIFO method:

- Statement of Equivalent production
- Abnormal Loss Account

Answer

(i) Statement of Equivalent Production (Using FIFO method)

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP Units introduced	10,000	Completed and transferred to Process-II					
	55,000	- From opening WIP	10,000	-		30	3,000
	0	- From fresh inputs	33,500	100	33,500	100	33,500
			43,500		0		0
		Normal Loss {5% (10,000 + 55,000 units)}	3,250	-	33,500		36,500
			6,250	100	0	60	0
		Abnormal loss (9,500 - 3,250)	12,000			90	-
			65,000	100	6,250		3,750
		Closing WIP	0		12,000		10,800
	65,000				0		0
	0				51,750		51,050

(ii) Abnormal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c (Refer Working Note-2)	6,250	29,698	By Cost Ledger Control A/c	6,250	53,125
To Costing Profit & Loss A/c	-		(6,250 units × ₹ 8.5)		
	6,250	23,427		6,250	53,125
		53,125			

Working Notes:

1. Computation of Cost per unit

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)
Input costs	2,20,000	26,500	61,500
Less: Realisable value of normal scrap (3,250 units × ₹ 8.5)	(27,625)	--	--
Net cost	1,92,375	26,500	61,500
Equivalent Units	51,750	51,050	51,050
Cost Per Unit	3.7174	0.5191	1.2047

Total cost per unit = ₹ (3.7174 + 0.5191 + 1.2047) = ₹ 5.4412

2. Valuation of Abnormal Loss

	(₹)
Materials (6,250 units × ₹ 3.7174)	23,233.75
Labour (3,750 units × ₹ 0.5191)	1,946.63
Overheads (3,750 units × ₹ 1.2047)	4,517.62
	<u>29,698</u>

Q10. Nov 2020, 10 marks

Following details are related to the work done in Process-I by ABC Ltd. during the month of May 2019 :

	(₹)
Opening work in process (3,000 units)	
Materials	1,80,500
Labour	32,400
Overheads	90,000
Materials introduced in Process-I (42,000 units)	36,04,000
Labour	4,50,000
Overheads	15,18,000b

Units Scrapped : 4,800 units
Degree of completion :
Materials : 100%
Labour & overhead : 70%
Closing Work-in-process : 4,200 units
Degree of completion :
Materials : 100%
Labour & overhead : 50%

Units finished and transferred to Process-II : 36,000 units

Normal loss:

4% of total input including opening work-in-process

Scrapped units fetch ₹ 62.50 per piece.

Prepare:

- Statement of equivalent production.
- Statement of cost per equivalent unit.
- Process-I A/c
- Normal Loss Account and
- Abnormal Loss Account

Answer

(i) Statement of Equivalent Production (Weighted Average method)

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units

Opening WIP	3,000	Completed	and	36,000	100	36,00	100	36,00
Units introduced	42,000	transferred to		1,800	--	0	--	0
	0	Process-II				--		--
		Normal Loss						
		{4% 45,000 units}		3,000	100		70	
		Abnormal loss				3,000		2,100
		(Balancing Figure)		4,200			50	
		Closing WIP		<u>45,000</u>	100	<u>4,200</u>		<u>2,100</u>
	<u>45,000</u>			<u>0</u>		<u>43,200</u>		<u>40,200</u>
	0					0		0

Statement showing cost for each element

Particulars	Materials (₹)	Labour (₹)	Overhead (₹)	Total (₹)
Cost of opening work-in-process	1,80,500	32,400	90,000	3,02,900
Cost incurred during the month	36,04,000	4,50,000	15,18,000	55,72,000
Less: Realisable Value of normal scrap (₹ 62.50 × 1,800 units)	(1,12,500)	--	--	(1,12,500)
Total cost: (A)	36,72,000	4,82,400	16,08,000	57,62,400
Equivalent units: (B)	43,200	40,200	40,200	
Cost per equivalent unit: (C) = (A ÷ B)	85.00	12.00	40.00	137.00

Statement of Distribution of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred: (36,000 units × ₹ 137)		49,32,000
2. Value of Abnormal Loss:		
- Materials (3,000 units × ₹ 85)	2,55,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	3,64,200
3. Value of Closing W-I-P:		
- Materials (4,200 units × ₹ 85)	3,57,000	
- Labour (2,100 units × ₹ 12)	25,200	
- Overheads (2,100 units × ₹ 40)	84,000	4,66,200

(iii) Process-I A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W.I.P:			By Normal Loss (₹ 62.5 × 1,800 units)	1,800	1,12,500
- Materials		1,80,500			
- Labour		32,400			
- Overheads		90,000			
To Materials introduced	42,000	36,04,000	By Abnormal loss	3,000	3,64,200
To Labour		4,50,000	By Process-I A/c	36,000	49,32,000
To Overheads		15,18,000	By Closing WIP	4,200	4,66,200
	<u>45,000</u>	<u>58,74,900</u>		<u>45,000</u>	<u>58,74,900</u>

(iv) Normal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	1,800	1,12,500	By Cost Ledger Control A/c	1,800	1,12,500
	<u>1,800</u>	<u>1,12,500</u>		<u>1,800</u>	<u>1,12,500</u>

(v) Abnormal Loss A/c

Particulars	Units	(₹)	Particulars	Units	(₹)
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To Process-I A/c	3,000	3,64,200	By Cost Ledger Control A/c (₹ 62.5 × 3,000 units)	3,000	1,87,500
			By Costing Profit & Loss A/c (Bal. Figure)		1,76,700
	3,000	3,64,200		3,000	3,64,200

Q11. Nov 2019, 10 marks

A product passes through two distinct processes before completion.

Following information are available in this respect :

	Process-1	Process-2
Raw materials used	10,000 units	-
Raw material cost (per unit)	₹ 75	-
Transfer to next process/Finished good	9,000 units	8,200 units
Normal loss (on inputs)	5%	10%
Direct wages	₹ 3,00,000	₹ 5,60,000
Direct expenses	50% of direct wages	65% of direct wages
Manufacturing overheads	25% of direct wages	15% of direct wages
Realisable value of scrap (per unit)	₹ 13.50	₹ 145

8,000 units of finished goods were sold at a profit of 15% on cost. There was no opening and closing stock of work-in-progress.

Prepare:

- Process-1 and Process-2 Account
- Finished goods Account
- Normal Loss Account
- Abnormal Loss Account
- Abnormal Gain Account.

Answer

i.

Dr.			Process-1 Account	Cr.		
Particulars	Units	Total (₹)	Particulars	Units	Total (₹)	
To Raw Material Consumed	10,000	7,50,000	By Normal Loss A/c @ 13.5	500	6,750	
To Direct Wages	--	3,00,000	By Process 2 @ 133.5	9,000	12,01,500	
To Direct Expenses	--	1,50,000	By Abnormal Loss @ 133.5	500	66,750	
To Manufacturing Overheads	--	75,000				
	10,000	12,75,000		10,000	12,75,000	
		0		0		

Cost per unit of completed units and abnormal loss:

$$= \frac{₹ 12,75,000 - ₹ 6,750}{10,000 \text{ units} - 500 \text{ units}} = ₹ 133.5$$

ii.

Dr.			Process-2 Account	Cr.		
Particulars	Units	Total (₹)	Particulars	Units	Total (₹)	
To Process-I A/c	9,000	12,01,500	By Normal Loss A/c @ 145	900	1,30,500	
To Direct Wages	--	5,60,000	By Finished Stock A/c [Bal fig]	8,200	21,04,667	
To Direct Expenses	--	3,64,000				
To Manufacturing Overheads	--	84,000				
" To Abnormal gain (₹ 256.67 × 100 units)	100	25,667				

	9,100	22,35,16 7		9,100	22,35,167
--	-------	---------------	--	-------	-----------

Cost per unit of completed units and abnormal gain:

$$= \frac{\text{₹ } 22,09,500 - \text{₹ } 1,30,500}{8,100 \text{ units}} = \text{₹ } 256.67$$

Dr.

Finished Goods A/c

Cr.

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Process-II A/c	8,200	21,04,66 7	By Cost of Sales	8,000	20,53,333
			By Balance c/d	200	51,334
	8,200	21,04,66 7		8,200	21,04,667

iii.

Dr.

Normal Loss A/c

Cr.

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Process-I A/c	500	6,750	By abnormal Gain II	100	14,500
To Process-II A/c	900	1,30,500	By Cash	500	6,750
			By Cash	800	1,16,000
	1400	1,37,250		1400	1,37,250

iv.

Dr.

Abnormal Loss A/c

Cr.

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Process-I A/c	500	66,750	By Cost Ledger Control A/c	500	6,750
			By Costing P & L A/C (Abnormal Loss)		60,000
		66,750			66,750

v.

Dr.

Abnormal Gain A/c

Cr.

Particulars	Units	Total (₹)	Particulars	Units	Total (₹)
To Normal Loss A/c @ 145	100	14,500	By Process II	100	25,667
To Costing P & L A/C		11,167			
	100	25,667		100	25,667

Q12. May 2019, 10 marks

KT Ltd. produces a product EMM which passes through two processes before it is completed and transferred to finished stock. The following data relate to May 2019:

Particulars	Process		Finished stock
	A (₹)	B (₹)	(₹)
Opening Stock	5,000	5,500	10,000
Direct Materials	9,000	9,500	
Direct Wages	5,000	6,000	
Factory Overheads	4,600	2,030	
Closing Stock	2,000	2,490	5,000
Inter-process profit included in opening stock		1,000	4,000

Output of Process A is transferred to Process B at 25% profit on the transfer price and output of Process B is transferred to finished stock at 20% profit on the transfer price. Stock in process is valued at prime cost. Finished stock is valued at the price at which it is received from Process B. Sales during the period are ₹ 75,000.

Prepare the Process cost accounts and Finished stock account showing the profit element at each stage.

Answer

Process-A A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
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Opening stock	5,000	5,000	--	Process B A/c	28,800	21,600	7,200
Direct materials	9,000	9,000	--				
Direct wages	5,000	5,000	--				
	19,000	19,000	--				
Less: Closing stock	(2,000)	(2,000)	--				
Prime Cost	17,000	17,000	--				
Overheads	4,600	4,600	--				
Process Cost	21,600	21,600	--				
Profit (33.33% of total cost)	7,200	--	7,200				
	28,800	21,600	7,200		28,800	21,600	7,200

Process-B A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	5,500	4,500	1,000	Finished stock A/c	61,675	41,550	20,125
Process A A/c	28,800	21,600	7,200				
Direct materials	9,500	9,500	--				
Direct wages	6,000	6,000	--				
	49,800	41,600	8,200				
Less: Closing stock	(2,490)	(2,080)	(410)				
Prime Cost	47,310	39,520	7,790				
Overheads	2,030	2,030	--				
Process Cost	49,340	41,550	7,790				
Profit (25% of total cost)	12,335	--	12,335				
	61,675	41,550	20,125		61,675	41,550	20,125

Finished Stock A/c

Particulars	Total (₹)	Cost (₹)	Profit (₹)	Particulars	Total (₹)	Cost (₹)	Profit (₹)
Opening stock	10,000	6,000	4,000	Costing P&L A/c	75,000	44,181	30,819
Process B A/c	61,675	41,550	20,125				
	71,675	47,550	24,125				
Less: Closing stock	(5,000)	(3,369)	(1,631)				
COGS	66,675	44,181	22,494				
Profit	8,325	--	8,325				
	75,000	44,181	30,819		75,000	44,181	30,819

Q13. Nov 2018, 5 marks

Following details have been provided by M/s AR Enterprises:

- Opening works-in-progress - 3000 units (70% complete)
- Units introduced during the year - 17000 units
- Cost of the process (for the period) - ₹ 33,12,720
- Transferred to next process - 15000 units
- Closing works-in-progress - 2200 units (80% complete)
- Normal loss is estimated at 12% of total input (including units in process in the beginning).

Scraps realise ₹ 50 per unit. Scraps are 100% complete.

Using FIFO method, compute:

- i. Equivalent production
- ii. Cost per equivalent unit

Answer

Statement of Equivalent Production Units (Under FIFO Method)

Particulars	Input units	Particulars	Output units	Equivalent Production	
				(%)	Equivalent units
Opening W-I-P Units introduced	3,000 17,000	From opening W-I-P	3,000	30	900
		From fresh inputs	12,000	100	12,000
		Units completed (Transferred to next process)	15,000		
		Normal Loss {12% (3,000 + 17,000 units)}	2,400	--	--
		Closing W-I-P	2,200	80	1760
		Abnormal loss (Balancing figure)	400	100	400
	20,000		11,000		15,060

Computation of cost per equivalent production unit :

Cost of the Process (for the period)	₹ 33,12,720
Less: Scrap value of normal loss (₹ 50 × 2,400 units)	<u>(₹ 1,20,000)</u>
Total process cost	<u>₹ 31,92,720</u>

Q14. May 2018, 10 marks

Alpha Ltd. is engaged in the production of a product A which passes through 3 different process - Process P, Process Q and Process R. The following data relating to cost and output is obtained from the books of accounts for the month of April 2017:

Particulars	Process P	Process Q	Process R
Direct Material	38,000	42,500	42,880
Direct Labour	30,000	40,000	50,000

Production overheads of ₹ 90,000 were recovered as percentage of direct labour.

10,000 kg of raw material @ ₹ 5 per kg. was issued to Process P. There was no stock of materials or work in process. The entire output of each process passes directly to the next process and finally to warehouse. There is normal wastage, in processing, of 10%.

The scrap value of wastage is ₹ 1 per kg. The output of each process transferred to next process and finally to warehouse are as under:

Process P = 9,000 kg

Process Q = 8,200 kg

Process R = 7,300 kg

The company fixes selling price of the end product in such a way so as to yield a profit of 25% selling price.

Prepare Process P, Q and R accounts. Also calculate selling price per unit of end product.

Answer

Process- P Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Input	10,000	50,000	By Normal wastage(1,000 kg. × ₹ 1)	1,000	1,000
To Direct Material	---	38,000	By Process- Q (9,000 kg. × ₹ 15.50)	9,000	1,39,500
To Direct Labour	---	30,000			
To Production OH (₹ 90,000 × 3/12)	---	22,500			
	10,000	1,40,500		10,000	1,40,500

$$\text{Cost per unit} = \frac{\text{₹ } 1,40,500 - \text{₹ } 1,000}{10,000\text{kg.} - 1,000\text{kg.}} = \text{₹ } 15.50$$

Process- Q Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-P A/c	9,000	1,39,500	By Normal wastage(900 kg. × ₹ 1)	900	900
To Direct Material	---	42,500	By Process- Q (8,200 kg. × ₹ 31)	8,200	2,54,200
To Direct Labour	---	40,000			
To Production OH (₹ 90,000 × 4/12)	---	30,000			
To Abnormal Gain (100 kg. × ₹ 31)	100	3,100			
	9,100	2,55,100		9,100	2,55,100

$$\text{Cost per unit} = \frac{\text{₹ } 2,52,000 - \text{₹ } 900}{9,000\text{kg.} - 900\text{kg.}} = \text{₹ } 31$$

Process- R Account

Particulars	Kg.	Amount (₹)	Particulars	Kg.	Amount (₹)
To Process-Q A/c	8,200	2,54,200	By Normal wastage(820 kg. × ₹ 1)	820	820
To Direct Material	---	42,880	By Abnormal loss (80 kg. × ₹ 52)	80	4,160
To Direct Labour	---	50,000	By Finished Goods (7,300 kg. × ₹ 52)	7,300	3,79,600
To Production OH (₹ 90,000 × 5/12)	---	37,500			
	8,200	3,84,580		8,200	3,84,580

$$\text{Cost per unit} = \frac{\text{₹ } 3,84,580 - \text{₹ } 820}{8,200\text{kg.} - 820\text{kg.}} = \text{₹ } 52$$

Calculation of Selling price per unit of end product:

Cost per unit	₹ 52.00
Add: Profit 25% on selling price i.e. 1/3 rd of cost	₹ 17.33
Selling price per unit	₹ 69.33

Q15. May 2024 RTP

The following data are available in respect of Process-I for January 2024:

- (1) Opening stock of work in process: 600 units at a total cost of ₹ 4,200.
- (2) Degree of completion of opening work in process: Material 100%
Labour 60%
Overheads 60%
- (3) Input of materials at a total cost of ₹ 55,200 for 9,200 units.
- (4) Direct wages incurred ₹ 18,600
- (5) Overheads ₹ 8,630.
- (6) Units scrapped 200 units. The stage of completion of these units was:
Materials 100%
Labour 80%
Overheads 80%
- (7) Closing work in process; 700 units. The stage of completion of these units was:
Material 100%
Labour 70%
Overheads 70%
- (8) 8,900 units were completed and transferred to the next process.
- (9) Normal loss is 4% of the total input (opening stock plus units put in)

(10) Scrap value is ₹ 6 per unit. You are required to:

- PREPARE using FIFO method, Statement of equivalent production,
- PREPARE Statement of cost,
- CALCULATE cost of closing WIP,
- CALCULATE the cost of the units to be transferred to the next process.

Answer:

- Statement of Equivalent Production (FIFO Method)

Input		Output		Equivalent Production					
				Materials		Labour		Overheads	
Details	Units	Details	Units	%	Units	%	Units	%	Units
Opening Stock	600	Finished goods transferred to next process:							
		-From opening stock	600	- 100	- 8,300	40	240	40	240
			8,300			100	8,300	100	8,300
		-From fresh materials	700	100	700				
		Closing W-I-P	392	-	-	70	490	70	490
		Normal loss							
		Less: Abnormal Gain							
			9,992		9,000		9,030		9,030
			(192)	100	(192)	100	(192)	100	(192)
	9,800		9,800		8,808		8,838		8,838

- Statement of Cost per equivalent units

Elements	(₹)	Cost (₹)	Equivalent units	Cost per equivalent Unit (₹)
Material Cost	55,200			
Less: Scrap realisation 392 units @ ₹ 6/- p.u.	<u>2,352</u>	52,848	8,808	6.00
Labour cost		18,600	8,838	2.10
Overheads		<u>8,630</u>	8,838	<u>0.98</u>
Total Cost		<u>80,078</u>		<u>9.08</u>

Cost of Abnormal Gain – 192 Units

	(₹)	(₹)
Material cost of 192 units @ ₹ 6.00/- p.u.	1,152.00	<u>1,743.36</u>
Labour cost of 192 units @ ₹ 2.10/- p.u.	403.20	
Overheads of 192 units @ ₹ 0.98/- p.u.	<u>188.16</u>	

- Cost of closing WIP – 700 Units

Material cost of 700 equivalent units @ ₹ 6.00/- p.u.	4,200.00	<u>5709.20</u>
Labour cost of 490 equivalent units @ ₹ 2.10/- p.u.	1,029.00	
Overheads of 490 equivalent @ ₹ 0.98/- p.u.	<u>480.20</u>	

- Calculation of cost of 8,900 units transferred to next process

	(₹)
(i) Cost of opening W-I-P Stock b/f – 600 units	4,200.00
(ii) Cost incurred on opening W-I-P stock	
Material cost	—
Labour cost 240 equivalent units @ ₹ 2.10 p.u.	504.00
Overheads 240 equivalent units @ ₹ 0.98/- p.u.	235.20
	739.20
(iii) Cost of 8,300 completed units	
8,300 units @ ₹9.08 p.u.	75,364.00
Total cost [(i) + (ii) + (iii)]	<u>80,303.20</u>

Q16. Nov 2023 RTP

The following information is furnished by ABC Company for Process - II of its manufacturing activity for the month of April 2023:

- (i) Opening Work-in-Progress – Nil
- (ii) Units transferred from Process I – 55,000 units at ₹ 3,27,800
- (iii) Expenditure debited to Process – II: Consumables ₹ 1,57,200
Labour ₹ 1,04,000
Overhead ₹ 52,000
- (iv) Units transferred to Process III – 51,000 units
- (v) Closing WIP – 2,000 units (Degree of completion): Consumables 80%
Labour 60%
Overhead 60%
- (vi) Units scrapped – 2,000 units, scrapped units were sold at ₹ 5 per unit
- (vii) Normal loss – 4% of units introduced

You are required to:

- (i) Prepare a Statement of Equivalent Production.
- (ii) Determine the cost per unit
- (iii) Determine the value of Work-in-Process and units transferred to Process – III

Answer:

Statement of Equivalent Production

Input Details	Units	Output Particulars	Units	Equivalent Production					
				Material- A*		Consumables		Labour & Overheads	
				%	Units	%	Units	%	Units
Units transferred from Process-I	55,000	Units transferred to Process-III	51,000	100	51,000	100	51,000	100	51,000
		Normal loss (4% of 55,000)	2,200	-	-	-	-	-	-
		Closing W-I-P	2,000	100	2,000	80	1,600	60	1,200
		Abnormal Gain	(200)	100	(200)	100	(200)	100	(200)
	55,000		55,000		52,800		52,400		52,000

*Material A represent transferred-in units from process-I

(ii) Determination of Cost per Unit

Particulars	Amount (₹)	Units	Per Unit (₹)
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(i) Direct Material (Consumables) :			
Value of units transferred from Process-I	3,27,800		
Less: Value of normal loss (2,200 units × ₹ 5)	(11,000)		
	3,16,800	52,800	6.00
(ii) Consumables added in Process-II	1,57,200	52,400	3.00
(iii) Labour	1,04,000	52,000	2.00
(iii) Overhead	52,000	52,000	1.00
Total Cost per equivalent unit			12.00

(iii) Determination of value of Work-in-Process and units transferred to Process-III

Particulars	Units	Rate (₹)	Amount (₹)
Value of Closing W-I-P:			
Material from Process-I	2,000	6.00	12,000
Consumables	1,600	3.00	4,800
Labour	1,200	2.00	2,400
Overhead	1,200	1.00	1,200
			20,400
Value of units transferred to Process-III	51,000	12.00	6,12,000

Q17. May 2023 RTP

The following information is furnished by ABC Company for Process - II of its manufacturing activity for the month of April 2023:

- (i) Opening Work-in-Progress – Nil
- (ii) Units transferred from Process I – 55,000 units at ₹ 3,27,800
- (iii) Expenditure debited to Process – II:
 - Consumables ₹ 1,57,200
 - Labour ₹ 1,04,000
 - Overhead ₹ 52,000
- (iv) Units transferred to Process III – 51,000 units
- (v) Closing WIP – 2,000 units (Degree of completion):
 - Consumables 80%
 - Labour 60%
 - Overhead 60%
- (vi) Units scrapped – 2,000 units, scrapped units were sold at ₹ 5 per unit
- (vii) Normal loss – 4% of units introduced

You are required to:

- (i) Prepare a Statement of Equivalent Production.
- (ii) Determine the cost per unit
- (iii) Determine the value of Work-in-Process and units transferred to Process – III

(i) Statement of Equivalent Production

Input Details	Units	Output Particulars	Units	Equivalent Production					
				Material-A*		Consumables		Labour & Overheads	
				%	Units	%	Units	%	Units

Units transferred from Process-I	55,000	Units transferred to Process-III	51,000	100	51,000	100	51,000	100	51,000
		Normal loss (4% of 55,000)	2,200	-	-	-	-	-	-
		Closing W-I-P	2,000	100	2,000	80	1,600	60	1,200
		Abnormal Gain	(200)	100	(200)	100	(200)	100	(200)
	55,000		55,000		52,800		52,400		52,000

*Material A represent transferred-in units from process-I

(ii) Determination of Cost per Unit

Particulars	Amount (₹)	Units	Per Unit (₹)
(i) Direct Material (Consumables) :			
Value of units transferred from Process-I	3,27,800		
Less: Value of normal loss (2,200 units × ₹ 5)	(11,000)		
	3,16,800	52,800	6.00
(ii) Consumables added in Process-II	1,57,200	52,400	3.00
(iii) Labour	1,04,000	52,000	2.00
(iii) Overhead	52,000	52,000	1.00
Total Cost per equivalent unit			12.00

(iii) Determination of value of Work-in-Process and units transferred to Process-III

Particulars	Units	Rate (₹)	Amount (₹)
Value of Closing W-I-P:			
Material from Process-I	2,000	6.00	12,000
Consumables	1,600	3.00	4,800
Labour	1,200	2.00	2,400
Overhead	1,200	1.00	1,200
			20,400
Value of units transferred to Process-III	51,000	12.00	6,12,000

Q18. Nov 2022 RTP

SM Pvt. Ltd. manufactures their products in three consecutive processes. The details are as below:

	Process A	Process B	Process C
Transferred to next Process	60%	50%	
Transferred to warehouse for sale	40%	50%	100%

In each process, there is a weight loss of 2% and scrap of 8% of input of each process.

The realizable value of scrap of each process is as below:

Process A @ ₹ 2 per ton

Process B @ ₹ 4 per ton

Process C @ ₹ 6 per ton.

The following particulars relate to April, 2022:

	Process A	Process B	Process C
Materials used (in Tons)	1,000	260	140

Rate per ton	₹ 20	₹ 15	₹ 10
Direct Wages	₹ 4,000	₹ 3,000	₹ 2,000
Direct Expenses	₹ 3,160	₹ 2,356	₹ 1,340

PREPARE Process Accounts- A, B and C & calculate cost per ton at each process.

Answer

Process A Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Materials	1,000	20,000	By Weight	20	---
To Wages		4,000	Loss	80	160
To Direct Expenses		3,160	By Scrap	540	16,200
			By Process B	360	10,800
			By Warehouse		
Total	1,000	27,160	Total	1,000	27,160

$$\begin{aligned}\text{Cost per Tonne} &= \frac{27,160 - 160}{1,000 - 20 - 80} \\ &= \frac{27,000}{900} = ₹ 30 \text{ per ton}\end{aligned}$$

Process B Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process A	540	16,200	By Weight	16	---
To Materials	260	3,900	Loss	64	256
To Wages		3,000	By Scrap	360	12,600
To Direct Expenses		2,356	By Process C	360	12,600
			By Warehouse		
Total	800	25,456	Total	800	25,456

$$\begin{aligned}\text{Cost per Tonne} &= \frac{25,456 - 256}{800 - 16 - 64} \\ &= \frac{25,200}{720} = ₹ 35 \text{ per ton}\end{aligned}$$

Process C Account

Particulars	Tones	Amount (₹)	Particulars	Tones	Amount (₹)
To Process B	360	12,600	By Weight	10	---
To Materials	140	1,400	Loss	40	240
To Wages		2,000	By Scrap	450	17,100
To Direct Expenses		1,340	By Warehouse		
Total	500	17,340	Total	500	17,340

$$\begin{aligned}\text{Cost per Tonne} &= \frac{17,340 - 240}{500 - 10 - 40} \\ &= \frac{17,100}{450} = ₹ 38 \text{ per ton}\end{aligned}$$

Q19. May 2022 RTP

A company produces a component, which passes through two processes. During the month of December, 2021, materials for 40,000 components were put into Process -I of which 30,000 were completed and transferred to Process-II. Those not transferred to Process- II were 100% complete as to materials cost and 50% complete as to labour and overheads cost.

The Process- I costs incurred were as follows:

Direct Materials	₹ 6,00,000
Direct Wages	₹ 7,00,000
Factory Overheads	₹ 4,90,000

Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process II. There were 1,800

units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

Costs incurred in Process-II are as follows:

Packing Materials ₹ 1,60,000

Direct Wages ₹ 1,42,250

Factory Overheads ₹ 1,70,700

Packing material cost is incurred at the end of the second process as protective packing to the completed units of production.

Required:(i) PREPARE Statement of Equivalent Production, Cost per unit and Process I A/c.

(ii) PREPARE statement of Equivalent Production, Cost per unit and Process II A/c.

Answer

Process I Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
40,000	Completed	30,000	100	30,000	100	30,000	100	30,000
	Closing WIP	10,000	100	10,000	50	5,000	50	5,000
40,000		40,000		40,000		35,000		35,000

Particulars	Materials	Labour	Overhead	Total
Cost incurred (₹)	6,00,000	7,00,000	4,90,000	17,90,000
Equivalent units	40,000	35,000	35,000	
Cost per equivalent unit (₹)	15	20	14	49

i. Process-I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	40,000	6,00,000	By Process-II A/c	30,000	14,70,000
To Labour		7,00,000	(30,000 units × ₹49)	10,000	3,20,000
To Overhead		4,90,000	By Closing WIP*		
	40,000	17,90,000		40,000	17,90,000

* (Material 10,000 units × ₹ 15) + (Labour 5,000 units × ₹ 20) + (Overheads 5,000 units × ₹ 14)

= ₹ 1,50,000 + ₹ 1,00,000 + ₹ 70,000 = ₹ 3,20,000

Process II Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
30,000	Completed	28,000	100	28,000	100	28,000	100	28,000
	Normal loss	200		--		--		--
	Closing WIP	1,800	100	1,800	25	450	25	450
30,000		30,000		29,800		28,450		28,450

Particulars	Materials	Labour	Overhead	Total
Process-I Cost	14,70,000	--	--	14,70,000
Cost incurred (₹)	--	1,42,250	1,70,700	3,12,950
Equivalent units	29,800	28,450	28,450	--
Cost per equivalent unit (₹)	49.3289	5.00	6.00	60.3289

ii. Process-II Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	30,000	14,70,000	By Normal loss A/c	200	--
To Packing Material	--	1,60,000	By Finished Goods Stock A/c	28,000*	18,49,209
To Direct Wages	--	1,42,250		1,800**	93,741
To Factory Overhead	--	1,70,700	By Closing WIP		
	30,000	19,42,950		30,000	19,42,950

* $28,000 \times ₹ 60.3289 = ₹ 16,89,209 + ₹ 1,60,000$ (Packing Material Cost) = ₹ 18,49,209

** $1,800 \text{ units} \times ₹ 49.3289 + 450 \text{ units} \times (₹ 5 + ₹ 6) = ₹ 93,741$

Q20. Nov 2021 RTP

Following information is available regarding Process-I of a manufacturing company for the month of February:

Production Record:

Units in process as on 1st February	8,000
(All materials used, 1/4th complete for labour and overhead)	
New units introduced	32,000
Units completed	28,000
Units in process as on 28th February	12,000
(All materials used, 1/3rd complete for labour and overhead)	

Cost Records:

Work-in-process as on 1st February	(₹)
Materials	1,20,000
Labour	20,000
Overhead	20,000
	<u>1,60,000</u>

Cost during the month:

Materials	5,12,000
Labour	3,00,000
Overhead	<u>3,00,000</u>
	<u>11,12,000</u>

Presuming that average method of inventory is used, PREPARE the following:

- Statement of equivalent production.
- Statement showing cost for each element.
- Statement of apportionment of cost.
- Process cost account for Process-I.

Answer

(i) Statement of equivalent production (Average cost method)

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Labour & O.H.	
				%	Units	%	Units
Opening WIP	8,000	Completed	28,000	100	28,000	100	28,000
Units introduced	32,000	and transferred	12,000	100	12,000	1/3rd	4,000
	0	Closing WIP					
	40,000		40,000		40,000		32,000
	0						

(ii) Statement showing cost for each element

Particulars	Materials	Labour	Overhead	Total
Cost of opening work-in-process	1,20,000	20,000	20,000	1,60,000
Cost incurred during the month	5,12,000	3,00,000	3,00,000	11,12,000
Total cost: (A)	6,32,000	3,20,000	3,20,000	12,72,000
Equivalent units: (B)	40,000	32,000	32,000	

Cost per equivalent unit: (C) = (A ÷ B)	15.8	10	10	35.8
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(iii) Statement of apportionment of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (28,000 units × ₹ 35.8)		10,02,400
2. Value of Closing W-I-P:		
- Materials (12,000 units × ₹ 15.8)	1,89,600	
- Labour (4,000 units × ₹ 10)	40,000	
- Overheads (4,000 units × ₹ 10)	40,000	
		2,69,600
		<u>12,72,000</u>

(iv) Process-I Cost Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W-I-P	8,000	1,60,000	By Completed units	28,000	10,02,400
To Materials		5,12,000	By Closing W-I-P	12,000	2,69,600
To Labour	32,000	3,00,000			
To Overhead	--	3,00,000			
	--				
	40,000	12,72,000		40,000	12,72,000

Q21. May 2021 RTP

A company produces a component, which passes through two processes. During the month of November, 2020, materials for 40,000 components were put into Process -I of which 30,000 were completed and transferred to Process-II. Those not transferred to Process- II were 100% complete as to materials cost and 50% complete as to labour and overheads cost.

The Process- I costs incurred were as follows:

Direct Materials ₹ 3,00,000

Direct Wages ₹ 3,50,000

Factory Overheads ₹ 2,45,000

Of those transferred to Process II, 28,000 units were completed and transferred to finished goods stores. There was a normal loss with no salvage value of 200 units in Process II. There were 1,800 units, remained unfinished in the process with 100% complete as to materials and 25% complete as regard to wages and overheads.

Costs incurred in Process-II are as follows:

Packing Materials ₹ 80,000

Direct Wages ₹ 71,125

Factory Overheads ₹ 85,350

Packing material cost is incurred at the end of the second process as protective packing to the completed units of production.

Required:(i) PREPARE Statement of Equivalent Production, Cost per unit and Process I A/c.

(ii) PREPARE statement of Equivalent Production, Cost per unit and Process II A/c.

Answer

Process I

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
40,000	Completed	30,000	100	30,000	100	30,000	100	30,000
	Closing WIP	10,000	100	10,000	50	5,000	50	5,000
40,000		40,000		40,000		35,000		35,000

Particulars	Materials	Labour	Overhead	Total
Cost incurred (₹)	3,00,000	3,50,000	2,45,000	8,95,000

Equivalent units	40,000	35,000	35,000	
Cost per equivalent unit (₹)	7.5	10	7	24.5

Process-I Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Materials	40,000	3,00,000	By Process-II A/c	30,000	7,35,000
To Labour		3,50,000	(30,000 units × ₹24.5)		
To Overhead		2,45,000	By Closing WIP*	10,000	1,60,000
	40,000	8,95,000		40,000	8,95,000

* (Material 10,000 units × ₹ 7.5) + (Labour 5,000 units × ₹ 10) + (Overheads 5,000 units × ₹ 7)
= ₹ 75,000 + ₹ 50,000 + ₹ 35,000 = ₹ 1,60,000

Process II

Statement of Equivalent Production and Cost

Input (Units)	Particulars	Output Units	Equivalent Production					
			Materials		Labour		Overheads	
			(%)	Units	(%)	Units	(%)	Units
30,000	Completed	28,000	100	28,000	100	28,000	100	28,000
	Normal loss	200		--		--		--
	Closing WIP	1,800	100	1,800	25	450	25	450
30,000		30,000		29,800		28,450		28,450

Particulars	Materials	Labour	Overhead	Total
Process-I Cost	7,35,000	--	--	7,35,000
Cost incurred (₹)	--	71,125	85,350	1,56,475
Equivalent units	29,800	28,450	28,450	--
Cost per equivalent unit (₹)	24.6644	2.5000	3.0000	30.1644

Process-II Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Process-I A/c	30,000	7,35,000	By Normal loss A/c	200	--
To Packing Material	--	80,000	By Finished Goods Stock A/c	28,000*	9,24,604
To Direct Wages	--	71,125		1,800**	46,871
To Factory Overhead	--	85,350	By Closing WIP		
	30,000	9,71,475		30,000	9,71,475

* 28,000 × ₹30.1644 = ₹ 8,44,603 + ₹80,000 (Packing Material Cost) = ₹ 9,24,604

** 1,800 units × ₹ 24.6644 + 450 units × (₹ 2.5 + ₹3) = ₹ 46

Q22. Nov 2020 RTP

M Ltd. produces a product-X, which passes through three processes, I, II and III. In Process-III a by-product arises, which after further processing at a cost of ₹85 per unit, product Z is produced. The information related for the month of August 2020 is as follows:

	Process-I	Process-II	Process-III
Normal loss	5%	10%	5%
Materials introduced (7,000 units)	1,40,000	-	-
Other materials added	62,000	1,36,000	84,200

Direct wages	42,000	54,000	48,000
Direct expenses	14,000	16,000	14,000

Production overhead for the month is ₹2,88,000, which is absorbed as a percentage of direct wages.

The scrapes are sold at ₹10 per unit

Product-Z can be sold at ₹135 per unit with a selling cost of ₹15 per unit

No. of units produced:

Process-I- 6,600; Process-II- 5,200, Process-III- 4,800 and Product-Z- 600 There is not stock at the beginning and end of the month.

You are required to PREPARE accounts for:

- Process-I, II and III
- By-product process.

Answer

(i) Process-I A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Materials	7,000	1,40,000	By Normal loss (5% of 7,000)	350	3,500
To Other materials	-	62,000	By Process-II*	6,600	3,35,955
To Direct wages	-	42,000	By Abnormal loss*	50	2,545
To Direct expenses	-	14,000			
To Production OH (200% of ₹42,000)	-	84,000			
	7,000	3,42,000		7,000	3,42,000

$$* \frac{₹(3,42,000 - 3,500)}{(7,000 - 350)} = ₹50.9022 \text{ units}$$

Process-II A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-I A/c	6,600	3,35,955	By Normal loss (10% of 6,600)	660	6,600
To Other materials	-	1,36,000	By Process-III**	5,200	5,63,206
To Direct wages	-	54,000	By Abnormal loss**	740	80,149
To Direct expenses	-	16,000			
To Production OH (200% of ₹54,000)	-	1,08,000			
	6,600	6,49,955		6,600	6,49,955

$$** \frac{₹(6,49,955 - 6,600)}{(6,600 - 660)} = ₹108.3089 \text{ units}$$

Process-III A/c

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-I A/c	5,200	5,63,206	By Normal loss (5% of 5,200)	260	2,600

To Other materials	-	84,200	By Product-X***	4,800	8,64,670
To Direct wages	-	48,000			
To Direct expenses	-	14,000	By Product-Z# (₹35×600)	600	21,000
To Production OH (200% of ₹48,000)	-	96,000			
To Abnormal gain***	460	82,864			
	5,660	8,88,270		5,660	8,88,270

*** $\frac{₹(8,05,406 - 2,600 - 21,000)}{(5,200 - 260 - 600)} = ₹180.1396 \text{ units}$

Realisable value = ₹135 - (85+15) = ₹35

(ii) **By-Product Process A/c**

Particulars	Units	Amt.(₹)	Particulars	Units	Amt.(₹)
To Process-III A/c	600	21,000	By Product-Z	600	81,000
To Processing cost	-	51,000			
To Selling expenses	-	9,000			
	600	81,000		600	81,000

Q23. May 2020 RTP

Star Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses FIFO method to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of papers containing records of the process operations for the month.

Star Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- Opening work-in-process at the beginning of the month was 1,600 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 1,06,560.
- Closing work-in-process at the end of the month was 320 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,200 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 8,400 litres.
- Losses have a scrap value of ₹15 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is ₹78 for the month made up as follows:

	(₹)
Raw Material	46
Labour	14
Overheads	18
	<u>78</u>

Required:

- i. CALCULATE the quantity (in litres) of raw material inputs during the month.

- ii. CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month
- iii. CALCULATE the values of raw material, labour and overheads added to the process during the month.
- iv. PREPARE the process account for the month.

Answer

(i) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	1,600	Transfer to Finished Goods	8,400
Raw material input (balancing figure)	8,320	Process Losses	1,200
		Closing WIP	320
	9,920		9,920

(ii) Calculation of Normal Loss and Abnormal Loss/Gain

	Litres
Total process losses for month	1,200
Normal Loss (10% input)	832
Abnormal Loss (balancing figure)	368

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	₹46.00	₹14.00	₹18.00
Equivalent units (litre) (refer the working note)	7,488	7,744	7,872
Cost of equivalent units	₹3,44,448	₹1,08,416	₹1,41,696
Add: Scrap value of normal loss (832 units × ₹15)	₹12,480	--	--
Total value added	₹3,56,928	₹1,08,416	₹1,41,696

Workings:

Statement of Equivalent Units (litre):

Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overheads	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	1,600	Units completed:							
Units introduced	8,320	- Opening WIP	1,600	--	--	480	30	640	40
		- Fresh inputs	6,800	6,800	100	6,800	100	6,800	100
		Normal loss	832	--	--	--	--	--	--
		Abnormal loss	368	368	100	368	100	368	100
		Closing WIP	320	320	100	96	30	64	20
	9,920		9,920	7,488		7,744		7,872	

(iv) Process Account for the month

	Litres	Amount (₹)		Litres	Amount (₹)
To Opening WIP	1,600	1,06,560	By Finished goods [8400 × ₹ 78]	8,400	6,55,200
To Raw Materials	8,320	3,56,928	By Normal loss [832 × ₹ 15]	832	12,480
To Wages	--	1,08,416	By Abnormal loss [368 × ₹ 78]	368	28,704
To Overheads	--	1,41,696	By Closing WIP [(320 × ₹ 46) + (320 × .30 × ₹ 14) + (320 × .20 × ₹ 18)]	320	17,216

	9,920	7,13,600		9,920	7,13,600
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Q24. Nov 2019 RTP

A product is manufactured in two sequential processes, namely Process-1 and Process-2. The following information relates to Process-1. At the beginning of June 2019, there were 1,000 WIP goods (60% completed in terms of conversion cost) in the inventory, which are valued at ₹2,86,020 (Material cost: ₹2,55,000 and Conversion cost: ₹31,020). Other information relating to Process-1 for the month of June 2019 is as follows;

	(₹)
Cost of materials introduced- 40,000 units	96,80,000
Conversion cost added	18,42,000
Transferred to Process-2 (Units)	35,000
Closing WIP (Units) (60% completed in terms of conversion cost)	1,500

100% of materials are introduced to Process-1 at the beginning. Normal loss is estimated at 10% of input materials (excluding opening WIP).

Required:

- PREPARE a statement of equivalent units using the weighted average cost method and thereby calculate the following:
- CALCULATE the value of output transferred to Process-2 and closing WIP.

Answer

i. Statement of Equivalent Production

Particulars	Input Units	Particulars	Output Units	Equivalent Production			
				Material		Conversion cost	
				%	Units	%	Units
Opening WIP	1,000	Completed and transferred to Process-2	35,000	100	35,000	100	35,000
Units introduced	40,000	Normal Loss (10% of 40,000)	4,000	--	--	--	--
		Abnormal loss (Balancing figure)	500	100	500	60	300
		Closing WIP	1,500	100	1,500	60	900
	41,000		41,000		37,000		36,200

ii. Calculation of value of output transferred to Process-2 & Closing WIP

	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (35,000 units × ₹ 320.25) (Refer working note)		1,12,08,750
2. Value of Closing W-I-P:		
- Materials (1,500 units × ₹ 268.51)	4,02,765	
- Conversion cost (900 units × ₹ 51.74)	46,566	4,49,331

Workings:

Cost for each element

Particulars	Materials (₹)	Conversion (₹)	Total (₹)
Cost of opening work-in-process	2,55,000	31,020	2,86,020
Cost incurred during the month	96,80,000	18,42,000	1,15,22,000
Total cost: (A)	99,35,000	18,73,020	1,18,08,020
Equivalent units: (B)	37,000	36,200	
Cost per equivalent unit: (C) = (A ÷ B)	268.51	51.74	320.25

Following information is available regarding Process-I of a manufacturing company for the month of February:20X9

Production Record:

Units in process as on 1st February 20X9	4,000
(All materials used, 25% complete for labour and overhead)	
New units introduced	16,000
Units completed	14,000
Units in process as on 28th February 20X9	6,000
(All materials used, 33-1/3% complete for labour and overhead)	

Cost Records:

(₹)

Work-in-process as on 1st February 20X9	
Materials	6,00,000
Labour	1,00,000
Overhead	<u>1,00,000</u>
	<u>8,00,000</u>

Cost during the month:

Materials	25,60,000
Labour	15,00,000
Overhead	<u>15,00,000</u>
	<u>55,60,000</u>

Presuming that average method of inventory is used, PREPARE the following:

- Statement of equivalent production.
- Statement showing cost for each element.
- Statement of apportionment of cost.
- Process cost account for Process-A.

Answer**(i) Statement of equivalent production (Average cost method)**

Input Units	Particulars	Output Units	Equivalent Production			
			Material		Labour & O.H.	
			%	Units	%	Units
20,000	Completed and transferred	14,000	100	14,000	100	14,000
	Closing WIP	6,000	100	6,000	33-1/3	2,000
20,000		20,000		40,000		32,000

(ii) Statement showing cost for each element

Particulars	Materials	Labour	Overhead	Total
Cost of opening work-in-process	6,00,000	1,00,000	1,00,000	8,00,000
Cost incurred during the month		15,00,000	15,00,000	55,60,000
Total cost: (A)	25,60,000	16,00,000	16,00,000	63,60,000
Equivalent units: (B)	31,60,000	16,000	16,000	
Cost per equivalent unit: (C) = (A ÷ B)	20,000	100	100	358
	158			

(iii) Statement of apportionment of cost

Particulars	Amount (₹)	Amount (₹)
1. Value of units completed and transferred (14,000 units × ₹ 358)		50,12,000
2. Value of Closing W-I-P:		
- Materials (6,000 units × ₹ 158)	9,48,000	
- Labour (2,000 units × ₹ 100)	2,00,000	
- Overheads (2,000 units × ₹ 100)	2,00,000	13,48,000

Total cost: (A+B)		63,60,000
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(iv) Process-I Cost Account

Particulars	Units	(₹)	Particulars	Units	(₹)
To Opening W-I-P	4,000	8,00,000	By Completed units	14,000	50,12,000
To Materials		25,60,000		6,000	13,48,000
To Labour	16,000	15,00,000	By Closing W-I-P		
To Overhead	--	15,00,000			
	--				
	20,000	63,60,000		20,000	63,60,000

Q26. Nov 2018 RTP

From the following information for the month of January, 20X9, PREPARE Process-III cost accounts.

Opening WIP in Process-III	1,600 units at ₹ 24,000
Transfer from Process-II	55,400 units at ₹ 6,23,250
Transferred to warehouse	52,200 units
Closing WIP of Process-III	4,200 units
Units Scrapped	600 units
Direct material added in Process-III	₹ 2,12,400
Direct wages	₹ 96,420
Production overheads	₹ 56,400

Degree of completion:

	Opening Stock	Closing Stock	Scrap
Material	80%	70%	100%
Labour	60%	50%	70%
Overheads	60%	50%	70%

The normal loss in the process was 5% of the production and scrap was sold @ ₹ 5 per unit. (Students may treat material transferred from Process – II as Material – A and fresh material used in Process – III as Material B)

Answer

**Statement of Equivalent Production
Process III**

Input Details	Units	Output Particulars	Units	Equivalent Production					
				Material-A		Material-B		Labour & Overhead	
				%	Units	%	Units	%	Units
Opening WIP	1,600	Work on Op. WIP	1,600	-	-	20	320	40	640
Process-II Transfer	55,400	Introduced & completed	50,600	100	50,600	10	50,600	100	50,600

		during the month							
		Normal loss (5% of 52,800 units)	2,640	-	-	-	-	-	-
		Closing WIP	4,200	100	4,200	70	2,940	50	2,100
		Abnormal Gain	(2,040)	100	(2,040)	100	(2,040)	100	(2,040)
	57,000		57,000		52,760		51,820		51,300

Working note:

Production units = Opening units + Units transferred from Process-II – Closing Units
= 1,600 units + 55,400 units – 4,200 units
= 52,800 units

Statement of cost

	Cost (₹)	Equivalent units	Cost per equivalent units (₹)
Material A (Transferred from previous process)	6,23,250		
Less: Scrap value of normal loss (2,640 units × ₹ 5)	(13,200)		
	6,10,050	52,760	11.5627
Material B	2,12,400	51,820	4.0988
Labour	96,420	51,300	1.8795
Overheads	56,400	51,300	1.0994
	9,75,270		18.6404

Statement of apportionment of Process Cost

		Amount (₹)	Amount (₹)
Opening WIP	Material A		24,000
Completed opening WIP units-1600	Material B (320 units × ₹ 4.0988)	1311.62	
	Wages (640 units × ₹ 1.8795)	1202.88	
	Overheads (640 units × ₹ 1.0994)	703.62	3,218.12
Introduced & Completed- 50,600 units	50,600 units × ₹ 18.6404		9,43,204.24
Total cost of 52,200 finished goods units			9,70,422.36
Closing WIP units- 4,200	Material A (4,200 units × ₹ 11.5627)		48,563.34
	Material B (2,940 units × ₹ 4.0988)		12,050.47

	Wages (2,100 units × ₹ 1.8795)		3,946.95
	Overheads (2,100 units × ₹ 1.0994)		2,308.74
Abnormal gain units - 2,040	(2,040 units × ₹ 18.6404)		66,869.50
			38026.42

Process III

Particulars	Units	Amount (₹)	Particulars	Units	Amount (₹)
To Balance b/d	1,600	24,000	By Normal loss	2,640	13,200
To Process II A/c	55,400	6,23,250	By Finished goods	52,200	9,70,422.36
To Direct material		2,12,400	By Closing WIP	4,200	66,874.06*
To Direct wages		96,420			
To Production overheads		56,400			
To Abnormal gain	2,040	38,026.42			
	59,040	10,50,496.42		59,040	10,50,496.42

* Difference in figure due to rounding off has been adjusted with closing WIP

Q27. May 2018 RTP

Star Ltd. manufactures chemical solutions for the food processing industry. The manufacturing takes place in a number of processes and the company uses FIFO method to value work-in-process and finished goods. At the end of the last month, a fire occurred in the factory and destroyed some of papers containing records of the process operations for the month.

Star Ltd. needs your help to prepare the process accounts for the month during which the fire occurred. You have been able to gather some information about the month's operating activities but some of the information could not be retrieved due to the damage. The following information was salvaged:

- Opening work-in-process at the beginning of the month was 800 litres, 70% complete for labour and 60% complete for overheads. Opening work-in-process was valued at ₹ 26,640.
- Closing work-in-process at the end of the month was 160 litres, 30% complete for labour and 20% complete for overheads.
- Normal loss is 10% of input and total losses during the month were 1,800 litres partly due to the fire damage.
- Output sent to finished goods warehouse was 4,200 litres.
- Losses have a scrap value of ₹15 per litre.
- All raw materials are added at the commencement of the process.
- The cost per equivalent unit (litre) is ₹39 for the month made up as follows:

	(₹)
Raw Material	23
Labour	7
Overheads	<u>9</u>
	<u>39</u>

Required:

- CALCULATE the quantity (in litres) of raw material inputs during the month.
- CALCULATE the quantity (in litres) of normal loss expected from the process and the quantity (in litres) of abnormal loss / gain experienced in the month
- CALCULATE the values of raw material, labour and overheads added to the process during the month.
- PREPARE the process account for the month.

Answer

(i) Calculation of Raw Material inputs during the month:

Quantities Entering Process	Litres	Quantities Leaving Process	Litres
Opening WIP	800	Transfer to Finished Goods	4,200
Raw material input (balancing figure)	5,360	Process Losses	1,800
		Closing WIP	160
	6,160		6,160

(ii) Calculation of Normal Loss and Abnormal Loss/Gain

	Litres
Total process losses for month	1,800
Normal Loss (10% input)	536
Abnormal Loss (balancing figure)	1,264

(iii) Calculation of values of Raw Material, Labour and Overheads added to the process:

	Material	Labour	Overheads
Cost per equivalent unit	₹23.00	₹7.00	₹9.00
Equivalent units (litre) (refer the working note)	4,824	4,952	5,016
Cost of equivalent units	₹1,10,952	₹34,664	₹45,144
Add: Scrap value of normal loss (832 units × ₹15)	₹8,040	--	--
Total value added	₹1,18,992	₹34,664	₹45,144

Workings:

Statement of Equivalent Units (litre):

Input Details	Units	Output details	Units	Equivalent Production					
				Material		Labour		Overheads	
				Units	(%)	Units	(%)	Units	(%)
Opening WIP	800	Units completed:							
Units introduced	5,360	- Opening WIP	800	--	--	240	30	320	40
		- Fresh inputs	3,400	3,400	100	3,400	100	3,400	100
		Normal loss	536	--	--	--	--	--	--
		Abnormal loss	1,264	1,264	100	1,264	100	1,264	100
		Closing WIP	160	160	100	48	30	32	20
	6,160		6,160	4,824		4,952		5,016	

(iv) Process Account for the month

	Litres	Amount (₹)		Litres	Amount (₹)
To Opening WIP	800	26,640	By Finished goods [8400 x ₹ 78]	8,400	1,63,800
To Raw Materials	5,360	1,18,992	By Normal loss [832 x ₹ 15]	832	8,040
To Wages	--	34,664	By Abnormal loss [368 x ₹ 78]	368	49,296
To Overheads	--	45,144	By Closing WIP	320	4,304
	6,160	2,25,440		6,160	2,25,440

CHAPTER 11: JOINT PRODUCT& BY PRODUCT
Past Exams and RTP Questions Compiler

Q1. May 2024 Exam, 5 marks

A company produces two products, A and B, through a joint production process. The total joint production cost incurred is as under:

Material	₹ 20,000
Labour	₹ 10,000
Variable overheads	₹ 6,000
Fixed Overheads	₹ 24,000

Product A and B can be sold for ₹ 20 per unit and ₹ 15 per unit respectively at split off point. The produced quantities are Product A-2,000 units and Product B – 4,000 units.

- (i) You are required to calculate the joint production cost allocation for each product using the:
- Physical unit method.
 - Contribution margin method.
- (ii) Product B can be further processed by incurring expenditure of ₹ 12,000. Loss in further processing is 2%. It can be sold @ ₹ 18 per unit. Explain the impact on profitability if Product B is further processed.

Answer:

Working

Calculation of joint cost

Description	Amount (₹)
Material	20,000
Labour	10,000
Variable overheads	6,000
Total variable cost	36,000
Fixed overheads	24,000
Total joint cost	60,000

- (i) (a) Allocation of joint cost using physical unit method:

Product A = ₹60,000 × 2,000/6,000 = ₹ 20,000

Product B = ₹60,000 × 4,000/6,000 = ₹ 40,000

- (b) Allocation of joint cost using contribution margin method:

	Description	Product-A	Product-B
	Units produced	2,000	4,000
	Selling price per unit (₹)	20	15
A.	Sales value (₹)	40,000	60,000
B.	Allocation of joint variable cost on the basis of physical unit		
	₹36,000 × 2,000/6,000	(12,000)	
	₹36,000 × 4,000/6,000		(24,000)
C = A-B	Contribution	28,000	36,000
D	Allocation of fixed joint cost on the basis of contribution margin		
	₹24,000 × 28,000/64,000	(10,500)	
	₹24,000 × 36,000/64,000		(13,500)
C-D	Profit at split off point	17,500	22,500

Allocation of Joint Cost on the basis of Contribution Margin Method:

Particulars	Product A	Product B
Allocation of Variable Cost	₹12,000	₹24,000
Allocation of Fixed Cost	₹10,500	₹13,500
Total Joint Cost	₹ 22,500	₹ 37,500

(ii) Profitability after further processing of Product B

Description	Amount (₹)
Units produced and sold 98% of 4,000 units	3,920
Selling price per unit (₹)	18
Sales value (₹)	70,560
Joint cost upto split off point	(37,500)
Further processing cost	(12,000)
Profit after further processing	21,060

Calculation of the profitability after further processing of product B can also be done in the following manner:

Profitability after further processing of Product B

Description	Amount (₹)
Incremental revenue on further processing (3,920 x ₹18) - (4,000 x ₹15)	10,560
Further processing cost	(12,000)
Incremental loss after further processing	1,440

Impact on profitability on Product B

If Product B is sold at split off point it earns profit of ₹ 22,500, but after further processing the profit is reduced to ₹ 21,060/- i.e. an opportunity loss of ₹ 1,440/-.

Q2. Nov 2023 Exam, 5 marks

XYZ Limited manufactures three joint products A, B and C from a joint process. Product B is sold at split off point whereas product A and C are sold after further processing. 10% of the quantity of product A is lost in further processing. Data regarding these products for the year ending 31st March, 2023 are as follows:

	A	B	C
Number of units produced and sold	3,60,000	2,10,000	4,50,000
Selling price per unit at split off point	-	₹ 6	-
Selling price per unit after further processing	₹ 9.50	-	₹ 12
Further processing costs	₹ 8,60,000	-	₹10,40,000

The joint production cost upto the split off point at which A, B and C become separable products is ₹ 57,26,000.

Required:

- Prepare a statement showing apportionment of joint cost to the products using Net realizable value method.
- Assume XYZ Limited has received an offer from D Limited to purchase product 'A' at the split off point at ₹ 7 per unit and another company PQR Limited has offered to purchase product 'C' at split off point at 9 per unit.

Advise whether these offers should be accepted or not?

Answer:

- Statement showing apportionment of joint cost to the products using NRV method

Particulars	Product A (₹)	Product B (₹)	Product C (₹)
-------------	---------------	---------------	---------------

Sales value	34,20,000 (3,60,000 x ₹ 9.5)	12,60,000 (2,10,000 x ₹ 6)	54,00,000 (4,50,000 x ₹ 12)
Less: Further processing cost	8,60,000	-	10,40,000
Net Realisable Value	25,60,000	12,60,000	43,60,000
Apportionment of joint cost of ₹ 57,26,000 in the ratio of 256:126:436	17,92,000	8,82,000	30,52,000

(ii) Decision whether to Process further or not

Particulars	Product A (₹)	Product C (₹)
Incremental Revenue	9,00,000 (₹ 9.5 - ₹ 7) x 3,60,000	13,50,000 (₹ 12 - ₹ 9) x 4,50,000
Less: Further processing cost	8,60,000	10,40,000
Less: wastage if further processed	2,80,000 ₹ 7 x (3,60,000 * 10% / 90%)	-
Incremental profit/(loss)	(2,40,000)	3,10,000

On comparing incremental sales revenue with further processing cost, there is net loss of ₹2,40,000 in case of product A and profit of ₹ 3,10,000 in case of product C. Hence offer of D Ltd should be accepted and Product A should be sold at split off point Whereas product C should be sold after further processing.

The solution can also be presented in following way:

Profit from further processing

Particulars	Product A (₹)	Product C (₹)
Sales Revenue	34,20,000 (3,60,000 x 9.5)	54,00,000 (4,50,000 x 12)
Less: Joint cost	17,92,000	30,52,000
Less: Further processing cost	8,60,000	10,40,000
(i) Profit/(loss)	7,68,000	13,08,000

Profit from Accepting offer (Sale at separation point)

Particulars	Product A (₹) D Limited offer accepted	Product C (₹) PQR Limited offer accepted
Sales Revenue	28,00,000 (3,60,000 / 0.90) x 7	40,50,000 (4,50,000 x 9)
Less: Joint cost	17,92,000	30,52,000
(ii) Profit/(loss)	10,08,000	9,98,000
Incremental profit (loss) (i)-(ii)	(2,40,000)	3,10,000

On comparing profit at separation point with further processing profit, there is net loss of ₹ 2,40,000 in case of product A and profit of ₹ 3,10,000 in case of product C. Hence offer of D Ltd should be accepted and Product A should be sold at split off point Whereas product C should be sold after further processing.

Q3. May 2023 Exam, 10 marks

ABC Company produces a Product 'X' that passes through three processes: R, S and T. Three types of raw materials, viz., J, K, and L are used in the ratio of 40:40:20 in process

R. The output of each process is transferred to next process. Process loss is 10% of total input in each process. At the stage of output in process T, a by-product 'Z' is emerging and the ratio of the main product 'X' to the by-product 'Z' is 80:20. The selling price of product 'X' is ₹60 per kg.

The company produced 14,580 kgs of product 'X'

Material price : Material J @ ₹ 15 per kg; Material K @ ₹ 9 per kg. Material L@ ₹ 7 per kg Process costs are as follows:

Process	Variable cost per kg (₹)	Fixed cost of Input (₹)
R	5.00	42,000
S	4.50	5,000
T	3.40	4,800

The by-product 'Z' cannot be processed further and can be sold at ₹ 30 per kg at the split- off stage. There is no realizable value of process losses at any stage.

Required:

Present a statement showing the apportionment of joint costs on the basis of the sales value of product 'X' and by-product 'Z' at the split- off point and the profitability of product 'X' and by-product 'Z'.

Answer:

(a) Working Notes:	
1. Calculation of Input of Raw Material	
Let assume total raw material in Process R be	100%
□ Output of Process T will be equal to:	
Input R	100%
- 10% Normal Loss	₹ 10
Input S	₹ 90%
- 10% Normal loss	₹ 9
Input T	81%
- 10% Normal loss	₹ 8.1
Output of T	72.9
Actual output of X	14,580 units
Which is 80% of the total output	

Output of Process T

$$= 14580 / 80\% = 18,225$$

$$\text{Input of Process R} = 18225 / 72.9\% = 25,000 \text{ kgs}$$

Alternative presentation for Calculation of Input in Process R, S and T

Working notes:

Process T (Kg.)			
To Input (Transfer from process S)	20,250	By Normal loss	2,025
		By Output Product X	14,580
		By output of by-product Z	3,645
	20,250		20,250

Process S (kg.)			
To Input (Transfer from process S)	22,500	By Normal loss (10%)	2,250
		By Transfer to process T	20,250
	22,500		22,500

Process R (kg.)			
To Input	25,000	By Normal loss (10%)	2,500
		By Transfer to process S	22,500
	25,000		25,000

2. Calculation of Joint Cost

Process	Inputs	Variable cost per kg	Variable cost	Fixed Cost	Total Cost
		₹	₹	₹	₹
R	25,000	5	1,25,000	42,000	1,67,000
S	22,500	4.5	1,01,250	5,000	1,06,250
T	20,250	3.4	68,850	4,800	<u>73,650</u>
					3,46,900

Raw material	J	10000 x 15	₹ 1,50,000
	K	10000 x 9	₹ 90,000
	L	5000 x 7	₹ <u>35,000</u>
			2,75,000

Add: Processing cost (as above) ₹ 3,46,900

Total Joint Cost 6,21,900

(i) Statement showing apportionment of Joint Cost

Particulars	Product X	By-Product Z	Total
Units	<u>14,580</u>	<u>3,645</u>	
Selling price (₹)	60	30	
Sales Value (₹)	8,74,800	1,09,350	9,84,150
(₹ 6,21,900 to apportioned in ratio of sales value at split off point)	5,52,800	69,100	6,21,900

(ii) Statement of Profitability

Particulars	Product X	By-Product Z	Total
Sales Value	8,74,800	1,09,350	9,84,150
Joint Cost (As apportioned above)	(5,52,800)	(69,100)	(6,21,900)
Profit	<u>3,22,000</u>	<u>40,250</u>	<u>3,62,250</u>

Q4. Nov 2022 Exam, 5 marks

ASR Ltd mainly produces Product 'L' and gets a by-Product 'M' out of a joint process. The net realizable value of the by-product is used to reduce the joint production costs before the joint costs are allocated to the main product. During the month of October 2022, company incurred joint production costs of ₹ 4,00,000. The main Product 'L' is not marketable at the split off point. Thus, it has to be processed further. Details of company's operation are as under:

Particulars	Product L	By- Product M
Production (units)	10,000	200
Selling price per kg	₹ 45	₹ 5
Further processing cost	₹ 1,01,000	-

You are required to find out:

(i) Profit earned from Product 'L'.

(ii) Selling price per kg of product 'L', if the company wishes to earn a profit of ₹ 1,00,000 from the above production.

Answer

(i) Calculation of profit on product 'L'

Particular	₹
Sales	4,50,000

Less: Further processing cost	(1,01,000)
	3,49,000
Less: Joint Production Cost*	(3,99,000)
loss	(50,000)

*Joint Production Cost = [4,00,000 – (200 × 5)] = 3,99,000

(ii) Calculation of desired selling price of product 'L'

$$\begin{aligned}
 \text{Desired selling price} &= \frac{\text{Desired Profit} + \text{Total Cost}}{\text{units measured}} \\
 &= \frac{1,00,000 + 1,01,000 + 3,99,000}{10,000} \\
 &= ₹ 60 \text{ per kg.}
 \end{aligned}$$

Q5. May 2022 Exam, 5 marks

RST Limited produces three joint products X, Y and Z. The products are processed further. Pre-separation costs are apportioned on the basis of weight of output of each joint product. The following data are provided for the month of April, 2022.

Cost incurred up to separation point: ₹ 10,000

	Product X	Product Y	Product Z
Output (in Litre)	100	70	80
	₹	₹	₹
Cost incurred after separation point	2,000	1,200	800
Selling Price per Litre:			
After further processing	50	80	60
At pre-separation point (estimated)	25	70	45

You are required to:

- Prepare a statement showing profit or loss made by each product after further processing using the presently adopted method of apportionment of pre-separation cost.
- Advise the management whether, on purely financial consideration, the three products are to be processed further or not

Answer

Statement showing profit/loss by each product after further processing

products	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)
Sales value after further processing	5,000	5,600	4,800
Less: Further processing cost	2,000	1,200	800
Less: Joint Cost* (as apportioned)	4,000	2,800	3,200
Profit/(loss)	(1,000)	1,600	800

* Statement showing apportionment of joint cost on the basis of physical units

	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)	Total (₹)
Output (in litre)	100	70	80	250
Weight	0.4 (100/250)	0.28 (70/250)	0.32 (80/250)	
Joint cost apportioned	4,000	2,800	3,200	

(ii) Decision whether to process further or not

	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)	Total (₹)
Incremental Revenue	2,500 [(50-25) × 100]	700 [(80-70) × 70]	1,200 [(60-45) × 80]	
Less: Further processing cost	2,000	1,200	800	
Incremental profit /(loss)	500	(500)	400	
	Product X (in ₹)	Product Y (in ₹)	Product Z (in ₹)	Total (₹)

Sales	2500	4900	3600	11000
Pre separation costs	4000	2800	3200	10000
Profit/(Loss)	(1500)	2100	400	1000

It is advisable to further process only product X and Z and to sale product Y at the point of separation.

Q6. Dec 2021 Exam, 5 marks

Narrate the terms 'Joint Products' and 'By-Products' with an example of each term.

Answer

i) Joint Products - Joint products represent "two or more products separated in the course of the same processing operation usually requiring further processing, each product being in such proportion that no single product can be designated as a major product".

In other words, two or more products of equal importance, produced, simultaneously from the same process, with each having a significant relative sale value are known as joint products.

For example, in the oil industry, gasoline, fuel oil, lubricants, paraffin, coal tar, asphalt and kerosene are all produced from crude petroleum. These are known as joint products.

(ii) By-Products - These are defined as "products recovered from material discarded in a main process, or from the production of some major products, where the material value is to be considered at the time of severance from the main product." Thus, by-products emerge as a result of processing operation of another product or they are produced from the scrap or waste of materials of a process. In short, a by-product is a secondary or subsidiary product which emanates as a result of manufacture of the main product.

The point at which they are separated from the main product or products is known as split-off point. The expenses of processing are joint till the split-off point. Examples of by-products are molasses in the manufacture of sugar, tar, ammonia and benzole obtained on carbonisation of coal and glycerine obtained in the manufacture of soap.

Q7. July 2021 Exam, 5 marks

OPR Ltd. purchases crude vegetable oil. It does refining of the same. The refining process results in four products at the split-off point - S, P, N and A. Product 'A' is fully processed at the split-off point. Product S, P and N can be individually further refined into SK, PM, and NL respectively. The joint cost of purchasing the crude vegetable oil and processing it were ₹ 40,000. Other details are as follows:

	Product Further processing costs (₹)	Sales at split-off point (₹)	Sales after further processing (₹)
S	80,000	20,000	1,20,000
P	32,000	12,000	40,000
N	36,000	28,000	48,000
A	-	20,000	-

You are required to identify the products which can be further processed for maximizing profits and make suitable suggestions.

Answer

Statement of Comparison of Profits before and after further processing

	S (₹)	P (₹)	N (₹)	A (₹)	Total (₹)
A. Sales at split off point	20,000	12,000	28,000	20,000	80,000
B. Apportioned Joint Costs (Refer Working Note)	10,000	6,000	14,000	10,000	40,000
C. Profit at split-off point	10,000	6,000	14,000	10,000	40,000
D. Sales after further processing	1,20,000	40,000	48,000	-	2,08,000
E. Further processing cost	80,000	32,000	36,000	-	1,48,000
F. Apportioned Joint Costs	10,000	6,000	14,000	-	-

(Refer Working Note)					
G. Profit if further processing (D - E + F)	30000	2,000	(-)2,000	-	-
H. Increase/ decrease in profit after further processing (G-C)	20,000	- 4000	- 16,000	-	-

Suggested Product to be further processed for maximising profits:

On comparing the figures of "Profit if no further processing" and "Profits if further processing", one observes that OPR Ltd. is earning more after further processing of Product S only i.e. ₹ 20,000. Hence, for maximizing profits, only Product S should be further processed and Product P, N and A should be sold at split-off point.

Working Note:

Apportionment of joint costs on the basis of Sales Value at split-off point

Apportioned joint cost = $\frac{\text{Total joint cost}}{\text{Total Sales value at split}} \times \text{sales value of each product}$

Where,

Total Joint cost = ₹ 40,000

Total sales at split off point (S, P, N and A) = 20,000 + 12,000 + 28,000 + 20,000
= ₹ 80,000

Share of S in joint cost = $\frac{₹ 40,000}{₹ 80,000} \times ₹ 20,000 = ₹ 10,000$

Share of P in joint cost = $\frac{₹ 40,000}{₹ 80,000} \times ₹ 12,000 = ₹ 6,000$

Share of N in joint cost = $\frac{₹ 40,000}{₹ 80,000} \times ₹ 28,000 = ₹ 14,000$

Share of A in joint cost = $\frac{₹ 40,000}{₹ 80,000} \times ₹ 20,000 = ₹ 10,000$

Alternative Solution

Decision for further processing of Product S, P and N

Products	S (₹)	P (₹)	N (₹)
Sales revenue after further processing	1,20,000	40,000	48,000
Less: sales value at split-off point	20,000	12,000	28,000
Incremental Sales Revenue	1,00,000	28,000	20,000
Less: Further Processing cost	80,000	32,000	36,000
Profit/ loss arising due to further processing	20,000	(-)4,000	(-)16,000

Suggested Product to be further processed for maximising profits:

On comparing the figures of "Profit if no further processing" and "Profits if further processing", one observes that OPR Ltd. is earning more after further processing of Product S only i.e. ₹ 20,000. Hence, for maximizing profits, only Product S should be further processed and Product P, N and A should be sold at split-off point.

Q8. Jan 2021 Exam, 10 marks

Mayura Chemicals Ltd buys a particular raw material at ₹ 8 per litre. At the end of the processing in Department- I, this raw material splits-off into products X, Y and Z. Product X is sold at the split-off point, with no further processing. Products Y and Z require further processing before they can be sold. Product Y is processed in Department-2, and Product Z is processed in Department-3. Following is a summary of the costs and other related data for the year 2019-20:

Particulars	Department		
	1	2	3
Cost of Raw Material	₹ 4,80,000	-	-
Direct Labour	₹ 70,000	₹ 4,50,000	₹ 6,50,000
Manufacturing	₹ 48,000	₹ 2,10,000	₹ 4,50,000

Overhead			
	Products		
	X	Y	Z
Sales (litres)	10,000	15,000	22,500
Closing inventory (litres)	5,000	-	7,500
Sale price per litre (₹)	30	64	50

There were no opening and closing inventories of basic raw materials at the beginning as well as at the end of the year. All finished goods inventory in litres was complete as to processing. The company uses the Net-realizable value method of allocating joint costs.

You are required to prepare:

- Schedule showing the allocation of joint costs.
- Calculate the Cost of goods sold of each product and the cost of each item in Inventory.
- A comparative statement of Gross profit.

Answer

(i) Statement of Joint Cost allocation of inventories of X, Y and Z

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Final sales value of total production (Working Note 1)	4,50,000 (15,000 x ₹ 30)	9,60,000 (15,000 x ₹ 64)	15,00,000 (30,000 x ₹ 50)	29,10,000
Less: Additional cost	--	6,60,000	11,00,000	17,60,000
Net realisable value (at split-off point)	4,50,000	3,00,000	4,00,000	11,50,000
Joint cost allocated (Working Note 2)	2,34,000	1,56,000	2,08,000	5,98,000

(ii) Calculation of Cost of goods sold and Closing inventory

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Allocated joint cost	2,34,000	1,56,000	2,08,000	5,98,000
Add: Additional costs	--	6,60,000	11,00,000	17,60,000
Cost of goods sold (COGS)	2,34,000	8,16,000	13,08,000	23,58,000
Less: Cost of closing inventory (Working Note 1)	78,000 (COGS × 100/3%)	--	3,27,000 (COGS × 25%)	4,05,000
Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000

(iii) Comparative Statement of Gross Profit

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Sales revenue	3,00,000 (10,000 x ₹ 30)	9,60,000 (15,000 x ₹ 64)	11,25,000 (22,500 x ₹ 50)	23,85,000
Less: Cost of goods sold	1,56,000	8,16,000	9,81,000	19,53,000
Gross Profit	1,44,000	1,44,000	1,44,000	4,32,000

Working Notes:

1. Total production of three products for the year 2019-2020

Products	Quantity sold in litres	Quantity of closing inventory in litres	Total production	Closing inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)]	(5) = (3)/ (4)
X	10,000	5,000	15,000	100/3

Y	15,000	--	15,000	--
Z	22,500	7,500	30,000	25

2. Joint cost apportioned to each product:

$$= \frac{\text{Total Joint cost}}{\text{Total Net Realisable Value}} \times \text{Net Realisable Value of each product}$$

$$\text{Joint cost of product X} = \frac{\text{₹ 5,98,000}}{\text{₹ 11,50,000}} \times \text{₹ 4,50,000} = \text{₹ 2,34,000}$$

$$\text{Joint cost of product Y} = \frac{\text{₹ 5,98,000}}{\text{₹ 11,50,000}} \times \text{₹ 3,00,000} = \text{₹ 1,56,000}$$

$$\text{Joint cost of product Z} = \frac{\text{₹ 5,98,000}}{\text{₹ 11,50,000}} \times \text{₹ 4,00,000} = \text{₹ 2,08,000}$$

Q9. Nov 2020 Exam, 5 marks

A company's plant processes 6,750 units of a raw material in a month to produce two products 'M' and 'N'.

The process yield is as under:

Product M 80%

Product N 12%

Process Loss 8%

The cost of raw material is ₹ 80 per unit.

Processing cost is ₹ 2,25,000 of which labour cost is accounted for 66%. Labour is chargeable to products 'M' and 'N' in the ratio of 100:80.

Prepare a Comprehensive Cost Statement for each product showing:

- Apportionment of joint cost among products 'M' and 'N' and
- Total cost of the products 'M' and 'N'. Comprehensive Cost Statement

Answer

Particulars	Total Cost (₹)	Product-M (₹)	Product-N (₹)
No. of units produced *		5,400 units	810 units
Cost of raw material (₹ 80 × 6,750 units)	5,40,000		
Processing cost: Labour cost (₹ 2,25,000 × 66%)	1,48,500		
- Other costs (₹ 2,25,000 - 1,48,500)	76,500		
Total joint cost	7,65,000		
(i) Apportionment of joint costs between the joint products			
Labour cost in the ratio of 100:80	1,48,500	82,500	66,000
		$\frac{1,48,500 \times 100}{180}$	$\frac{1,48,500 \times 80}{180}$
		5,36,087	80,413
Other joint costs (including material) in the ratio of output (5,400:810)	6,16,500	$\frac{6,16,500 \times 5,400}{6,210}$	$\frac{6,16,500 \times 810}{6,210}$
		6,18,587	1,46,413
(ii) Total product cost	7,65,000	6,18,587	1,46,413

* No. of units produced of Product M = 6750 units × 80% = 5400 units

No. of units produced of Product N = 6750 units × 12% = 810 units

Q10. Nov 2019 Exam, 5 marks

A Factory produces two products, 'A' and 'B' from a single process. The joint processing costs during a particular month are :

Direct Material ₹30,000

Direct Labour ₹ 9,600

Variable Overheads ₹ 12,000

Fixed Overheads ₹ 32,000

Sales: A- 100 units @ ₹ 600 per unit; B – 120 units @ ₹ 200 per unit.

I. Apportion joints costs on the basis of:

- Physical Quantity of each product.

- ii. Contribution Margin method, and
 II. Determine Profit or Loss under both the methods.

Answer

Total Joint Cost

	Amount (₹)
Direct Material	30,000
Direct Labour	9,600
Variable Overheads	12,000
Total Variable Cost	51,600
Fixed Overheads	32,000
Total joint cost	83,600

Apportionment of Joint Costs:

			Product-A	Product-B
I.	(i)	Apportionment of Joint Cost on the basis of 'Physical Quantity'	$\frac{₹ 83,600}{100 + 120 \text{ units}} \times 100$ ₹ 38,000	$\frac{₹ 83,600}{100 + 120 \text{ units}} \times 120$ ₹ 45,600
	(ii)	Apportionment of Joint Cost on the basis of 'Contribution Margin Method':		
		- Variable Costs (on basis of physical units)	$\frac{₹ 51,600}{100 + 120 \text{ units}} \times 100$ ₹ 23,455	$\frac{₹ 51,600}{100 + 120 \text{ units}} \times 120$ ₹ 28,145
		Contribution Margin	36,545 (₹600×100 – 23,455)	-4,145 (₹200×120 – 28,145)
		Fixed Costs*	₹ 32,000	
		Total apportioned cost	₹ 55,455	₹ 28,145
II.	(iii)	Profit or Loss:		
		When Joint cost apportioned on basis of physical units		
	A.	Sales Value	₹ 60,000	₹ 24,000
	B.	Apportioned joint cost on basis of 'Physical Quantity':	₹ 38,000	₹ 45,600
	A-B	Profit or (Loss)	22,000	(21,600)
		When Joint cost apportioned on basis of 'Contribution Margin Method'		
	C	Apportioned joint cost on basis of 'Contribution Margin Method'	₹ 55,455	₹ 28,145
	A-C	Profit or (Loss)	₹ 4,545	₹ (4,145)

* The fixed cost of ₹ 32,000 is to be apportioned over the joint products A and B in the ratio of their contribution margin but contribution margin of Product B is Negative so fixed cost will be charged to Product A only.

Q11. May 2019 Exam, 5 marks

A Factory is engaged in the production of chemical Bomex and in the course of its manufacture a by-product Cromex is produced which after further processing has a commercial value. For the month of April 2019 the following are the summarised cost data:

	Joint Expenses (₹)	Separate Expenses (₹)	
		Bomex	Cromex
Materials	1,00,000	6,000	4,000
Labour	50,000	20,000	18,000
Overheads	30,000	10,000	6,000
Selling Price per unit		100	40

Estimated profit per unit on sale of Cromex		2,000 units	5
Number of units produced			2,000 units

The factory uses net realisable value method for apportionment of joint cost to by-products.

You are required to prepare statements showing :

- Joint cost allocable to Cromex
- Product wise and overall profitability of the factory for April 2019.)

Answer

(i) Statement Showing Joint Cost Allocation to 'Cromex'

Particulars	Cromex (₹)
Sales (₹ 40 × 2,000 units)	80,000
Less: Post Split Off Costs (4,000+18,000+6,000)	(28,000)
Less: Estimated Profit (₹ 5 × 2,000 units)	(10,000)
Joint cost allocable	42,000

(ii) Statement Showing Product Wise and Overall Profitability

Particulars	Bomex (₹)	Cromex (₹)	Total (₹)
Sales	2,00,000	80,000	2,80,000
Less: Share in Joint Expenses	(1,38,000)*	(42,000)	(1,80,000)
Less: Post Split Off Costs	(36,000)	(28,000)	(64,000)
Profit	26,000	10,000	36,000

(*) 1,80,000 – 42,000

Q12. Nov 2023 RTP

A factory producing article A also produces a by-product B which is further processed into finished product. The joint cost of manufacture is given below:

Material	₹ 5,000
Labour	₹ 3,000
Overhead	₹ 2,000
	₹ 10,000

Subsequent cost in ₹ are given below:

	A	B
Material	3,000	1,500
Labour	1,400	1,000
Overhead	600	500
	5,000	3,000

Selling prices are A ₹ 16,000

B ₹ 8,000

Estimated profit on selling prices is 25% for A and 20% for B.

Assume that selling and distribution expenses are in proportion of sales prices. Show how you would apportion joint costs of manufacture and prepare a statement showing cost of production of A and B.

Answer:

1. Apportionment of Joint Costs

Particulars	A (₹)	B (₹)
Selling Price	16,000	8,000
Less: Estimated profit	4,000 (25% of ₹16,000)	1,600 (20% of ₹ 8,000)
Cost of sales	12,000	6,400
Less: Selling & Distribution exp. (Refer working note)	267 (₹ 400 × 2/3)	133 (₹ 400 × 1/3)
Less: Subsequent cost	5,000	3,000

Share of Joint cost	6,733	3,267
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So, Joint cost of manufacture is to be distributed to A & B in the ratio of 6733 : 3267

Statement showing Cost of Production of A and B

Elements of cost	Joint Cost		Subsequent Cost		Total Cost	
	A	B	A	B	A	B
Material	3,367	1,633	3,000	1,500	6,367	3,133
Labour	2,020	980	1,400	1,000	3,420	1,980
Overheads	1,346	654	600	500	1,946	1,154
Cost of production					11,733	6,267

Working Note:

Calculation of Selling and Distribution Expenses

Particulars	(₹)
Total Sales Revenue (₹ 16,000 + ₹ 8,000)	24,000
Less: Estimated Profit (₹ 4,000 + ₹ 1,600)	(5,600)
Cost of Sales	18,400
Less: Cost of production:	
- Joint Costs	(10,000)
- Subsequent costs (₹ 5,000 + ₹ 3,000)	(8,000)
Selling and Distribution expenses (Balancing figure)	400

Q13. May 2023 RTP

A factory producing article A also produces a by-product B which is further processed into finished product. The joint cost of manufacture is given below:

Material	₹ 5,000
Labour	₹ 3,000
Overhead	₹ 2,000
	₹ 10,000

Subsequent cost in ₹ are given below:

	A	B
Material	3,000	1,500
Labour	1,400	1,000
Overhead	600	500
	5,000	3,000

Selling prices are A ₹ 16,000

B ₹ 8,000

Estimated profit on selling prices is 25% for A and 20% for B.

Assume that selling and distribution expenses are in proportion of sales prices. Show how you would apportion joint costs of manufacture and prepare a statement showing cost of production of A and B.

Answer

Apportionment of Joint Costs

Particulars	A (₹)	B (₹)
Selling Price	16,000	8,000
Less: Estimated profit	4,000	1,600
	(25% of ₹16,000)	(20% of ₹ 8,000)
Cost of sales	12,000	6,400
Less: Selling & Distribution exp.	267	133
(Refer working note)	(₹ 400 × 2/3)	(₹ 400 × 1/3)
Less: Subsequent cost	5,000	3,000

Share of Joint cost	6,733	3,267
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So, Joint cost of manufacture is to be distributed to A & B in the ratio of 6733 : 3267

Statement showing Cost of Production of A and B

Elements of cost	Joint Cost		Subsequent Cost		Total Cost	
	A	B	A	B	A	B
Material	3,367	1,633	3,000	1,500	6,367	3,133
Labour	2,020	980	1,400	1,000	3,420	1,980
Overheads	1,346	654	600	500	1,946	1,154
Cost of production					11,733	6,267

Working Note:

Calculation of Selling and Distribution Expenses

Particulars	(₹)
Total Sales Revenue (₹ 16,000 + ₹ 8,000)	24,000
Less: Estimated Profit (₹ 4,000 + ₹ 1,600)	(5,600)
Cost of Sales	18,400
Less: Cost of production:	
- Joint Costs	(10,000)
- Subsequent costs (₹ 5,000 + ₹ 3,000)	(8,000)
Selling and Distribution expenses (Balancing figure)	400

Q14. Nov 2022 RTP

JP Ltd. uses joint production process that produces three products at the split-off point.

Joint production costs during the month of July, 2022 were ₹ 33,60,000.

Product information for the month of July is as follows:

Particulars	Product A	Product B	Product C
Units produced	3,000	6,000	9,000
Sales prices:			
At the split-off	₹ 200		
After further processing	₹ 300	₹ 350	₹ 100
Costs to process after split-off	₹ 6,00,000	₹ 6,00,000	₹ 6,00,000

Other information is as follows:

Product C is a by-product and the company accounts for the by-product at net realizable value as a reduction of joint cost. Further, Product B & C must be processed further before they can be sold. FIND OUT the joint cost allocated to Product A in the month of July if joint cost allocation is based on Net Realizable Value

Answer

Product A

As the question says that "Products B and C must be processed further before they can be sold", it means Product A can be sold at the split-off point.

Cost to process Product A after the split-off point = ₹ 6,00,000

Additional revenue to be earned by processing further = ₹ 3,00,000

(₹ 100 increase in selling price per unit x
3,000 units)

Therefore, Product A will not be processed further, and the sales value at split-off for A will be used for allocating the joint costs.

Sales value at the split-off for A = ₹ 6,00,000

(₹ 200 × 3,000 units)

Product B

Since Product B must be processed further, we use its net realizable value for the joint cost allocation.

Net realizable value of Product B = ₹ 15,00,000
 [(₹ 350 × 6,000 units) – ₹ 6,00,000 further processing costs]

Product C

Product C, the by-product, must also be processed further to be sold.

Net realizable value of Product C = ₹ 3,00,000
 [(₹ 100 × 9,000 units) – ₹ 6,00,000 in further processing costs]

Joint Cost Allocation

Joint production cost = ₹ 33,60,000

Since, by-product C is accounted for as a reduction to the joint costs, the joint costs to be allocated = ₹ 30,60,000

(₹ 33,60,000 – ₹ 3,00,000 NRV of Product C)

Allocation of joint costs between Product A and B will be on the basis of ₹ 6,00,000: ₹ 15,00,000

Joint Cost allocated to Product A = ₹ 30,60,000 × $\frac{₹ 6,00,000}{₹ 21,00,000}$
 = ₹ 8,74,286

Q15. Nov 2021 RTP

A company produces two joint products A and B from the same basic materials. The processing is completed in three departments.

Materials are mixed in Department I. At the end of this process, A and B get separated. After separation, A is completed in the Department II and B in Department III. During a period, 4,00,000 kg of raw material was processed in Department I at a total cost of ₹ 17,50,000, and the resultant 50% becomes A and 40% becomes B and 10% normally lost in processing.

In Department II, 1/5th of the quantity received from Department I is lost in processing. A is further processed in Department II at a cost of ₹ 2,60,000.

In Department III, further new material is added to the material received from Department I and weight mixture is doubled, there is no quantity loss in the department III.

Further processing cost (with material cost) in Department III is ₹ 3,00,000.

The details of sales during the said period are:

	Product A	Product B
Quantity sold (kg)	1,50,000	3,00,000
Sales price per kg (₹)	10	4

There were no opening stocks. If these products sold at split-off-point, the selling price of A and B would be ₹ 8 and ₹ 4 per kg respectively.

Required:

- PREPARE a statement showing the apportionment of joint cost to A and B in proportion of sales value at split off point.
- PREPARE a statement showing the cost per kg of each product indicating joint cost, processing cost and total cost separately.
- PREPARE a statement showing the product wise profit for the year.
- On the basis of profits before and after further processing of product A and B, give your COMMENT that products should be further processed or not.

Answer

Calculation of quantity produced

	Dept I (kg)	Dept II (kg)	Dept III (kg)
Input	4,00,000	2,00,000 (50% of 4,00,000 kg.)	1,60,000 (40% of 4,00,000 kg.)
Weight (lost) or added	(40,000) (10% of 4,00,000 kg.)	(40,000) (1/5th of 2,00,000 kg.)	1,60,000
	3,60,000	1,60,000	3,20,000
Production of A	2,00,000	1,60,000	--
Production of B	1,60,000	--	3,20,000

(i) Statement of apportionment of joint cost of dept I

	Product A	Product B
--	-----------	-----------

Output (kg)	2,00,000	1,60,000
Selling price per kg (₹)	8	4
Sales value (₹)	16,00,000	6,40,000
Share in Joint cost (5:2)	12,50,000	5,00,000
	(₹ 17,50,000 × 5 ÷ 7)	(₹ 17,50,000 × 2 ÷ 7)

(ii) Statement of cost per kg

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Share in joint cost (₹)	12,50,000	5,00,000
Joint Cost per kg (₹) (A)	7.8125	1.5625
Further processing cost (₹)	2,60,000	3,00,000
Further processing cost per kg (₹) (B)	1.625	0.9375
Total cost per kg (₹) {(A)+(B)}	9.4375	2.5000

(iii) Statement of profit

	Product A	Product B
Output (kg)	1,60,000	3,20,000
Sales (kg)	(1,50,000)	(3,00,000)
Closing stock (kg)	10,000	20,000
	(₹)	(₹)
Sales	15,00,000 (1,50,000 kg × ₹ 10)	12,00,000 (3,00,000 kg × ₹ 4)
Add: closing stock (at full cost)	94,375 (10,000 kg × ₹ 9.4375)	50,000 (20,000 kg × ₹ 2.5)
Value of production	15,94,375	12,50,000
Less: Share in joint cost	12,50,000	5,00,000
Further processing cost	2,60,000	3,00,000
Profit	84,375	4,50,000

(iv) Profitability statement before and after processing

	Product A		Product B	
	Before (₹)	After (₹)	Before (₹)	After (₹)
Sales Value	16,00,000		6,40,000	
Share in joint costs	12,50,000		5,00,000	
Profit	3,50,000	84,375 (as per iii above)	1,40,000	4,50,000 (as per iii above)

Product A should be sold at split off point and product B after processing because of higher profitability

Q16. May 2021 RTP

HOW apportionment of joint costs upto the point of separation amongst the joint products using market value at the point of separation and net realizable value method is done? DISCUSS.)

Answer

Apportionment of Joint Cost amongst Joint Products using:

Market value at the point of separation: This method is used for apportionment of joint costs to joint products upto the split off point. It is difficult to apply if the market value of the product at the point of separation is not available. It is useful method where further processing costs are incurred disproportionately. Net realizable value Method:

From the sales value of joint products (at finished stage) the followings are deducted:

- Estimated profit margins
- Selling & distribution expenses, if any

– Post split off costs.

The resultant figure so obtained is known as net realizable value of joint products. Joint costs are apportioned in the ratio of net realizable value.

Q17. Nov 2020 RTP

ABC Ltd. operates a simple chemical process to convert a single material into three separate items, referred to here as X, Y and Z. All three end products are separated simultaneously at a single split-off point.

Product X and Y are ready for sale immediately upon split off without further processing or any other additional costs. Product Z, however, is processed further before being sold.

There is no available market price for Z at the split-off point.

The selling prices quoted here are expected to remain the same in the coming year. During 2019-20, the selling prices of the items and the total amounts sold were:

X – 186 tons sold for ₹3,000 per ton

Y – 527 tons sold for ₹2,250 per ton

Z – 736 tons sold for ₹1,500 per ton

The total joint manufacturing costs for the year were ₹12,50,000. An additional ₹ 6,20,000 was spent to finish product Z.

There were no opening inventories of X, Y or Z at the end of the year. The following inventories of complete units were on hand:

X 180 tons

Y 60 Tons

Z 25 tons

There was no opening or closing work-in-progress.

Required:

COMPUTE the cost of inventories of X, Y and Z and cost of goods sold for year ended March 31, 2020, using Net realizable value (NRV) method of joint cost allocation.

Answer

i.

**(a) Statement of Joint Cost allocation of inventories of X, Y and Z
(By using Net Realisable Value Method)**

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Final sales value of total production (Working Note 1)	10,98,000 (366 × ₹3,000)	13,20,750 (587 × ₹2,250)	11,41,500 (761 × ₹1,500)	35,60,250
Less: Additional cost	--	--	(6,20,000)	(6,20,000)
Net realisable value (at split-off point)	10,98,000	13,20,750	5,21,500	29,40,250
Joint cost allocated (Working Note 2)	4,66,797	5,61,496	2,21,707	12,50,000

**Cost of goods sold as on March 31, 2020
(By using Net Realisable Value Method)**

	Products			Total (₹)
	X (₹)	Y (₹)	Z (₹)	
Allocated joint cost	4,66,797	5,61,496	2,21,707	12,50,000
Additional cost	--	--	6,20,000	6,20,000
Cost of goods	4,66,797	5,61,496	8,41,707	18,70,000

available for sale (CGAS)				
Less: Cost of ending inventory (Working Note 1)	2,29,571 (CGAS×49.18%)	57,385 (CGAS × 10.22%)	27,692 (CGAS × 3.29%)	3,14,648
Cost of goods sold	2,37,226	5,04,111	8,14,015	15,55,352

Working Notes

1. Total production of three products for the year 2019-2020

Products	Quantity sold in tones	Quantity of ending inventory in tones	Total production	Ending inventory percentage (%)
(1)	(2)	(3)	(4) = [(2) + (3)]	(5) = (3)/ (4)
X	186	180	366	49.18
Y	527	60	587	10.22
Z	736	25	761	3.29

2. Joint cost apportioned to each product:

$$= \frac{\text{Total Joint cost}}{\text{Total NetRealisableValue}} \times \text{NetRealisableValue of each product}$$

□

$$\text{Total cost of Product X} = \frac{\text{₹ 12,50,000}}{\text{₹ 29,40,250}} \times \text{₹ 10,98,000} = \text{₹ 4,66,797}$$

$$\text{Total cost of Product Y} = \frac{\text{₹ 12,50,000}}{\text{₹ 29,40,250}} \times \text{₹ 13,20,750} = \text{₹ 5,61,496}$$

$$\text{Total cost of Product Z} = \frac{\text{₹ 12,50,000}}{\text{₹ 29,40,250}} \times \text{₹ 5,21,500} = \text{₹ 2,21,707}$$

Q18. May 2020 RTP

DISCUSS the treatment of by-product cost in cost accounting

Answer

By-product cost can be dealt in cost accounting in the following ways:

(i) When they are of small total value: When the by-products are of small total value, the amount realised from their sale may be dealt in any one the following two ways:

1. The sales value of the by-products may be credited to the Costing Profit and Loss Account and no credit be given in the Cost Accounts. The credit to the Costing Profit and Loss Account here is treated either as miscellaneous income or as additional sales revenue.
2. The sale proceeds of the by-product may be treated as deductions from the total costs. The sale proceeds in fact should be deducted either from the production cost or from the cost of sales.

(ii) When the by-products are of considerable total value: Where by-products are of considerable total value, they may be regarded as joint products rather than as by-products. To determine exact cost of by-products the costs incurred upto the point of separation, should be apportioned over by-products and joint products by using a logical basis. In this case, the joint costs may be divided over joint products and by-products by using relative market values; physical output method (at the point of split off) or ultimate selling prices (if sold).

(iii) Where they require further processing: In this case, the net realisable value of the by-product at the split-off point may be arrived at by subtracting the further processing cost from the realisable value of by-products.

If total sales value of by-products at split-off point is small, it may be treated as per the provisions discussed above under (i).

In the contrary case, the amount realised from the sale of by-products will be considerable and thus it may be treated as discussed under (ii).

Q19. May 2019 RTP | May 2018 RTP

A company processes a raw material in its Department 1 to produce three products, viz.

A, B and X at the same split-off stage. During a period 1,80,000 kgs of raw materials were processed in Department 1 at a total cost of ₹ 12,88,000 and the resultant output of A, B and X were 18,000 kgs, 10,000 kgs and 54,000 kgs respectively. A and B were further processed in Department 2 at a cost of ₹1,80,000 and ₹1,50,000 respectively. X was further processed in Department 3 at a cost of ₹1,08,000. There is no waste in further processing. The details of sales affected during the period were as under:

	A	B	X
Quantity Sold (kgs.)	17,000	5,000	44,000
Sales Value (₹)	12,24,000	2,50,000	7,92,000

There were no opening stocks. If these products were sold at split-off stage, the selling prices of A, B and X would have been ₹ 50, ₹ 40 and ₹ 10 per kg respectively.

Required:

- PREPARE a statement showing the apportionment of joint costs to A, B and X.
- PRESENT a statement showing the cost per kg of each product indicating joint cost and further processing cost and total cost separately.
- PREPARE a statement showing the product wise and total profit for the period.
- STATE with supporting calculations as to whether any or all the products should be further processed or not.

Answer

i. Statement showing the apportionment of joint costs to A, B and X

Products	A	B	X	Total
Output (kg)	18,000	10,000	54,000	
Sales value at the point of split off (₹)	9,00,000 (₹ 50 x 18,000)	4,00,000 (₹ 40 x 10,000)	5,40,000 (₹ 10 x 54,000)	18,40,000
Joint cost apportionment on the basis of sales value at the point of split off (₹)	6,30,000 $\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 9,00,000$	2,80,000 $\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 4,00,000$	3,78,000 $\frac{₹ 12,88,000}{₹ 18,40,000} \times ₹ 5,40,000$	12,88,000

ii. Statement showing the cost per kg. of each product

(indicating joint cost; further processing cost and total cost separately)

Products	A	B	X
Joint costs apportioned (₹) : (I)	6,30,000	2,80,000	3,78,000
Production (kg) : (II)	18,000	10,000	54,000
Joint cost per kg (₹): (I ÷ II)	35	28	7
Further processing Cost per kg. (₹)	10 $\frac{₹ 1,80,000}{18,000\text{kg}}$	15 $\frac{₹ 1,50,000}{10,000\text{kg}}$	2 $\frac{₹ 1,08,000}{54,000\text{kg}}$
Total cost per kg (₹)	45	43	9

(iii) Statement showing the product wise and total profit for the period

Products	A	B	X	Total
Sales value (₹)	12,24,000	2,50,000	7,92,000	
Add: Closing stock value (₹) (Refer to Working note 2)	45,000	2,15,000	90,000	
Value of production (₹)	12,69,000	4,65,000	8,82,000	26,16,000
Apportionment of joint cost	6,30,000	2,80,000	3,78,000	
Add: Further processing cost (₹)	1,80,000	1,50,000	1,08,000	
Total cost (₹)	8,10,000	4,30,000	4,86,000	17,26,000
Profit (₹)	4,59,000	35,000	3,96,000	8,90,000

Working Notes

1.

Products	A	B	X
Sales value (₹)	12,24,000	2,50,000	7,92,000
Quantity sold (Kgs.)	17,000	5,000	44,000
Selling price ₹/kg	72 $\frac{₹ 12,24,000}{17,000\text{kg}}$	50 $\frac{₹ 2,50,000}{5,000\text{kg}}$	18 $\frac{₹ 7,92,000}{44,000\text{kg}}$

2. Valuation of closing stock:

Since the selling price per kg of products A, B and X is more than their total costs, therefore closing stock will be valued at cost.

Products	A	B	X	Total
Closing stock (kgs.)	1,000	5,000	10,000	
cost per kg (₹)	45	43	9	
Closing stock value (₹)	45,000 (₹ 45 x 1,000 kg)	2,15,000 (₹ 43 x 5,000 kg)	90,000 (₹ 9 x 10,000 kg)	3,50,000

(iv) Calculations for processing decision

Products	A	B	X
Selling price per kg at the point of split off (₹)	50	40	10
Selling price per kg after further processing (₹) (Refer to working Note 1)	72	50	18
Incremental selling price per kg (₹)	22	10	8
Less: Further processing cost per kg (₹)	(10)	(15)	(2)
Incremental profit (loss) per kg (₹)	12	(5)	6

Product A and X has an incremental profit per unit after further processing, hence, these two products may be further processed. However, further processing of product B is not profitable hence, product B shall be sold at split off point.

Q20. Nov 2018 RTP

In an Oil Mill four products emerge from a refining process. The total cost of input during the quarter ending March 20X8 is ₹1,48,000. The output, sales and additional processing costs are as under:

Products	Output in Litres	Additional processing cost after split off (₹)	Sales value (₹)
ACH	8,000	43,000	1,72,500
BCH	4,000	9,000	15,000
CSH	2,000	--	6,000
DSH	4,000	1,500	45,000

In case these products were disposed-off at the split off point that is before further processing, the selling price per litre would have been:

ACH (₹)	BCH (₹)	CSH (₹)	DSH (₹)
15.00	6.00	3.00	7.50

PRODUCE a statement of profitability based on:

- If the products are sold after further processing is carried out in the mill.
- If they are sold at the split off point.

Answer

(i) Statement of profitability of the Oil Mill (after carrying out further processing) for the quarter ending 31st March 20X8.

Products	Sales Value after further processing	Share of Joint cost	Additional processing cost	Total cost after processing	Profit (loss)
ACH	1,72,500	98,667	43,000	1,41,667	30,833

BCH	15,000	19,733	9,000	28,733	(13,733)
CSH	6,000	4,933	--	4,933	1,067
DSH	45,000	24,667	1,500	26,167	18,833
	2,38,500	1,48,000	53,500	2,01,500	37,000

(ii) Statement of profitability at the split off point

Products	Selling price of split off	Output in units	Sales value at split off point	share of joint cost	profit at split off point
ACH	15.00	8,000	1,20,000	98,667	21,333
BCH	6.00	4,000	24,000	19,733	4,267
CSH	3.00	2,000	6,000	4,933	1,067
DSH	7.50	4,000	30,000	24,667	5,333
			1,80,000	1,48,000	32,000

Note: Share of Joint Cost has been arrived at by considering the sales value at split off point

CHAPTER 12: SERVICE COSTING
Past Exams and RTP Questions Compiler

Q1. May 2023 Exam, 5 marks

Star Airlines operates a single aircraft of 180 seats capacity between city 'ND' and 'GA'. The average normal occupancy is estimated at 70% per flight. The average one-way fare is ` 12,500 from city 'ND' to 'GA'. The costs of operation of the flight as collected by an expert analyst are:

Fuel cost (Variable) per flight from 'ND' to 'GA'	` 2,28,000 per flight
Food served on flight from 'ND' to 'GA' (no charge to passenger)	` 270 per passenger
Commission paid to Travel Agents (All ticket booking through agents)	7.5% of fare
Fixed costs:	
Lease & landing charges per flight 'ND' to 'GA'	` 9,12,000
Salaries of flight crew per flight 'ND' to 'GA'	` 90,000

Note: Assume that fuel costs are unaffected by the actual number of passengers on a flight.

You are required to:

- Calculate the net operating income that Star Airlines makes per flight from 'ND' to 'GA'.
- Star Airlines expects that its occupancy will increase to 144 passengers per flight if the fare is reduced to ` 11,670. Advise whether this proposal should be implemented or not.

Answer:

- No. of passengers 180 seats $\times$ 70% = 126

	(`)	(`)
Fare collection (126 passengers $\times$ ` 12,500)		15,75,000
Variable costs:		
Fuel	2,28,000	
Food (126 passengers $\times$ ` 270)	34,020	
Commission (7.5 % of ` 15,75,000)	1,18,125	3,80,145
Contribution per flight		11,94,855
Fixed costs:		
Lease and Landing Charges	9,12,000	
Salaries of flight Crew	90,000	10,02,000
Net income per flight		1,92,855

-

Fare collection (144 passengers $\times$ ` 11,670)		16,80,480
Variable costs:		
Fuel	2,28,000	
Food (144 passengers $\times$ ` 270)	38,880	
Commission (7.5% of ` 16,80,480)	1,26,036	3,92,916
Contribution		12,87,564
Fixed costs:		
Lease and Landing Charges	9,12,000	
Salaries of flight Crew	90,000	10,02,000
Net income per flight		2,85,564

There is an increase in contribution by ` 92,709. Hence the proposal is acceptable.

Q2. Nov 2023 Exam, 10 marks

Royal Hotel offers three types of rooms to its guests - Deluxe Room, Executive Room and Suite Room. Other information is as follows:-

	Deluxe Room	Executive Room	Suite Room
Room Tariff per day	₹ 1,500	₹ 2,400	₹ 3,800
No. of rooms	20	10	4
Average occupancy during theyear	80%	60%	75%
Housekeeping expenses perday	₹280	₹320	₹425

The hotel provides complimentary breakfast facility to its executive room and suite room guests while swimming pool facility is provided free of cost only to suite room guests.

The restaurant and swimming pool is run by a contractor. The contractor recovers charges of ₹ 150 per person for breakfast and ₹ 200 per person for using swimming pool facility from Royal Hotel.

Besides the above-mentioned charges, annual fixed expenses are as follows:

Salaries to staff ₹ 57,60,000

Electricity Expenses ₹ 24,00,000

Salaries to staff are apportioned to Deluxe Room, Executive Room and Suite Room in the ratio of 25:35:40 and electricity expenses are to be apportioned in proportion to occupancy.

You are required to calculate the total profit of each room type on annual basis. Note: Assume 360 days in a year and double occupancy in each category of room.

Answer:

Calculation of room days:

Nature of Room	Occupancy (Room-days)
Deluxe room	5760 (20 x 80% x 360)
Executive room	2160 (10 x 60% x 360)
Suite room	1080 (4 x 75% x 360)

Statement showing Total Profit for each room type

Elements	Deluxe room	Executive room	Suite room	Total
	(₹)	(₹)	(₹)	(₹)
Room Days	5760	2160	1080	
Revenue	86,40,000	51,84,000	41,04,000	1,79,28,000
Cost				
Housekeeping @ ₹ 280 perroom day	16,12,800	6,91,200	4,59,000	27,63,000
Breakfast @ ₹ 150 per person	-	6,48,000	3,24,000	9,72,000
Swimming pool @ ₹ 200 perperson	-	-	4,32,000	4,32,000
Salaries to staff (25:35:40)	14,40,000	20,16,000	23,04,000	57,60,000
Electricity expenses (occupancy)	15,36,000	5,76,000	2,88,000	24,00,000
Total cost	45,88,800	39,31,200	38,07,000	1,23,27,000
Profit	40,51,200	12,52,800	2,97,000	56,01,000

The solution can also be presented in following way:

Calculation of room days

Particulars	Occupancy during the year		
	Deluxe Room	Executive Room	Suite Room

(i) No. of Rooms	20	10	4
(ii) Occupancy in %	80%	60%	75%
No. of rooms occupied per day	16	6	3
No. of rooms occupied per year	5,760	2,160	1,080

Statement showing Total Profit for each room type

Annual Room Rent	Deluxe Room	Executive Room	Suite Room
Room Rent per day per room	₹1,500	₹2,400	₹3,800
Annual Room Rent (A)	₹ 86,40,000	₹ 51,84,000	₹ 41,04,000
Annual Fixed Expenses			
Staff Salary (25:35:40)	₹ 14,40,000	₹ 20,16,000	₹ 23,04,000
Electricity Expenses (Occupancy)	₹ 15,36,000	₹ 5,76,000	₹ 2,88,000
Total (B)	₹ 29,76,000	₹ 25,92,000	₹ 25,92,000
Housekeeping Expenses	₹ 16,12,800	₹ 6,91,200	₹ 4,59,000
Breakfast Charges		₹ 6,48,000 (2,160 x 2 x 150)	₹ 3,24,000 (1,080 x 2 x 150)
Swimming Pool Charges			₹ 4,32,000 (1,080 x 2 x 200)
Total (C)	₹ 16,12,800	₹ 13,39,200	₹ 12,15,000
Total Cost (B+C)	₹ 45,88,800	₹ 39,31,200	₹ 38,07,000
Profit	₹ 40,51,200	₹ 12,52,800	₹ 2,97,000

Q3. May 2023 Exam, 5 marks

Suggest any one basis of re-apportionment of service department overheads over production departments in the following instances:

Cost of Service Department	Basis
(i) Maintenance and Repair Shop	
(ii) Hospital and Dispensary	
(iii) Fire Protection	
(iv) Stores Department	
(v) Transport Department	
(vi) Computer Section	
(vii) Power House (Electric Power Cost)	
(viii) Inspection	
(ix) Tool Room	
(x) Time-keeping	

Answer:

Basis of re-apportionment of service department overheads over production departments

Cost of the Service Departments:	Basis
(i) Maintenance and Repair shop	Direct labour hours, Machine hours, Direct labour wages, Asset value x Hours worked
(ii) Hospital and Dispensary	No. of employees, No. of direct workers etc.
(iii) Fire Protection	Capital values
(iv) Stores Department	No. of requisitions, Weight or value of Materials issued.
(v) Transport Department	Crane hours, Truck hours, Truck mileage, Truck tonnage, Truck ton- hours, Tonnage handled. No. of packages of Standard size

(vi) Computer Section	Computer hours, Specific allocation to departments
(vii) Power House (Electric Power Cost)	Horse power, Kwh, Horse power × Machine hours, Kwh × Machine hours
(viii) Inspection	Inspection hours, number of inspections.
(ix) Tool room	Direct labour hours, Machine hours, Direct labour wages, Asset value × Hours worked
(x) Time-keeping	No. of card punched, No. of employees

Q4. May 2023 Exam, 5 marks

RST Toll Plaza Limited built an 80-kilometre-long highway between two cities and operates a toll plaza to collect tolls from passing vehicles using the highway. The company has estimated that 50,000 light weight, 12,000 medium weight and 10,000 heavy weight vehicles will be using the highway in one month in outward journey and the same number for return journey.

As per government notification, vehicles used for medical emergencies, Members of Parliament, and essential services are exempt from toll charges. It is estimated that 10% of light weight vehicles will pass the highway for such use.

It is the policy of the company that if vehicles return within 24 hours of their outward journey, the toll fare will be reduced by 25 percent automatically. It is estimated that 30% of chargeable light weight vehicles return within the specified time frame.

The toll charges for medium weight vehicles is to be fixed as 2.5 times of the light weight vehicles and that of heavy weight vehicles as 2 times of the medium weight vehicles.

The toll and maintenance cost for a month is ₹ 59,09,090, The company requires a profit of 10% over the total cost to cover interest and other costs.

Required:

- Calculate the toll rate for each type of vehicle if concession facilities are not available on the return journey.
- Calculate the toll rate that will be charged from light weight vehicles if a return journey concession facility is available, assuming that the revenue earned from light weight vehicles calculated in option (i) remains the same.

Answer:

Working Notes:

- Calculation of equivalent numbers of Light weight vehicles (when no concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	45,000	1	90,000
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	<u>1,00,000</u>
				2,50,000

*50,000 light vehicles less 10% exempted vehicles

- Calculation of equivalent numbers of Light weight vehicles (when concession is provided on return journey)

Type of vehicle	Monthly traffic (A)	Return traffic (B)	Ratio (C)	Equivalent light weight [(A + B) × C]
Light weight	45,000*	41,625 [45,000 - (45,000 ×	1	86,625

		30% × 25%]		
Medium weight	12,000	12,000	2.5	60,000
Heavy weight	10,000	10,000	5	1,00,000
				2,46,625

(i) Calculation of toll rate for each type of vehicle:

Total cost to cover ÷ Equivalent type of vehicles

(₹ 59,09,090 + 10% of ₹ 59,09,090) ÷ 2,50,000 equivalent vehicles (Refer working note 1)

= 65,00,000 ÷ 2,50,000 = ₹ 26

Toll rate for:

Light weight vehicle = ₹ 26

Medium weight vehicle = ₹ 26 × 2.5 = ₹ 65 Heavy weight vehicle = ₹ 26 × 5 = ₹ 130

(ii) **Calculation of toll rate for each type of vehicle:**

Revenue earned from Light weight vehicle in (i) above

= 90,000 vehicles × ₹ 26 = ₹ 23,40,000

New toll rate to maintain the same revenue from Light weight vehicle

= ₹ 23,40,000 ÷ 86,625 (Refer working note-2) = ₹ 27.01

Light weight vehicle = ₹ 27.01

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26

Alternative presentation

(ii) **Toll rate to be charged from light weight vehicles if concession applicable**

Revenue share in light vehicles = 90,000 × 26 = ₹ 23,40,000

Suppose rate is x, then outward journey 45,000 x; return journey (45,000 - 30% of 45,000) + 13,500 (x - 0.25)

45,000x + 31,500x + 13,500 (0.75x) = ₹ 23,40,000

Toll rate to be charged from light weight vehicles : 86,625x = ₹ 23,40,000 = ₹ 27.01

Rate to be charged from 76,500 light weight vehicles @ 27.01; revenue will be ₹ 20,66,494

Rate to be charged from 13,500 light weight vehicles = 27.01 × 0.75 = 20.26 revenue will be ₹ 2,73,506

Q5. Nov 2022 Exam, 5 marks

ABC Bank is having a branch which is engaged in processing of 'Vehicle Loan' and 'Education Loan' applications in addition to other services to customers. 30% of the overhead costs for the branch are estimated to be applicable to the processing of 'Vehicle Loan' applications and 'Education Loan' applications each. Branch is having four employees at a monthly salary of ₹ 50,000 each, exclusively for processing of Vehicle Loan applications and two employees at a monthly salary of ₹ 70,000 each, exclusively for processing of Education Loan applications.

In addition to above, following expense are incurred by the Branch:

- Branch Manager who supervises all the activities of branch, is paid at ₹ 90,000 per month.
- Legal charges, Printing & stationery and Advertising Expenses are incurred at ₹ 30,000, ₹ 12,000 and ₹ 18,000 respectively for a month.
- Other expenses are ₹ 10,000 per month.

You are required to:

- Compute the cost of processing a Vehicle Loan application on the assumption that 496 Vehicle Loan applications are processed each month.
- Find out the number of Education Loan Applications processed, if the total processing cost per Education Loan Application is same as in the Vehicle Loan Application as computed in (i) above.

Answer

Particulars	Vehicle loan Applications (₹)	Education loan Application (₹)	Total (₹)
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Employee Cost	2,00,000	1,40,000	3,40,000
Apportionment of Branch	(₹ 50,000 × 4)	(₹ 70,000 × 2)	
Manager's salary	27,000	27,000	54,000
Legal charges, Printing & Stationery and Advertising expenses	18,000	18,000	36,000
Other expenses	3,000	3,000	6,000
Total cost	2,48,000	1,88,000	4,36,000

(i) Computation of cost of processing a vehicle loan application:

Total Cost ÷ No. of applications

₹ 2,48,000 ÷ 496 = ₹ 500

(ii) Computation of no. of Education loan Processed

Total Cost = No. of applications × Processing cost per application

₹ 1,88,000 = No. of applications × ₹ 500

No. of education loan applications = ₹1,88,000 ÷ ₹500 = 376 applications

Q6. Nov 2022 Exam, 5 marks

Mention the cost units (physical measurements) for the following Industry/product:

- (i) Automobile
- (ii) Gas
- (iii) Brick works
- (iv) Power
- (v) Steel
- (vi) Transport (by road)
- (vii) Chemical
- (viii) Oil
- (ix) Brewing
- (x) Cement

Answer

Industry or Product	Cost Units
Automobile	Number
Gas	Cubic feet
Brick works	1,000 bricks
Power	Kilo-watt hour (kWh)
Steel	Tonne
Transport (by road)	Passenger- kilometer or Tonne-kilometer
Chemical	Litre, gallon, kilogram, tonne etc.
Oil	1 Barrel, tonne, litre
Brewing	Barrel
Cement	Ton/ per bag etc.

Q7. May 2022, 5 marks

Coal is transported from two mines X & Y and unloaded at plots in a railway station. X is at distance of 15 kms and Y is at a distance of 20 kms from the rail head plots. A fleet of lorries having carrying capacity of 4 tonnes is used to transport coal from the mines. Records reveal that average speed of the lorries is 40 kms per hour when running and regularly take 15 minutes to unload at the rail head.

At Mine X average loading time is 30 minutes per load, while at mine Y average loading time is 25 minutes per load.

Additional Information:

Drivers' wages, depreciation, insurance and taxes, etc. ₹ 12 per hour

Operated Fuel, oil tyres, repairs and maintenance, etc. ₹ 1.60 per km

You are required to prepare a statement showing the cost per tonne kilometre of carrying coal from each mine 'X' and 'Y'

Answer

Statement showing the cost per tonne-kilometre of carrying mineral from each mine

	Mine X (₹)	Mine Y (₹)
Fixed cost per trip: (Refer to working note 1)		
(Driver's wages, depreciation, insurance and taxes)		
X: 1 hour 30 minutes @ ₹ 12 per hour	18.00	
Y: 1 hour 40 minutes @ ₹ 12 per hour		20.00
Running and maintenance cost:		
(Fuel, oil, tyres, repairs and maintenance)		
X: 30 km. ₹ 1.60 per km.	48.00	
Y: 40 km. ₹ 1.60 per km		64.00
Total cost per trip (₹)	66.00	84.00
Cost per tonne – km (Refer to working note 2)	1.1 ₹ 66 60 tonne – km	1.05 ₹ 84 80 tonne – km

Working notes:

	Mine- X	Mine- Y
(1) Total operated time taken per trip		
Running time to & fro	45 minutes $\frac{₹ 60 \text{ minutes}}{40 \text{ km.}} \times 30 \text{ km}$	60 minutes $\frac{₹ 60 \text{ minutes}}{40 \text{ km.}} \times 40 \text{ km}$
Un-loading time	15 minutes	15 minutes
Loading time	30 minutes	25 minutes
Total operated time	90 minutes or 1 hour 30 minutes	100 minutes or 1 hour 40 minutes
(2) Effective tones – km.	60 (4 tonnes × 15 km.)	80 (4 tonnes × 20 km.)

□

Q8. Dec 2021 Exam, 10 marks

Paras Travels provides mini buses to an IT company for carrying its employees from home to office and dropping back after office hours. It runs a fleet of 8 mini buses for this purpose. The buses are parked in a garage adjoining the company's premises. Company is operating in two shifts (one shift in the morning and one shift in the afternoon). The distance travelled by each mini bus one way is 30 kms. The company works for 20 days in a month.

The seating capacity of each mini bus is 30 persons. The seating capacity is normally 80% occupied during the year. The details of expenses incurred for a year are as under:

Particulars	
Driver's salary	₹ 20,000 per driver per month
Lady attendant's salary (mandatorily required for each mini bus)	₹ 10,000 per attendant per month
Cleaner's salary (One cleaner for 2 mini buses)	₹ 15,000 per cleaner per month
Diesel (Avg. 8 kms per litre)	₹ 80 per litre
Insurance charges (per annum)	2% of Purchase Price
License fees and taxes	₹ 5,080 per mini bus per month
Garage rent paid	₹ 24,000 per month
Repair & maintenance including engine oil and lubricants (for every 5,760 kms)	₹ 2,856 per mini bus
Purchase Price of mini bus	₹ 15,00,000 each
Residual life of mini bus	8 Years
Scrap value per mini bus at the end of residual life	₹ 3,00,000

Paras Travels charges two types of fare from the employees. Employees coming from a distance of beyond 15 kms away from the office are charged double the fare which is charged from employees coming from a distance of up-to 15 kms. away from the office. 50% of employees travelling in each trip are coming from a distance beyond 15 kms. from the office. The charges are to be based on average cost.

You are required to:

- Prepare a statement showing expenses of operating a single mini bus for a year,
- Calculate the average cost per employee per month in respect of:
 - Employees coming from a distance upto 15 kms. from the office.
 - Employees coming from a distance beyond 15 kms. from the office.

Answer

(i) Statement of Expenses of operating a mini bus in a year

Particulars	Rate (₹)	Per Bus per annum (₹)
(A) Standing Charges:		
Driver's salary	20,000 p.m	2,40,000
Lady attendant's salary	10,000 p.m	1,20,000
Average Cleaner's salary (50%)	15,000 p.m	90,000
Insurance charge	30,000 p.a.	30,000
License fee, taxes etc.	5,080 p.m.	60,960
Average Garage Rent	24,000 p.m	36,000
Depreciation{(15,00,000-3,00,000)/8}	1,50,000 p.a.	1,50,000
(B) Maintenance Charges:		
Repairs & maintenance including engine oil and lubricants (Working Note 1)	28,560 p.a.	
(C) Operating Charges:		
Diesel (Working Note 2)		5,76,000
Total Cost (A + B + C)		13,31,520
Cost per month		1,10,960

(ii) Average cost per employee per month:

A. Employee coming from distance of upto 15 km

$$= \frac{\text{Total cost per month}}{\text{Total no. of equivalent employee}} \\ = \frac{1,10,960}{72*} = ₹ 1,541.11$$

B. Employee coming from a distance beyond 15 km = $1541.11 \times 2 = ₹ 3,082.22$

*** Considering half fare employees as a base**

Full fare employees (12 × 2) 24
employees

Add: Half fare employees (Working Note 3) 12
employees

Total Equivalent number of employees per month 36
employees

Total Equivalent number of employees per month (morning + afternoon shift of company) 72
employees

Working Notes:

1. Calculation of Repairs and maintenance cost of a bus :

Distance travelled in a year:

(4 trip × 2 shifts × 30 km. × 20 days × 12 months)

Distance travelled p.a.: 57,600 km.

Repairs and maintenance cost per Bus per annum:

$$= \frac{57,600 \text{ km.}}{5,760 \text{ km}} \times ₹ 2,856 \text{ per bus}$$

$$= ₹ 28,560 \text{ per annum}$$

2. Calculation of diesel cost per bus per annum:

Distance travelled in a year = 57,600 km

$$\text{Diesel cost per Bus per annum:} = \frac{57,600 \text{ km.}}{8 \text{ km}} \times ₹ 80$$

$$= ₹ 5,76,000$$

3. Calculation of equivalent number of employees per bus:

Seating capacity of a bus 30 employees

Occupancy (80% of capacity) 24 employees

Half fare employees (50% of 24 employees) 12 employees

Full fare employees (50% of 24 employees) 12 employee

[Note: Total Equivalent number of employees per month (morning + afternoon shift of company can also be calculated considering full fare employees as a base. In that case the number will be 36. Then fare for employees coming from distance beyond 15km will be $\frac{1,10,960}{36} = ₹ 3,082.22$ and employees coming from distance upto 15 km will be $3,082.22 / 2 = ₹ 1,541.11$]

Q9. July 2021 Exam, 5 marks

MRSL Healthcare Ltd. has incurred the following expenditure during the last year for its newly launched 'COVID-19' Insurance policy:

Office administration cost	48,00,000
Claim management cost	3,80,000
Employees cost	16,20,000
Postage and logistics	32,40,000
Policy issuance cost	29,50,000
Facilities cost	46,75,000
Cost of marketing of the policy	1,38,90,000
Policy development cost	35,00,000
Policy servicing cost	96,45,000
Sales support expenses	32,00,000
I.T. Cost	?

Number of Policy sold: 2,800

Total insured value of policies - ₹ 3,500 Crores

Cost per rupee of insured value - ₹ 0.002

You are required to:

- Calculate Total Cost for "COVID-19" Insurance policy segregating the costs into four main activities namely (a) Marketing and Sales support (b) Operations (c) I.T. Cost and (d) Support functions.
- Calculate Cost Per Policy

Answer

(i) Calculation of total cost for 'COVID-19' Insurance policy

	Particulars	Amount (₹)	Amount (₹)
a.	Marketing and Sales support:		
	- Policy development cost	35,00,000	
	- Cost of marketing	1,38,90,000	
	- Sales support expenses	32,00,000	2,05,90,000
b.	Operations:		
	- Policy issuance cost	29,50,000	
	- Policy servicing cost	96,45,000	
	- Claim management cost	3,80,000	1,29,75,000
c.	IT Cost*		2,21,00,000
d.	Support functions		
	- Postage and logistics	32,40,000	

- Facilities cost	46,75,000	
- Employees cost	16,20,000	
- Office administration cost	48,00,000	1,43,35,000
Total Cost		7,00,00,000

*IT cost = (₹ 3,500 crores x 0.002) – ₹ 4,79,00,000 = ₹ 2,21,00,000

$$(ii) \text{ Calculation of cost per policy} = \frac{\text{Total cost}}{\text{No. of policies}} \\ = \frac{₹ 7,00,00,000}{2,800} = ₹ 25,000$$

Q10. July 2021 Exam, 5 marks

What do you understand by Build-Operate-Transfer (BOT) approach in Service Costing? How is the Toll rate computed?

Answer

Build-Operate-Transfer (BOT) Approach: In recent years a growing trend emerged among Governments in many countries to solicit investments for public projects from the private sector under BOT scheme. **BOT is an option for the Government to outsource public projects to the private sector.**

With BOT, the private sector designs, finances, constructs and operate the facility and eventually, after specified concession period, the ownership is transferred to the Government. Therefore, BOT can be seen as a developing technique for infrastructure projects by making them amenable to private sector participation.

Toll Rate: In general, the toll rate should have a direct relation with the benefits that the road users would gain from its improvements. The benefits to road users are likely to be in terms of fuel savings, improvement in travel time and good riding quality.

To compute the toll rate, following formula may be used

$$= \frac{\text{Total Cost} + \text{Profit}}{\text{Number of Vehicles}}$$

Or, to compute the toll rate following formula with rounding off to nearest multiple of five has been adopted: User fee = Total distance x Toll rate per km.

Q11. Jan 2021 Exam, 10 marks

ABC Health care runs an Intensive Medical Care Unit. For this purpose, it has hired a building at a rent of ₹ 50,000 per month with the agreement to bear the repairs and maintenance charges also. The unit consists of 100 beds and 5 more beds can comfortably be accommodated when the situation demands. Though the unit is open for patients all the 365 days in a year, scrutiny of accounts for the year 2020 reveals that only for 120 days in the year, the unit had the full capacity of 100 patients per day and for another 80 days, it had, on an average only 40 beds occupied per day. But, there were occasions when the beds were full, extra beds were hired at a charge of ₹ 50 per bed per day. This did not come to more than 5 beds above the normal capacity on any one day. The total hire charges for the extra beds incurred for the whole year amounted to ₹ 20,000. The unit engaged expert doctors from outside to attend on the patients and the fees were paid on the basis of the number of patients attended and time spent by them which on an average worked out to ₹ 30,000 per month in the year 2020.

The permanent staff expenses and other expenses of the unit were as follows:

	₹
2 Supervisors each at a per month salary of	5,000
4 Nurses each at a per month salary of	3,000
2 Ward boys each at a per month salary of	1,500
Other Expenses for the year were as under:	
Repairs and Maintenance	28,000
Food supplied to patients	4,40,000
Caretaker and Other services for patients	1,25,000
Laundry charges for bed linen	1,40,000
Medicines supplied	2,80,000
Cost of Oxygen etc. other than directly borne for treatment of	75,000

patients	71,000
General Administration Charges allocated to the unit	

Required:

- What is the profit per patient day made by the unit in the year 2020, if the unit recovered an overall amount of ₹ 200 per day on an average from each patient.
- The unit wants to work on a budget for the year 2021, but the number of patients requiring medical care is a very uncertain factor. Assuming that same revenue and expenses prevail in the year 2021 in the first instance, work out the number of patient days required by the unit to break even.

Answer

Workings:

Calculation of number of Patient days

100 Beds × 120 days = 12000

40 Beds × 80 days = 3,200

Extra beds = 400

Total = 15,600

(i) Statement of Profitability

Particulars	Amount (₹)	Amount (₹)
Income for the year (₹ 200 per patient per day × 15,600 patient days)		31,20,000
Variable Costs:	3,60,000	
Doctor Fees (₹ 30,000 per month × 12)	4,40,000	
Food to Patients (Variable)	1,25,000	
Caretaker Other services to patients (Variable)	1,40,000	
Laundry charges (Variable)	2,80,000	
Medicines (Variable)	20,000	
Bed Hire Charges (₹ 50 × 400 Beds)		(13,65,000)
Total Variable costs		17,55,000
Contribution		
Fixed Costs:	6,00,000	
Rent (₹ 50,000 per month × 12)	1,20,000	
Supervisor (2 persons × ₹ 5,000 × 12)	1,44,000	
Nurses (4 persons × ₹ 3,000 × 12)	36,000	
Ward Boys (2 persons × ₹ 1500 × 12)	28,000	
Repairs (Fixed)	75,000	
Cost of Oxygen	71,000	
Administration expenses allocated		(10,74,000)
Total Fixed Costs		6,81,000
Profit		

Calculation of Contribution and profit per Patient day

Total Contribution = ₹ 17,55,000

Total Patient days = 15,600 days

Contribution per Patient day = ₹ 17,55,000 / 15,600 days = ₹ 112.50

Total Profit = ₹ 6,81,000

Total Patient days = 15,600 days

Profit per Patient day = ₹ 6,81,000 / 15,600 days = ₹ 43.65

(ii) Breakeven Point = Fixed Cost / Contribution per Patient day

= ₹ 10,74,000 / ₹ 112.50

= 9,547 patient days

Q12. Nov 2020 Exam, 10 marks

SEZ Ltd. built a 120 km. long highway and now operates a toll road to collect tolls. The company has invested ₹ 900 crore to build the road and has estimated that a total of 120 crore vehicles will

be using the highway during the 10 years toll collection tenure. The other costs for the month of "June 2020" are as follows:

- i. Salary:
 - Collection personnel (3 shifts and 5 persons per shift) - ₹ 200 per day per person.
 - Supervisor (3 shifts and 2 persons per shift) - ₹ 350 per day per person.
 - Security personnel (2 shifts and 2 persons per shift) - ₹ 200 per day per person.
 - Toll Booth Manager (3 shifts and 1 person per shift) - ₹ 500 per day per person.
- ii. Electricity - ₹ 1,50,000
- iii. Telephone - ₹ 1,00,000
- iv. Maintenance cost - ₹ 50 lakhs
- v. The company needs 30% profit over total cost.

Required:

1. Calculate cost per kilometre.
2. Calculate the toll rate per vehicle

Answer

Statement of Cost

Particulars	(₹)
A. Apportionment of capital cost ($\frac{₹ 900 \text{ crore}}{10 \text{ years}} \times \frac{1}{12}$ months)	7,50,00,000
B. Other Costs	
Salary to Collection Personnel (3 Shifts × 5 persons per shift × 30 days × ₹ 200 per day)	90,000
Salary to Supervisor (3 Shifts × 2 persons per shift × 30 days × ₹ 350 per day)	63,000
Salary to Security Personnel (2 Shifts × 2 persons per shift × 30 days × ₹ 200 per day)	24,000
Salary to Toll Booth Manager (3 Shifts × 1 person per shift × 30 days × ₹ 500 per day)	45,000
Electricity	1,50,000
Telephone	1,00,000
	4,72,000
C. Maintenance cost	50,00,000
Total (A + B + C)	8,04,72,000

(1) Calculation of cost per kilometre:

$$= \frac{\text{Total Cost}}{\text{Total km.}} = \frac{₹ 8,04,72,000}{120 \text{ km.}} = ₹ 6,70,600$$

(2) Calculation of toll rate per vehicle:

$$= \frac{\text{Total Cost} + 25\% \text{ profit}}{\text{Vehicles per month}} = \frac{₹ 8,04,72,000 + ₹ 2,41,41,600}{1,00,00,000 \text{ vehicles}} = ₹ 10.46$$

Working:

$$\begin{aligned} \text{Vehicles per month} &= \frac{\text{Total estimated vehicles}}{10 \text{ years}} \times \frac{1 \text{ month}}{12 \text{ months}} \\ &= \frac{120 \text{ crore}}{10 \text{ years}} \times \frac{1 \text{ month}}{12 \text{ months}} \\ &= 1 \text{ Crore vehicles} \end{aligned}$$

Q13. Nov 2019 Exam, 10 marks

A hotel is being run in a Hill station with 200 single rooms. The hotel offers concessional rates during six off-season months in a year.

During this period, half of the full room rent is charged. The management's profit margin is targeted at 20% of the room rent. The following are the cost estimates and other details for the year ending 31st March, 2019:

- i. Occupancy during the season is 80% while in the off-season it is 40%.
- ii. Total investment in the hotel is ₹ 300 lakhs of which 80% relates to Buildings and the balance to Furniture and other Equipment.
- iii. Room attendants are paid ₹ 15 per room per day on the basis of occupancy of rooms in a month.
- iv. Expenses:
 - Staff salary (excluding that of room attendants) ₹ 8,00,000
 - Repairs to Buildings ₹ 3,00,000
 - Laundry Charges ₹ 1,40,000
 - Interior Charges ₹ 2,50,000
 - Miscellaneous Expenses ₹ 2,00,200
- v. Annual Depreciation is to be provided on Buildings @ 5% and 15% on Furniture and other Equipments on straight line method.
- vi. Monthly lighting charges are ₹ 110, except in four months in winter when it is ₹ 30 per room and this cost is on the basis of full occupancy for a month.

You are required to work out the room rent chargeable per day both during the season and the off-season months using the foregoing information.

(Assume a month to be of 30 days and winter season to be considered as part of off-season).

Answer

Working Notes:

(i) Total Room days in a year

Season	Occupancy (Room-days)	Equivalent Full Room charge days
Season – 80% Occupancy	200 Rooms × 80% × 6 months × 30 days in a month = 28,800 Room Days	28,800 Room Days × 100% = 28,800
Off-season – 40% Occupancy	200 Rooms × 40% × 6 months × 30 days in a month = 14,400 Room Days	14,400 Room Days × 50% = 7,200
Total Room Days	28,800 + 14,400 = 43,200 Room Days	36,000 Full Room days

(ii) Lighting Charges:

It is given in the question that lighting charges for 8 months is ₹110 per month and during winter season of 4 months it is ₹30 per month. Further it is also given that peak season is 6 months and off season is 6 months.

It should be noted that – being Hill station, winter season is to be considered as part of Off season. Hence, the non-winter season of 8 months include – Peak season of 6 months and Off season of 2 months.

Accordingly, the lighting charges are calculated as follows:

Season	Occupancy (Room-days)
Season & Non-winter – 80% Occupancy	200 Rooms × 80% × 6 months × ₹ 110 per month = ₹ 1,05,600
Off- season & Non-winter – 40% Occupancy (8 – 6 months)	200 Rooms × 40% × 2 months × ₹110 per month = ₹ 17,600
Off- season & -winter – 40% Occupancy (months)	200 Rooms × 40% × 4 months × ₹ 30 per month = ₹ 9,600
Total Lighting charges	₹ 1,05,600 + ₹ 17,600 + ₹ 9,600 = ₹ 1,32,800

Statement of total cost:

	(₹)
Staff salary	8,00,000

Repairs to building	3,00,000
Laundry	1,40,000
Interior	2,50,000
Miscellaneous Expenses	2,00,200
Depreciation on Building (₹ 300 Lakhs × 80% × 5%)	12,00,000
Depreciation on Furniture & Equipment (₹ 300 Lakhs × 20% × 15%)	9,00,000
Room attendant's wages (₹ 15 per Room Day for 43,200 Room Days)	6,48,000
Lighting charges	1,32,800
Total cost	45,71,000
Add: Profit Margin (20% on Room rent or 25% on Cost)	11,42,750
Total Rent to be charged	57,13,750

Calculation of Room Rent per day:

Total Rent / Equivalent Full Room days = ₹ 57,13,750 / 36,000 = ₹ 158.72

Room Rent during Season = ₹ 158.72

Room Rent during Off season = ₹ 158.72 × 50% = ₹ 79.36

Q14. May 2019 Exam, 10 marks

X Ltd. distributes its goods to a regional dealer using single lorry. The dealer premises are 40 kms away by road. The capacity of the lorry is 10 tonnes. The lorry makes the journey twice a day fully loaded on the outward journey and empty on return journey. The following information is available:

Diesel Consumption	8 km per litre
Diesel Cost	₹ 60 per litre
Engine Oil	₹ 200 per week
Driver's Wages (fixed)	₹ 2,500 per week
Repairs	₹ 600 per week
Garage Rent	₹ 800 per week
Cost of Lorry (excluding cost of tyres)	₹ 9,50,000
Life of Lorry	1,60,000 kms
Insurance	₹ 18,200 per annum
Cost of Tyres	₹ 52,500
Life of Tyres	25,000 kms
Estimated sale value of the lorry at end of its life is	₹ 1,50,000
Vehicle License Cost	₹ 7,800 per annum
Other Overhead Cost	₹ 41,600 per annum

The lorry operates on a 5 day week.

Required:

- A statement to show the total cost of operating the vehicle for the four week period analysed into Running cost and Fixed cost.
- Calculate the vehicle operating cost per km and per tonne km. (Assume 52 weeks in a year)

Answer

Working Notes:

Particulars	For 4 weeks	For 1 week (by dividing by 4)
Total distance travelled (40 k.m × 2 × 2 trips × 5 days × 4 weeks)	3,200 km	800 km
Total tonne km (40 k.m × 10 tonnes × 2 × 5 days × 4 weeks)	16,000 tonne km	4,000 tonne km

(i) Statement showing Operating Cost

Amount (₹)		
Particulars	For 4 weeks	For 1 week (by dividing

		by 4)
A. Fixed Charges:		
Drivers' wages (₹2,500 × 4 weeks)	10,000	2,500
Garage rent (₹800 × 4 weeks)	3,200	800
Insurance {(₹18,200 ÷ 52 weeks) × 4 weeks}	1,400	350
Vehicle license {(₹7,800 ÷ 52 weeks) × 4 weeks}	600	150
Other overheads cost {(₹41,600 ÷ 52 weeks) × 4 weeks}	3,200	800
Total (A)	18,400	4,600
B. Running Cost:		
Cost of diesel {(3,200 ÷ 8 kms) × ₹60}	24,000	6,000
Engine Oil (₹200 × 4 weeks)*	800	200
Repairs (₹600 × 4 weeks)*	2,400	600
Depreciation on vehicle $\frac{₹ 9,50,000 - ₹ 1,50,000}{1,60,000\text{km}} \times 3,200 \text{ km}$	16,000	4,000
Depreciation on tyres $\frac{₹ 52,500}{25,000\text{km}} \times 3,200\text{km}$	6,720	1,680
Total (B)	49,920	12,480
C. Total Cost (A + B)	68,320	17,080

*Cost of engine oil & repairs may also be treated as fixed cost, as the question relates these with time i.e. in weeks instead of running of vehicle.

(ii) Calculation of vehicle operating cost:

$$\text{Operating cost per k.m.} = \frac{₹ 68,320}{3,200 \text{ kms}} \text{ or } \frac{₹ 17,080}{800 \text{ Kms}} = ₹ 21.35$$

$$\text{Operating cost per Tonne-k.m.} = \frac{₹ 68,320}{16,000} \text{ or } \frac{₹ 17,080}{4,000} = ₹ 4.27$$

Q15. Nov 2018 Exam, 10 marks

M/s XY Travels has been given a 25 km. long route to run an air- conditioned Mini Bus. The cost of bus is ₹ 20,00,000. It has been insured @3% premium per annum while annual road tax amounts to ₹ 36,000. Annual repairs will be ₹ 50,000 and the bus is likely to last for 5 years. The driver's salary will be ₹2,40,000 per annum and the conductor's salary will be ₹ 1,80,000 per annum in addition to 10% of the takings as commission (to be shared by the driver and the conductor equally). Office and administration overheads will be ₹ 18,000 per annum. Diesel and oil will be ₹ 1,500 per 100 km. The bus will make 4 round trips carrying on an average 40 passengers on each trip.

Assuming 25% profit on takings and considering that the bus will run on an average 25 days in a month, you are required to:

- prepare operating cost sheet (for the month).
- calculate fare to be charged per passenger km.

Answer

(i) Statement showing the Operating Cost per Passenger-km.

	Yearly (₹.)	Monthly (₹.)
(A) Standing Charges:		
Insurance Charge ₹. 20,00,000 × 3%	60,000	5,000
Road Tax	36,000	3,000
Depreciation (20,00,000/5)	4,00,000	33,333.33
Total	4,96,000	41,333.33
(B) Maintenance Charges:		
Annual Repairs	50,000	4166.67
Office and administration overheads	3,18,000	26,500
Total	3,68,000	30666.67
(C) Running Cost/Charges:		
Driver's Salary	2,40,000	20,000
Conductor's Salary	1,80,000	15,000

Diesel & Oil $60,000 \times \frac{1,500}{100}$	9,00,000	75,000
Total	13,20,000	41,333.33
Total (A+B+C) Cost before commission and profit	21,84,000	1,82,000
Commission (33,60,000 × 10%) (working note 2)	3,36,000	28,000
Profit (33,60,000 × 25%) (working note 2)	8,40,000	70,000
Takings (working note 1)	33,60,000	2,80,000

$$(ii) \text{ Fare per Passenger-km.} = \frac{\text{Total Collection/Takings}}{\text{Total Passenger-km (Working note 3)}}$$

$$= \frac{33,60,000}{24,00,000} = ₹. 1.40$$

OR

$$\text{Fare per Passenger-km. (monthly)} = \frac{2,80,000}{2,00,000} = ₹.1.40$$

Working note:

- Cost before commission (10%) and profit (25%) is 21,84,000 which is 65% of total takings. So total takings is $(21,84,000 \div 65) \times 100 = ₹ 33,60,000$
- Commission is 10% of ₹ 33,60,000 = ₹ 3,36,000 and Profit is 25% of ₹ 33,60,000 = ₹ 8,40,000
- Total Km is (4 Round Trips × Days in a month × Month = $(4 \times 2 \times 25 \times 25 \times 12) = 60,000$ km
Passenger km is 60,000 km × 40 passenger = 24,00,000

Q16. May 2018 Exam, 10 marks

A group of 'Health Care Services' has decided to establish a Critical Care Unit in a metro city with an investment of ₹ 85 lakhs in hospital equipments. The unit's capacity shall be of 50 beds and 10 more beds, if required, can be added.

Other information for a year are as under:

	(₹)
Building Rent	2,25,000 per month
Manager Salary (Number of Manager-03)	50,000 per month to each one
Nurses Salary (Number of Nurses-24)	18,000 per month to each Nurse
Ward boy's Salary (Number of ward boys' -24)	9,000 per month per person
Doctor's payment (Paid on the basis of number of patients attended and time spent by them)	5,50,000 per month
Food and laundry services (variable)	39,53,000
Medicines to patients (variable)	22,75,000 per year
Administrative Overheads	28,00,000 per year
Depreciation on equipments	15% per annum on original cost

It was reported that for 200 days in a year 50 beds were occupied, for 105 days 30 beds were occupied and for 60 days 20 beds were occupied.

The hospital hired 250 beds at a charge of ₹ 950 per bed to accommodate the flow of patients. However, this never exceeded the normal capacity of 50 beds on any day.

Find out:

- Profit per patient day, if hospital charges on an average ₹ 2,500 per day from each patient.
- Break even point per patient day (Make calculation on annual basis)

Answer

$$\text{Number of Patient Days} = (200 \times 50) + (105 \times 30) + (60 \times 20)$$

$$= 14,350 \text{ patient days} + 250 = 14,600$$

Statement Showing Profit

Elements of Cost and Revenue	Total (₹)
A. Revenue (14,600 × ₹ 2,500)	3,65,00,000
B. Variable Costs	
Food and Laundry Service	39,53,000
Medicines to Patients	22,75,000
Doctor's Payment	66,00,000
Hire Charges of Bed (250 × ₹ 950)	2,37,500
Total Variable Cost	1,30,65,500

C. Fixed Costs	
Building Rent	27,00,000
Manager's Salary (₹ 50,000 x 3 x 12)	18,00,000
Nurse's Salary (₹ 18,000 x 12 x 24)	51,84,000
Ward boy's Salary (₹ 9,000 x 12 x 24)	25,92,000
Administrative Overheads	28,00,000
Depreciation on Equipment's	12,75,000
Total Fixed Costs	1,63,51,000
D. Total Cost (B+C)	2,94,16,500
E. Profit (A-D)	70,83,500

Profit per patient day = ₹ 70,83,500/14,600 = ₹ 485.17

(i) Contribution (per patient day) = (₹ 3,65,00,000 – ₹ 1,30,65,500)/ 14,600 = ₹ 1,605.10

BEP = 1,63,51,000/1,605.10 = 10,186.90 or say 10,187 patient days

Notes:

1. Higher Charges for extra beds are a semi variable cost; still, for the sake of convenience it has been considered a variable cost.
2. Assumed, the hospital hired 250 beds at a charge of ₹ 950 per bed to accommodate the flow of patients. However, this never exceeded the 10 beds above the normal capacity of 50 beds on any day.
3. The fees were paid based on the number of patients attended to and the time spent by them, which on an average worked out to ₹ 5,50,000 p.m.

Q17. May 2023 RTP | Nov 2023 RTP

P Holiday Resorts offers three types of rooms to its guests, viz deluxe room, super deluxe room and luxury suite. You are required to ascertain the tariff to be charged to the customers for different types of rooms on the basis of following information:

Types of Room	Number of Rooms	Occupancy
Deluxe Room	100	90%
Super Deluxe Room	60	75%
Luxury Suite	40	60%

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and that of 'luxury suite' is 3 times of 'deluxe room'. Annual expenses are as follows:

Particulars	Amount (₹ lakhs)
Staff salaries	680.00
Lighting, Heating and Power	300.00
Repairs, Maintenance and Renovation	180.00
Linen	30.00
Laundry charges	24.00
Interior decoration	75.00
Sundries	30.28

An attendant for each room was provided when the room was occupied and he was paid ₹ 500 per day towards wages. Further, depreciation is to be provided on building @ 5% on ₹ 900 lakhs, furniture and fixtures @ 10% on ₹ 90 lakhs and air conditioners @ 10% on ₹ 75 lakhs.

Profit is to be provided @ 25% on total taking and assume 360 days in a year.

Answer

Operating cost statement of P Holiday Resorts

Particulars	Cost per annum (₹ In lakhs)
Staff Salaries	680.00
Room Attendant's Wages (Refer WN-3)	286.20
Lighting, Heating & Power	300.00
Repairs, Maintenance & Renovation	180.00

Linen	30.00
Laundry charges	24.00
Interior Decoration	75.00
Sundries	30.28
Depreciation: (Refer WN-4)	
Building	45.00
Furniture & Fixture	9.00
Air Conditioners	7.50
Total cost for the year	1666.98

Computation of profit:

Let ₹ x be the rent for deluxe from.

Equivalent deluxe room days are 90,720 (Refer WN-2)

Total takings = ₹ 90,720x

Profit is 25% of total takings.

Profit = 25% of ₹ 90,720x = ₹ 22,680x Total takings = Total Cost + Profit

₹ 90,720x = ₹ 16,66,98,000 + ₹ 22,680x

₹ 90,720x - ₹ 22,680x = ₹ 16,66,98,000

₹ 68,040x = ₹ 16,66,98,000

$X = \frac{₹ 16,66,98,000}{₹ 68,040} = ₹ 2,450$

Rent to be charged for deluxe room	₹ 2,450
Rent to be charged for super deluxe room = Rent of deluxe room x 2 = ₹ 2,450 x 2	₹ 4,900
Rent to be charged for luxury suite = Rent of Deluxe room x 3 = ₹ 2,450 x 3	₹ 7,350

Working Notes:

1. Computation of Room Occupancy

Type of Room	No. of rooms x no. of days x occupancy %	Room days
Deluxe Room	100 rooms x 360 days x 90% occupancy	32,400
Super Deluxe Room	60 rooms x 360 days x 75% occupancy	16,200
Luxury Suite	40 x 360 days x 60% occupancy	8,640
	Total	57,240

2. Computation of equivalent deluxe room days

Rent of 'super deluxe' room is to be fixed at 2 times of 'deluxe room' and luxury suite' is 3 times of 'deluxe room'. Therefore, equivalent room days would be:

Type of Room	Room days	Equivalent deluxe room days
Deluxe Room	32,400 x 1	32,400
Super Deluxe Room	16,200 x 2	32,400
Luxury Suite	8,640 x 3	25,920
Total		90,720

3. Computation of room attendant's wages:

Room occupancy days @ ₹ 500 per day

= 57,240 days × ₹ 500 per day

= ₹ 2,86,20,000.

Computation of Depreciation per annum:

Particulars	Cost (₹)	Rate of Depreciation	Depreciation (₹)
Building	900,00,000	5%	45,00,000
Furniture & Fixture	90,00,000	10%	9,00,000
Air Conditioners	75,00,000	10%	7,50,000

Q18. Nov 2022 RTP

Royal Transport Services runs fleet of buses within the limits of Jaipur city. The following are the details which were incurred by the company during October, 2021:

	(₹)
Cost of each Bus	24,00,000
Garage Rent	1,00,000
Insurance	25,000
Road tax	20,000
Manager's Salary	60,000
Assistant's Salary (Two)	32,000 each
Supervisor's Salary (Three)	24,000 each
Driver's Salary (Twenty-Five)	20,000 each
Cleaner's Salary (Twenty)	5,000 each
Office Staff's Salary	1,00,000
Consumables	1,20,000
Repairs & Maintenance	90,000
Other Fixed Expenses	72,000
Diesel (10 Kms per Litre)	80 per litre
Oils & Lubricants	1,45,000
Tyres and tubes	35,000
Depreciation	10% p.a. on Cost

Other details are as below:

	Capacity
12 Buses	60 Passengers
13 Buses	50 Passengers

Each bus makes 4 round trips a day covering a distance of 10 Kilometers in each trip (One Way) on an average. During the trips 80% of the seats are occupied. The annual records show that 5 buses are generally required to be kept away from roads each day for repairs.

You are required to CALCULATE cost per passenger-km.

Cost sheet to be prepared on the basis of 25 buses.

Answer

Operating Cost Sheet

Particulars	Amount (₹)	Amount (₹)
<u>Standing Charges:</u>		
Depreciation (₹ 24,00,000 X 10% X 1/12 X 25)	5,00,000	
Garage Rent	1,00,000	
Insurance	25,000	
Road Tax	20,000	
Manager's Salary	60,000	
Assistant's Salary (₹ 32,000 X 2)	64,000	
Supervisor's Salary (₹ 24,000 X 3)	72,000	
Driver's Salary (₹ 20,000 X 25)	5,00,000	
Cleaner's Salary (₹ 5,000 X 20)	1,00,000	
Office Staff's Salary	1,00,000	
Consumables	1,20,000	
Repairs & Maintenance	90,000	
Other Fixed Expenses	72,000	
<u>Running Charges</u>	1,45,000	
		3,96,800

Diesel (49,600 Kms / 10 Kms X ₹ 80 per unit)	35,000	
Oils & Lubricants	18,23,000	5,76,800
Tyres and tubes		23,99,800
Total Operating Cost		

$$\begin{aligned} \text{Cost per passenger-km} &= \frac{\text{Total Operating Cost}}{\text{Passenger -kms}} \\ &= \frac{23,99,800}{27,18,080} = 0.883 \end{aligned}$$

Working Note:

Calculation of Total Kilometers and Passenger Kilometers

Specification	Total Km.	Passenger-Km.
12 Buses (60 Passengers)	29,760 Kms (10 Kms × 4 X 2 trips × 31 days × 12 Buses)	14,28,480 (29760 Kms x 60 Pass. x 80%)
13 Buses (50 Passengers)	32,240 Kms (10 Kms × 4 X 2 trips × 31 days × 13 Buses)	12,89,600 (32240 Kms x 50 Pass. x 80%)
Total	62,000	27,18,080

Since 5 buses out of 25 buses are kept for repairs every day

Actual total Km. $62,000 \times 20/25 = 49,600$

Q19. May 2022 RTP | May 2024 RTP

Navya LMV Pvt. Ltd, operates cab/ car rental service in Delhi/NCR. It provides its service to the offices of Noida, Gurugram and Faridabad. At present it operates CNG fuelled cars but it is also considering to upgrade these into Electric vehicle (EV). The details related with the owning of CNG & EV propelled cars are as tabulated below:

Particulars	CNG Car	EV Car
Car purchase price (₹)	9,20,000	15,20,000
Govt. subsidy on purchase of car (₹)	--	1,50,000
Life of the car	15 years	10 years
Residual value (₹)	95,000	1,70,000
Mileage e	20 km/kg	240 km per charg
Electricity consumption per full charge cost per Kg (₹)	--	30 Kwh CNG
Power cost per Kwh (₹)	60	--
Annual Maintenance cost (₹)	--	7.60
Annual insurance cost (₹)	8,000	5,200
Tyre replacement cost in every 5 -year (₹)	7,600	14,600
Battery replacement cost in every 8- year (₹)	16,000	16,000
	12,000	5,40,000

Apart from the above, the following are the additional information:

Particulars	
Average distance covered by a car in a month	1,500 km
Driver's salary (₹)	20,000 p.m
Garage rent per car (₹)	4,500 p.m
Share of Office & Administration cost per car (₹)	1,500 p.m

Required: CALCULATE the operating cost of vehicle per month per car for both CNG & EV options.

Answer

Working Notes:

1. Calculation of Depreciation per month:

Particulars	CNG Car	EV Car
A Car purchase price (₹)	9,20,000	15,20,000
B Less: Govt. subsidy (₹)	--	(1,50,000)
C Less: Residual value (₹)	(95,000)	(1,70,000)
D Depreciable value of car (₹) [A-B-C]	8,25,000	12,00,000

E Life of the car	15 years	10 years
F Annual depreciation (₹) [D÷E]	55,000	1,20,000
G Depreciation per month (₹) [F÷12]	4,583.33	10,000

2. Fuel/ Electricity consumption cost per month:

Particulars	CNG Car	EV Car
A Average distance covered in a month (KM)	1,500	1,500
B Mileage (KM)	20	240
C Qty. of CNG/ Full charge required [A÷B]	75 kg.	6.25
D Electricity Consumption [C×30kwh]	-	187.5
E Cost of CNG per kg (₹)	60	-
F Power cost per Kwh (₹)	-	7.60
G CNG Cost per month (₹) [C×E]	4,500	-
H Power cost per month (₹) [D×F]	-	1,425

3. Amortised cost of Tyre replacement:

Particulars	CNG Car	EV Car
A Life of vehicle	15 years	10 years
B Replacement interval	5 years	5 years
C No. of time replacement required	2 times	1 time
D Cost of tyres for each replacement (₹)	16,000	16,000
E Total replacement cost (₹) [C×D]	32,000	16,000
F Amortised cost per year (₹) [E÷A]	2,133.33	1,600
E Cost per month (₹) [F÷12]	177.78	133.33

4. Amortised cost of Battery replacement:

Particulars	CNG Car	EV Car
A Life of vehicle	15 years	10 years
B Replacement interval	8 years	8 years
C No. of time replacement required	1 time	1 time
D Cost of tyres for each replacement (₹)	12,000	5,40,000
E Total replacement cost (₹) [C×D]	12,000	5,40,000
F Amortised cost per year (₹) [E÷A]	800	54,000
E Cost per month (₹) [F÷12]	66.67	4,500

Calculation of Operating cost per month:

Particulars	CNG Car (₹)	EV Car (₹)
A Running cost:		
Fuel cost/ Power consumption cost [Refer WN-2]	4,500	1,425
B Maintenance cost:		
Annual Maintenance cost [Annual cost ÷ 12]	666.67	433.33
Annual Insurance cost [Annual cost ÷ 12]	633.33	1,216.67
Annual Insurance cost [Annual cost ÷ 12]	177.78	133.33
Amortised cost of Tyre replacement [Refer WN-3]	66.67	4,500
	1,544.45	6,283.33
Amortised cost of Battery replacement [Refer WN-4]	4,583.33	10,000
	20,000	20,000
C Fixed cost:		
Depreciation [Refer WN-1]	4,500	4,500
	1,500	1,500
Driver's salary	30,583.33	36,000
Garage rent	36,627.78	43,708.33
Share of Office & Administration cost		
D Operating cost per month [A+B+C]		

Mr. PS owns a bus which runs according to the following schedule:

(i) Delhi to Hisar and back, the same day

Distance covered: 160 km.
 one way Number of days run each month: 9
 Seating capacity occupied 90%.

(ii) Delhi to Aligarh and back, the same day

Distance covered: 160 km.
 one way Number of days run each month: 12
 Seating capacity occupied 95%

(iii) Delhi to Alwar and back, the same day

Distance covered: 170 km.
 one way Number of days run each month: 6
 Seating capacity occupied 100%

(iv) Following are the other details:

Cost of the bus ₹ 15,00,000
 Salary of the Driver ₹ 30,000 p.m.
 Salary of the Conductor ₹ 26,000 p.m.
 Salary of the part-time Accountant ₹ 7,000 p.m.
 Insurance of the bus ₹ 6,000 p.a.
 Diesel consumption 5 km. per litre at ₹ 90 per litre
 Road tax ₹ 21,912 p.a.
 Lubricant oil ₹ 30 per 100 km.
 Permit fee ₹ 500 p.m.
 Repairs and maintenance ₹ 5,000 p.m.
 Depreciation of the bus @ 30% p.a.
 Seating capacity of the bus 50 persons
 Passenger tax is 20% of the total takings.

CALCULATE the bus fare to be charged from each passenger to earn a profit of 30% on total takings.

The fares are to be indicated per passenger for the journeys:

(i) Delhi to Hisar

(ii) Delhi to Aligarh and

(iii) Delhi to Alwar.

Answer

Working Notes:

1. Total Distance (in km.) covered per month

Bus route	Km. per trip	Trips per day	Days per month	Km. per month
Delhi to Hisar	160	2	9	2,880
Delhi to Aligarh	160	2	12	3,840
Delhi to Alwar	170	2	6	2,040
Total				8,760

2. Passenger- km. per month

	Total seats available per month (at 100% capacity)	Capacity utilised		Km. per trip	PassengerK m. per month
		(%)	Seats		
Delhi to Hisar & Back	900 (50 seats × 2 trips × 9 days)	90	810	160	1,29,600 (810 seats × 160 km.)
Delhi to Aligarh & Back	1,200 (50 seats × 2 trips × 12 days)	95	1,140	160	1,82,400 (1,140 seats × 160 km.)

Delhi to Alwar & Back	600 (50 seats × 2 trips × 6 days)	100	600	170	1,02,000 (600 seats × 170 km.)
Total					4,14,000

Monthly Operating Cost Statement

Particulars	(₹)	(₹)
(i) Running Costs		
Diesel {(8,760 km / 5 km) × ₹ 90}	1,57,680.00	
Lubricant oil {(8,760 km / 100) × ₹ 30}	2,628.00	1,60,308.00
(ii) Maintenance Costs		
Repairs & Maintenance		5,000.00
(iii) Standing charges		
Salary to driver	30,000.00	
Salary to conductor	26,000.00	
Salary of part-time accountant	7,000.00	
Insurance (₹ 6,000 ÷ 12)	500.00	
Road tax (₹ 21,912 ÷ 12)	1,826.00	
Permit fee	500.00	
Depreciation {(₹ 15,00,000 × 30%) × 12}	37,500.00	1,03,326.00
Total costs per month before Passenger Tax (i)+(ii)+(iii)		2,68,634.00
Passenger Tax*		1,07,453.60
Total Cost		3,76,087.60
Add: Profit*		1,61,180.40
Total takings per month		5,37,268.00

*Let total takings be X then,

$X = \text{Total costs per month before passenger tax} + 0.2 X (\text{passenger tax}) + 0.3 X (\text{profit})$

$X = ₹ 2,68,634 + 0.2 X + 0.3 X \Rightarrow 0.5 X = ₹ 2,68,634$ or,

$X = ₹ 5,37,268$

Passenger Tax = 20% of ₹ 5,37,268 = ₹ 1,07,453.60

Profit = 30% of ₹ 5,37,268 = ₹ 1,61,180.40

Calculation of Rate per passenger km. and fares to be charged for different routes

Rate per Passenger-Km. = $\frac{\text{Total takings per month}}{\text{Total Passenger - Km. per month}}$
 $= \frac{₹ 5,37,268}{4,14,000 \text{ Passenger-Km.}} = ₹ 1.30 (\text{approx.})$

Bus fare to be charged per passenger:

Delhi to Hisar = ₹ 1.30 × 160 km = ₹ 208.00

Delhi to Aligarh = ₹ 1.30 × 160 km = ₹ 208.00

Delhi to Alwar = ₹ 1.30 × 170 km = ₹ 221.00

Q21. May 2021 RTP

VPS is a public school having 25 buses each plying in different directions for the transport of its school students. In view of large number of students availing of the bus service, the buses work two shifts daily both in the morning and in the afternoon. The buses are garaged in the school. The workload of the students has been so arranged that in the morning, the first trip picks up senior students and the second trip plying an hour later picks up junior students. Similarly, in the afternoon, the first trip takes the junior students and an hour later the second trip takes the senior students home.

The distance travelled by each bus, one way is 8 km. The school works 22 days in a month and remains closed for vacation in May and June. The bus fee, however, is payable by the students for all the 12 months in a year.

The details of expenses for a year are as under:

Driver's salary - payable for all the 12 in	₹ 12,000 per month per
---	------------------------

months	driver
Cleaner's salary payable for all the 12 months	₹ 8,000 per month per cleaner
License fees, taxes etc.	₹ 8,400 per bus per annum
Insurance Premium	₹ 15,600 per bus per annum
Repairs and Maintenance	₹ 20,500 per bus per annum
Purchase price of the bus	₹ 20,00,000 each
Life of the bus	16 years
Scrap value	₹ 1,60,000
Diesel Cost	₹ 78.50 per litre

Each bus gives an average of 5 km. per litre of diesel.

The seating capacity of each bus is 40 students.

The school follows differential transportation fees based on distance travelled as under:

Students picked up and dropped within the range of distance from the school	Transportation fee	Percentage of students availing this facility
2 km.	25% of Full	15%
4 km.	50% of Full	30%
8 km.	Full	55%

Due to a pandemic, lockdown imposed on schools and the school remained closed from April 2020 to December 2020. Drivers and cleaners were paid 75% of their salary during the lockdown period. Repairing cost reduced to 75% for the year 2020.

Ignore the interest cost.

Required:

- PREPARE a statement showing the expenses of operating a single bus and the fleet of 25 buses for a year.
- FIND OUT transportation fee per student per month in respect of:
 - Students coming from a distance of upto 2 km. from the school.
 - Students coming from a distance of upto 4 km. from the school; and
 - Students coming from a distance of upto 8 km. from the school.
- CALCULATE the minimum bus fare that has to be recovered from the students for the year 2020.

Answer

(i) Statement showing the expenses of operating a single bus and the fleet of 25 buses for a year

Particulars	Per bus per annum (₹)	Fleet of 25 buses per annum (₹)
Running costs : (A)		
Diesel (Refer to working note 1)	2,21,056	55,26,400
Repairs & maintenance costs: (B)	20,500	5,12,500
Fixed charges:		
Driver's salary (₹ 12,000 × 12 months)	1,44,000	36,00,000
Cleaners salary (₹ 8,000 × 12 months)	96,000	24,00,000
Licence fee, taxes etc.	8,400	2,10,000
Insurance	15,600	3,90,000
Depreciation $\frac{\text{₹ } 20,00,000 - \text{₹ } 1,60,000}{16 \text{ years}}$	1,15,000	28,75,000
Total fixed charges: (C)	3,79,000	94,75,000
Total expenses: (A+B+C)	6,20,556	1,55,13,900

(ii) Average cost per student per month in respect of students coming from a distance of:

- a. 2 km. from the school {₹ 6,20,556 / (236 students × 12 months)} ₹ 219.12 (Refer to Working Note 2)
- b. 4 km. from the school (₹ 219.12 × 2) ₹ 438.24
- c. 8 km. from the school (₹ 219.12 × 4) ₹ 876.48

(iii) Calculation of minimum bus fare to be recovered from the students during the year 2020:**Statement showing the expenses of operating a single bus in year 2020**

Particulars	Per bus per annum (₹)
Running costs : (A)	
Diesel (Refer to working note 3)	66,316.80
Repairs & maintenance costs: (B) (₹ 20,500 × 0.75)	15,375
Fixed charges:	
Driver's salary {₹ 12,000 × 3 months + (75% of ₹ 12,000 × 9 months)}	1,17,000
Cleaners salary {₹ 8,000 × 3 months + (75% of ₹ 8,000 × 9 months)}	78,000
Licence fee, taxes etc.	8,400
Insurance	15,600
Depreciation $\frac{₹ 20,00,000 - ₹ 1,60,000}{16 \text{ years}}$	1,15,000
Total fixed charges: (C)	3,34,000
Total expenses: (A+B+C)	4,15,691.80

Minimum bus fare to be recovered:

- a. 2 km. from the school {₹ 4,15,691.8 / (236 students × 12 months)} ₹ 146.78 (Refer to Working Note 2)
- b. 4 km. from the school (₹ 146.78 × 2) ₹ 293.56
- c. 8 km. from the school (₹ 146.78 × 4) ₹ 587.12

Working Notes:**1. Calculation of diesel cost per bus:**

No. of trips made by a bus each day	4
Distance travelled in one trip both ways (8 km. × 2 trips)	16 km.
Distance travelled per day by a bus (16 km. × 4 shifts)	64 km.
Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled per year (1,408 × 10 months)	14,080 km.
No. of litres of diesel required per bus per year (14,080 km. ÷ 5 km.)	2,816 litres
Cost of diesel per bus per year (2,816 litres × ₹ 78.50)	₹ 2,21,056

2. Calculation of equivalent number of students per bus:

Bus capacity of 2 trips (40 students × 2 trips)	80 students
1/4 th fare students (15% × 80 students)	12 students
½ fare students (30% × 80 students × 2) (equivalent to 1/4 th fare students)	48 students
Full fare students (55% × 80 students × 4) (equivalent to 1/4 th fare students)	<u>176 students</u>
Total students equivalent to 1/4 th fare students	<u>236 students</u>

3. Calculation of diesel cost per bus in Year 2020:

Distance travelled during a month (64 km. × 22 days)	1,408 km.
Distance travelled during the year 2020 (1,408 × 3 months)	4,224 km.
No. of litres of diesel required per bus per year (4,224 km. ÷ 5 km.)	844.8 litres
Cost of diesel per bus per year (844.8 litres × ₹ 78.50)	₹ 66,316.80

A transport company has 20 vehicles, the capacities are as follows:

No. of Vehicles	Capacity per vehicle
5	9 MT
6	12 MT
7	15 MT
2	20 MT

The company provides the goods transport service between stations 'A' to station 'B'. Distance between these stations is 100 kilometers. Each vehicle makes one round trip per day on an average. Vehicles are loaded with an average of 90 per cent of capacity at the time of departure from station 'A' to station 'B' and at the time of return back loaded with 70 per cent of capacity. 10 per cent of vehicles are laid up for repairs every day.

The following information is related to the month of August, 2020:

Salary of Transport Manager	₹ 60,000
Salary of 30 drivers	₹ 20,000 each driver
Wages of 25 Helpers	₹ 12,000 each helper
Loading and unloading charges	₹ 850 each trip
Consumable stores (depends on running of vehicles)	₹ 1,35,000
Insurance (Annual)	₹ 8,40,000
Road Licence (Annual)	₹ 6,00,000
Cost of Diesel per litre	₹ 78 Kilometres run per litre each vehicle 5 Km.
Lubricant, Oil etc.	₹ 1,15,000
Cost of replacement of Tyres, Tubes, other parts etc. (on running basis)	₹ 4,25,000
Garage rent (Annual)	₹ 9,00,000
Routine mechanical services	₹ 3,00,000
Electricity charges (for office, garage and washing station)	₹ 55,000
Depreciation of vehicles (on time basis)	₹ 6,00,000

There is a workshop attached to transport department which repairs these vehicles and other vehicles also. 40 per cent of transport manager's salary is debited to the workshop.

The transport department has been apportioned ₹88,000 by the workshop during the month.

During the month operation was for 25 days.

You are required:

- CALCULATE per ton-km operating cost.
- DETERMINE the freight to be charged per ton-km, if the company earned a profit of 25 per cent on freight.

Answer

(i) Operating Cost Sheet for the month of August, 2020

Particulars	Amount (₹)
A. Fixed Charges:	
Manager's salary (₹60,000 × 60%)	36,000
Drivers' Salary (₹20,000 × 30 drivers)	6,00,000
Helpers' wages (₹12,000 × 25 helpers)	3,00,000
Insurance (₹8,40,000 ÷ 12 months)	70,000
Road licence (₹6,00,000 ÷ 12 months)	50,000
Garage rent (₹9,00,000 ÷ 12 months)	75,000
Routine mechanical services	3,00,000
Electricity charges (for office, garage and washing station)	55,000

Depreciation of vehicles	6,00,000
Apportioned workshop expenses	88,000
Total (A)	21,74,000
B. Variable Charges:	
Loading and unloading charges (Working Note 1)	7,65,000
Consumable Stores	1,35,000
Cost of diesel (Working Note 2)	14,04,000
Lubricant, Oil etc.	1,15,000
Replacement of Tyres, Tubes & other parts	4,25,000
Total (B)	28,44,000
C. Total Cost (A + B)	50,18,000
D. Total Ton-Kms. (Working Note 3)	9,43,200
E. Cost per ton-km. (C ÷ D)	5.32

(ii) Calculation of Chargeable Freight

Cost per ton-km.	₹ 5.32
Add: Profit @ 25% on freight or 33⅓% on cost	₹ 1.77
Chargeable freight per ton-km.	₹ 7.09

Working Notes:

1. Wages paid to loading and unloading labours

Numbers of vehicles available per day × No. of days × trips × wages per trip
 (20 vehicles × 90%) × 25 days × 2 trips × ₹850
 $18 \times 25 \times 2 \times 850 = ₹7,65,000$

2. Cost of Diesel:

Distance covered by each vehicle during August, 2020 = 100 k.m. × 2 × 25 days × 90% = 4,500 km.

Consumption of diesel = $\frac{4,500 \text{ k.m.} \times 20 \text{ vehicles}}{5 \text{ k.m.}}$
 = 18,000 litres.

Cost of diesel = 18,000 litres × ₹ 78 = ₹14,04,000.

3. Calculation of total ton-km:

Total Ton-Km. = Total Capacity × Distance covered by each vehicle × Average Capacity Utilisation ratio.

$$= [(5 \times 9 \text{ MT}) + (6 \times 12 \text{ MT}) + (7 \times 15 \text{ MT}) + (2 \times 20 \text{ MT})] \times 4,500 \text{ k.m.} \times \frac{90\% + 70\%}{2}$$

$$= (45 + 72 + 105 + 40) \times (4,500 \text{ k.m.} \times 80\%)$$

$$= 262 \times 4,500 \times 80\%$$

$$= 9,43,200 \text{ ton-km.}$$

Q23. May 2020 RTP | May 2018 RTP

AD Higher Secondary School (AHSS) offers courses for 11th & 12th standard in three streams i.e. Arts, Commerce and Science. AHSS runs higher secondary classes alongwith primary and secondary classes but for accounting purpose it treats higher secondary as a separate responsibility centre. The Managing committee of the school wants to revise its fee structure for higher secondary students. The accountant of the school has provided the following details for a year:

Amount	(₹)
Teachers' salary (15 teachers × ₹35,000 × 12 months)	63,00,000
Principal's salary	14,40,000
Lab attendants' salary (2 attendants × ₹15,000 × 12 months)	3,60,000
Salary to library staff	1,44,000
Salary to peons (4 peons × ₹10,000 × 12 months)	4,80,000
Salary to other staffs	4,80,000
Examinations expenditure	10,80,000
	15,20,000

Office & Administration cost	4,50,000
Annual day expenses	1,20,000
Sports expenses	

Other information:

(i)

	Standard 11 & 12			Primary & Secondary
	Arts	Commerce	Science	
No. of students	120	360	180	840
Lab classes in a year	0	0	144	156
No. of examinations in a year	2	2	2	2
Time spent at library per student per year	180 hours	120 hours	240 hours	60 hours
Time spent by principal for administration	208 hours	312 hours	480 hours	1,400 hours
Teachers for 11 & 12 standard	4	5	6	

(ii) One teacher who teaches economics for Arts stream students also teaches commerce stream students. The teacher takes 1,040 classes in a year, it includes 208 classes for commerce students.

(iii) There is another teacher who teaches mathematics for Science stream students also teaches business mathematics to commerce stream students. She takes 1,100 classes a year, it includes 160 classes for commerce students.

(iv) One peon is fully dedicated for higher secondary section. Other peons dedicate their 15% time for higher secondary section.

(v) All school students irrespective of section and age participate in annual functions and sports activities.

Requirement:

- CALCULATE cost per student per annum for all three streams.
- If the management decides to take uniform fee of ₹ 1,000 per month from all higher secondary students, CALCULATE stream wise profitability.
- If management decides to take 10% profit on cost, COMPUTE fee to be charged from the students of all three streams respectively.

Answer

Calculation of Cost per annum

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Teachers' salary (W.N-1)	16,80,000	21,00,000	25,20,000	63,00,000
Re-apportionment of Economics & Mathematics teachers' salary (W.N- 2)	(84,000)	1,45,091	(61,091)	-
Principal's salary (W.N-3)	1,24,800	1,87,200	2,88,000	6,00,000
Lab assistants' salary (W.N-4)	-	-	1,72,800	1,72,800
Salary to library staff (W.N-5)	43,200	28,800	57,600	1,29,600
Salary to peons (W.N-6)	31,636	94,909	47,455	1,74,000
Salary to other staffs (W.N-7)	38,400	1,15,200	57,600	2,11,200
Examination expenses (W.N- 8)	86,400	2,59,200	1,29,600	4,75,200
Office & Administration expenses (W.N- 7)	1,21,600	3,64,800	1,82,400	6,68,800
Annual Day expenses (W.N-7)	36,000	1,08,000	54,000	1,98,000
Sports expenses (W.N- 7)	9,600	28,800	14,400	52,800
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400

(a) Calculation of cost per student per annum

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Total Cost per annum	20,87,636	34,32,000	34,62,764	89,82,400
No. of students	120	360	180	660
Cost per student per annum	17,397	9,533	19,238	13,610

(b) Calculation of profitability

Particulars	Arts (₹)	Commerce (₹)	Science (₹)	Total (₹)
Total Fees Per annum	12,000	12,000	12,000	
Cost per student per annum	17,397	9,533	19,238	
Profit/ (Loss) per student per annum	(5,397)	2,467	(7,238)	
No. of students	120	360	180	
Total Profit/ (Loss)	(6,47,640)	8,88,120	(13,02,840)	(10,62,360)

(c) Computation of fees to be charged to earn a 10% profit on cost

Particulars	Arts (₹)	Commerce (₹)	Science (₹)
Cost per student per annum	17,397	9,533	19,238
Add: Profit @10%	1,740	953	1,924
Fees per annum	19,137	10,486	21,162
Fees per month	1,595	874	1,764

Working Notes:

(1) Teachers' salary

Particulars	Arts (₹)	Commerce (₹)	Science (₹)
No. of teachers	4	5	6
Salary per annum (₹)	4,20,000	4,20,000	4,20,000
Total salary	16,80,000	21,00,000	25,20,000

(2) Re-apportionment of Economics and Mathematics teachers' salary

Particulars	Economics		Mathematics	
	Arts	Commerce	Science	Commerce
No. of classes	832	208	940	160
Salary re-apportionment (₹)	(84,000)	84,000	(61,091)	61,091
	$\frac{₹ 4,20,000}{1,040} \times 208$		$\frac{₹ 4,20,000}{1,040} \times 160$	

Total addition to Commerce stream = ₹ 84,000 + ₹ 61,091 = ₹ 1,45,091

(3) Principal's salary has been apportioned on the basis of time spent by him for administration of classes.

(4) Lab attendants' salary has been apportioned on the basis of lab classes attended by the students.

(5) Salary of library staffs are apportioned on the basis of time spent by the students in library.

(6) Salary of Peons are apportioned on the basis of number of students.

The peons' salary allocable to higher secondary classes is calculated as below:

	Amount (₹)
Peon dedicated for higher secondary (1 peon × ₹10,000 × 12 months)	1,20,000
Add: 15% of other peons' salary {15% of (3 peons × ₹10,000 × 12 months)}	54,000
	<u>1,74,000</u>

(7) Salary to other staffs, office & administration cost, Annual day expenses and sports expenses are apportioned on the basis of number of students.

(8) Examination Expenses has been apportioned into account.

Q24. Nov 2019 RTP

A transport company has a fleet of four trucks of 10 tonne capacity each plying in different directions for transport of customer's goods. The trucks run loaded with goods and return empty. The distance travelled, number of trips made and the load carried per day by each truck are as under:

Truck No.	One way Distance Km	No. of trips per day	Load carried per trip / day tonnes
1	48	4	6
2	120	1	9
3	90	2	8
4	60	4	8

The analysis of maintenance cost and the total distance travelled during the last two years is as under

Year	Total distance travelled	Maintenance Cost ₹
1	1,60,200	1,38,150
2	1,56,700	1,35,525

The following are the details of expenses for the year under review: Diesel ₹ 60 per litre. Each litre gives 4 km per litre of diesel on an average.

Driver's salary	₹ 22,000 per truck per month
Licence and taxes	₹ 15,000 per annum per truck
Insurance	₹ 80,000 per annum for all the four trucks
Purchase Price per truck	
Scrap value at the end of life is	₹30,00,000, Life 10 years.
Oil and sundries	₹1,00,000.
General Overhead	₹ 525 per 100 km run.
	₹ 1,10,840 per annum

The trucks operate 24 days per month on an average.

Required

- PREPARE an Annual Cost Statement covering the fleet of four trucks.
- CALCULATE the cost per km. run.
- DETERMINE the freight rate per tonne km. to yield a profit of 30% on freight.

Answer

(i) Annual Cost Statement of four vehicles

	(₹)
Diesel {(4,21,632 km. ÷ 4 km) × ₹ 60} (Refer to Working Note 1)	63,24,480
Oil & sundries {(4,21,632 km. ÷ 100 km.) × ₹ 525}	22,13,568
Maintenance {(4,21,632 km. × ₹ 0.75) + ₹ 18,000} (Refer to Working Note 2)	3,34,224
Drivers' salary {(₹22,000 × 12 months) × 4 trucks}	10,56,000
Licence and taxes (₹ 15,000 × 4 trucks)	60,000
Insurance	80,000
Depreciation {(₹29,00,000 ÷ 10 years) × 4 trucks}	11,60,000
General overhead	1,10,840
Total annual cost	1,13,39,112

(ii) Cost per km. run

$$\begin{aligned} \text{Cost per kilometer run} &= \frac{\text{Total annual cost of vehicles}}{\text{Total kilometre travelled annually}} && \text{(Refer to Working Note 1)} \\ &= \frac{₹ 1,13,39,112}{4,21,632 \text{ Kms}} = ₹ 26.89 \end{aligned}$$

(iii) Freight rate per tonne km (to yield a profit of 30% on freight)

$$\begin{aligned} \text{Cost per tonne km.} &= \frac{\text{Total annual cost of three vehicles}}{\text{Total effective tonnes kms.per annum}} && \text{(Refer to Working Note 1)} \\ &= \frac{₹ 1,13,39,112}{16,10,496 \text{ kms}} = ₹ 7.04 \end{aligned}$$

Freight rate per tonne km. $\left(\frac{7.04}{0.7}\right) \times 1 = ₹ 10.06$

Working Notes:

1. Total kilometre travelled and tonnes kilometre (load carried) by four trucks in one year

Truck number	One way distance in kms	No. of trips	Total distance covered in km per day	Load carried per trip / day in tonnes	Total effective tonnes km
1	48	4	384	6	1,152
2	120	1	240	9	1,080
3	90	2	360	8	1,440
4	60	4	480	8	1,920
	Total		1,464		5,592

Total kilometre travelled by four trucks in one year

(1,464 km. × 24 days × 12 months) = 4,21,632

Total effective tonnes kilometre of load carried by four trucks during one year

(5,592 tonnes km. × 24 days × 12 months) = 16,10,496

2. Fixed and variable component of maintenance cost:

$$\begin{aligned} \text{Variable maintenance cost per km} &= \frac{\text{Difference in maintenance cost}}{\text{Difference in distance travelled}} \\ &= \frac{₹ 1,38,150 - ₹ 1,35,525}{1,60,200 \text{ kms} - 1,56,700 \text{ kms}} \\ &= ₹ 0.75 \end{aligned}$$

Fixed maintenance cost = Total maintenance cost - Variable maintenance cost

$$= ₹ 1,38,150 - 1,60,200 \text{ kms} \times ₹ 0.75 = ₹ 18,000$$

Q25. May 2019 RTP

A company runs a holiday home. For this purpose, it has hired a building at a rent of ₹10,00,000 per month alongwith 5% of total taking. It has three types of suites for its customers, viz., single room, double rooms and triple rooms.

Following information is given:

Type of suite	Number Occupancy	percentage
Single room	100	100%
Double rooms	50	80%
Triple rooms	30	60%

The rent of double rooms suite is to be fixed at 2.5 times of the single room suite and that of triple rooms suite as twice of the double rooms suite.

The other expenses for the year 20X9 are as follows:

	(₹)
Staff salaries	14,25,00,000
Room attendants' wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000

Provide profit @ 20% on total taking and assume 360 days in a year.

You are required to CALCULATE the rent to be charged for each type of suite.

Answer

Total equivalent single room suites

Nature of suite	Occupancy (Room-days)	Equivalent single room suites (Room-days)
Single room suites	36,000 (100 rooms × 360 days × 100%)	36,000 (36,000 × 1)
Double rooms	14,400	36,000

suites	(50 rooms × 360 days × 80%)	(14,400 × 2.5)
Triple rooms suites	6,480	32,400
	(30 rooms × 360 days × 60%)	(6,480 × 5)
		1,04,400

(ii) Statement of total cost:

	(₹)
Staff salaries	14,25,00,000
Room attendants' wages	4,50,00,000
Lighting, heating and power	2,15,00,000
Repairs and renovation	1,23,50,000
Laundry charges	80,50,000
Interior decoration	74,00,000
Sundries	1,53,00,000
	25,21,00,000
Building rent {(₹10,00,000 × 12 months) + 5% on total taking}	1,20,00,000 + 5% on total takings
Total cost	26,41,00,000 + 5% on total takings

Profit is 20% of total takings

□ Total takings = ₹ 26,41,00,000 + 25% (5% + 20%) of total takings

Let x be rent for single room suite

Then $1,04,400 \times x = 26,41,00,000 + 0.25 \times 1,04,400 \times x$

Or, $1,04,400 \times x = 26,41,00,000 + 26,100 \times x$

Or, $78,300 \times x = 26,41,00,000$

Or, **x = 3,373**

(iii) Rent to be charged for single room suite = ₹ 3,373

Rent for double rooms suites ₹ 3,373 × 2.5 = ₹ 8,432.5

Rent for triple rooms suites ₹ 3,373 × 5 = ₹ 16,865

Q26. Nov 2018 RTP

Sanziet Lifecare Ltd. operates in life insurance business. Last year it has launched a new term insurance policy for practicing professionals 'Professionals Protection Plus'. The company has incurred the following expenditures during the last year for the policy:

Policy development cost	₹11,25,000
Cost of marketing of the policy	₹45,20,000
Sales support expenses	₹11,45,000
Policy issuance cost	₹10,05,900
Policy servicing cost	₹35,20,700
Claims management cost	₹1,25,600
IT cost	₹74,32,000
Postage and logistics	₹10,25,000
Facilities cost	₹15,24,000
Employees cost	₹ 5,60,000
Office administration cost	₹16,20,400

Number of policy sold- 528

Total insured value of policies- ₹1,320 crore

Required:

- CALCULATE total cost for Professionals Protection Plus' policy segregating the costs into four main activities namely (a) Marketing and Sales support, (b) Operations, (c) IT and (d) Support functions.
- CALCULATE cost per policy.

iii. CALCULATE cost per rupee of insured value.

Answer

(i) Calculation of total cost for 'Professionals Protect Plus' policy

Particulars	Amount (₹)	Amount (₹)
1. Marketing and Sales support:		
- Policy development cost	11,25,000	
- Cost of marketing	45,20,000	
- Sales support expenses	11,45,000	67,90,000
2. Operations:		
- Policy issuance cost	10,05,900	
- Policy servicing cost	35,20,700	
- Claims management cost	1,25,600	46,52,200
3. IT Cost		74,32,000
4. Support functions		
- Postage and logistics	10,25,000	
- Facilities cost	15,24,000	
- Employees cost	5,60,000	
- Office administration cost	16,20,400	47,29,400
Total Cost		2,36,03,600

(ii) Calculation of cost per policy = $\frac{\text{Total cost}}{\text{No. of policies}}$
 $= \frac{₹ 2,36,03,600}{528}$
 $= ₹44,703.79$

(iii) Cost per rupee of insured value = $\frac{\text{Total cost}}{\text{Total insured value}}$
 $= \frac{₹ 2.36 \text{ crore}}{₹ 1,320 \text{ crore}}$
 $= ₹ 0.0018$

Q1. May 2024 Exam, 10 Marks

Following data is available for XYZ Ltd. for the month of February 2024:

Standard working hours	8 hours per day of 6 days per week
No. of weeks in the month	4
Maximum capacity	150 employees
Actual working	125 employees
Actual usage of Budgeted Capacity Ratio	86%
Efficiency Ratio	110%

You are required to calculate the following:

- (i) Actual Hours worked.
- (ii) Standard Hours for actual output.
- (iii) Activity Ratio.
- (iv) Standard Capacity Usage Ratio.

Answer:

(i) Actual Hours worked

Actual Usage of Budgeted Capacity Ratio = Actual working Hours / Budgeted Hours $\times 100$

86% = (Actual working hours $\div$ Budgeted hours) $\times 100$

Budgeted hours = 125 workers $\times$ 8 hours $\times$ 6 days $\times$ 4 weeks = 24,000 hours

Actual hours = 24,000 $\times$ 86% = 20,640 hours

(ii) Standard hours for actual output

Efficiency ratio = Standard Hrs / Actual Hrs $\times 100$

110% = Standard hours $\div$ Actual hours

Standard hours = 20,640 $\times$ 110% = 22,704 hours

(iii) Activity ratio = Standard Hrs / Budgeted Hrs $\times 100$

= (22,704 $\div$ 24,000) $\times 100$ = 94.6%

(iv) Standard capacity usage ratio

= Budgeted Hours / Max. possible hours in the budgeted period $\times 100$

= {24,000 hours $\div$ (150 workers $\times$ 8 hours $\times$ 6 days $\times$ 4 weeks)} $\times 100$

= (24,000 $\div$ 28,800) $\times 100$ = 83.33%

Q2. Nov 2023 Exam, 10 Marks

PQR Alloys Ltd. uses a standard costing system.

Budgeted information for the year:

Budgeted output 84,000 units

Variable Factory Overhead per unit	₹ 16
Standard time for one unit of output	0.80 machine hour
Fixed factory overheads	₹ 6,72,000

Actual results for the year:

Actual output	87,600 units
Variable Overhead efficiency variance	₹ 67,200 (A)
Actual Fixed factory overheads	₹ 7,05,000
Actual variable factory overheads	₹ 14,37,000

Required:

Calculate the following variances clearly indicating Adverse(A) or Favourable (F):

- (i) Variable factory overhead expenditure variance.
- (ii) Fixed factory overhead expenditure variance.
- (iii) Fixed factory overhead efficiency variance.
- (iv) Fixed factory overhead capacity variance.

Answer:

Calculation of actual hours

$$\begin{aligned}\text{Standard rate per hour} &= \text{Variable factory overhead per unit} / \text{Standard time for one unit of output} \\ &= 16 / 0.8 = 20\end{aligned}$$

Variable Overhead Efficiency Variance:

$$(\text{Standard hours for actual production} - \text{Actual hours}) \times \text{Standard rate per hour}$$

Let actual hours be x

$$[(87,600 \times 0.8) - x] \times 20 = -67,200$$

$$(70,080 - x) \times 20 = -67,200$$

$$x = 73,440$$

- (i) Variable Factory Overhead Expenditure Variance:

$$(\text{Variable overhead at actual hours} - \text{Actual variable overheads})$$

$$[(13,44,000 / 67,200) \times 73,440] - 14,37,000$$

$$= 31,800 \text{ F}$$

- (ii) Fixed Factory Overhead Expenditure Variance:

$$\text{Budgeted fixed overhead} - \text{Actual fixed overhead.}$$

$$(6,72,000 - 7,05,000) = 33,000 \text{ A}$$

- (iii) Fixed Factory Overhead Efficiency Variance:

$$(\text{Standard hours for actual production} - \text{Actual hours}) \times \text{Standard rate per hour}$$

$$(70,080 - 73,440) \times 10 = 33,600 \text{ A}$$

- (iv) Fixed Overhead Capacity Variance:

$$(\text{Actual hours} - \text{Budgeted hours}) \times \text{Standard rate per hour}$$

$$(73,440 - 67,200) \times 10 = 62,400 \text{ F}$$

The solution can also be presented in following way based on Quantity (units)

Calculation of standard quantity for actual hours:

Variable standard rate per unit (SR) = ₹ 16

Variable Overhead Efficiency Variance:

$(SR \times AQ) - (SR \times \text{standard quantity for Actual hours worked})$

$$-67,200 = (16 \times 87,600) - 16 \times$$

$$-67200 = 14,01,600 - 16 \times$$

$$x = 14,68,800 / 16 = 91,800 \text{ (SQ for actual hours worked)}$$

- (i) Variable Factory Overhead Expenditure Variance:
 $(SR \times SQ \text{ for actual hour worked} - \text{Actual variable overheads})$
 $16 \times 91,800 - 14,37,000 \text{ or } 14,68,800 - 14,37,000$
 $= 31,800 \text{ F}$
- (ii) Fixed Factory Overhead Expenditure Variance:
Budgeted fixed overhead – Actual fixed overhead.
 $(6,72,000 - 7,05,000) = 33,000 \text{ A}$
- (iii) Fixed Factory Overhead Efficiency Variance:
Standard rate per unit (SR) = $6,72,000 / 84,000 = ₹ 8 \text{ per unit}$
 $(SR \times AQ) - (SR \times \text{standard quantity for Actual hours})$
 $(8 \times 87,600) - (8 \times 91,800)$
 $(7,00,800 - 7,34,400) = 33,600 \text{ A}$
- (iv) Fixed Overhead Capacity Variance:
 $(SR \times \text{standard quantity for Actual hours} - \text{Budgeted fixed overheads})$
 $(8 \times 91800) - (6,72,000)$
 $(7,34,400 - 6,72,000) = 62,400 \text{ F}$

Q3. May 2023 Exam, 10 Marks

NC Limited uses a standard costing system for the manufacturing of its product 'X'. The following information is available for the last week of the month:

- 25,000 kg of raw material were actually purchased for ₹ 3,12,500. The expected output is 8 units of product 'X' from each one kg of raw material. There is no opening and closing inventories. The material price variance and material cost variance, as per cost records, are ₹ 12,500 (F) and ₹ 1800 (A), respectively.
- The standard time to produce a batch of 10 units of product 'X' is 15 minutes. The standard wage rate per labour hour is 50. The company employs 125 workers in two categories, skilled and semi-skilled, in a ratio of 60:40. The hourly wages actually paid were ₹ 50 per hour for skilled workers and ₹ 40 per hour for semi- skilled workers. The weekly working hours are 40 hours per worker. Standard wage rate is the same for skilled and semi- skilled workers.
- The monthly fixed overheads are budgeted at ₹ 76,480 Overheads are evenly distributed throughout the month and assume 4 weeks in a month. In the last week of the month, the actual fixed overhead expenses were ₹ 19,500.

Required:

- (i) Calculate the standard price per kg and the standard quantity of raw material.
- (ii) Calculate the material usage variance, labour cost variance, and labour efficiency variance.
- (iii) Calculate the fixed overhead cost variance, the fixed overhead expenditure variance and the fixed overhead volume variance.

Note: Indicate the nature of variance i.e Favourable or Adverse.

Answer:

- (i) Calculation of Standard price per kg and the standard quantity of raw material:

Standard Price

- (a) Material Price Variance = Standard Cost of Actual Quantity – Actual Cost

$$12,500 \text{ (F)} = (\text{SP} \times \text{AQ}) - ₹ 3,12,500$$

$$12,500 \text{ (F)} = (\text{SP} \times 25,000) - ₹ 3,12,500$$

$$\text{SP} = ₹ 13$$

Standard Quantity

- (b) Material Cost Variance = Standard Cost – Actual Cost

$$1,800 \text{ (A)} = \text{SQ} \times ₹ 13 - ₹ 3,12,500$$

$$\text{SQ} = 23,900 \text{ kg.}$$

- (ii) Calculation of Material Usage Variance, Labour Cost Variance and Labour Efficiency Variance

- (a) Material Usage Variance = Standard Cost of Standard Quantity for Actual Output – Standard Cost of Actual Quantity

$$= \text{SQ} \times \text{SP} - \text{AQ} \times \text{SP}$$

Or

$$= \text{SP} \times (\text{SQ} - \text{AQ})$$

$$= ₹ 13 \times (23,900 \text{ kg.} - 25,000 \text{ kg.})$$

$$= ₹ 14,300 \text{ (A)}$$

- (b) Labour Cost Variance = Standard Cost – Actual Cost

$$= (\text{SH} \times \text{SR}) - (\text{AH} \times \text{AR})$$

$$= ₹ 2,39,000 - ₹ 2,30,000$$

$$= ₹ 9,000 \text{ (F)}$$

- (c) Labour Efficiency Variance = Standard Cost of Standard Time for Actual Production – Standard Cost of Actual Time

$$= (\text{SH} \times \text{SR}) - (\text{AH} \times \text{SR})$$

Or

$$= (\text{SH} - \text{AH}) \times \text{SR}$$

$$= ₹ 50 \times [4,780 \text{ hrs.} - 5,000 \text{ hrs.}]$$

$$= ₹ 11,000 \text{ (A)}$$

- (iii) **Calculation of Fixed Overhead Cost Variance, Fixed Overhead Expenditure Variance and Fixed Overhead Volume Variance:**

- (a) **Fixed overhead cost variance** = Standard Fixed Overheads – Actual Fixed Overheads

$$= 18,279 - 19,500$$

$$= ₹ 1,221 \text{ (A)}$$

- (b) **Fixed Overhead Expenditure** = Budgeted Fixed Overheads – Actual Fixed Overheads

$$\text{Variance} = ₹ 19,120 - ₹ 19,500$$

$$= ₹ 380 (A)$$

(c) Fixed overhead volume variance = (Budgeted output – Actual Output) X Budgeted rate per unit

$$= (2,00,000 - 1,91,200) 0.0956$$

$$= ₹ 8,800 \times 0.0956$$

$$= ₹ 841 (A)$$

Alternative presentation to part (iii) (a) and (b)

(i) Fixed Overhead Cost Variance:

= Overhead absorbed for actual production – Actual overhead incurred

$$= ₹ 19,120 / 2,00,000 \times 1,91,200 - 19,500 = ₹ 1,221(A)$$

(ii) Fixed Overhead Volume Variance:

= Absorbed overhead – Budgeted overhead

$$= ₹ 19,120 / 2,00,000 \times 1,91,200 - 19,120 = ₹ 841(A)$$

Working Notes:

- Standard time to produce 10 units of product X is 15 minutes. Therefore we can manufacture 40 units in an hour.

Hours available in a week

$$125 \text{ Workers} \times 40 \text{ Hours} = 5,000 \text{ hours}$$

$$\text{Therefore budgeted output} = 5,000 \times 40 \text{ units per hour} = 2,00,000 \text{ units}$$

Alternatively

$$\text{Budgeted time per unit} = 15 \text{ units} / 10 \text{ units} = 1.5 \text{ minutes}$$

$$\text{So, Budgeted output} = (5,000 \text{ Hours} \times 60 \text{ Minutes}) / 1.5 \text{ Minutes} = 2,00,000 \text{ units}$$

$$\text{Actual output} = 23,900 \times 8 \text{ units} = 1,91,200 \text{ units}$$

$$\text{Standard hour for actual output} = 1,91,200 \times 0.25 \text{ Hrs} / 10 = 4,780 \text{ Hrs}$$

2.

Labour									
Budget			Revised standard			Actual			
Hours	Rate	₹	Hours	Rate	₹		Hours	Rate	₹
5,000	50	2,50,000	4,780	50	2,39,000	Skilled	3000	50	1,50,000
						Semi-Skilled	2000	40	80,000
							5000		2,30,000

3.

	Budget	Actual
Units	2,00,000	1,91,200
Fixed Overheads	19,120	19,500

- Standard Fixed overheads:

$$(19,120 / 2,00,000) \times 1,91,200 = ₹18,279$$

Budgeted rate per unit:

Q4. Nov 2022 Exam, 10 Marks

a) Y Ltd manufactures "Product M" which requires three types of raw materials - "A", "B" & "C". Following information related to 1st quarter of the F.Y. 2022-23 has been collected from its books of accounts. The standard material input required for 1,000 kg of finished product 'M' are as under:

Material	Quantity (Kg.)	Std. Rate per Kg. (₹)
A	500	25
B	350	45
C	250	55
	1100	
Standard Loss	100	
Standard Output	1000	

During the period, the company produced 20,000 kg of product "M" for which the actual quantity of materials consumed and purchase prices are as under:

Material	Quantity (Kg.)	Std. Rate per Kg. (₹)
A	11,000	23
B	7,500	48
C	4,500	60

You are required to calculate:

- Material Cost Variance
- Material Price Variance for each raw material and Product 'M'
- Material Usage Variance for each raw material and Product 'M'
- Material Yield Variance

Note: Indicate the nature of variance i.e. Favourable or Adverse.

Answer

Basic Calculations:

	Standard for 20,000 kg			Actual for 20,000 kg.		
	Qty.Kg.	Rate (₹)	Amount (₹)	Qty.Kg.	Rate (₹)	Amount (₹)
A	10,000	25	2,50,000	11,000	23	2,53,000
B	7,000	45	3,15,000	7,500	48	3,60,000
C	5,000	55	2,75,000	23,000	60	2,70,000
Total	22,000		8,40,000	23,000		8,83,000

Calculation of Variances:

(i) Material Cost Variance = Std. Cost for actual output - Actual cost

$$MCV = 8,40,000 - 8,83,000 = ₹ 43,000(A)$$

(ii) Material Price Variance = $(SP - AP) \times AQ$

$$A = (25 - 23) \times 11,000 = 22,000 (F)$$

$$B = (45 - 48) \times 7,500 = 22,500 (A)$$

$$C = (55 - 60) \times 4,500 = 22,500 (A)$$

$$23,000 (A)$$

(iii) Material Usages Variance = $(SQ - AQ) \times SP$

$$A = (10,000 - 11,000) \times 25 = 25,000 (A)$$

$$B = (7,000 - 7,500) \times 45 = 22,500 (A)$$

$$C = (5,000 - 4,500) \times 55 = 27,500 (F)$$

$$20,000 (A)$$

(iv) Material Yield Variance = $(SQ - RSQ^*) \times SP$

$$A = (10,000 - 10,454.54) \times 25 = 11,363.5(A)$$

$$B = (7,000 - 7,318.18) \times 45 = 14,318.1(A)$$

$$C = (5,000 - 5,227.27) \times 55 = 12,500(A)$$

$$38,181.6(A)$$

***Revised Standard Quantity (RSQ)**

$$A = \frac{10,000}{22,000} \times 23,000 = 10,454.54$$

$$B = \frac{7,000}{22,000} \times 23,000 = 7,318.18$$

$$C = \frac{5,000}{22,000} \times 23,000 = 5,227.27$$

Material Yield Variance can also be Calculated as below

Material yield variance = Standard cost per unit (Actual yield – Standard yield)

$$\text{Standard cost per unit} = \frac{8,40,000}{20,000} = ₹ 42$$

$$\text{New Standard Yield} = \frac{20,000}{22,000} \times 22,000 = 20,909$$

$$\begin{aligned} \text{Material yield variance} &= ₹ 42 (20,000 - 20,909) \\ &= ₹ 38,178 (A) \end{aligned}$$

Q5. May 2022 Exam, 5 Marks

A manufacturing department of a company has employed 120 workers. The standard output of product "NPX" is 20 units per hour and the standard wage rate is ₹ 25 per labour hour.

In a 48 hours week, the department produced 1,000 units of 'NPX' despite 5% of the time paid being lost due to an abnormal reason. The hourly wages actually paid were ₹ 25.70 per hour.

Calculate:

- Labour Cost Variance
- Labour Rate Variance
- Labour Efficiency Variance
- Labour Idle time Variance

Answer**Working Notes****1. Calculation of standard man hours**

When 120 worker works for 1 hr., then the std. output is 20 units.

$$\text{Std. man hour per unit} = \frac{120 \text{ hrs.}}{20 \text{ units}} = 6 \text{ hrs.}$$

2. Calculation of std. man hours for actual output

Total std. man hours = 1,000 units × 6 hrs. = 6,000 hrs.

Standard for actual			Actual				
Hours	Rate (₹)	Amount (₹)	Actual hrs. paid	Idle time hrs.	Production hrs.	Rate (₹)	Amount Paid (₹)
6,000	25	1,50,000	5,760 (48 hrs. x 120 workers)	288	5,472	25.70	1,48,032

(i) Labour cost variance

$$\begin{aligned} &= \text{Std. labour cost} - \text{Actual labour cost} \\ &= 1,50,000 - 1,48,032 = ₹ 1,968 \text{ F} \end{aligned}$$

(ii) Labour rate variance

$$\begin{aligned} &= (SR - AR) \times \text{AHPaid} \\ &= (25 - 25.70) \times 5,760 = ₹ 4,032 \text{ A} \end{aligned}$$

(iii) Labour efficiency variance

$$\begin{aligned} &= (SH - AH) \times SR \\ &= (6,000 - 5,472) \times 25 = ₹ 13,200 \text{ F} \end{aligned}$$

(iv) Labour Idle time variance

$$\begin{aligned} &= \text{Idle Hours} \times SR \\ &= 288 \times 25 = ₹ 7,200 \text{ A} \end{aligned}$$

Q6. Dec 2021 Exam, 10 Marks

In a manufacturing company the standard units of production for the year were fixed at 1,20,000 units and overhead expenditures were estimated to be as follows:

Particulars	Amount (₹)
Fixed	12,00,000
Semi-variable (60% expenses are of fixed nature and 40% are of variable nature)	1,80,000
Variable	6,00,000

Actual production during the month of April, 2021 was 8,000 units. Each month has 20 working days. During the month there was one public holiday. The actual overheads were as follows:

Particulars	Amount (₹)
Fixed	1,10,000
Semi-variable (60% expenses are of fixed nature and 40% are of variable nature)	19,200
Variable	48,000

You are required to calculate the following variances for the month of April 2021:

- Overhead Cost variance
- Fixed Overhead Cost variance
- Variable Overhead Cost variance
- Fixed Overhead Volume variance
- Fixed Overhead Expenditure Variance
- Calendar Variance

Answer**Working Notes**

Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{₹ 12,00,000}{1,20,000 \text{ units}}$	₹ 10
Fixed Overheads element in Semi-Variable Overheads i.e. 60% of ₹1,80,000	₹ 1,08,000
Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Output}} = \frac{₹ 1,08,000}{1,20,000 \text{ units}}$	₹ 0.90
Standard Rate of Absorption of Fixed Overheads per unit (₹10 + ₹0.90)	₹ 10.90
Fixed Overheads Absorbed on 8,000 units @ ₹ 10.90	₹ 87,200
Budgeted Variable Overheads	₹ 6,00,000
Add: Variable element in Semi-Variable Overheads 40% of ₹ 1,80,000	₹ 72,000
Total Budgeted Variable Overheads	₹ 6,72,000
Standard Variable Cost per unit = $\frac{\text{Budgeted Variable Overheads}}{\text{Budgeted Output}} = \frac{₹ 6,72,000}{1,20,000 \text{ units}}$	₹ 5.60
Standard Variable Overheads for 8,000 units @ ₹5.60	₹ 44,800
Budgeted Annual Fixed Overheads (₹ 12,00,000 + 60% of ₹ 1,80,000)	₹ 13,08,000
Possible Fixed Overheads = $\frac{\text{Budgeted Fixed Overheads}}{\text{Budgeted Days}} \times \text{Actual Days} = \frac{₹ 1,09,000}{20 \text{ Days}} \times 19 \text{ Days}$	₹ 1,03,550
Actual Fixed Overheads (₹1,10,000 + 60% of ₹ 19,200)	₹ 1,21,520
Actual Variable Overheads (₹48,000 + 40% of ₹19,200)	₹ 55,680

COMPUTATION OF VARIANCES

- Overhead Cost Variance = Absorbed Overheads – Actual Overheads
 $= (₹ 87,200 + ₹ 44,800) - (₹ 1,21,520 + ₹ 55,680)$
 $= ₹ 45,200 \text{ (A)}$
- Fixed Overhead Cost Variance = Absorbed Fixed Overheads – Actual Fixed Overheads
 $= ₹ 87,200 - ₹ 1,21,520$
 $= ₹ 34,320 \text{ (A)}$

iii. Variable Overhead Cost Variance = Standard Variable Overheads for Production – Actual Variable Overheads

$$= ₹ 44,800 - ₹ 55,680$$

$$= ₹ 10,880 (A)$$

iv. Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

$$= ₹ 87,200 - ₹ 1,09,000$$

$$= ₹ 21,800 (A)$$

v. Fixed Overhead Expenditure Variance = Budgeted Fixed Overheads – Actual Fixed Overheads

$$= ₹ 10.90 \times 10,000 \text{ units} - ₹ 1,21,520$$

$$= ₹ 12,520 (A)$$

vi. Calendar Variance = Possible Fixed Overheads – Budgeted Fixed Overheads

$$= ₹ 1,03,550 - ₹ 1,09,000$$

$$= ₹ 5,450 (A)$$

OR

Calendar Variance = (Actual days – Budgeted days) x Standard fixed overhead rate per day

Standard fixed overhead rate per day = $1308000/20 \times 12$ = ₹ 5450

Fixed Overhead Calendar Variance = $(19-20) \times 5450$ = 5450(A)

Q7. July 2021 Exam, 10 Marks

The standard output of a Product 'DJ' is 25 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 960 units of product 'DJ' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 6.20, ₹ 6.00 and ₹ 5.70 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers.

Labour Efficiency Variance is given ₹ 240 (F).

You are required to compute:

- Total Labour Cost Variance.
- Total Labour Rate Variance.
- Total Labour Gang Variance.
- Total Labour Yield Variance, and
- Total Labour Idle Time Variance.

Answer

Working Notes:

1. Calculation of Standard Man hours

When 100 workers work for 1 hour, the standard output is 25 units.

Standard man hours per unit = $\frac{100 \text{ hours}}{25 \text{ units}} = 4 \text{ hours per unit}$

2. Calculation of standard man hours for actual output:

$$= 960 \text{ units} \times 4 \text{ hours} = 3,840 \text{ hours.}$$

3. Calculation of actual cost

Type of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount (₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	6.2	2,480	20	380
Group 'B'	30	1,200	6	7,200	60	1,140
Group 'C'	60	2,400	5.7	13,680	120	2,280
	100	4,000		23,360	200	3,800

4. Calculation of Standard wage Rate:

Labour Efficiency Variance = 240F

(Standard hours for Actual production – Actual Hours) x SR = 240F

$$(3,840 - 3,800) \times SR = 240$$

Standard Rate (SR) = ₹ 6 per hour

(i) Total Labour Cost Variance

$$\begin{aligned} &= (\text{Standard hours} \times \text{Standard Rate}) - (\text{Actual Hours} \times \text{Actual rate}) \\ &= (3,840 \times 6) - 23,360 = 320A \end{aligned}$$

(ii) Total Labour Rate Variance

$$= (\text{Standard Rate} - \text{Actual Rate}) \times \text{Actual Hours}$$

$$\text{Group 'A'} = (6 - 6.2) 400 = 80A$$

$$\text{Group 'B'} = (6 - 6) 1,200 = 0$$

$$\text{Group 'C'} = (6 - 5.7) 2,400 = 720F$$

640F

(iii) Total Labour Gang Variance

$$= \text{Total Actual Time Worked (hours)} \times \{ \text{Average Standard Rate per hour of Standard Gang} - \text{Average Actual Gang} \}$$

@ on the basis of hours worked

$$= 3,800 \times \left(6 - \frac{3,840 \times 6}{3,800} \right) = 0$$

= 0

(iv) Total Labour Yield Variance

$$= \text{Average Standard Rate per hour of Standard Gang} \times \{ \text{Total Standard Time (hours)} - \text{Total Actual Time worked (hours)} \}$$

$$= 6 \times (3,840 - 3,800)$$

$$= 240F$$

(v) Total Labour idle time variance

$$= \text{Total Idle hours} \times \text{standard rate per hour}$$

$$= 200 \text{ hours} \times 6$$

$$= 1,200A$$

Q8. Jan 2021 Exam, 10 Marks

Premier Industries has a small factory where 52 workers are employed on an average for 25 days a month and they work 8 hours per day. The normal down time is 15%. The firm has introduced standard costing for cost control. Its monthly budget for November, 2020 shows that the budgeted variable and fixed overhead are ₹ 1,06,080 and ₹ 2,21,000 respectively. The firm reports the following details of actual performance for November, 2020, after the end of the month:

Actual hours worked	8,100 hrs.
Actual production expressed in standard hours	8,800 hrs.
Actual Variable Overheads	₹ 1,02,000
Actual Fixed Overheads	₹ 2,00,000

You are required to calculate:

(i) Variable Overhead Variances:

(a) Variable overhead expenditure variance.

(b) Variable overhead efficiency variance.

(ii) Fixed Overhead Variances:

(a) Fixed overhead budget variance.

(b) Fixed overhead capacity variance.

(c) Fixed overhead efficiency variance.

(iii) Control Ratios:

(a) Capacity ratio.

(b) Efficiency ratio.

(c) Activity ratio.

Answer

Workings

Calculation of budgeted hours

$$\text{Budgeted hours} = (52 \times 25 \times 8) \times 85\% = 8,840 \text{ hours}$$

(i) Variable overheads variance

(a) Variable overhead expenditure variance

= Std. overhead for Actual hours – Actual variable Overhead

$$= \frac{1,06,080}{8,840} \times 8,100$$

= 4800 A

(b) Variable overhead efficiency variance

Std. rate per hour × (Std. hours for actual production – Actual hours)

$$= \frac{1,06,080}{8,840} \times (8,800 - 8,100)$$

= 8400 F

(ii) Fixed overhead variances

(a) Fixed overhead budget variance

= Budgeted overhead – Actual overhead

= ₹ 2,21,000 – ₹ 2,00,000

= 21,000 F

(b) Fixed overhead capacity variance

= Std rate × (Actual hours – budgeted hours)

$$= \frac{2,21,000}{8,840} \times (8,100 - 8,840)$$

= 18,500 A

(c) Fixed overhead efficiency variance

= Std rate × (Std hours for actual production – Actual hours)

$$= \frac{2,21,000}{8,840} \times (8,800 - 8,840)$$

= 17,500 F

(iii) Control Ratios

(a) Capacity Ratio

$$= \frac{\text{Actual hours}}{\text{Budgeted hours}} \times 100$$

$$= \frac{8,100}{8,840} \times 100 = 91.63\%$$

(b) Efficiency Ratio

$$= \frac{\text{Standard hours}}{\text{Actual Hours}} \times 100$$

$$= \frac{8,800}{8,100} \times 100 = 108.64\%$$

(c) Activity Ratio

$$= \frac{\text{Standard hours}}{\text{Budgeted Hours}} \times 100$$

$$= \frac{8,800}{8,840} \times 100 = 99.55\%$$

Q9. Nov 2020 Exam, 10 Marks

ABC Ltd. has furnished the following information regarding the overheads for the month of June 2020 :

- i. Fixed Overhead Cost Variance ₹ 2,800 (Adverse)
- ii. Fixed Overhead Volume Variance ₹ 2,000 (Adverse)
- iii. Budgeted Hours for June, 2020 2,400 hours
- iv. Budgeted Overheads for June, 2020 ₹ 12,000
- v. Actual rate of recovery of overheads ₹ 8 Per Hour

From the above given information

Calculate:

1. Fixed Overhead Expenditure Variance
2. Actual Overheads Incurred
3. Actual Hours for Actual Production
4. Fixed Overhead Capacity Variance
5. Standard hours for Actual Production
6. Fixed Overhead Efficiency Variance

Answer

(1) Fixed Overhead Expenditure Variance

= Budgeted Fixed Overheads – Actual Fixed Overheads

= ₹ 12,000 – ₹ 12,800 (as calculated below) = ₹ 800 (A)

(2) Fixed Overhead Cost Variance= Absorbed Fixed Overheads – Actual Fixed Overheads

2,800 (A) = ₹ 10,000 – Actual Overheads

Actual Overheads = ₹ 12,800

(3) Actual Hours for Actual Production = ₹ 12,800/ ₹8 = 1,600 hrs.**(4) Fixed Overhead capacity Variance**

= Budgeted Fixed Overheads for Actual Hours– Budgeted Fixed Overheads

= ₹ 5 x 1600 hrs. – ₹ 12,000 = ₹ 4,000 (A)

(5) Standard Hours for Actual Production

= Absorbed Overheads/ Std. Rate

= ₹ 10,000/ ₹ 5 = 2,000 hrs.

(6) Fixed Overhead Efficiency Variance

= Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours

= ₹ 10,000 – ₹ 5 x 1,600 hrs. = ₹ 2,000 (F)

Working Note:

(i) Fixed Overhead Volume Variance = Absorbed Fixed Overheads – Budgeted Fixed Overheads

2,000 (A) = Absorbed Fixed Overheads – ₹12,000

Absorbed Fixed Overheads = ₹ 10,000

(ii) Standard Rate/ Hour = ₹ 5 (₹ 12,000/2,400 hrs.)

Q10. Nov 2019 Exam, 10 Marks

The standard cost of a chemical mixture is as follows:

60% of Material A @ ₹ 50 per kg

40% Material B @ ₹ 60 per kg

A standard loss of 25% on output is expected in production. The cost records for a period has shown the following usage.

540 kg of Material A @ ₹ 60 per kg

260 kg of Material B @ ₹ 50 per kg

The quantity processed was 680 kilograms of good product.

From the above given information

Calculate:

(i) Material Cost Variance

(ii) Material Price Variance

(iii) Material Usage Variance

(iv) Material Mix Variance

(v) Material Yield Variance.

Answer**Basic Calculation**

Material	Standard for 640 kg. output			Actual for 680 kg. output		
	Qty. Kg.	Rate (₹)	Amount (₹)	Qty. Kg.	Rate (₹)	Amount (₹)
A	480	50	24,000	540	60	32,400
B	320	60	19,200	260	50	13,000
Total	800		43,200	800		45,400
	160	-	-	120	-	-
	640		43,200	680		45,400

Std. cost of actual output = ₹ 43,200 × 680/640 = ₹ 45,900

Calculation of Variances

(i) Material Cost Variance

= (Std. cost of actual output – Actual cost)

= (45,900– 45,400)

= ₹ 500 (F)

(ii) Material Price Variance

= (SP – AP) × AQ

Material A

= (50 – 60) × 540 = ₹ 5400 (A)

$$\begin{aligned}\text{Material B} &= (60 - 50) \times 260 = ₹ 2,600 \text{ (F)} \\ \text{MPV} &= ₹ 2,800 \text{ (A)}\end{aligned}$$

(iii) **Material Usage Variance (MUV)** = (Std. Quantity for actual output – Actual Quantity) × Std. Price

$$\text{Material A} = \frac{480 \times 680}{640} - 540 \times 50 = ₹ 1,500 \text{ (A)}$$

$$\text{Material B} = \frac{320 \times 680}{640} - 260 \times 60 = ₹ 4,800 \text{ (F)}$$

$$\text{MUV} = ₹ 3,300 \text{ (F)}$$

(iv) **Material Mix Variance** = SP × (RAQ – AQ)

$$\text{A} = ₹ 50 \times (480 \text{ Kg} - 540 \text{ Kg}) = ₹ 3,000 \text{ (A)}$$

$$\text{B} = ₹ 60 \times (320 \text{ Kg.} - 260 \text{ Kg.}) = ₹ 3,600 \text{ (F)}$$

$$\text{Total} = ₹ 3,000 \text{ (A)} + ₹ 3,600 \text{ (F)} = ₹ 600 \text{ (F)}$$

(v) **Material Yield Variance** = SP × (SQ – RAQ)

$$\text{A} = ₹ 50 \times (510 \text{ Kg.} - 480 \text{ Kg}) = ₹ 1,500 \text{ (F)}$$

$$\text{B} = ₹ 60 \times (340 \text{ Kg.} - 320 \text{ Kg.}) = ₹ 1,200 \text{ (F)}$$

$$\text{Total} = ₹ 1,500 \text{ (F)} + ₹ 1,200 \text{ (F)} = ₹ 2,700 \text{ (F)}$$

Q11. May 2019 Exam, 10 Marks

A gang of workers normally consists of 30 skilled workers, 15 semi-skilled workers and 10 unskilled workers. They are paid at standard rate per hour as under:

Skilled ₹ 70

Semi-skilled ₹ 65

Unskilled ₹ 50

In a normal working week of 40 hours, the gang is expected to produce 2,000 units of output. During the week ended 31st March, 2019, the gang consisted of 40 skilled, 10 semi-skilled and 5 unskilled workers. The actual wages paid were at the rate of ₹ 75, ₹ 60 and ₹ 52 per hour respectively. Four hours were lost due to machine breakdown and 1,600 units were produced. Calculate the following variances showing clearly adverse (A) or favourable (F)

- (i) Labour Cost Variance (ii) Labour Rate Variance
(iii) Labour Efficiency Variance (iv) Labour Mix Variance
(v) Labour Idle Time Variance

Answer

Labour Cost Variance = Standard Cost – Actual Cost

$$= ₹ 1,14,400 - ₹ 1,54,400$$

$$= ₹ 40,000 \text{ (A)}$$

$$(1,600 \times 75 + 400 \times 60 + 200 \times 52 = ₹ 1,54,400)$$

Or

Types of workers	Standard Cost – Actual Cost	Amount (₹)
Skilled Workers	(30x40x70/2,000x1,600) - (40x40x75) 67,200-1,20,000	52,800 (A)
Semi- Skilled	(15x40x65/2,000x1,600) - (10x40x60) 31,200-24,000	7,200 (F)
Un-Skilled Workers	(10x40x50/2,000x1,600) - (5x40x52) 16,000-10,400	5,600 (F)
Total	1,14,400-1,54,400	40,000 (A)

(ii) **Labour Rate Variance**

Types of workers	Actual Hours × (Standard Rate -Actual Rate)	Amount (₹)
Skilled Workers	1,600 hours × (₹70.00 – ₹75.00)	8,000 (A)
Semi- Skilled	400 hours × (₹65.00 – ₹60.00)	2,000 (F)
Un-Skilled Workers	200 hours × (₹50.00 – ₹52.00)	400 (A)
Total	₹8,000 (A) + ₹2,000 (F) + ₹400 (A)	6,400 (A)

(iii) **Labour Efficiency Variance**

Types of workers	Standard Rate × (Standard Hours -Actual Hours)	Amount (₹)
------------------	--	------------

Skilled Workers	₹70.00 × (960 hours – 1,440 hours)	33,600 (A)
Semi- Skilled	₹65.00 × (480 hours – 360 hours)	7,800 (F)
Un-Skilled Workers	₹50.00 × (320 hours – 180 hours)	7,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	18,800 (A)

Alternatively labour efficiency can be calculated on basis of labour hours paid

Types of workers	Standard Rate × (Standard Hours – Actual Hours)	Amount (₹)
Skilled Workers	70.00 × (960 hours – 1600 hours)	44,800 (A)
Semi- Skilled	65.00 × (480 hours – 400 hours)	5,200 (F)
Un-Skilled Workers	50.00 × (320 hours – 200 hours)	6,000 (F)
Total	33,600 (A) + 7,800 (F) + 7,000 (F)	33,600 (A)

(iv) Labour Mix Variance

= Total Actual Time Worked (hours) × {Average Standard Rate per hour of Standard Gang Less Average Standard Rate per hour of Actual Gang}

@on the basis of hours worked

$$= 1,980 \text{ hours} \times \left(\frac{1,14,400}{1,760 \text{ hrs}} - \frac{1,440 \text{ hrs} \times ₹70 + 360 \text{ hrs} \times ₹65 + 180 \text{ hrs} \times ₹50}{1,980 \text{ hrs}} \right)$$

$$= ₹ 4,500 (A)$$

Or

Labour Mix Variance	Types of workers Std. Rate × (Revised Actual Hours Worked – Actual Hours Worked)	Amount (₹)
Skilled Workers	₹70 × (1,080 hrs. – 1440 hrs.)	25,200 (A)
Semi- Skilled	₹65 × (540 hrs. – 360 hrs.)	11,700 (F)
Un-Skilled Workers	₹50 × (360 hrs. – 180 hrs.)	9,000 (F)
Total	₹25,200 (A) + ₹11,700 (F) + ₹9,000 (F)	4,500 (A)

(v) Labour Idle Time Variance

Types of workers	Standard Rate × (Hours Paid – Hours Worked)	Amount (₹)
Skilled Workers	₹70.00 × (1,600 hours – 1,440 hours)	11,200 (A)
Semi- Skilled	₹65.00 × (400 hours – 360 hours)	2,600 (A)
Un-Skilled Workers	₹50.00 × (200 hours – 180 hours)	1,000 (A)
Total	11,200 (A) + 2,600 (A) + 1,000 (A)	14,800 (A)

Verification:

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance + Labour Idle Time Variance

$$= 6,400 (A) + 18,800 (A) + 14,800 (A) = ₹ 40,000 (A)$$

Labour Cost Variance

= Labour Rate Variance + Labour Efficiency Variance

$$= 6400(A) + 33600(A) = ₹40000(A)$$

In this case, labour idle time variance is a part of labour efficiency variance.

Working Notes:

Category	Standard Cost			Actual (1600 units)			Revised Actual Hours
	Hrs.	Rate	Amt. (₹)	Hrs.	Rate	Amt. (₹)	
Skilled	960 (30Wx40x1,600/2,000)	70.00	67,200	1,440 (40Wx36)	75.00	1,08,000	1,080 (1,980x6/11)
Semi-Skilled	480 (15Wx40x1,600/2,000)	65.00	31,200	360 (10Wx36)	60.00	21,600	540 (1,980x3/11)
Unskilled	320	50.00	16,000	180 (5Wx36)	52.00	9,360	360

	(10Wx40 x1,600/2,000)						(1,980x2/11)
Total	1,760	66	1,14,40 0	1,960		1,38,96 0	1,960

Q12. Nov 2018 Exam, 5 Marks

A manufacturing concern has provided following information related to fixed overheads:

	Standard	Actual
Output in a month	5000 units	4800 units
Working days in a month	25 days	23 days
Fixed overheads	₹ 5,00,000	₹ 4,90,000

Compute:

- Fixed overhead variance
- Fixed overhead expenditure variance
- Fixed overhead volume variance
- Fixed overhead efficiency variance

Answer

Calculation of Variances:

(i) Fixed Overhead Variance: Standard fixed overhead – Actual fixed overhead
= ₹ [(5,00,000 ÷ 5000) × 4800] – ₹ 4,90,000 = ₹ 10,000 (A)

(ii) Fixed Overhead Expenditure Variances:

Budgeted fixed overhead – Actual fixed overhead
= ₹ 5,00,000 – ₹ 4,90,000 = ₹ 10,000 (F)

(iii) Fixed Overhead Volume Variance: Standard fixed overhead – Budgeted fixed overhead
= ₹ 4,80,000 – ₹ 5,00,000 = ₹ 20,000 (A)

(iv) Fixed Overhead efficiency Variance: Standard fixed overhead – Budgeted fixed overhead
Actual days
= ₹ 4,80,000 – [(₹ 5,00,000 ÷ 25) × 23] = ₹ 20,000 (F)

Q10. May 2018 Exam, 5 Marks

Beta Ltd. is manufacturing Product N. This is manufactured by mixing two materials namely Material P and Material Q. The Standard Cost of Mixture is as under:

Material P 150 ltrs. @ ₹ 40 per ltr.

Material Q 100 ltrs. @ ₹ 60 per ltr.

Standard loss @ 20 of total input is expected during production.

The cost records for the period exhibit following consumption:

Material P 140 ltrs. @ ₹ 42 per ltr,

Material Q 110 ltrs. @ ₹ 56 per ltr,

Quantity produced was 195 ltrs.

Calculate:

- Material Cost Variance
- Material Usage Variance.
- Material Price Variance

Answer

Workings:

Take the good output of 195 ltr. The standard quantity of material required for 195 ltr. of output is
 $\frac{195}{80} \times 100 = 243.75$ lr

Statement showing computation of Standard Cost/Actual Cost/ Revised Actual Quantity

Material	Standard Cost			Actual Cost		
	Quantity[S Q] (Kg.)	Rate [SP] (₹)	Amount [SQ × SP] (₹)	Quantity[S Q] (Kg.)	Rate [SP] (₹)	Amount [SQ × SP] (₹)

A (60% of 243.75 ltr.)	146.25	40	5,850.00	140	42	5,880
B (40% of 243.75 Kg.)	97.50	60	5,850.00	110	56	6,160
	243.75		11,700.00	200		12,040

Note: SQ = Standard Quantity = Expected Consumption for Actual Output
AQ = Actual Quantity of Material Consumed
SP = Standard Price Per Unit
AP = Actual Price Per Unit

Computation of Variances:

Material Cost Variance = $SQ \times SP - AQ \times AP$

A = ₹ 146.25 ltr. × ₹ 40 – 140 ltr. × ₹ 42 = ₹ 30.00 (A)
B = ₹ 97.50 ltr. × ₹ 60 – 110 ltr. × ₹ 56 = ₹ 310.00 (A)
Total = ₹ 30.00 (A) + ₹ 310.00 (A)
= ₹ 3,40.00 (A)

Material Usage Variance = $SP \times (SQ - AQ)$

A = ₹ 40 × (146.25 ltr. – 140 ltr.) = ₹ 250.00 (F)
B = ₹ 60 × (97.50 ltr. – 110 ltr.) = ₹ 750.00 (A)
Total = ₹ 250.00 (F) + ₹ 750.00 (A)
= ₹ 500.00 (A)

Material Price Variance = $AQ \times (SP - AP)$

A = 140 Kg. × (₹ 40 – ₹ 42) = ₹ 280 (A)
B = 110 Kg. × (₹ 60 – ₹ 56) = ₹ 440 (F)
Total = ₹ 280 (A) + ₹ 440 (F)
= ₹ 160 (F)

Q13. May 2023 RTP | Nov 2023 RTP

The following information has been provided by a company:

Number of units produced and sold 6,000
Standard labour rate per hour ₹ 8
Standard hours required for 6,000 units -
Actual hours required 17,094 hours
Labour efficiency 105.3%
Labour rate variance ₹ 68,376 (A)

You are required to calculate:

- Actual labour rate per hour
- Standard hours required for 6,000 units
- Labour Efficiency variance
- Standard labour cost per unit
- Actual labour cost per unit.

Answer

SR – Standard labour Rate per Hour

AR – Actual labour rate per hour

SH – Standard Hours

AH – Actual hours

(i) Labour rate Variance = $AH (SR - AR)$

Or $17,094 (8 - AR) = 68,376(A)$

Or $17,094 (8 - AR) = - 68,376$

Or $8 - AR = -4$

Or $AR = ₹12$

(ii) Labour Efficiency = $\frac{SH}{AH} \times 100 = 105.3$

= $SH = \frac{AH \times 105.3}{100} = \frac{17,094 \times 105.3}{100}$

$$\begin{aligned}
 &= 17,999.982 \\
 &= SH = 18,000 \text{ hours} \\
 \text{(iii) Labour Efficiency Variance} &= SR (SH - AH) \\
 &= 8(18,000 - 17,094) \\
 &= 8 \times 906 \\
 &= ₹ 7,248(F) \\
 \text{(iv) Standard Labour Cost per Unit} &= \frac{18000 \times 8}{6,000} = ₹ 24 \\
 \square \\
 \text{(v) Actual Labour Cost Per Unit} &= \frac{17,094 \times 12}{6,000} = ₹ 34.19
 \end{aligned}$$

Q14. Nov 2022 RTP

EML operates in coal mining through open cast mining method. Explosives and detonators are used for excavation of coal from the mines. The following are the details of standard quantity of explosives materials used for mining:

Particulars	Rate (₹)	Standard Qty. for Iron ore	Standard Qty. for Overburden (OB)
SME	40.00 per kg.	2.4 kg per tonne	1.9 kg per cubic-meter
Detonators	20.00 per piece	2 pcs per tonne	2 pcs per cubic- meter

The standard stripping ratio is 3:1 (means 3 cubic- meter of overburden soil to be removed to get one tonne of coal).

During the month of December 2023, the company produces 20,000 tonnes of coal and 58,000 cubic- meter of OB. The quantity of explosive materials used and paid for the month is as below:

Material	Quantity	Amount (₹)
SME	1,67,200 kg.	63,53,600
Detonators	1,18,400 pcs	24,27,200

Explosive suppliers are paid for the explosive materials on the basis of performance of the explosives which is termed as powder factor. One of the suppliers has presented their bill for explosive supplied for the month of December 2023. You being a bill passing officer of EML is required to COMPUTE the material price variance, material quantity variance and material cost variance.

Answer:

Workings:

1. Calculation of Standard Qty. of Explosives and Detonators for actual output:

	Particulars	Coal	Overburden (OB)	Total
SME:				
A	Actual Output	20,000 tonne	58,000 M ³	
B	Standard Qty per unit	2.4 kg./ tonne	1.9 kg./M ³	
C	Standard Qty. for actual production [A×B]	48,000 kg.	1,10,200 kg.	1,58,200 kg.
Detonators:				
D	Standard Qty per unit	2 pcs/ tonne	2 pcs/ M ³	

E	Standard Qty. for actual production [A × D]	40,000 pcs.	1,16,000 pcs	1,56,000 pcs
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2. Calculation of Actual Price per unit of materials:

Material	Quantity [A]	Amount (₹) [B]	Rate (₹) [C = B÷A]
SME	1,67,200 kg.	63,53,600	38.00
Detonators	1,18,400 pcs	24,27,200	20.50

Computation of material price variance:

Material Price Variance = Actual Qty. × (Std. Price - Actual Price)

SME = 1,67,200 kg. × (₹40 - ₹38) = ₹3,34,400 (F)

Detonators = 1,18,400 pcs × (₹20 - ₹20.5) = ₹59,200 (A)

Total = ₹2,75,200 (F)

Computation of material quantity variance:

Material Qty. Variance = Std. Price × (Std. Qty for actual output - Actual Qty.)

SME = ₹40 × (1,58,200 kg. - 1,67,200 kg.) = ₹3,60,000 (A)

Detonators = ₹20 × (1,56,000 pcs - 1,18,400 pcs) = ₹7,52,000 (F)

Total = ₹3,92,000 (F)

Computation of material cost variance:

Material cost variance = Std. cost - Actual Cost

Or, (Std. Price × Std. Qty) - (Actual Price × Actual Qty.)

SME = (₹ 40 × 1,58,200 kg) - (₹ 38 × 1,67,200 kg.)

= ₹ 63,28,000 - ₹ 63,53,600 = ₹ 25,600 (A)

Detonators = (₹ 20 × 1,56,000 pcs) - (₹ 20.50 × 1,18,400 pcs)

= ₹31,20,000 - ₹24,27,200 = 6,92,800 (F)

Total = ₹6,67,200 (F)

Q15. Nov 2022 RTP

Ahaan Limited operates a system of standard costing in respect of one of its products 'AH1' which is manufactured within a single cost centre. Details of standard per unit are as follows:

- The standard material input is 20 kilograms at a standard price of ₹ 24 per kilogram.
- The standard wage rate is ₹ 72 per hour and 5 hours are allowed to produce one unit.
- Fixed production overhead is absorbed at the rate of 100% of wages cost.

During the month of April 2022, the following was incurred:

- Actual price paid for material purchased @ ₹ 22 per kilogram.
- Total direct wages cost was ₹ 43,92,000
- Fixed production overhead cost incurred was ₹ 45,00,000

Analysis of variances was as follows:

Variances	Favourable	Adverse
Direct material price	₹ 4,80,000	-
Direct material usage	₹ 48,000	-
Direct labour rate	-	₹ 69,120
Direct labour efficiency	₹ 33,120	-

Fixed production overhead expenditure		₹ 1,80,000
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You are required to CALCULATE the following for the month of April, 2022

- Material cost variance
- Budgeted output (in units)
- Quantity of raw materials purchased (in kilograms)
- Actual output (in units)
- Actual hours worked
- Actual wage rate per labour hour
- Labour cost variance
- Production overhead cost variance

Answer

(i) **Direct Material Cost Variance** = Direct Material Price Variance + Direct Material Usage Variance
= ₹ 4,80,000 F + ₹ 48,000 F = ₹ 5,28,000 F

(ii) **Budgeted Output (units)**

Fixed Production Overhead Expenditure Variance

= Budgeted Fixed Overhead - Actual Fixed Overheads

= Budgeted Output x Standard Overhead Rate - Actual Fixed Overheads

₹ 1,80,000 A = Budgeted Output x ₹ 360 (5 hrs @ ₹ 72) - ₹ 45,00,000

Budgeted Output = $\frac{₹ 45,00,000 - ₹ 1,00,000}{₹ 360}$ = **12,000 units**

(iii) **Quantity of Materials purchased (in kilograms)**

Material Price Variance = Actual Usage (Standard Price per kg - Actual price per kg)

₹ 4,80,000 F = Actual Usage (₹ 24 - ₹ 22)

Actual usage in kgs = $\frac{₹ 4,80,000 - ₹ 1,80,000}{₹ 2}$ = **2,40,000 kgs**

(iv) **Actual Output (units)**

Actual Direct Wages	₹ 43,92,000
Direct labour rate variance	₹ 69,120 A
Direct labour efficiency variance	₹ 33,120 F
Standard labour cost for actual output	₹ 43,56,000

Actual Output = $\frac{\text{Standard labour cost for actual output}}{\text{Standard wage rate per unit}}$

= $\frac{₹ 43,56,000}{₹ 360(72 \times 5)}$ = **12,100 units**

Alternatively, let X be the actual quantity of output

Then, Standard Quantity of input for actual output 'X'

20X = SQ

Material cost variance = (SQ x SP) - (AQ x AP)

₹ 5,28,000 = (20 X x ₹ 24) - (2,40,000 kgs x ₹ 22)

480X = ₹ 52,80,000 + ₹ 5,28,000

480X = ₹ 58,08,000

X = $\frac{₹ 58,08,000}{480}$ = **12,100 units**

(v) **Actual hours worked**

Labour Efficiency Variance = Standard Labour Rate (Standard time for actual output - Actual time)

₹ 33,120 F = ₹ 72 (5 hours x 12100 units - Actual time)

460 hours = 60,500 hours - Actual time

Actual time = 60,500 - 460 = 60,040 hours

(vi) **Actual wage rate per hour**

Actual Wages paid = ₹ 43,92,000

Actual hours worked = 60,040 hours

Actual Wage rate per hour = $\frac{₹ 43,92,000}{60,040}$ = **₹ 73.15 per hour**

(vii) **Labour cost variance**

= Labour rate variance + Labour efficiency variance

= ₹ 69,120 A + ₹ 33,120 F

$$= ₹ 36,000 \text{ A}$$

(viii) **Production Overhead Cost Variance**

$$= \text{Actual Output} \times \text{Standard overhead rate} - \text{Actual Overheads Incurred}$$

$$= 12,100 \text{ units} \times ₹ 360 - ₹ 45,00,000$$

$$= ₹ 43,56,000 - ₹ 45,00,000$$

$$= ₹ 1,44,000 \text{ A}$$

Q16. May 2022 RTP

The standard output of a Product 'D' is 50 units per hour in manufacturing department of a Company employing 100 workers. In a 40 hours week, the department produced 1,920 units of product 'D' despite 5% of the time paid was lost due to an abnormal reason. The hourly wage rates actually paid were ₹ 12.40, ₹ 12.00 and ₹ 11.40 respectively to Group 'A' consisting 10 workers, Group 'B' consisting 30 workers and Group 'C' consisting 60 workers. The standard wage rate per labour is same for all the workers. Labour Efficiency Variance is given ₹ 480 (F). You are required to COMPUTE:

- (i) Total Labour Cost Variance.
- (ii) Total Labour Rate Variance.
- (iii) Total Labour Gang Variance
- (iv) Total Labour Yield Variance, and
- (v) Total Labour Idle Time Variance.

Answer

Working Notes:

1. Calculation of Standard Man hours

When 100 workers work for 1 hour, the standard output is 50 units.

$$\text{Standard man hours per unit} = \frac{100 \text{ hours}}{50 \text{ units}} = 2 \text{ hours per unit}$$

2. Calculation of standard man hours for actual output:

$$= 1,920 \text{ units} \times 2 \text{ hours} = 3,840 \text{ hours.}$$

3. Calculation of actual cost

Type of Workers	No of Workers	Actual Hours Paid	Rate (₹)	Amount (₹)	Idle Hours (5% of hours paid)	Actual hours Worked
Group 'A'	10	400	12.40	4,960	20	380
Group 'B'	30	1,200	12	14,400	60	1,140
Group 'C'	60	2,400	11.40	27,360	120	2,280
	100	4,000		46,720	200	3,800

4. Calculation of Standard wage Rate:

$$\begin{aligned} \text{Labour Efficiency Variance} &= 480 \text{ F} \\ (\text{Standard hours for Actual production} - \text{Actual Hours}) \times \text{SR} &= 480 \text{ F} \\ (3,840 - 3,800) \times \text{SR} &= 480 \\ \text{Standard Rate (SR)} &= ₹ 12 \text{ per hour} \end{aligned}$$

(i) Total Labour Cost Variance

$$= (\text{Standard hours} \times \text{Standard Rate}) - (\text{Actual Hours} \times \text{Actual rate})$$

$$= (3,840 \times 12) - 46,720 = \mathbf{640 \text{ A}}$$

(ii) Total Labour Rate Variance

$$= (\text{Standard Rate} - \text{Actual Rate}) \times \text{Actual Hours}$$

$$\text{Group 'A'} = (12 - 12.40) 400 = 160 \text{ A}$$

$$\text{Group 'B'} = (12 - 12) 1,200 = 0$$

$$\text{Group 'C'} = (12 - 11.40) 2,400 = 1,440 \text{ F}$$

$$\mathbf{1,280 \text{ F}}$$

(iii) Total Labour Gang Variance

$$= \text{Total Actual Time Worked (hours)} \times \{ \text{Average Standard Rate per hour of Standard Gang} - \text{Average Standard Rate per hour of Actual Gang} \}$$

@ on the basis of hours worked

$$= 3,800 \times (12 \times \frac{3,840}{3,800})$$

= 0

[Note: As the number of workers in standard and actual is the same, there is no difference in mix ratio, so labour gang variance will be NIL]

(iv) Total Labour Yield Variance

= Average Standard Rate per hour of Standard Gang × {Total Standard Time (hours) - Total Actual Time worked (hours)}

$$= 12 \times (3,840 - 3,800)$$

= **480F**

(v) Total Labour idle time variance

= Total Idle hours × standard rate per hour

$$= 200 \text{ hours} \times 12$$

= **2,400A**

Q17. Nov 2021 RTP

BabyMoon Ltd. uses standard costing system in manufacturing one of its product 'Baby Cap'. The details are as follows:

Direct Material 1 Meter @ ₹ 60 per meter ₹ 60

Direct Labour 2 hour @ ₹ 20 per hour ₹ 40

Variable overhead 2 hour @ ₹ 10 per hour ₹ 20

Total ₹ 120

During the month of August, 10,000 units of 'Baby Cap' were manufactured. Details are as follows:

Direct material consumed 11,400 meters @ ₹ 58 per meter

Direct labour Hours ? @ ? ₹ 4,48,800

Variable overhead incurred ₹ 2,24,400

Variable overhead efficiency variance is ₹ 4,000 A. Variable overheads are based on Direct Labour Hours.

You are required to CALCULATE the following Variances:

(a) Material Variances- Material Cost Variance, Material Price Variance and Material Usage Variance.

(b) Variable Overheads variances- Variable overhead Cost Variance, Variable overhead Efficiency Variance and Variable overhead Expenditure Variance.

(c) Labour variances- Labour Cost Variance, Labour Rate Variance and Labour Efficiency variance

Answer

(i) Material Variances

Budget			Std. for actual			Actual		
Quantity (Meter)	Price (₹)	Amount (₹)	Quantity (Meter)	Price (₹)	Amount (₹)	Quantity (Meter)	Price (₹)	Amount (₹)
1	60	60	10,000	60	6,00,000	11,450	58	61,200

Material Cost Variance = (SQ × SP - AQ × AP)

$$= 6,00,000 - 6,61,200 = ₹ 61,200 (A)$$

Material Price Variance = (SP - AP) AQ

$$= (60 - 58) 11,400 = ₹ 22,800 (F)$$

Material Usage Variance = (SQ - AQ) SP

$$= (10,000 - 11,400) 60 = ₹ 84,000 (A)$$

(ii) Variable Overheads variances

Variable overhead cost Variance

= Standard variable overhead - Actual Variable Overhead

$$= (10,000 \text{ units} \times 2 \text{ hours} \times ₹ 10) - 2,24,400 = ₹ 24,400 (A)$$

Variable overhead Efficiency Variance

$$= (\text{Standard Hours} - \text{Actual Hours}) \times \text{Standard Rate per Hour}$$

Let Actual Hours be 'X', then:

$$\begin{aligned}(20,000 - X) \times 10 &= 4,000 \text{ (A)} \\ 2,00,000 - 10X &= - 4,000 \\ X &= 2,04,000 \div 10\end{aligned}$$

Therefore, Actual Hours (X) = 20,400

Variable overhead Expenditure Variance

= Variable Overhead at Actual Hours - Actual Variable Overheads

$$= 20,400 \times ₹ 10 - 2,24,400 = ₹ 20,400 \text{ (A)}$$

(ii) Labour variances

Budget			Std. for actual			Actual		
Hours	Rate (₹)	Amount(₹)	Hours	Rate (₹)	Amount(₹)	Hours	Rate (₹)	Amount(₹)
2	20	40	20,000	20	4,00,000	20,400	22*	4,48,800

*Actual Rate = ₹ 4,48,800 ÷ 20,400 hours = ₹ 22

Labour Cost Variance = (SH × SR) - (AH × AR)

$$= 4,00,000 - 4,48,800 = ₹ 48,800 \text{ (A)}$$

Labour Rate Variance = (SR - AR) × AH

$$= (20 - 22) \times 20,400 = ₹ 40,800 \text{ (A)}$$

Labour Efficiency Variance = (SH - AH) × SR

$$= (20,000 - 20,400) \times 20 = ₹ 8,000 \text{ (A)}$$

Q16. May 2021 RTP

LM Limited produces a product 'SX4' which is sold in a 10 Kg. packet. The standard cost card per packet of 'SX4' is as follows:

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹ 80 per hour	640
Variable Overhead 8 hours @ ₹ 20 per hour	160
Fixed Overhead	<u>250</u>
	<u>1,950</u>

Budgeted output for a quarter of a year was 10,000 Kg. Actual output is 9,000 Kg.

Actual costs for this quarter are as follows:

	(₹)
Direct Materials 8,900 Kg @ ₹ 92 per Kg	8,18,800
Direct Labour 7,000 hours @ ₹ 84 per hour	5,88,000
Variable Overhead incurred	1,40,000
Fixed Overhead incurred	2,60,000

You are required to CALCULATE:

- Material Usage Variance
- Material Price Variance
- Material Cost Variance
- Labour Efficiency Variance
- Labour Rate Variance
- Labour Cost Variance
- Variable Overhead Cost Variance
- Fixed Overhead Cost Variance

Answer

- (i) Material Usage Variance = Std. Price (Std. Quantity - Actual Quantity)
= ₹ 90 (9,000 kg. - 8,900 kg.)
= ₹ 9,000 (Favourable)
- (ii) Material Price Variance = Actual Quantity (Std. Price - Actual Price)
= 8,900 kg. (₹ 90 - ₹ 92) = ₹ 17,800 (Adverse)
- (iii) Material Cost Variance = Std. Material Cost - Actual Material Cost
= (SQ × SP) - (AQ × AP)
= (9,000 kg. × ₹ 90) - (8,900 kg. × ₹ 92)
= ₹ 8,10,000 - ₹ 8,18,800
= ₹ 8,800 (Adverse)

- (iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)
= ₹ 80 ($\frac{9000}{10} \times 8 \text{ hours} - 7000 \text{ hrs}$)
= ₹ 80 (7,200 hrs. – 7,000 hrs.)
= ₹ 16,000 (Favourable)
- (v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
= 7,000 hrs. (₹ 80 – ₹ 84)
= ₹ 28,000 (Adverse)
- (vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
= (SH × SR) – (AH × AR)
= (7,200 hrs. × ₹ 80) – (7,000 hrs. × ₹ 84)
= ₹ 5,76,000 – ₹ 5,88,000
= ₹ 12,000 (Adverse)
- (vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
= (7,200 hrs. × ₹ 20) – ₹ 1,40,000
= ₹ 4,000 (Adverse)
- (viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead
= $\frac{250}{10 \text{ kgs}} \times 9000 \text{ kgs} - 2,60,000$
= ₹ 2,25,000 – ₹ 2,60,000
= ₹ 35,000 (Adverse)

Q17. Nov 2020 RTP

Following are the standard cost for a product-X

	(₹)
Direct materials 10 kg @ ₹ 90 per kg	900
Direct labour 8 hours @ ₹ 100 per hour	800
Variable Overhead 8 hours @ ₹ 15 per hour	120
Fixed Overhead	400
	<u>2,220</u>

Budgeted output for a year of a year was 2,000 units. Actual output is 1,800 units

Actual costs for this year are as follows:

	(₹)
Direct Materials 1,800 Kg @ ₹ 92 per Kg	16,37,600
Direct Labour 14,000 hours @ ₹ 104 per hour	14,56,000
Variable Overhead incurred	2,17,500
Fixed Overhead incurred	7,68,000

You are required to CALCULATE:

- Material Usage Variance
- Material Price Variance
- Material Cost Variance
- Labour Efficiency Variance
- Labour Rate Variance
- Labour Cost Variance
- Variable Overhead Cost Variance
- Fixed Overhead Cost Variance

Answer

- (i) Material Usage Variance = Std. Price (Std. Quantity – Actual Quantity)
= ₹ 90 (18,000 kg. – 17,800 kg.)
= ₹ 18,000 (Favourable)
- (ii) Material Price Variance = Actual Quantity (Std. Price – Actual Price)
= 17,800 kg. (₹ 90 – ₹ 92) = ₹ 35,600 (Adverse)
- (iii) Material Cost Variance = Std. Material Cost – Actual Material Cost
= (SQ × SP) – (AQ × AP)
= (18,000 kg. × ₹ 90) – (17,800 kg. × ₹ 92)
= ₹ 16,20,000 – ₹ 16,37,600
= ₹ 17,600 (Adverse)
- (iv) Labour Efficiency Variance = Std. Rate (Std. Hours – Actual Hours)

- = ₹ 100 (1,800 units × 8-14,000hrs)
 □ = ₹ 100 (14,400 hrs. – 14,000 hrs.)
 = ₹ 40,000 (Favourable)
- (v) Labour Rate Variance = Actual Hours (Std. Rate – Actual Rate)
 = 14,000 hrs. (₹ 100 – ₹ 104)
 = ₹ 56,000 (Adverse)
- (vi) Labour Cost Variance = Std. Labour Cost – Actual Labour Cost
 = (SH × SR) – (AH × AR)
 = (14,400 hrs. × ₹ 100) – (14,000 hrs. × ₹ 104)
 = ₹ 14,40,000 – ₹ 14,56,000
 = ₹ 16,000 (Adverse)
- (vii) Variable Cost Variance = Std. Variable Cost – Actual Variable Cost
 = (14,400 hrs. × ₹ 15) – ₹ 2,17,500
 = ₹ 1,500 (Adverse)
- (viii) Fixed Overhead Cost Variance = Absorbed Fixed Overhead – Actual Fixed Overhead
 = – (1800units × ₹400) -7,68,000
 = ₹ 7,20,000 – ₹ 7,68,000
 = ₹ 48,000 (Adverse)

Q18. May 2020 RTP

ABC Ltd. had prepared the following estimation for the month of January:

	Quantity	Rate (₹)	Amount (₹)
Material-A	800 kg	90.00	72,000
Material-B	600 kg	60.00	36,000
Skilled labour	81,000 hours	75.00	75,000
Unskilled labour	800 hours	44.00	35,200

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material-A	900 kg	86.00	77,400
Material-B	650 kg	65.00	42,250
Skilled labour	1,200 hours	71.00	85,200
Unskilled labour	860 hours	46.00	39,560

You are required to CALCULATE:

- Material Cost Variance;
- Material Price Variance;
- Material Mix Variance;
- Material Yield Variance;
- Labour Cost Variance;
- Labour Efficiency Variance and
- Labour Yield Variance.

Answer

Material Variances:

Material	SQ (WN-1)	SP (₹)	SQ × SP (₹)	RSQ (WN-2)	RSQ × SP (₹)	AQ	AQ × SP (₹)	AP (₹)	AQ × AP (₹)
A	940 kg.	90.00	84,600	886 kg.	79,740	900 kg.	81,000	86.00	77,400
B	705 kg.	60.00	42,300	664 kg.	39,840	650 kg.	39,000	65.00	42,250
	1,645kg		1,26,900	1,550kg	1,19,580	1,550kg	1,20,000		1,19,650

WN-1: Standard Quantity (SQ):

$$\text{Material A-} \quad \frac{800\text{kg.}}{0.9 \times 1,400\text{kg.}} \times 1,480\text{kg.} = 939.68 \text{ or } 940 \text{ kg.}$$

$$\text{Material B-} \quad \frac{600\text{kg.}}{0.9 \times 1,400\text{kg.}} \times 1,480\text{kg.} = 704.76 \text{ or } 705 \text{ kg.}$$

WN- 2: Revised Standard Quantity (RSQ):

$$\text{Material A-} \quad \frac{800\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} = 885.71 \text{ or } 886 \text{ kg.}$$

$$\text{Material B-} \quad \frac{600\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} = 664.28 \text{ or } 664 \text{ kg.}$$

$$\begin{aligned} \text{(i) Material Cost Variance (A + B)} &= \{(SQ \times SP) - (AQ \times AP)\} \\ &= \{1,26,900 - 1,19,650\} = 7,250 \text{ (F)} \end{aligned}$$

$$\begin{aligned} \text{(ii) Material Price Variance (A + B)} &= \{(AQ \times SP) - (AQ \times AP)\} \\ &= \{1,20,000 - 1,19,650\} = 350 \text{ (F)} \end{aligned}$$

$$\begin{aligned} \text{(iii) Material Mix Variance (A + B)} &= \{(RSQ \times SP) - (AQ \times SP)\} \\ &= \{1,19,580 - 1,20,000\} = 420 \text{ (A)} \end{aligned}$$

$$\begin{aligned} \text{(iv) Material Yield Variance (A + B)} &= \{(SQ \times SP) - (RSQ \times SP)\} \\ &= \{1,26,900 - 1,19,580\} = 7,320 \text{ (F)} \end{aligned}$$

Labour Variances:

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	1,116 hrs	75.00	83,700	1144	85,800	1,200	90,000	71.00	85,200
Unskilled	893 hrs	44.00	39,292	916	40,304	860	37,840	46.00	39,560
	2,009 hrs		1,22,992	2,060	1,27,840	2,060	1,27,840		1,24,760

WN- 3: Standard Hours (SH):

$$\text{Skilled labour-} \quad \frac{0.95 \times 1,000\text{hr.}}{0.90 \times 1,400\text{kg.}} \times 1,480\text{kg.} = 1,115.87 \text{ or } 1,116 \text{ hrs.}$$

$$\text{Unskilled labour-} \quad \frac{0.95 \times 800\text{hr.}}{0.90 \times 1,400\text{kg.}} \times 1,480\text{kg.} = 892.69 \text{ or } 893 \text{ hrs.}$$

WN- 4: Revised Standard Hours (RSH):

$$\text{Skilled labour-} \quad \frac{1,000\text{hr.}}{1,800\text{hr.}} \times 2,060\text{hr.} = 1,144.44 \text{ or } 1,144 \text{ hrs.}$$

$$\text{Unskilled labour-} \quad \frac{800\text{hr.}}{1,800\text{hr.}} \times 2,060\text{hr.} = 915.56 \text{ or } 916 \text{ hrs.}$$

$$\begin{aligned} \text{(v) Labour Cost Variance (Skilled + Unskilled)} &= \{(SH \times SR) - (AH \times AR)\} \\ &= \{1,22,992 - 1,24,760\} = 1,768 \text{ (A)} \end{aligned}$$

$$\begin{aligned} \text{(vi) Labour Efficiency Variance (Skilled + Unskilled)} &= \{(SH \times SR) - (AH \times SR)\} \\ &= \{1,22,992 - 1,27,840\} = 4,848 \text{ (A)} \end{aligned}$$

$$\begin{aligned} \text{(vii) Labour Yield Variance (Skilled + Unskilled)} &= \{(SH \times SR) - (RSH \times SR)\} \\ &= \{1,22,992 - 1,26,104\} = 3,112 \text{ (A)} \end{aligned}$$

Q19. Nov 2019 RTP

JVG Ltd. produces a product and operates a standard costing system and value material and finished goods

inventories at standard cost. The information related with the product is as follows:

Particulars	Cost per unit (₹)
Direct materials (30 kg at ₹350 per kg)	10,500
Direct labour (5 hours at ₹80 per hour)	400

The actual information for the month just ended is as follows:

(a) The budgeted and actual production for the month of September 2019 is 1,000 units.

(b) Direct materials – 5,000 kg at the beginning of the month. The closing balance of direct materials for the

month was 10,000 kg. Purchases during the month were made at ₹ 365 per kg. The actual utilization of direct

materials was 7,200 kg more than the budgeted quantity.

(c) Direct labour – 5,300 hours were utilised at a cost of ₹ 4,34,600.

Required:

CALCULATE (i) Direct material price and usage variances (ii) Direct labour rate and efficiency variances.

Answer

Working:

Quantity of material purchased and used.

No. of units produced	1,000 units
Std. input per unit	30kg.
Std. quantity (Kg.)	30,000 kg.
Add: Excess usage	7,200 kg.
Actual Quantity	37,200 kg.
Add: Closing Stock	10,000 kg.
Less: Opening stock	5,000 kg.
Quantity of Material purchased	42,200 kg.

(i) Direct Material Price Variance:

= Actual Quantity purchased (Std. Price – Actual Price)

= 42,200 kg. (₹350 – ₹365) = 6,33,000 (Adverse)

Direct Material Usage Variance:

= Std. Price (Std. Quantity – Actual Quantity)

= ₹350 (30,000 kg. – 37,200 kg.) = ₹25,20,000 (Adverse)

(ii) Direct Labour Rate Variance:

= Actual hours (Std. Rate – Actual Rate)

= 5,300 hours (₹80 – ₹82) = ₹10,600 (Adverse)

Direct Labour Efficiency Variance:

= Std. Rate (Std. hours – Actual hours)

= ₹80 (1,000 units × 5 hours – 5,300 hours) = ₹24,000 (Adverse)

Q18. May 2019 RTP | May 2018 RTP

ABC Ltd. had prepared the following estimation for the month of April:

	Quantity	Rate (₹)	Amount (₹)
Material-A	800 kg.	45.00	36,000
Material-B	600 kg.	30.00	18,000
Skilled labour	1,000 hours	37.50	37,500
Unskilled labour	800 hours	22.00	17,600

Normal loss was expected to be 10% of total input materials and an idle labour time of 5% of expected labour hours was also estimated.

At the end of the month the following information has been collected from the cost accounting department:

The company has produced 1,480 kg. finished product by using the followings:

	Quantity	Rate (₹)	Amount (₹)
Material-A	900 kg.	43.00	38,700
Material-B	650 kg.	32.50	21,125
Skilled labour	1,200 hours	35.50	42,600
Unskilled labour	860 hours	23.00	19,780

Required:

CALCULATE:

- Material Cost Variance;
- Material Price Variance;
- Material Mix Variance;
- Material Yield Variance;
- Labour Cost Variance;
- Labour Efficiency Variance and
- Labour Yield Variance

Answer

Material Variances:

Material	SQ	SP	SQ × SP	RSQ	RSQ ×	AQ	AQ × SP	AP	AQ × AP
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	(WN-1)	(₹)	(₹)	(WN-2)	SP (₹)		(₹)	(₹)	(₹)
A	940 kg.	45.00	42,300	886 kg.	39,870	900 kg.	40,500	43.00	38,700
B	705 kg.	30.00	21,150	664 kg.	19,920	650 kg.	19,500	32.50	21,125
	1645 kg		63,450	1550 kg	59,790	1550 kg		60,000	59,825

WN-1: Standard Quantity (SQ):

Material A- $\frac{800\text{kg.}}{0.9 \times 1,400\text{kg.}} \times 1,480\text{kg.} = 939.68 \text{ or } 940 \text{ kg.}$

Material B- $\frac{600\text{kg.}}{0.9 \times 1,400\text{kg.}} \times 1,480\text{kg.} = 704.76 \text{ or } 705 \text{ kg.}$

WN- 2: Revised Standard Quantity (RSQ):

Material A- $\frac{800\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} = 885.71 \text{ or } 886 \text{ kg.}$

Material B- $\frac{600\text{kg.}}{1,400\text{kg.}} \times 1,550\text{kg.} = 664.28 \text{ or } 664 \text{ kg.}$

(i) Material Cost Variance (A + B) = $\{(SQ \times SP) - (AQ \times AP)\}$

= $\{63,450 - 59,825\} = 3,625 \text{ (F)}$

(ii) Material Price Variance (A + B) = $\{(AQ \times SP) - (AQ \times AP)\}$

= $\{60,000 - 59,825\} = 175 \text{ (F)}$

(iii) Material Mix Variance (A + B) = $\{(RSQ \times SP) - (AQ \times SP)\}$

= $\{59,790 - 60,000\} = 210 \text{ (A)}$

(iv) Material Yield Variance (A + B) = $\{(SQ \times SP) - (RSQ \times SP)\}$

= $\{63,450 - 59,790\} = 3,660 \text{ (F)}$

Labour Variances:

Labour	SH (WN-3)	SR (₹)	SH × SR (₹)	RSH (WN-4)	RSH × SR (₹)	AH	AH × SR (₹)	AR (₹)	AH × AR (₹)
Skilled	1,116 hrs	37.50	41,850	1144	42,900	1,200	45,000	35.50	42,600
Unskilled	893 hrs	22.00	19,646	916	20,152	860	18,920	23.00	19,780
	2,009 hrs		61,496	2,060	63,052	2,060	63,920		62,380

WN- 3: Standard Hours (SH):

Skilled labour- $\frac{0.95 \times 1,000\text{hr.}}{0.90 \times 1,400\text{kg.}} \times 1,480\text{kg.} = 1,115.87 \text{ or } 1,116 \text{ hrs.}$

Unskilled labour- $\frac{0.95 \times 800\text{hr.}}{0.90 \times 1,400\text{kg.}} \times 1,480\text{kg.} = 892.69 \text{ or } 893 \text{ hrs.}$

WN- 4: Revised Standard Hours (RSH):

Skilled labour- $\frac{1,000\text{hr.}}{1,800\text{hr.}} \times 2,060\text{hr.} = 1,144.44 \text{ or } 1,144 \text{ hrs.}$

Unskilled labour- $\frac{800\text{hr.}}{1,800\text{hr.}} \times 2,060\text{hr.} = 915.56 \text{ or } 916 \text{ hrs.}$

(v) Labour Cost Variance (Skilled + Unskilled) = $\{(SH \times SR) - (AH \times AR)\}$

= $\{61,496 - 62,380\} = 884 \text{ (A)}$

(vi) Labour Efficiency Variance (Skilled + Unskilled) = $\{(SH \times SR) - (AH \times SR)\}$

= $\{61,496 - 63,920\} = 2,424 \text{ (A)}$

(vii) Labour Yield Variance (Skilled + Unskilled) = $\{(SH \times SR) - (RSH \times SR)\}$

= $\{61,496 - 63,052\} = 1,556 \text{ (A)}$

Q18. May 2018 RTP

Aaradhya Ltd. manufactures a commercial product for which the standard cost per unit is as follows:

	(₹)
Material:	
5 kg. @ ₹ 4 per kg.	20.00
Labour:	
3 hours @ ₹10 per hour	30.00

Overhead	
Variable: 3 hours @ ₹1	3.00
Fixed: 3 hours @ ₹0.50	1.50
Total	54.50

During Jan. 20X8, 600 units of the product were manufactured at the cost shown below:

	(₹)
Materials purchased:	
5,000 kg. @ ₹4.10 per kg.	20,500
Materials used:	
3,500 kg.	
Direct Labour:	
1,700 hours @ ₹ 9	15,300
Variable overhead	1,900
Fixed overhead	900
Total	38,600

The flexible budget required 1,800 direct labour hours for operation at the monthly activity level used to set the fixed overhead rate.

COMPUTE:

(a) Material price variance, (b) Material Usage variance; (c) Labour rate variance; (d) Labour efficiency variance;
(e) Variable overhead expenditure variance; (f) Variable overhead efficiency variance; (g) Fixed overhead expenditure variance; (h) Fixed overhead volume variance; (i) Fixed overhead capacity variance; and (j) Fixed overhead efficiency variance.

Also RECONCILE the standard and actual cost of production.

Answer

(a) Material price variance:

$$= (\text{Standard price} - \text{Actual Price}) \times \text{Actual quantity}$$

$$= (\text{₹ } 4 - \text{₹ } 4.10) \times 5,000 = \text{₹ } 500 \text{ Adv.}$$

(b) Material usage variance:

$$= (\text{Std. quantity for actual output} - \text{Actual qty.}) \times \text{Std. price}$$

$$= (600 \times 5 - 3,500) \times 4 = \text{₹ } 2,000 \text{ Adv.}$$

(c) Labour Rate Variance:

$$= (\text{Standard rate} - \text{Actual rate}) \times \text{Actual hours}$$

$$= (\text{₹ } 10 - \text{₹ } 9) \times 1,700 = \text{₹ } 1,700 \text{ Fav.}$$

(d) Labour Efficiency Variance:

$$= (\text{Standard hours for actual output} - \text{Actual hours}) \times \text{Standard rate}$$

$$= (600 \times 3 - 1,700) \times \text{₹ } 10$$

$$= \text{₹ } 1,000 \text{ Fav.}$$

(e) Variable Overhead Expenditure Variance

$$= (\text{Actual Hours} \times \text{Standard Rate}) - \text{Actual Overhead}$$

$$= (1,700 \times \text{₹ } 1) - \text{₹ } 1,900$$

$$= \text{₹ } 200 \text{ Adv.}$$

(f) Variable Overhead Efficiency Variance:

$$= \text{Std. hours for actual output} - \text{Actual hours}) \times \text{Std. rate}$$

$$= (600 \times 3 - 1,700) \times \text{₹ } 1 = \text{₹ } 100 \text{ Fav.}$$

(g) Fixed Overhead Expenditure Variance:

$$= (\text{Budgeted overhead} - \text{Actual overhead})$$

$$= (1,800 \times 0.50 - 900) = \text{Nil}$$

(h) Fixed Overhead Volume Variance:

$$= (\text{Std. hours for actual output} - \text{Budgeted hours}) \times \text{Std. rate}$$

$$= (600 \times 3 - 1,800) \times \text{₹ } 0.50 = \text{Nil}$$

(i) Fixed Overhead Capacity Variance:

$$= (\text{Budgeted hours} - \text{Actual Hours}) \times \text{Standard rate}$$

$$= (1,800 - 1,700) \times \text{₹ } 0.50 = \text{₹ } 50 \text{ Adv.}$$

(j) Fixed Overhead Efficiency Variance:

= (Std. hours for actual output – Actual hours) × Standard rate

= (600 × 3 – 1,700) × ₹ 0.50 = ₹ 50 Fav.

Verification:	(₹)	(₹)
Overhead recovered: 600 units @ ₹4.50		2,700
Actual Overhead:		
Variable	1,900	
Fixed	900	2,800
		100 Adv.
Variable expenditure variance		200 Adv.
Variable Efficiency variance		100 Fav.
Fixed expenditure variance		Nil
Fixed overhead volume variance		Nil
		100 Adv.

Reconciliation Statement

Standard Cost: 600 units @ ₹54.50		32,700	
Actual Cost:	38,600		
Less: Material Stock at standard cost: (1,500 × ₹4)	6,000	(32,600)	100 Fav.
Variances:	Adv. (₹)	Fav. (₹)	
Material price	500		
Material usage	2,000		
Labour rate		1,700	
Labour efficiency		1,000	
Variable expenditure	200		
Variable efficiency		100	
Total	2,700	2,800	100 Fav.

Q1. May 2024 Exam, 4 marks

The following information is given by PQR Ltd:

Year	Sales (₹)	Profit (Loss (₹))
2022-23	1,80,00,000	(3,80,000)
2023-24	2,40,00,000	11,20,000

You are required to:

- (i) Calculate the Break even sales.
- (ii) In 2024-25, it is estimated that the variable cost will go up by 5% and fixed cost will reduce by ₹ 4,80,000. Selling price will remain same. Calculate the sales volume to earn a profit of ₹ 15,00,000.

Answer:

- (i) Break-even sales = Fixed Cost / P/V Ratio
P/V Ratio = Change in profit / Change in sales X 100 = $15,00,000 / (2,40,00,000 - 1,80,00,000) \times 100$
Or $15,00,000 / 60,00,000 \times 100$ Or 25%
Fixed Cost = Contribution – Profit
= ₹ 2,40,00,000 × 25% - ₹ 11,20,000
= ₹ 60,00,000 - ₹ 11,20,000 = ₹ 48,80,000
Break-even sales = $48,80,000 / 25\% = ₹ 1,95,20,000$
- (ii) Desired Contribution in 2024-25 = Revised Fixed Cost + Target Profit
= (₹ 48,80,000 - ₹ 4,80,000) + ₹ 15,00,000
= ₹ 59,00,000
Earlier P/V ratio = 25%. So Variable Cost ratio = 75%.
Selling price remain the same.
Variable cost increased by 5% i.e. Variable Cost ratio will be 78.75% (75%+5% of 75).
Now revised P/V ratio = 21.25%
Sales Volume in 2024-25 = $59,00,000 / 21.25\% = ₹ 2,77,64,706$ (approx.)

If it is assumed that variable cost will go up by 5% on total. So, it will be increased from 75% to 80% and solution can be done in following way:
(i) Desired Contribution in 2024-25 = Revised Fixed Cost + Target Profit
= (₹ 48,80,000 - ₹ 4,80,000) + ₹ 15,00,000
= ₹ 59,00,000
Earlier P/V ratio = 25%. So Variable Cost ratio = 75%.
Selling price remain the same.

Variable cost increased by 5% i.e. Variable Cost ratio will be 80% (75%+5%).
Now revised P/V ratio = 20%
Sales Volume in 2024-25 = $59,00,000 / 20\% = ₹ 2,95,00,000$

Q2. May 2024 Exam, 7 marks

A factory is currently working at 60% capacity and produces 12,000 units of a product.

Management is thinking to increase the working capacity either to 70% or 90% level. It is estimated that at both the levels, it will be able to sell all the produced units. The other details are as under:

- At 70% capacity, the cost of raw materials increases by 4% and the selling price falls by 3%.
- At 90% capacity, the cost of raw materials increases by 5% and selling price falls by 4%.

- At 60% capacity, the product cost is ₹ 360 per unit and it is sold at ₹ 400 per unit.
- The unit cost of 360 consists of the following:

Material	₹ 200
Labour	₹ 60
Factory overhead	₹ 60 (50 % fixed)
Administrative & Selling overhead	₹ 40 (60 % fixed)

- Additional advertising cost of ₹ 20,000 is to be incurred for selling the product above 80% capacity.

You are required to:

- Calculate the profits of the company when the factory works at 60%, 70% and 90% capacity level.
- Offer your comments regarding increase in the capacity based on profit calculated.

Answer:

Expense Budget at 60%, 70% & 90% level

	60% (12,000 units)		70% (14,000 units)		90% (18,000 units)	
	Per unit (₹)	Amount(₹)	Per unit (₹)	Amount(₹)	Per unit (₹)	Amount(₹)
Sales (A)	400	48,00,000	388	54,32,000	384	69,12,000
Variable Costs:						
Direct Material	200	24,00,000	208	29,12,000	210	37,80,000
Direct Wages	60	7,20,000	60	8,40,000	60	10,80,000
Variable Factory Overheads	30	3,60,000	30	4,20,000	30	5,40,000
Variable Administrative & Selling Overheads	16	1,92,000	16	2,24,000	16	2,88,000
Total Variable Cost (B)	306	36,72,000	314	43,96,000	316	56,88,000
Contribution (C)=(A-B)	94	11,28,000	74	10,36,000	68	12,24,000
Fixed Costs:						
Fixed Factory Overheads (50%)	--	3,60,000	--	3,60,000	--	3,60,000
Fixed Administrative & Selling Overheads (60%)	--	2,88,000	--	2,88,000	--	2,88,000
Adverting Cost	--	--	--	--	--	20,000
Total Fixed Costs(D)	--	6,48,000	--	6,48,000	--	6,68,000
Profit (C - D)	--	4,80,000	--	3,88,000	--	5,56,000

Comment: Increase of production capacity to 90% is likely to increase the profit to maximum of ₹ 5,56,000 due to increase in contribution while fixed cost is slightly increased due to in advertising cost. At 70% capacity, profit is reduced to minimum of ₹ 3,88,00 due to decrease in selling price by 3% along with increase in raw material cost by 4% resulting in decrease of contribution. Therefore, it is recommended that factory should operate at 90% capacity.

Q3. Nov 2023 Exam, 5 marks

R Ltd. produces and sells 60,000 units of product 'AN', at its Noida Plant. The selling price of the product is ₹ 15 per unit. The variable cost is 80% of selling price per unit. Fixed cost during this period is ₹ 4,20,000. The company is continuously suffering losses, and management plans to shut down the Noida Plant.

The fixed cost is expected to be reduced by ₹ 2,50,000. Additional costs of plant shut down are expected at ₹ 25,000. You are required to comment on:

- Whether the Noida plant be shut down?
- Find the shut-down point in units.

Answer:

Statement of profit

Particulars	₹
Selling Price	15 per unit
Less : Variable cost	12 per unit
Contribution	3 per unit
Capacity	60,000 units
Total contribution (60,000 units × ₹ 3)	1,80,000
Less: Fixed Cost	4,20,000
Loss	(2,40,000)

Shut down cost

Particular	₹
Fixed cost	1,70,000
Additional cost	25,000
Shut down cost	1,95,000

- Since the loss of Noida plant exceeds shut down cost it is better to shut down the plant.
- Shut down point: $\frac{\text{Total fixed cost} - \text{Shut down cost}}{\text{Contribution per unit}}$

$$\frac{(4,20,000 - 1,95,000)}{3} = 75,000 \text{ units}$$

The solution can also be presented in following way

Statement of profit

Particulars	If plant is continued ₹	If plant is shut down ₹
Selling Price	15 per unit	-
Less : Variable cost	12 per unit	-
Contribution	3 per unit	-
Capacity	60,000 units	-
Total contribution (60,000 units × ₹ 3)	1,80,000	-
Less : Fixed Cost	4,20,000	1,70,000
Additional Fixed Cost	-	25,000
Loss	2,40,000	1,95,000

- Since the loss of Noida plant exceeds shut down cost it is better to shut down the plant.
-

Shut down point: $\frac{\text{Total fixed cost} - \text{Shut down cost}}{\text{Contribution per unit}}$

$$\frac{(4,20,000 - 1,95,000)}{3} = 75,000 \text{ units}$$

Q4. May 2023 Exam, 5 marks

MNP Company Limited produces two products 'A' and 'B'. The relevant cost and sales data per unit of output is as follows.

Particulars	Product A	Product B
	(₹)	(₹)
Direct material	55	60
Direct labour	35	45
Variable factory overheads	40	20
Selling Price	180	175

The availability of machine hours is limited to 55,000 hours for the month. The monthly demand for product 'A' and product 'B' is 5,000 units and 6,000 units, respectively. The fixed expenses of the company are ₹1,40,000 per month. Variable factory overheads are ₹ 4 per machine hour. The company can produce both products according to the market demand.

Required:

Calculate the product mix that generates maximum profit for the company in the situation and also calculate profit of the company.

Answer:

Particulars	Product A ₹	Product B ₹
Selling Price	180	175
Variable cost:		
Direct Material	55	60
Direct labour	35	45
Variable factory overheads	40	20
	<u>130</u>	<u>125</u>
Contribution	50	50
Machine hour (p.u.)	10	5
Contribution per hour	5	10
Rank	II	I

Calculation of Product Mix

Hours available	55,000
Product B (6000 x 5)	<u>30,000</u>
Balance Hours	25,000
Product A (2500 x 10)	<u>25,000</u>
Balance Hours	0

Calculation of Profit

	₹
Contribution	
A 2500 units x 50	
B 6000 units x 50	4,25,000
Less: Fixed cost	<u>(1,40,000)</u>
Profit	<u>2,85,000</u>

Q5. May 2023 Exam, 5 marks

The following information pertains to ZB Limited for the year:

Profit volume ratio	30%
Margin of Safety (as % of total sales)	25%
Fixed cost	₹ 12,60,000

You are required to calculate:

- (i) Break even sales value (₹).
- (ii) Total sales value (₹) at present,
- (iii) Proposed sales value (₹) if company wants to earn the present profit after reduction of 10% in fixed cost,
- (iv) Sales in value (₹) to be made to earn a profit of 20% on sales assuming fixed cost remains unchanged,
- (v) New Margin of Safety if the sales value at present as computed in (ii) decreased by 12.5%.

Answer:

(i) Calculation of Break-even sales in value:

$$= \text{Fixed Cost} \div \text{P/V Ratio}$$

$$= ₹ 12,60,000 \div 30\% = ₹ 42,00,000$$

(ii) Calculation of Total Sales value:

$$\text{Sales value (S)} = \text{Break-even Sales} + \text{Margin of Safety Or, } S = 42,00,000 + 0.25 S$$

$$\text{Or, } 0.75 S = 42,00,000$$

$$\text{Or, } S = 42,00,000 \div 0.75$$

$$\text{Or, Sales} = ₹ 56,00,000$$

(iii) Calculation of proposed sales value to earn present profit:

$$\text{Present profit} = \text{Sales} - \text{Variable cost} - \text{Fixed Cost}$$

$$= ₹ 56,00,000 - 70\% \text{ of } 56,00,000 - ₹ 12,60,000$$

$$= ₹ 56,00,000 - ₹ 39,20,000 - ₹ 12,60,000$$

$$= ₹ 4,20,000$$

$$\text{Proposed Sales value (S)} = 0.7S + (90\% \text{ of } ₹ 12,60,000) + 4,20,000$$

$$S = 0.7S + 11,34,000 + 4,20,000$$

$$S = 15,54,000 \div 0.3 = ₹ 51,80,000$$

(iv) Calculation of sales value to earn 20% on sales:

$$\text{Sales Value (S)} = 0.7 S + 12,60,000 + 0.2S$$

$$S = 12,60,000 \div 0.10 = ₹ 1,26,00,000$$

(v) New Margin of Safety:

$$= (\text{Sales} - \text{BES}) \div \text{Sales}$$

$$= (87.5\% \text{ of } 56,00,000 - 42,00,000) \div (87.5\% \text{ of } 56,00,000)$$

$$= (49,00,000 - 42,00,000) \div 49,00,000$$

$$= 7,00,000 \div 49,00,000 = 14.29\%$$

Or

$$= (\text{Sales} - \text{BES})$$

$$= (87.5\% \text{ of } 56,00,000 - 42,00,000)$$

$$= ₹ 7,00,000$$

Q6. Nov 2022 Exam, 5 marks

ABC Ltd sells its Product 'Y' at a price of ₹ 300 per unit and its variable cost is ₹ 180 per unit. The fixed costs are ₹ 16,80,000 per year uniformly incurred throughout the year. The Profit for the year is ₹ 7,20,000.

You are required to calculate:

- i. BEP in value (₹) and units.
- ii. Margin of Safety
- iii. Profits made when sales are 24,000 units.
- iv. Sales in value (₹) to be made to earn a net profit of ₹ 10,00,000 for the year.

Answer

(i) Calculation of BEP in value

$$\text{P / V ratio} = \frac{\text{Sales price} - \text{Variable Cost}}{\text{Sales}} = \frac{300 - 180}{300} = 40\%$$

$$\text{Break Even Point in Value (₹)} = \frac{\text{Fixed Cost}}{\text{P / V ratio}} = \frac{16,80,000}{40\%} = 42,00,000$$

$$\text{Break Even Point in Units} = \frac{\text{Fixed Cost}}{\text{Contribution}} = \frac{₹ 16,80,000}{120} = ₹ 14,000 \text{ Units}$$

$$(\text{Alternatively, } \frac{₹ 42,00,000}{300} = 14000 \text{ units})$$

$$\text{(ii) Margin of safety (In Amount)} = \frac{\text{Profit}}{\text{P / V ratio}} = \frac{7,20,000}{40\%} = ₹ 18,00,000$$

Margin of safety may also be calculated by deducting BEP sales from present sale.

Present sale is ₹ 60,00,000 i.e. (16,80,000 + 7,20,000)/40%.

$$\text{Margin of safety (In units)} = \frac{\text{Profit}}{\text{Contribution per unit}} = \frac{7,20,000}{120} = 6,000 \text{ units}$$

(iii) Profit when sales are 24,000 units

Particulars	(₹)
Contribution (24,000 × 120)	28,80,000
Less: Fixed cost	16,80,000
Profit	12,00,000

(iv) Sales in value to earn a net profit of ₹10,00,00

$$\frac{\text{Fixed Cost} + \text{Desired profit}}{\text{P / V Ratio}} = \frac{16,80,000 + 10,00,000}{40\%} = 67,00,000$$

Q7. Nov 2022 Exam, 10 marks

An agriculture based company having 210 hectares of land is engaged in growing three different cereals namely, wheat, rice and maize annually. The yield of the different crops and their selling prices are given below:

	Wheat	Rice	Maize
Yield (in kgs per hectare)	2,000	500	100
Selling Price (₹ per kg)	20	40	250

The variable cost data of different crops are given below:

(All figures in ₹ per kg)

Crop	Labour charges	Packing Materials	Other variable expenses
Wheat	8	2	4
Rice	10	2	1
Maize	120	10	20

The company has a policy to produce and sell all the three kinds of crops. The maximum and minimum area to be cultivated for each crop is as follows:

Crop	Maximum Area (in hectares)	Minimum Area (in hectares)
Wheat	160	100
Rice	50	40
Maize	60	10

You are required to:

- Rank the crops on the basis of contribution per hectare.
- Determine the optimum product mix considering that all the three cereals are to be produced.
- Calculate the maximum profit which can be achieved if the total fixed cost per annum is ₹ 21,45,000. (Assume that there are no other constraints applicable to this company)

Answer

(i) Statement showing Ranking of crops on the basis of Contribution per hectare

Sl. No	Particulars	Wheat	Rice	Maize
(i)	Sales price per kg (₹)	20	40	250
(ii)	Variable cost* per kg (₹)	14	13	150
(iii)	Contribution per kg (₹)	6	27	100
(iv)	Yield (in kgs per hectare)	2,000	500	100
(v)	Contribution per hectare (₹)	12,000	13,500	10,000
(vi)	Ranking	II	I	III

*Variable cost = Labour Charges +Packing Material+ Other Variable Expenses

Therefore, to maximize profits, the order of priority of production would be Rice, Wheat and Maize.

(ii) & (iii) Statement showing optimum product mix considering that all the three cereals are to be produced and maximum profit thereof

Sl.No	Particulars	Wheat	Rice	Maize	Total
(i)	Minimum Area (in hectare)	100	40	10	150
(ii)	Remaining area (in hectare)				60
(iii)	Distribution of remaining area based on ranking considering Maximum area	50	10	-	60
(iv)	Optimum mix (in hectare)	150	50	10	210
(v)	Contribution per hectare (₹)	12,000	13,500	10,000	
(vi)	Total contribution (₹)	18,00,000	6,75,000	1,00,000	25,75,000
(vii)	Fixed cost (₹)				21,45,000
(viii)	Maximum Profit (₹)				4,30,000

Optimum Product Mix and calculation of maximum profit earned by company can also be presented as below

(iii) Optimum Product Mix:

Particular	Area (in hectares)	Yield (kg per hectare)	Total Production (in kgs)
(a) Maximum of Rice	50	500	25,000
(b) Minimum of Maize	10	100	1000
(c) Balance of Wheat	150	2000	3,00,000
	250		3,26,000

(iv) Calculation of maximum profit earned by the company

	Production (in kgs)	Contribution (₹ per kg)	Total Contribution (₹)
(a) Rice	25,000	24	6,75,000
(b) Maize	1,000	100	1,00,000
(c) Wheat	3,00,000	6	18,00,000
Total contribution			25,75,000
Less: Total Fixed Cost per annum			(21,45,000)
Maximum profits earned by the company			4,30,000

Q8. May 2022 Exam, 5 marks

Top-tech a manufacturing company is presently evaluating two possible machines for the manufacture of superior Pen-drives. The following information is available:

Particulars	Machine A	Machine B
Selling price per unit	₹ 400.00	₹ 400.00
Variable cost per unit	₹ 240.00	₹ 260.00
Total fixed costs per year	₹ 350 lakhs	₹ 200 lakhs
Capacity (in units)	8,00,000	10,00,000

Required:

(i) Recommend which machine should be chosen?

(ii) Would you change your answer, if you were informed that in near future demand will be unlimited and the capacities of the two machines are as follows?

Machine A - 12,00,000 units

Machine B - 12,00,000 units

Why?

Answer

	Machine-A	Machine-B	Total
--	-----------	-----------	-------

A	Selling price per unit (₹)	400	400	
B	Variable cost per cost (₹)	240	260	
C	Contribution per unit (₹) [A-B]	160	140	
D	Units	8,00,000	10,00,000	
E	Total contribution (₹ [C×D])	12,80,00,000	14,00,00,000	26,80,00,000
F	Fixed Cost (₹)	3,50,00,000	2,00,00,000	5,50,00,000
G	Profit [E-F] (₹)	9,30,00,000	12,00,00,000	21,30,00,000
H	Profit per unit [G÷D] (₹)	116.25	120.00	

(i) Machine B has the higher profit of ₹2,70,00,000 than the Machine-A. Further, Machine-B's fixed cost is less than the fixed cost of Machine-A and higher capacity. Hence, **Machine B be recommended.**

Note: This question can also be solved as below:

Indifferent point = Difference in fixed cost / difference in variable cost per unit
= 1,50,00,000 / 20 = 7,50,000 units

At the level of demand 7,50,000 units both machine options equally profitable.

If demand below 7,50,000 units, select machine B (with lower FC).

If demand above 7,50,000 units, select machine A (with lower VC).

(ii) When the capacities of both the machines are same and demand for the product is unlimited, calculation of profit will be as follows:

		Machine-A	Machine-B	Total
A	Contribution per unit (₹)	160	140	
B	Units	12,00,000	12,00,000	
C	Total contribution (₹) [A×B]	19,20,00,000	16,80,00,000	36,00,00,000
D	Fixed Cost (₹)	3,50,00,000	2,00,00,000	5,50,00,000
E	Profit [C-E] (₹)	15,70,00,000	14,80,00,000	30,50,00,000
F	Profit per unit [E÷B] (₹)	130.83	123.33	

Yes, the preference for the machine would change because now, Machine A is having higher contribution and higher profit, hence recommended

Q9. May 2022 Exam, 5 marks

UV Limited started a manufacturing unit from 1st October 2021. It produces designer lamps and sells its lamps at ₹ 450 per unit.

During the quarter ending on 31st December, 2021, it produced and sold 12,000 units and suffered a loss of ₹ 35 per unit.

During the quarter ending on 31st March, 2022, it produced and sold 30,000 units and earned a profit of ₹ 40 per unit.

You are required to calculate:

- Total fixed cost incurred by UV Ltd. per quarter.
- Break Even sales value (in rupees)
- Calculate Profit, if the sale volume reaches 50,000 units in the next quarter (i.e., quarter ending on 30th June, 2022).

Answer

	Quarter ending 31st December, 2021 (₹)	Quarter ending 31st March, 2022 (₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]

P/V Ratio = $\frac{\text{Change in profit}}{\text{Change in Sales}} \times 100$

$\frac{16,20,000}{81,00,000} \times 100 = 20\%$

(i) Fixed Cost = Sales × P/V ratio – profit

= ₹ 1,35,00,000 × 20% – 12,00,000

$$= ₹ 15,00,000$$

Alternative Presentation for the calculation of Fixed cost

	Quarter ending 31st December, 2021(₹)	Quarter ending 31st March, 2022 (₹)
Sales (No. of units sold x ₹ 450 per unit)	54,00,000	1,35,00,000
Profit (Loss)	(4,20,000) [12,000 × 35]	12,00,000 [30,000 × 40]
Total cost	58,20,000	1,23,00,000

$$\text{VC per unit} = (1,23,00,000 - 58,20,000) / (30,000 - 12,000)$$

$$= 64,80,000 / 18,000 = ₹ 360 \text{ per unit}$$

$$\text{Fixed cost} = \text{TC} - \text{VC}, 58,20,000 (360 \times 12,000 \text{ units}) ₹ 15,00,000$$

$$\text{(ii) Break even sales value (in Rupees)} = \frac{\text{Fixed cost}}{\text{P/V ratio}} \times 100$$

$$= \frac{15,00,000}{20\%} = ₹ 75,00,000$$

(iii) Profit, if sales reach 50,000 units for the quarter ending 30th June, 2022

	(₹)
Sales (50,000 × ₹ 450)	2,25,00,000
Less: Variable cost	1,80,00,000
Contribution	45,00,000
Less: Fixed cost	15,00,000
Profit	30,00,000

Q10. Dec 2021 Exam, 10 marks

AZ company has prepared its budget for the production of 2,00,000 units. The variable cost per unit is ₹ 16 and fixed cost is ₹ 4 per unit. The company fixes its selling price to fetch a profit of 20% on total cost.

You are required to calculate:

- Present break-even sales (in ₹ and in quantity).
- Present profit-volume ratio.
- Revised break-even sales in ₹ and the revised profit-volume ratio, if it reduces its selling price by 10%.
- What would be revised sales- in quantity and the amount, if a company desires a profit increase of 20% more than the budgeted profit and selling price is reduced by 10% as above in point (iii).

Answer

$$\text{Variable Cost per Unit} = ₹ 16$$

$$\text{Fixed Cost per Unit} = ₹ 4, \text{ Total Fixed Cost} = 2,00,000 \text{ units} \times ₹ 4 = ₹ 8,00,000$$

$$\text{Total Cost per Unit} = ₹ 20$$

$$\text{Selling Price per Unit} = \text{Total Cost} + \text{Profit} = ₹ 20 + ₹ 4 = ₹ 24$$

$$\text{Contribution per Unit} = ₹ 24 - ₹ 16 = ₹ 8$$

$$\text{(i) Present Break-even Sales (Quantity)} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{8,00,000}{8} = 1,00,000 \text{ units}$$

$$\text{Present Break-even Sales (₹)} = 1,00,000 \text{ units} \times ₹ 24 = ₹ 24,00,000$$

$$\text{(ii) Present P/V Ratio} = \frac{8}{24} \times 100 = 33.33\%$$

$$\text{(iii) Revised Selling Price per Unit} = ₹ 24 - 10\% \text{ of } ₹ 24 = ₹ 21.60$$

$$\text{Revised Contribution per Unit} = ₹ 21.60 - ₹ 16 = ₹ 5.60$$

$$\text{Revised P/V Ratio} = \frac{5.60}{21.60} \times 100 = 25.926\%$$

$$\text{Revised Break-even point (₹)} = \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{8,00,000}{25.926\%} \times ₹ 30,85,705$$

Or

$$\text{Revised Break-even point (units)} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} = \frac{8,00,000}{5.60} = 1,42,857 \text{ units}$$

$$\text{Revised Break-even point (₹)} = 1,42,857 \text{ units} \times ₹ 21.60 = ₹ 30,85,711$$

(iv) Present profit = ₹ 8,00,000

Desired Profit = 120% of ₹ 8,00,000 = ₹ 9,60,000

Sales to earn a profit of ₹ 9,60,000

Total contribution required = 8,00,000 + 9,60,000 = ₹ 17,60,000

$$\frac{\text{Fixed cost} + \text{Desired profit}}{\text{Contribution per unit}} = \frac{8,00,000 + 9,60,000}{5.60} = 3,14,286 \text{ units}$$

Revised sales (in ₹) = 3,14,286 units × ₹ 21.60 = ₹ 67,88,578

Q11. July 2021 Exam, 5 marks

LR Ltd. is considering two alternative methods to manufacture a new product it intends to market. The two methods have a maximum output of 50,000 units each and produce identical items with a selling price of ₹ 25 each. The costs are:

	Method-1 Semi-Automatic (₹)	Method-2 Fully-Automatic (₹)
Variable cost per unit	15	10
Fixed costs	1,00,000	3,00,000

You are required to calculate:

- (1) Cost Indifference Point in units. Interpret your results.
- (2) The Break-even Point of each method in terms of units.

Answer

(i) Cost Indifference Point

	Method-1 and Method-2 (₹)
Differential Fixed Cost (I)	₹ 2,00,000 (₹ 3,00,000 – ₹ 1,00,000)
Differential Variable Costs (II)	₹ 5 (₹ 15 – ₹ 10)
Cost Indifference Point (I/II) 40,000 (Differential Fixed Cost / Differential Variable Costs per unit)	40,000

Interpretation of Results

At activity level below the indifference points, the alternative **with lower fixed costs and higher variable costs should be used**. At activity level above the indifference point, alternative with **higher fixed costs and lower variable costs should be used**.

No. of Product	Alternative to be Chosen
Product ≤ 40,000 units	Method-1, Semi-Automatic
Product ≥ 40,000 units	Method-2, Automatic

(ii) Break Even point (in units)

	Method-1	Method-2
BEP (in units) = $\frac{\text{Fixed cost}}{\text{Contribution per unit}}$	$\frac{1,00,000}{(25-15)} = 10,000$	$\frac{3,00,000}{(25-10)} = 20,000$

Q12. July 2021 Exam, 5 marks

What is Margin of Safety? What does a large Margin of Safety indicates? How can you calculate Margin of Safety?

Answer

Margin of Safety: The margin of safety can be defined as the difference between the expected level of sale and the breakeven sales.

The larger the margin of safety, the higher is the chances of making profits. The Margin of Safety can be calculated by identifying the difference between the projected sales and breakeven sales in

units multiplied by the contribution per unit. This is possible because, at the breakeven point all the fixed costs are recovered and any further contribution goes into the making of profits.

Margin of Safety = (Projected sales – Breakeven sales) in units x contribution per unit

It also can be calculated as:

$$\text{Margin of Safety} = \frac{\text{Profit}}{\text{P/V Ratio}}$$

Q13. Jan 2021 Exam, 5 marks

During a particular period ABC Ltd has furnished the following data:

Sales ₹ 10,00,000

Contribution to sales ratio 37% and

Margin of safety is 25% of sales.

A decrease in selling price and decrease in the fixed cost could change the "contribution to sales ratio" to 30% and "margin of safety" to 40% of the revised sales. Calculate:

(i) Revised Fixed Cost.

(ii) Revised Sales and

(iii) New Break-Even Point.

Answer

Contribution to sales ratio (P/V ratio) = 37%

Variable cost ratio = 100% - 37% = 63%

Variable cost = ₹ 10,00,000 x 63% = ₹ 6,30,000

After decrease in selling price and fixed cost, sales quantity has not changed. Thus, variable cost is ₹ 6,30,000.

Revised Contribution to sales = 30%

Thus, Variable cost ratio = 100% - 30% = 70%

Thus, Revised sales = $\frac{6,30,000}{70\%} = ₹ 9,00,000$

Revised, Break-even sales ratio = 100% - 40% (revised Margin of safety) = 60%

(i) **Revised fixed cost** = revised breakeven sales x revised contribution to sales ratio

= ₹ 5,40,000 (₹ 9,00,000 x 60%) x 30%

= ₹ 1,62,000

(ii) **Revised sales**

= ₹ 9,00,000 (as calculated above)

(iii) **Revised Break-even point** ratio

= Revised sales x Revised break-even sales ratio

= ₹ 9,00,000 x 60%

= ₹ 5,40,000

Q14. Jan 2021 Exam, 10 marks

Two manufacturing companies A and B are planning to merge. The details are as follows:

	A	B
Capacity utilisation (%)	90	60
Sales (₹)	63,00,000	48,00,000
Variable Cost (₹)	39,60,000	22,50,000
Fixed Cost (₹)	13,00,000	15,00,000

Assuming that the proposal is implemented, calculate:

(i) Break-Even sales of the merged plant and the capacity utilization at that stage.

(ii) Profitability of the merged plant at 80% capacity utilization.

(iii) Sales Turnover of the merged plant to earn a profit of ₹ 60,00,000.

(iv) When the merged plant is working at a capacity to earn a profit of ₹ 60,00,000, what percentage of increase in selling price is required to sustain an increase of 5% in fixed overheads.

Answer

(a) Workings:

1. Statement showing computation of Breakeven of merged plant and other required information

S.No	Particulars	Plan A		Plan B		Merged Plant (100%)(₹)
		Before (90%)(₹)	After (100%)(₹)	Before (60%)(₹)	After (100%)(₹)	
(i)	Sales	63,00,000	70,00,000	48,00,000	80,00,000	1,50,00,000
(ii)	Variable cost	39,60,000	44,00,000	22,50,000	37,50,000	81,50,000
(iii)	Contribution (i - ii)	23,40,000	26,00,000	25,50,000	42,50,000	68,50,000
(iv)	Fixed Cost	13,00,000	13,00,000	15,00,000	15,00,000	28,00,000
(v)	Profit (iii - iv)	10,40,000	13,00,000	10,50,000	27,50,000	40,50,000

2. PV ratio of merged plant

$$= \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$= \frac{68,50,000}{1,50,00,000} \times 100$$

$$= 45.67 \%$$

(i) Break even sales of merged plant

$$= \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{28,00,000}{45.67\%}$$

$$= ₹ 61,30,939.34 \text{ (approx.)}$$

Capacity utilisation

$$= \frac{61,30,939.34}{1,50,00,000} \times 100$$

$$= 40.88\%$$

(ii) Profitability of the merged plant at 80% capacity utilisation

$$= (\text{₹ } 1,50,00,000 \times 80\%) \times \text{P/v ratio} - \text{fixed cost}$$

$$= ₹ 1,20,00,000 \times 45.67\% - ₹ 28,00,000$$

$$= ₹ 26,80,400$$

(iii) Sales to earn a profit of ₹ 60,00,000

$$\text{Desired sales} = \frac{\text{Fixed Cost} + \text{desired profit}}{\text{P/V Ratio}}$$

$$= \frac{28,00,000 + 60,00,000}{45.67\%}$$

$$= ₹ 1,92,68,666 \text{ (approx.)}$$

(iv) Increase in fixed cost

$$= ₹ 28,00,000 \times 5\% = ₹ 1,40,000$$

Therefore, percentage increase in sales price

$$= \frac{1,40,000}{1,92,68,666} \times 100 = 0.726\% \text{ (approx.)}$$

Q15. Nov 2020 Exam, 5 marks

Moon Ltd. produces products 'X', 'Y' and 'Z' and has decided to analyse its production mix in respect of these three products - 'X', 'Y' and 'Z'. You have the following information :

	X	Y	Z
Direct Materials ₹ (per unit)	160	120	80
Variable Overheads ₹ (per unit)	8	20	12

Direct labour :

Departments:	Rate per Hour (₹)	Hours per unit	Hours per unit	Hours per unit
		X	Y	Z
Department-A	4	6	10	5
Department-B	8	6	15	11

From the current budget, further details are as below :

	X	Y	Z
Annual Production at present (in units)	10,000	12,000	20,000
Estimated Selling Price per unit (₹)	312	400	240
Sales departments estimate of	12,000	16,000	24,000

possible sales in the coming year (in units)			
--	--	--	--

There is a constraint on supply of labour in Department-A and its manpower cannot be increased beyond its present level.

Required:

(i) Identify the best possible product mix of Moon Ltd.

(ii) Calculate the total contribution from the best possible product mix.

Answer

(i) Statement Showing "Calculation of Contribution/ unit"

Particulars	X(₹)	Y(₹)	Z(₹)
Selling Price (A)	312	400	240
Variable Cost:			
Direct Material	160	120	80
Direct Labour			
Dept. A (Rate x Hours)	24	40	20
Dept. B (Rate x Hours)	48	120	88
Variable Overheads	8	20	12
Total Variable Cost (B)	240	300	200
Contribution per unit (A - B)	72	100	40
Hours in Dept.A	6	10	5
Contribution per hour	12	10	8
Rank	I	II	III

Existing Hours = 10,000 x 6hrs. + 12,000 x 10 hrs. + 20,000 x 5 hrs. = 2,80,000 hrs.

Best possible product mix (Allocation of Hours on the basis of ranking)

Produce 'X' = 12,000 units

Hours Required = 72,000 hrs (12,000 units × 6 hrs.)

Balance Hours Available = 2,08,000 hrs (2,80,000 hrs. – 72,000 hrs.)

Produce 'Y' (the Next Best) = 16,000 units

Hours Required = 1,60,000 hrs (16,000 units × 10 hrs.)

Balance Hours Available = 48,000 hrs (2,08,000 hrs. – 1,60,000 hrs.)

Produce 'Z' (balance) = 9,600 units (48,000 hrs./ 5 hrs.)

(ii) Statement Showing "Contribution"

Product	Units	Contribution/ Unit (₹)	Total Contribution (₹)
X	12,000	72	8,60,000
Y	16,000	100	16,00,000
Z	9,600	40	3,84,000
		Total	28,48,000

Q16. Nov 2020 Exam, 5 marks

Difference between Marginal costing and Absorption costing

Answer

S.No.	Marginal costing	Absorption costing
1.	Only variable costs are considered for product costing and inventory valuation.	Both fixed and variable costs are considered for product costing and inventory valuation.
2.	Fixed costs are regarded as period costs. The Profitability of different products is judged by their P/V ratio	Fixed costs are charged to the cost of production. Each product bears a reasonable share of fixed cost and thus the profitability of a product is influenced by the apportionment of fixed costs.

3.	Cost data presented highlight the total contribution of each product.	Cost data are presented in conventional pattern. Net profit of each product is determined after subtracting fixed cost along with their variable costs.
4.	The difference in the magnitude of opening stock and closing stock does not affect the unit cost of production	The difference in the magnitude of opening stock and closing stock affects the unit cost of production due to the impact of related fixed cost.
5.	In case of marginal costing the cost per unit remains the same, irrespective of the production as it is valued at variable cost	In case of absorption costing the cost per unit reduces, as the production increases as it is fixed cost which reduces, whereas, the variable cost remains the same per unit.

Q17. Nov 2019 Exam, 5 marks

When volume is 4,000 units; average cost is ₹ 3.75 per unit. When volume is 5,000 units, average cost is ₹ 3.50 per unit. The Break-Even point is 6,000 units.

Calculate: (i) Variable Cost per unit (ii) Fixed Cost and (iii) Profit Volume Ratio.

Answer

(i) Variable cost per unit

$$\begin{aligned}
 &= \frac{\text{Change in Total cost}}{\text{Change in units}} \\
 &= \frac{(3.50 \times 5,000 \text{ units}) - (3.75 \times 4,000 \text{ units})}{5,000 - 4,000} \\
 &= \frac{17,500 - 15,000}{1,000} \text{ ₹} = ₹ 2,500/1000 = ₹ 2.5
 \end{aligned}$$

(ii) Fixed cost

$$\begin{aligned}
 &= \text{Total Cost} - \text{Variable cost (at 5,000 units level)} \\
 &= ₹ 17,500 - ₹ 2.5 \times 5,000 = ₹ 5,000
 \end{aligned}$$

(iii) Contribution per unit

$$\begin{aligned}
 &= \frac{\text{Fixed cost}}{\text{BEP (in units)}} \\
 &= \frac{₹ 5,000}{6,000 \text{ units}} \\
 &= 0.833
 \end{aligned}$$

P/V Ratio

$$\begin{aligned}
 &= \frac{\text{Contribution per unit}}{\text{Sale price per unit}} \\
 &= \frac{0.833}{0.833 + 2.5} \\
 &= 25
 \end{aligned}$$

Q18. Nov 2019 Exam, 10 marks

PJ Ltd manufactures hockey sticks. It sells the products at ₹ 500 each and makes a profit of ₹125 on each stick. The Company is producing 5,000 sticks annually by using 50% of its machinery capacity.

The cost of each stick is as under:

Direct Material	₹ 150
Direct Wages	₹ 50
Works Overhead	₹ 125 (50% fixed)
Selling Expenses	₹ 50 (25% variable)

The anticipation for the next year is that cost will go up as under:

Fixed Charges	10%
Direct Wages	20%
Direct Material	5%

There will not be any change in selling price.

There is an additional order for 2,000 sticks in the next year.

Calculate the lowest price that can be quoted so that the Company can earn the same profit as it has earned in the current year?

Answer

Selling Price = ₹ 500

Profit = ₹ 125
No of Sticks = 5,000

Particulars	Current Year(₹)	Next Year(₹)
Direct Material	150	157.50 (150 + 5%)
Direct Wages	50	60 (50+20%)
Works Overheads	62.50 (125 × 50%)	62.5
Selling Expenses	12.50 (50 × 25%)	12.5
Total Variable Cost	275	292.50
Fixed Cost (62.5 × 5,000) = 3,12,500; (37.5 × 5,000) = 1,87,500	5,00,000	5,50,000

Let: Lowest Price Quoted = K

Now, Sales = Target Profit (5,000 units × ₹ 125) + Variable Cost + Fixed Cost

Or, = (5,000 × 500) + (2,000 × K) = 6,25,000 + 20,47,500 + 5,50,000

Or, K = ₹ 361.25

So, Lowest Price that can be quoted to earn the profit of ₹ 6,25,000 (same as current year) is ₹361.25

Q19. May 2019 Exam, 5 marks

M/s Gaurav Private Limited is manufacturing and selling two products:

'BLACK' and 'WHITE' at selling price of ₹ 20 and ₹ 30 respectively.

The following sales strategy has been outlined for the financial year 2019-20:

(i) Sales planned for the year will be ₹ 81,00,000 in the case of 'BLACK' and ₹ 54,00,000 in the case of 'WHITE'.

(ii) The selling price of 'BLACK' will be reduced by 10% and that of 'WHITE' by 20%.

(iii) Break-even is planned at 70% of the total sales of each product.

(iv) Profit for the year to be maintained at ₹ 8,26,200 in the case of 'BLACK' and ₹ 7,45,200 in the case of 'WHITE'. This would be possible by reducing the present annual fixed cost of ₹ 42,00,000 allocated as ₹ 22,00,000 to 'BLACK' and ₹ 20,00,000 to 'WHITE'.

You are required to calculate:

(1) Number of units to be sold of 'BLACK' and 'WHITE' to Break even during the financial year 2019-20.

(2) Amount of reduction in fixed cost product-wise to achieve desired profit mentioned at (iv) above.(i)

Answer

(i) Statement showing Break Even Sales

Particulars	Black	White
Sales Planned	81,00,000	54,00,000
Selling Price (₹)	18	24
Number of Units to be sold	4,50,000	2,25,000
Break Even sales (in Units), 70% of total sales	3,15,000	1,57,500
Or		
Break Even sales (in ₹), 70% of total sales	56,70,000	37,80,000

(iii) Statement Showing Fixed Cost Reduction

Profit to be maintained (₹)	8,26,200	7,45,200
Margin of Safety (70% of Sales) (₹)	24,30,000	16,20,000
PVR (Profit/ Margin of Safety) × 100	34%	46%
Contribution (Sales × 34% or 46%) (₹)	27,54,000	24,84,000

Less: Profit (₹)	8,26,200	7,45,200
Revised Fixed Cost (₹)	19,27,800	17,38,800
Present Fixed Cost (₹)	22,00,000	20,00,000
Reduction in Fixed Cost	2,72,200	2,61,200

Q20. May 2019 Exam, 5 marks

What are the limitations of marginal costing?

Answer

Limitations of Marginal Costing

(i) Difficulty in classifying fixed and variable elements: It is difficult to classify exactly the expenses into fixed and variable category. Most of the expenses are neither totally variable nor wholly fixed. For example, various amenities provided to workers may have no relation either to volume of production or time factor.

(ii) Dependence on key factors: Contribution of a product itself is not a guide for optimum profitability unless it is linked with the key factor.

(iii) Scope for Low Profitability: Sales staff may mistake marginal cost for total cost and sell at a price; which will result in loss or low profits. Hence, sales staff should be cautioned while giving marginal cost

(iv) Faulty valuation: Overheads of fixed nature cannot altogether be excluded particularly in large contracts, while valuing the work-in-progress. In order to show the correct position fixed overheads have to be included in work-in-progress.

(v) Unpredictable nature of Cost: Some of the assumptions regarding the behaviour of various costs are not necessarily true in a realistic situation. For example, the assumption that fixed cost will remain static throughout is not correct. Fixed cost may change from one period to another. For example, salaries bill may go up because of annual increments or due to change in pay rate etc. The variable costs do not remain constant per unit of output. There may be changes in the prices of raw materials, wage rates etc. after a certain level of output has been reached due to shortage of material, shortage of skilled labour, concessions of bulk purchases etc.

(vi) Marginal costing ignores time factor and investment: The marginal cost of two jobs may be the same but the time taken for their completion and the cost of machines used may differ. The true cost of a job which takes longer time and uses costlier machine would be higher. This fact is not disclosed by marginal costing.

(vii) Understating of W-I-P: Under marginal costing stocks and work in progress are understated.

Q21. Nov 2018 Exam, 10 marks

A manufacturing company is producing a product 'A' which is sold in the market at ₹45 per unit. The company has the capacity to produce 40000 units per year. The budget for the year 2018-19 projects a sale of 30000 units.

The costs of each unit are expected as under:

	₹
Materials	12
Wages	9
Overheads	6

Margin of safety is ₹ 4,12,500.

You are required to:

(i) calculate fixed cost and break-even point.

(ii) calculate the volume of sales to earn profit of 20% on sales

(iii) if management is willing to invest ₹10,00,000 with an expected return of 20%, calculate units to be sold to earn this profit.

(iv) Management expects additional sales if the selling price is reduced to ₹ 44. Calculate units to be sold to achieve the same profit as desired in above (iii).

Answer

$$\text{Margin of Safety} = \frac{\text{Profit}}{P / V \text{ ratio}} = 4,12,500₹$$

$$= \frac{\text{Profit}}{45 - (12 + 9 + 6)} = 4,12,500/45$$

$$= \frac{\text{Profit}}{45} = 4,12,500$$

$$= \frac{18}{45} = 40\%$$

Profit = 1,65,000 OR P/V = (18/45) × 100 = 40%

(i) Fixed Cost

Profit = (Sales × P/V Ratio) – Fixed Cost
 1,65,000 = [(30,000 × 45,000) × $\frac{18}{45}$] – Fixed Cost
 Or Fixed Cost = 5,40,000 – 1,65,000
 = ₹ 3,75,000

OR

Profit = Contribution – Fixed Cost = ₹ 5,40,000 – ₹ 3,75,000 = ₹ 1,65,000

P/V Ratio = $\frac{18}{45} = 40\%$

Break-even Point = Total Sales – Margin of Safety
 = ₹ (30,000 × 45) – 4,12,500
 = 13,50,000 – 4,12,500 = ₹ 9,37,500 Or

BEP = $\frac{\text{Fixed Cost}}{\text{P/V ratio}} = \frac{3,75,000}{\frac{18}{45}} = \frac{3,75,000}{40\%} = ₹ 9,37,500$ OR **20833.33 Units**

(ii) Let's assume, Sales Volume = S unit so total sales value is 45 S and

Contribution is 45 S – 27 S = 18 S

Now, Contribution = Fixed Cost + Desired Profit

18 S = 3,75,000 + 9 S (20% of 45 S)

Or, 9 S = 3,75,000

So, S = $\frac{3,75,000}{9}$ units

Volume of sales = $\frac{3,75,000 \times 45}{9}$
 = ₹ 18,75,000 OR **41666.67 Units**

So, ₹ 18,75,000 sales are required to earn profit on 20% of sales

(iii) Contribution = Fixed Cost + Desired Profit

18 S = 3,75,000 + Return on Investment

18 S = 3,75,000 + 2,00,000

S = $\frac{5,75,000}{18}$ Units = **31,945 Units (approx.)**

So, 31,945 Units to be sold to earn a return of ₹ 2,00,000.

(iv) Revised Contribution = Fixed Cost + Desired Profit

17 S = 3,75,000 + 2,00,000

S = $\frac{5,75,000}{17}$ Units

S = 33,824 units (approx.)

∴ Additional Sales to be sold to achieve the same profit is **33,824 Units**.

Q22. May 2018 Exam, 5 Marks

Following figures have been extracted from the books of M/s. RST Private Limited:

Financial Year	Sales (₹)	Profit/Loss (₹)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000 (Profit)

You are required to calculate:

- Profit Volume Ratio
- Fixed Costs
- Break Even Point
- Sales required to earn a profit of ₹ 45,000.
- Margin of Safety in Financial Year 2017-18.

Answer

Financial Year	Sales (₹)	Profit/Loss (₹)
2016-17	4,00,000	15,000(loss)
2017-18	5,00,000	15,000 (Profit)
Difference	1,00,000	30,000

$$(i) \text{ P/V Ratio} = \frac{\text{Difference in Sales}}{\text{Difference in profit}} \times 100 = \frac{1,00,000}{30,000} \times 100 = 30\%$$

(ii)	(₹)
Contribution in 2016 (4,00,000 × 30%)	1,20,000
Add: Loss	<u>15,000</u>
Fixed Cost*	1,35,000

*Contribution = Fixed cost + Profit

Fixed cost = Contribution - Profit

$$(iii) \text{ Break-even point} = \frac{\text{Fixed cost}}{\text{P/V ratio}} = \frac{1,35,000}{30\%} = ₹ 4,50,000$$

$$(iv) \text{ Sales to earn a profit of ₹ 45,000} = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{P/V ratio}} = \frac{1,35,000 + 45,000}{30\%} = ₹ 6,00,000$$

(v) Margin of safety in 2017 -18

$$\text{Margin of safety} = \text{Actual sales} - \text{Break-even sales} = 5,00,000 - 4,50,000 = ₹ 50,000.$$

Q23. May 2018 Exam, 10 Marks

PH Gems Ltd. is manufacturing readymade suits. It has annual production capacity of 2,000 pieces. The Cost Accountant has presented following information for the year to the management:

Particulars	Amount (₹)	Amount (₹)
Sales 1,500 pieces @ ₹ 1,800 per piece		27,00,000
Direct Material	5,94,200	
Direct Labour	4,42,600	
Overheads (40% Fixed)	11,97,000	22,33,800
Net Profit		4,66,300

Evaluate following options:

- If selling price is increased by ₹ 200, the sales will come down to 60% of the total annual capacity. Should the company increase its selling price?
- The company can earn a profit of 20% on sales if the company provide TIEPIN with ready-made suit. The cost of each TIEPIN is ₹ 18. Calculate the sales to earn a profit of 20% on sales.

Answer

(i) Evaluation of Option (i)

$$\text{Selling Price} = ₹ 1800 + ₹ 200 = ₹ 2,000$$

$$\text{Sales} = 2000 \times 60\% = 1200 \text{ Pieces}$$

	(₹)
Sales (1,200 pieces @ ₹ 2,000)	24,00,000
Less: Direct Material $\frac{₹ 5,94,200 \times 1,200}{1,500 \text{ units}}$	4,75,360
Direct Labour $\frac{₹ 4,42,600 \times 1,200}{1,500 \text{ units}}$	3,54,080
Variable Overhead $\frac{₹ 11,97,000 \times 60\% \times 1,200}{1,500 \text{ units}}$	5,74,560

□ □	
Contribution	9,96,000
Less: Fixed cost (Rs. 11,97,000x40 %)	4,78,800
Profit	5,17,200

If price has been increased by 11.11% (increases by 200 on 1,800) sales goes down by 20% (decreased by 300 on 1,500). Change in demand is greater than change in price. Since the variable costs are still same profit has been arose to ₹ 5,17,200 in spite of high elasticity of demand. PH gems would not be able to sustain this policy on account of change if any in variable costs.

(ii) Evaluation of Option (ii)

	(₹)
Sales	1,800.00
Less: Direct Material $\frac{₹ 5,94,200}{1,500 \text{ units}}$	396.13
Cost of Tie PIN	18.00
Direct Labour $\frac{₹ 4,42,600}{1,500 \text{ units}}$	295.07
Variable Overhead $\frac{₹ 11,97,000 \times 60\%}{1,500 \text{ units}}$	478.80
Contribution	612.00
P/V Ratio (₹ 612/1800x100)	34.0%

Sales to required earn a profit of 20%

$$\text{Sales} = \frac{₹ 4,78,800 + 0.20 \text{ of Sales}}{34.00\%}$$

$$\text{Sales} = ₹ 34,20,000 \text{ or } 1,900 \text{ units } (₹ 34,20,000/1800)$$

To earn profit 20% on sales of readymade suit (along with TIE PIN) company has to sold 1,900 units i.e. 95% of the full capacity. This sales level of 1,900 units is justified only if variable cost is constant. Any upside in variable cost would impact profitability, to achieve the desired profitability. Production has to be increased but the scope is limited to 5% only.

Q24. May 2023 RTP | Nov 2023 RTP

A dairy product company manufacturing baby food with a shelf life of one year furnishes the following information:

- On 1st April, 2023, the company has an opening stock of 20,000 packets whose variable cost is ₹ 180 per packet.
- In 2022-23, production was 1,20,000 packets and the expected production in 2023-2024 in 1,50,000 packets. Expected sales for 2023-2024 in 1,60,000 packets.
- In 2022-23, fixed cost per unit was ₹ 60 and it is expected to increase by 10% in 2023-24. The variable cost is expected to increase by 25%. Selling price for 2023-24 has been fixed at ₹ 300 per packet.

You are required to calculate the Break-even volume in units for 2023-24.

Answer

Working Notes:

Particulars	2022-23 (₹)	2023-24 (₹)
Fixed Cost	72,00,000 (₹ 60 × 1,20,000 units)	79,20,000 (110% of ₹ 72,00,000)
Variable Cost	180	225 (125% of ₹ 180)

Calculation of Break-even Point (in units):

Since, shelf life of the product is one year only, hence, opening stock is to be sold first.

	(₹)
Total Contribution required to recover total fixed cost in 2023-24 and to reach break-even volume.	79,20,000
Less: Contribution from opening stock {20,000 units × (₹ 300 – ₹ 180)}	24,00,000
Balance Contribution to be recovered	55,20,000

Units to be produced to get balance contribution

$$= \frac{₹ 55,20,000}{₹ 300 - ₹ 225} = 73,600 \text{ packets.}$$

Break-even volume in units for 2023-24

	Packets
From 2023-24 production	73,600
Add: Opening stock from 2022-23	20,000
	93,600

Q25. May 2023 RTP | Nov 2023 RTP

The M-Tech Manufacturing Company is presently evaluating two possible processes for the manufacture of a

toy. The following information is available:

Particulars	Process A (₹)	Process B (₹)
Variable cost per unit	12	14
Sales price per unit	20	20
Total fixed costs per year	30,00,000	21,00,000
Capacity (in units)	4,30,000	5,00,000
Anticipated sales (Next year, in units)	4,00,000	4,00,000

Suggest:

1. Identify the process which gives more profit.
2. Would you change your answer as given above, if you were informed that the capacities of the two processes are as follows: A - 6,00,000 units; B - 5,00,000 units?

Answer

(1) Comparative Profitability Statements

Particulars	Process- A (₹)	Process- B (₹)
Selling Price per unit	20.00	20.00
Less: Variable Cost per unit	12.00	14.00
Contribution per unit	8.00	6.00
Total Contribution	32,00,000 (₹ 8 × 4,00,000)	24,00,000 (₹ 6 × 4,00,000)
Less: Total fixed costs	30,00,000	21,00,000
Profit	2,00,000	3,00,000

Capacity (units)	4,30,000	5,00,000
Total Contribution at full capacity	34,40,000 (₹ 8 × 4,30,000)	30,00,000 (₹ 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	4,40,000	9,00,000

Process - B gives more profit.

(2)

Particulars	Process- A (₹)	Process- B (₹)
*Capacity (units)	6,00,000	5,00,000
Total contribution	48,00,000 (₹ 8 × 6,00,000)	30,00,000 (₹ 6 × 5,00,000)
Fixed Cost	30,00,000	21,00,000
Profit	18,00,000	9,00,000

Process-A be chosen.

***Note: It is assumed that capacity produced equals sales.**

Q26. Nov 2022 RTP

RPP Manufacturers is approached by an international customer for one-time special order similar to one offered

to its domestic customers. Per unit data for sales to regular customers is provided below:

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604
Markup (50%)	₹ 1302
Targeted selling price	₹ 3906

It is provided that RPP Manufacturers has excess capacity.

Required:

- WHAT is the full cost of the product per unit?
- WHAT is the contribution margin per unit?
- WHICH costs are relevant for making the decision regarding this one-time special order? WHY?
- For RPP Manufacturers, WHAT is the minimum acceptable price of this one-time-special order only
- For this one-time-only special order, SHOULD RPP Manufacturers consider a price of ₹ 2100 per unit? WHY or why not?

Answer

(i) Full cost of the product per unit

Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Fixed manufacturing support	₹ 1092
Total manufacturing costs	₹ 2604

(ii) Contribution margin per unit

Selling price	₹ 3906
Less: Variable costs	
Direct material	₹ 693
Direct labour	₹ 315
Variable manufacturing support	₹ 504
Contribution margin per unit	₹ 2394

(iii) Costs for decision making are those costs that differ between alternatives, which in this situation are the incremental costs.

Direct material	₹ 693
Direct labour	₹ 315

Variable manufacturing support ₹ 504

Total incremental costs ₹ 1512

(iv) Minimum acceptable price would be the incremental costs in the short term i.e. ₹ 1512

(v) Yes, RPP Manufacturers may consider a price of ₹ 2100 per unit because this price is greater than the minimum acceptable price.

Q27. Nov 2022 RTP

The lab corner of Newlife Hospital Trust operates two types of specialist MRI scanning machine-MR10 and MR59. Following details are estimated for the next period:

Machine	MR10	MR59
Running hours	1,100	2,000
	(₹)	(₹)
Variable running costs excluding special technology	68,750	1,60,000
Fixed Costs	50,000	2,43,750

A brain scan is normally carried out on machine type MR10. This task uses special technology costing ₹ 100 each and takes four hours of machine time. Because of the nature of the process, around 10% of the scans produce blurred and therefore useless results.

Required:

- CALCULATE the total cost of a satisfactory brain scan on machine type MR10.
- Brain scans can also be done on machine type MR59 and would take only 1.8 hours per scan with a reduced reject rate of 6%. However, the cost of the special technology would be ₹ 137.50 per scan. ADVISE which type should be used, assuming sufficient capacity is available on both types of machines. Consider fixed costs will remain unchanged.

Answer

(i)

Particulars	(₹)
Variable cost per running hour of Machine MR10	62.50
(₹ 68,750/1100 hours)	45.46
Fixed cost (₹ 50,000/1100 hours)	(₹)
Cost of brain scan on Machine MR1:	250.00
Variable machine cost (4 hours × ₹ 62.50)	100.00
Special technology	350.00
Total variable cost	181.84
Fixed machine cost (4 hours × ₹ 45.46)	531.84
Total cost of a scan	590.93
Total cost of a satisfactory scan (₹ 531.84/0.9)	

(ii) It is given that fixed cost will remain unchanged and thus they are not relevant for the decision. The relevant costs would be the incremental costs of an additional scan:

Machine MR10:	(₹)
Variable cost per scan	350.00
Variable cost per satisfactory scan (₹ 350/0.9)	388.89
Machine MR59:	(₹)
Variable machine cost per scan (₹ 1,60,000 / 2000 hours × 1.8 hours)	144.00
Special technology	137.50
Variable cost per scan	281.50
Variable cost per satisfactory scan (₹ 281.50/0.94)	299.47

The relevant costs per satisfactory scan are cheaper on Machine MR59 and therefore brain scans should be undertaken on said machine.

Q28. May 2022 RTP

A Limited manufactures three different products and the following information has been collected from the books of accounts:

	Products			
	S	T	U	
Sales Mix	25%	35%	40%	
Selling Price	₹ 600	₹800	₹400	
Variable Cost	₹ 300	₹400	₹240	
Total Fixed Costs				₹ 36,00,000
Total Sales				₹ 1,20,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products			
	S	T	M	
Sales Mix	40%	35%	25%	
Selling Price	₹ 600	₹800	₹600	
Variable Cost	₹ 300	₹400	₹300	
Total Fixed Costs				₹ 36,00,000
Total Sales				₹ 1,28,00,000

Required:

- COMPUTE the PV ratio, total contribution, profit and Break-even sales for the existing product mix.
- COMPUTE the PV ratio, total contribution, profit and Break-even sales for the proposed product mix

Answer

(i) Computation of PV ratio, contribution, profit and break-even sales for existing product mix

	Products			Total
	S	T	U	
Selling Price	₹ 600	₹800	₹400	
Less: Variable Cost	₹ 300	₹400	₹240	
Contribution per unit (₹)	300	400	160	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	12.5%		16%	16%
Contribution per rupee of sales (P/V Ratio × Sales Mix)		1		
		7.		₹ 55,20,000
Present Total Contribution (₹1,20,00,000 × 46%)		5		₹ 36,00,000
Less: Fixed Costs		%		₹ 19,20,000
Present Profit				₹ 78,26,087
Present Break Even Sales (₹36,00,000/0.46)				

(ii) Computation of PV ratio, contribution, profit and break-even sale for proposed product mix

	Products	Total
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	S	T	M	
Selling Price	₹ 600	₹800	₹600	
Less: Variable Cost	₹ 300	₹400	₹300	
Contribution per unit (₹)	300	400	300	
P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	20%		12.5%	50%
Contribution per rupee of sales (P/V Ratio × Sales Mix)		1		
Present Total Contribution (₹1,28,00,000 × 50%)		7.5%		₹ 64,00,000
Less: Fixed Costs				₹ 28,00,000
Present Profit				₹ 36,00,000
Present Break Even Sales (₹36,00,000/0.50)				₹ 72,00,000

Q29. Nov 2021 RTP

A company has three factories situated in North, East and South with its Head Office in Mumbai. The Management has received the following summary report on the operations of each factory for a period:

(₹ in '000)

Factory	Sales		Profit	
	Actual	Over / (Under) Budget	Actual	Over / (Under) Budget
North	1,100	(400)	135	(180)
East	1,450	150	210	90
South	1,200	(200)	330	(110)

CALCULATE the following for each factory and for the company as a whole for the period:

- Fixed Cost
- Break-even Sales

Answer

Computation of Profit Volume Ratio

(₹ in '000)

Factory	Sales			Profit			P/V Ratio Change in Profit Change in Sales
	Actual	Over / (Under) Budget	Budgeted Sales	Actual	Over / (Under) Budget	Budgeted Profit	
North	1,100	(400)	1,500	135	(180)	315	45%
East	1,450	150	1,300	210	90	120	60%
South	1,200	(200)	1,400	330	(110)	440	55%

(i) Computation of Fixed Costs (₹ in '000)

Factory	Actual Sales	P/V Ratio	Contribution	Actual Profit	Fixed Cost
	(1)	(2)	(3) = (1) × (2)	(4)	(5) = (3) - (4)
North	1,100	45%	495	135	360
East	1,450	60%	870	210	660
South	1,200	55%	660	330	330
Total	3,750		2,025	675	1,350

(ii) Computation of Break-Even Sales

Factory	Fixed Cost	P/V Ratio	Break-even Sales
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	(a)	(b)	(a) / (b)
North	360	45%	800
East	660	60%	1,100
South	330	55%	600
			2,500

$$\begin{aligned}\text{Break-even Sales (Company as Whole)} &= \frac{\text{Fixed Cost}}{\text{Composite P / V Ratio} *} \\ &= \frac{\text{₹ 13,50,000}}{54\%} = \text{₹ 25,00,000}\end{aligned}$$

$$\begin{aligned}\text{*Composite P/V Ratio} &= \frac{\text{Total Contribution}}{\text{Total Actual sales}} \\ &= \frac{2,025}{3,750} = 54\%\end{aligned}$$

Q30. May 2021 RTP

Aditya Limited manufactures three different products and the following information has been collected from the books of accounts

	Products			
	S	T	U	
Sales Mix	35%	35%	30%	
Selling Price	₹ 300	₹400	₹200	
Variable Cost	₹ 150	₹200	₹120	
Total Fixed Costs				₹ 18,00,000
Total Sales				₹ 60,00,000

The company has currently under discussion, a proposal to discontinue the manufacture of Product U and replace it with Product M, when the following results are anticipated:

	Products			
	S	T	M	
Sales Mix	50%	25%	25%	
Selling Price	₹ 300	₹400	₹300	
Variable Cost	₹ 150	₹200	₹150	
Total Fixed Costs				₹ 18,00,000
Total Sales				₹ 64,00,000

Required:

- COMPUTE the PV ratio, total contribution, profit and Break-even sales for the existing product mix.
- COMPUTE the PV ratio, total contribution, profit and Break-even sales for the proposed product mix

Answer

(i) Computation of PV ratio, contribution, profit and break-even sales for existing product mix

	Products			Total
	S	T	U	
Selling Price	₹ 300	₹400	₹200	
Less: Variable Cost	₹ 150	₹200	₹120	
Contribution per unit (₹)	150	200	80	
P/V Ratio (Contribution/Selling price)	50%	50%	40%	
Sales Mix	17.5%	17.5%	12%	47%
Contribution per rupee of sales (P/V Ratio × Sales Mix)				₹ 28,20,000

Present Total Contribution (₹1,20,00,000 × 46%)				
Less: Fixed Costs				₹ 18,00,000
Present Profit				₹ 10,20,000
Present Break Even Sales (₹18,00,000/0.47)				₹ 38,29,787

(ii) Computation of PV ratio, contribution, profit and break-even sale for proposed product mix

	Products			Total
	S	T	M	
Selling Price	₹ 300	₹400	₹300	
Less: Variable Cost	₹ 150	₹200	₹150	
Contribution per unit (₹)	150	200	150	
P/V Ratio (Contribution/Selling price)	50%	50%	50%	
Sales Mix	25%	12.5%	12.5%	50%
Contribution per rupee of sales (P/V Ratio × Sales Mix)				₹ 32,00,000
Proposed Total Contribution (₹1,28,00,000 × 50%)				₹ 18,00,000
Less: Fixed Costs				₹ 14,00,000
Proposed Profit				₹ 36,00,000
Proposed Break Even Sales (₹18,00,000/0.50)				

Q31. Nov 2020 RTP

J Ltd. manufactures a Product-Y. Analysis of income statement indicated a profit of ₹ 250 lakhs on a sales volume of 5,00,000 units. Fixed costs are ₹1,000 lakhs which appears to be high. Existing selling price is ₹680 per unit. The company is considering revising the profit target to ₹ 700 lakhs. You are required to COMPUTE –

- Break- even point at existing levels in units and in rupees.
- The number of units required to be sold to earn the target profit.
- Profit with 10% increase in selling price and drop in sales volume by 10%.
- Volume to be achieved to earn target profit at the revised selling price as calculated in (ii) above, if a reduction of 10% in the variable costs and ₹ 170 lakhs in the fixed cost is envisaged

Answer

Sales Volume 5,00,000 Units

Computation of existing contribution

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	680	3,400
Fixed Cost	200	1,000
Profit	50	250
Contribution	250	1,250
Variable Cost (Sales – Contribution)	430	2,150

$$(i) \text{ Break even sales in units} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}} = \frac{\text{₹ 10,00,00,000}}{\text{₹ 250}} = 4,00,000 \text{ units}$$

$$\text{Break even sales in rupees} = 4,00,000 \text{ units} \times \text{₹ 680} = \text{₹ 2,720 lakhs}$$

OR

$$P/V \text{ Ratio} = \frac{250}{680} \times 100 = 36.76\%$$

$$B.EP \text{ (Rupees)} = \frac{\text{Fixed Cost}}{P/V \text{ Ratio}} = \frac{10,00,00,000}{36.76\%} = ₹ 2,720 \text{ lakhs (approx.)}$$

(ii) Number of units sold to achieve a target profit of ₹700 lakhs:

$$\begin{aligned} \text{Desired Contribution} &= \text{Fixed Cost} + \text{Target Profit} \\ &= 1,000 \text{ L} + 700 \text{ L} = 1,700 \text{ L} \end{aligned}$$

$$\begin{aligned} \text{Number of units to be sold} &= \frac{\text{Desired Contribution}}{\text{Contribution per unit}} \\ &= \frac{17,00,00,000}{250} = 6,80,000 \text{ units} \end{aligned}$$

(iii) Profit if selling price is increased by 10% and sales volume drops by 10%:

$$\text{Existing Selling Price per unit} = ₹ 680$$

$$\text{Revised selling price per unit} = ₹ 680 \times 110\% = ₹ 748$$

$$\text{Existing Sales Volume} = 5,00,000 \text{ units}$$

$$\text{Revised sales volume} = 5,00,000 \text{ units} - 10\% \text{ of } 5,00,000 = 4,50,000 \text{ units.}$$

Statement of profit at sales volume of 4,50,000 units @ ₹ 748 per unit

Particulars	Per unit (₹)	Total (₹ In lakhs)
Sales	748	3,366
Less: Variable Costs	430	1,935
Contribution	318	1,431
Less: Fixed Cost		1,000
Profit		431

(iv) Volume to be achieved to earn target profit of ₹700 lakhs with revised selling price and reduction of 10% in variable costs and ₹170 lakhs in fixed cost:

$$\text{Revised selling price per unit} = ₹ 748$$

$$\text{Variable costs per unit existing} = ₹ 430$$

Revised Variable Costs

$$\text{Reduction of 10\% in variable costs} = ₹ 430 - 10\% \text{ of } 430$$

$$= ₹ 430 - ₹ 43$$

$$= ₹ 387$$

$$\text{Total Fixed Cost (existing)} = ₹ 1,000 \text{ lakhs}$$

$$\text{Reduction in fixed cost} = ₹ 170 \text{ lakhs}$$

$$\text{Revised fixed cost} = ₹ 1,000 \text{ lakhs} - ₹ 170 \text{ lakhs} = ₹ 830 \text{ lakhs}$$

$$\text{Revised Contribution (unit)} = \text{Revised selling price per unit} - \text{Revised Variable Costs per units}$$

$$\text{Revised Contribution per unit} = ₹ 748 - ₹ 387 = ₹ 361$$

$$\text{Desired Contribution} = \text{Revised Fixed Cost} + \text{Target Profit}$$

$$= ₹ 830 \text{ lakhs} + ₹ 700 \text{ lakhs} = ₹ 1,530 \text{ lakhs}$$

$$\text{No. of units to be sold} = \frac{\text{Desired Contribution}}{\text{Contribution per unit}}$$

$$= \frac{₹ 15,30,00,000}{₹ 361}$$

$$= 4,23,823 \text{ unit}$$

Q32. May 2020 RTP | May 2024 RTP

A Ltd. manufacture and sales its product R-9. The following figures have been collected from cost records of last year for the product R-9:

Elements of Cost	Variable Cost portion	Fixed Cost
Direct Material	30% of Cost of Goods Sold	--
Direct Labour	15% of Cost of Goods Sold	--
Factory Overhead	10% of Cost of Goods Sold	₹ 2,30,000
Administration Overhead	2% of Cost of Goods Sold	₹ 71,000
Selling & Distribution	4% of Cost of Sales	₹ 68,000

Overhead		
----------	--	--

Last Year 5,000 units were sold at ₹185 per unit. From the given DETERMINE the followings:

- Break-even Sales (in rupees)
- Profit earned during last year
- Margin of safety (in %)
- Profit if the sales were 10% less than the actual sales.

(Assume that Administration Overhead is related with production activity)

Answer

Working Notes:

(1) Calculation of Cost of Goods Sold (COGS):

$$\begin{aligned}
 \text{COGS} &= \text{DM} + \text{DL} + \text{FOH} + \text{AOH} \\
 \text{COGS} &= \{0.3 \text{ COGS} + 0.15 \text{ COGS} + (0.10 \text{ COGS} + ₹ 2,30,000) + (0.02 \text{ COGS} + ₹ 71,000)\} \\
 \text{Or, COGS} &= 0.57 \text{ COGS} + ₹ 3,01,000 \\
 \text{Or, COGS} &= \frac{₹ 3,01,000}{0.43} = ₹ 7,00,000
 \end{aligned}$$

(2) Calculation of Cost of Sales (COS):

$$\begin{aligned}
 \text{COS} &= \text{COGS} + \text{S\&DOH} \\
 \text{COS} &= \text{COGS} + (0.04 \text{ COS} + ₹ 68,000) \\
 \text{Or, COS} &= ₹ 7,00,000 + (0.04 \text{ COS} + ₹ 68,000) \\
 \text{Or, COS} &= \frac{₹ 7,68,000}{0.96} = ₹ 8,00,000
 \end{aligned}$$

(3) Calculation of Variable Costs:

Direct Material- (0.30 × ₹ 7,00,000)	₹ 2,10,000
Direct Labour- (0.15 × ₹ 7,00,000)	₹ 1,05,000
Factory Overhead- (0.10 × ₹ 7,00,000)	₹ 70,000
Administration OH- (0.02 × ₹ 7,00,000)	₹ 14,000
Selling & Distribution OH (0.04 × ₹ 8,00,000)	<u>₹ 32,000</u>
	<u>₹ 4,31,000</u>

(4) Calculation of total Fixed Costs:

Factory Overhead	- ₹ 2,30,000
Administration OH	- ₹ 71,000
Selling & Distribution OH	- <u>₹ 68,000</u>
	<u>₹ 3,69,000</u>

(5) Calculation of P/V Ratio:

$$\begin{aligned}
 \text{P/V Ratio} &= \frac{\text{Contribution}}{\text{Sales}} \times 100 \\
 &= \frac{\text{Sales} - \text{Variable Costs}}{\text{Sales}} \times 100 \\
 &= \frac{(₹ 185 \times 5,000 \text{ units}) - 4,31,000}{₹ 185 \times 5,000 \text{ units}} \times 100 = 53.41\%
 \end{aligned}$$

(i) Break-Even Sales

$$\begin{aligned}
 &= \frac{\text{Fixed Costs}}{\text{P / V Ratio}} \\
 &= \frac{₹ 3,69,000}{53.41\%} = ₹ 6,90,882
 \end{aligned}$$

(ii) Profit earned during the last year

$$\begin{aligned}
 &= (\text{Sales} - \text{Total Variable Costs}) - \text{Total Fixed Costs} \\
 &= (₹ 9,25,000 - ₹ 4,31,000) - ₹ 3,69,000 \\
 &= ₹ 1,25,000
 \end{aligned}$$

(iii) Margin of Safety (%)

$$= \frac{\text{Sales} - \text{Breakeven sales}}{\text{Sales}} \times 100$$

$$= \frac{₹ 9,25,000 - ₹ 6,90,882}{₹ 9,25,000} \times 100$$

$$= 25.31\%$$

(iv) Profit if the sales were 10% less than the actual sales:

$$\text{Profit} = 90\% (₹9,25,000 - ₹4,31,000) - ₹3,69,000$$

$$= ₹4,44,600 - ₹3,69,000 = ₹75,600$$

Q33. Nov 2019 RTP

PVC Ltd sold 55,000 units of its product at ₹375 per unit. Variable costs are ₹175 per unit (manufacturing costs of ₹140 and selling cost ₹35 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹65,00,000 (including depreciation of ₹15,00,000). There is no beginning or ending inventories.

Required:

- COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.
- COMPUTE the P/V ratio.
- COMPUTE the number of units that must be sold to earn an income (EBIT) of ₹5,00,000.
- COMPUTE the sales level achieve an after-tax income (PAT) of ₹5,00,000, assume 40% corporate tax rate

Answer

(i) Contribution = ₹375 - ₹175 = ₹200 per unit.

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}}$$

$$= \frac{₹ 65,00,000}{₹ 200} = 32,500 \text{ units}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{cash Fixed cost}}{\text{Contribution margin per unit}}$$

$$= \frac{₹ 50,00,000}{₹ 200} = 25,000 \text{ units.}$$

(ii) P/V ratio

$$= \frac{\text{Contribution/ unit}}{\text{Selling Price / unit}} \times 100$$

$$= \frac{₹ 200}{₹ 375} \times 100 = 53.33\%$$

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹5,00,000

$$= \frac{\text{Fixed cost} + \text{Desired EBIT level}}{\text{Contribution margin per unit}}$$

$$= \frac{65,00,000 + 5,00,000}{200} = 35,000 \text{ units}$$

(iv) After Tax Income (PAT) = ₹5,00,000

Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{₹ 5,00,000}{60} \times 100$$

$$= ₹8,33,333$$

Estimate Sales Level

$$= \frac{\text{FixedCost} + \text{DesiredProfit}}{\text{P/V ratio}}$$

Or,

$$= \frac{\text{FixedCost} + \text{DesiredProfit}}{\text{Contribution per unit}} \times \text{Selling Price per unit}$$

$$= \frac{₹ 65,00,000 + ₹ 8,33,333}{53.33\%}$$

$$= ₹1,37,50,859$$

Q34. May 2019 RTP

MNP Ltd sold 2,75,000 units of its product at ₹ 375 per unit. Variable costs are ₹ 175 per unit (manufacturing costs of ₹140 and selling cost ₹35 per unit). Fixed costs are incurred uniformly throughout the year and amount to ₹3,50,00,000 (including depreciation of ₹ 1,50,00,000). there are no beginning or ending inventories.

Required:

- COMPUTE breakeven sales level quantity and cash breakeven sales level quantity.

- ii. COMPUTE the P/V ratio.
- iii. COMPUTE the number of units that must be sold to earn an income (EBIT) of ₹ 25,00,000.
- iv. COMPUTE the sales level achieve an after-tax income (PAT) of ₹ 25,00,000. Assume 40% corporate Income Tax rate.

Answer

(i) Contribution = ₹375 - ₹175 = ₹200 per unit.

$$\text{Break even Sales Quantity} = \frac{\text{Fixed cost}}{\text{Contribution margin per unit}} \\ = \frac{\text{₹ 3,50,00,000}}{\text{₹ 200}} = 1,75,000 \text{ units}$$

$$\text{Cash Break even Sales Qty} = \frac{\text{cash Fixed cost}}{\text{Contribution margin per unit}} \\ = \frac{\text{₹ 2,00,00,000}}{\text{₹ 200}} = 1,00,000 \text{ units.}$$

$$\text{(ii) P/V ratio} = \frac{\text{Contribution/ unit}}{\text{Selling Price / unit}} \times 100 \\ = \frac{\text{₹ 200}}{\text{₹ 375}} \times 100 = 53.33\%$$

(iii) No. of units that must be sold to earn an Income (EBIT) of ₹25,00,000

$$= \frac{\text{Fixed cost + Desired EBIT level}}{\text{Contribution margin per unit}} \\ = \frac{3,50,00,000 + 25,00,000}{200} = 1,87,500 \text{ units}$$

(iv) After Tax Income (PAT) = ₹25,00,000

Tax rate = 40%

$$\text{Desired level of Profit before tax} = \frac{\text{₹ 25,00,000}}{60} \times 100 \\ = \text{₹ 41,66,667}$$

$$\text{Estimate Sales Level} = \frac{\text{FixedCost + DesiredProfit}}{\text{P/V ratio}} \\ \text{Or,} \\ = \frac{\text{FixedCost + DesiredProfit}}{\text{Contribution per unit}} \times \text{Selling Price per unit} \\ = \frac{\text{₹ 3,50,00,000 + ₹ 41,66,667}}{53.33\%} \\ = \text{₹ 7,34,42,091}$$

Q35. Nov 2018 RTP

A company sells its product at ₹ 15 per unit. In a period, if it produces and sells 8,000 units, it incurs a loss of ₹ 5 per unit. If the volume is raised to 20,000 units, it earns a profit of ₹ 4 per unit. CALCULATE break-even point both in terms of rupees as well as in units.

Answer

We know that $S - V = F + P$ (S - Sales, V - Variable cost, F - Fixed cost and P - Profit/loss)

Suppose variable cost = x per unit

Fixed Cost = y

When sales is 8,000 units, then

$$15 \times 8,000 - 8,000x = y - 40,000 \dots\dots\dots (1)$$

When sales volume raised to 20,000 units, then

$$15 \times 20,000 - 20,000x = y + 80,000 \dots\dots\dots (2)$$

$$\text{Or, } 1,20,000 - 8,000x = y - 40,000 \dots\dots\dots (3)$$

$$\text{And } 3,00,000 - 20,000x = y + 80,000 \dots\dots\dots (4)$$

From (3) & (4) we get $x = ₹ 5$.

Variable cost per unit = ₹ 5

Putting this value in 3rd equation:

$$1,20,000 - (8,000 \times 5) = y - 40,000$$

$$\text{or } y = ₹ 1,20,000$$

$$\text{Fixed Cost} = ₹ 1,20,000$$

$$\begin{aligned} \text{P/V ratio} &= \frac{S - V}{S} = \frac{15 - 5}{15} \times 100 \\ &= \frac{200}{3} = 66 \frac{2}{3} \% . \end{aligned}$$

Suppose break-even sales = x

$15x - 5x = 1,20,000$ (at BEP, contribution will be equal to fixed cost)

$x = 12,000$ units.

Or Break-even sales in units = 12,000

Break-even sales in rupees = $12,000 \times ₹ 15 = ₹ 1,80,000$

Q36. May 2018 RTP

A company manufactures two types of herbal product, A and B. Its budget shows profit figures after apportioning the fixed joint cost of ₹15 lacs in the proportion of the numbers of units sold. The budget for 2018, indicates:

	A	B
Profit (₹)	1,50,000	30,000
Selling Price / unit (₹)	200	120
P/V Ratio (%)	40	50

Required:

COMPUTE the best option among the following, if the company expects that the number of units to be sold would be equal.

- (i) Due to exchange in a manufacturing process, the joint fixed cost would be reduced by 15% and the variables would be increased by $7\frac{1}{2}\%$.
- (ii) Price of A could be increased by 20% as it is expected that the price elasticity of demand would be unity over the range of price.
- (iii) Simultaneous introduction of both the option, viz, (i) and (ii) above.

Answer

Option (i)

Increase in profit when due to change in a manufacturing process there is reduction in joint fixed cost and increase in variable costs.

	(₹)
Revised Contribution from 12,000 units of A due to 7.5% increase in Variable Cost {12,000 units $\times$ (₹200 - ₹129)}	8,52,000
Revised Contribution from 12,000 units of B due to 7.5% increase in Variable Cost {12,000 units $\times$ (₹120 - ₹64.50)}	6,66,000
Total Revised Contribution	15,18,000
Less: Fixed Cost (₹15,00,000 - 15% $\times$ ₹15,00,000)	12,75,000
Revised Profit	2,43,000
Less: Existing Profit	1,80,000
Increase in Profit	63,000

Option (ii)

Increase in profit when the price of product A increased by 20% and the price elasticity of its demand would be unity over the range of price.

	(₹)
Budgeted Revenue from Product A (12,000 units $\times$ ₹200)	24,00,000
Revised Demand (in units) (₹24,00,000 / ₹240)	10,000
Revised Contribution (in ₹) [10,000 units $\times$ (₹240 - ₹120)]	12,00,000
Less: Existing Contribution (12,000 units $\times$ ₹80)	9,60,000
Increase in Profit (Contribution)	2,40,000

***Note:** Since Price Elasticity of Demand is 1, therefore the Revenue in respect of Products will remain same.

Option (iii)

Increase in profit on the simultaneous introduction of above two options.

	(₹)
Revised Contribution from Product A [10,000 units × (₹240 – ₹129)]	11,10,000
Revised Contribution from Product B [12,000 units × (₹120 – ₹64.50)]	6,66,000
Total Revised Contribution	17,76,000
Less: Revised Fixed Cost	12,75,000
Revised Profit	5,01,000
Less: Existing Profit	1,80,000
Increase in Profit	3,21,000

A comparison of increase in profit figures under above three options clearly indicates that the option (iii) is the best as it increases the profit of the concern by ₹3,21,000.

Note: The budgeted profit / (loss) for 2018 in respect of products A and B should be ₹ 2,10,000 and (₹30,000) respectively instead of ₹ 1,50,000 and ₹ 30,000.

Workings**1. Contribution per unit of each product:**

	Product	
	A (₹)	B (₹)
Contribution per unit (Sales × P/V Ratio)	80 (₹200 × 40%)	60 (₹120 × 50%)

2. Number of units to be sold:

Total Contribution – Fixed Cost = Profit

Let x be the number of units of each product sold, therefore:

$(80x + 60x) - ₹15,00,000 = ₹1,50,000 + ₹30,000$

Or $x = 12,000$ units

Q1. May 2024 Exam, 4 marks

Discuss Feedback Control and Feedforward Control system of budgetary control.

Answer:

There are two types of budgetary control system based on timing of action:

Feedback Control: The feedback system of budgetary control, the actual results for the budgeted period are collected and compared with the budgeted figures. The exercise of variance identification is done after the completion of the budget period. The variances are reported and based on the report corrective actions are taken, responsibility is fixed and based on experience, modification in future targets is implemented. As the name suggests, it is an Ex-post Corrective control system of budget.

This system of budgetary control is common in organisations where Management Information System (MIS) is not so robust and where data is obtained only after the finalisation of books of account. Though this type of control system is less expensive to maintain but has limitations.

Feedforward Control: This is the opposite of feedback control system of budgetary control. It is Ex-Ante Preventive control mechanism of budgetary control. The budgets are set at the inception of the budgeted period and the actual results are continuously monitored and compared. The targets are kept realistic as far as possible and the targets are reviewed and reset if necessary.

This budgetary control system requires a robust MIS supported by integrated ERP system enabling an entity to get data as and when desired basis. This system is very expensive and beneficial for the organisations where the business environment is dynamic and information has important role in getting edge in competition and today's data warfare.

Q2. Nov 2023 Exam, 10 marks

HL Limited produces and sells four varieties of beverage. The past data shows different demand patterns for various quarters during the year. The sales quantity and selling price for the month of September 2023 is as follows:

	Sales Quantity	Selling Price per unit
Hot Coffee	1,40,000 Units	₹ 20/-
Cold Coffee	3,40,000 Units	₹ 40/-
Fruit Juice	4,20,000 Units	₹ 20/-
Carbonated Soft Drink	2,70,000 units	₹ 20/-

For the quarter October to December 2023, it is estimated that due to climate changes the demand for Hot Coffee would increase every month by 50% of the previous month and the demand for Cold Coffee would decrease every month by 30% of the previous month. The demand for Fruit Juice would decrease by 20% in the month of October 2023 and thereafter it will remain constant. HL Limited would be able to sell only 60,000 units, 50,000 units and 30,000 units of Carbonated Soft Drink respectively during the months of October, November and December 2023. There would be no change in the selling price of all the products during the next quarter.

Standard Quantity of closing stock for the period September 2023 to December 2023 is as follows:

	Hot Coffee	Cold Coffee	Fruit Juice	Carbonated Soft Drink
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September 2023	12,000	13,000	11,000	7,500
October 2023	15,000	14,000	12,000	5,500
November 2023	13,000	15,000	10,000	6,000
December 2023	11,000	16,000	13,000	7,000

You are required to prepare a Production Budget (in units) and Sales Budget (in units and sales value) for the months of October, November and December 2023.

Answer:

Production Budget (in units)

Particulars	Hot Coffee	Cold Coffee	Fruit Juice	Carbonated Soft Drink
October 2023				
Sales*	2,10,000	2,38,000	3,36,000	60,000
Add: Closing stock	15,000	14,000	12,000	5,500
Total Quantity Required	2,25,000	2,52,000	3,48,000	65,500
Less: Opening stock	12,000	13,000	11,000	7,500
Production	2,13,000	2,39,000	3,37,000	58,000
November 2023				
Sales*	3,15,000	1,66,600	3,36,000	50,000
Add: Closing stock	13,000	15,000	10,000	6,000
Total Quantity Required	3,28,000	1,81,600	3,46,000	56,000
Less: Opening stock	15,000	14,000	12,000	5,500
Production	3,13,000	1,67,600	3,34,000	50,500
December 2023				
Sales*	4,72,500	1,16,620	3,36,000	30,000
Add: Closing stock	11,000	16,000	13,000	7,000
Total Quantity Required	4,83,500	1,32,620	3,49,000	37,000
Less: Opening stock	13,000	15,000	10,000	6,000
Production	4,70,500	1,17,620	3,39,000	31,000

sales units are taken from sales budget

Sales Budget (in Units and sales value)

Particulars	Hot Coffee	Cold Coffee	Fruit Juice	Carbonated Soft Drink
October 2023(in units)	2,10,000 [1,40,000 + (1,40,000 x 50%)]	2,38,000 [3,40,000 -(3,40,000 x 30%)]	3,36,000 [420,000 -(4,20,000x20%)]	60,000
October 2023 (Sales Value in ₹)	42,00,000 (2,10,000x ₹20)	95,20,000 (2,38,000x ₹40)	67,20,000 (3,36,000 x ₹20)	12,00,000 (60,000x ₹20)
November 2023(in units)	3,15,000 [2,10,000 +(2,10,000 x 50%)]	1,66,600 [2,38,000 -(2,38,000 x 30%)]	3,36,000	50,000
November 2023 (Sales Value in ₹)	63,00,000 (3,15,000 x ₹20)	66,64,000 (1,66,600 x ₹40)	67,20,000 (3,36,000 x ₹20)	10,00,000 (50,000 x ₹20)
December 2023(in units)	4,72,500 [3,15,000 +(3,15,000 x 50%)]	1,16,620 [1,66,600 -(1,66,600 x 30%)]	3,36,000	30,000

December 2023 (Sales Value in ₹)	94,50,000 (4,72,500 x ₹ 20)	46,64,800 (1,16,620 x ₹ 40)	67,20,000 (3,36,000 x ₹ 20)	6,00,000 (30,000 x ₹ 20)
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Sales Budget can also be presented in following way:

	Oct 2023		Nov 2023		Dec 2023	
	Quantity (units)	Amount (₹)	Quantity (units)	Amount (₹)	Quantity (units)	Amount (₹)
Hot Coffee @ ₹ 20per unit	2, 10,000	42,00,000	3,15,000	63,00,000	4,72,500	94,50,000
Cold Coffee @ ₹ 40per unit	2,38,000	95,20,000	1,66,600	66,64,000	1,16,620	46,64,800
Fruit Juice @ ₹ 20per unit	3,36,000	67,20,000	3,36,000	67,20,000	3,36,000	67,20,000
Carbonated SoftDrink @ ₹ 20 per unit	60,000	12,00,000	50,000	10,00,000	30,000	6,00,000
		2,16,40,000		2,06,84,000		2,14,34,800

Q3. May 2023 Exam, 10 marks

PQR Limited manufactures three products - Product X, Product Y and Product Z. The output for the current year is 2,50,000 units of Product X, 2,80,000 units of Product Y and 3,20,000 units of Product Z respectively.

Selling price of Product X is 1.25 times of Product Z whereas Product Y can be sold at double the price at which product Z can be sold. Product Z can be sold at a profit of 20% on its marginal cost.

Other information are as follows:

	Product X	Product Y	Product Z
Direct Material Cost (Per unit)	₹ 20	₹ 20	₹ 20
Direct Wages Cost (per unit)	₹ 16	₹ 24	₹ 16

Raw material used for manufacturing all the three products is the same. Direct Wages are paid @ ₹ 4 per labour hour,

Total overhead cost of the company is ₹ 52,80,000 for the year, out of which ₹ 1 per labour hour is variable and the rest is fixed.

In the next year it is expected that sales of product X and product Z will increase by 12% and 15% respectively and sale of product Y will decline by 5%. The total overhead cost of the company for the next year is estimated at ₹ 55,08,000. The variable cost of ₹ 1 per labour hour remains unchanged.

It is anticipated that all other costs will remain same for the next year and there is opening and closing stock. Selling Price per unit of each product will remain unchanged in the next year.

Required:

Prepare a budget showing the current position and the position for the next year clearly indicating the total product-wise contribution and profit for the company as a whole.

Answer:

(i) Budget showing current position of total product wise contribution and profitability

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Direct material cost (per unit)	20	20	20	

B	Direct wages cost (per unit)	16	24	16	
C	Variable overhead per unit (Refer WN-1)	4	6	4	
D	Total variable cost/ Marginal cost per unit [A+B+C]	40	50	40	
E	Add: Profit [20% of D]	-	-	8	
F	Selling price unit [D+E]	-	-	48	
G	Price weight	1.25	2	1	
H	Selling price per unit [Selling price of Product Z × G]	60	96	48	
I	Contribution per unit [H-D]	20	46	8	
J	Quantity to be sold	2,50,000	2,80,000	3,20,000	
K	Total Contribution [J×I]	50,00,000	1,28,80,000	25,60,000	2,04,40,000
L	Fixed Overheads [Refer WN-1]				13,20,000
M	Profit				1,91,20,000

Working Notes:

1. Segregation of Overheads into variable and fixed in current year

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Total overhead cost	-	-	-	52,80,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	
C	Quantity produced	2,50,000	2,80,000	3,20,000	
D	Total variable overhead cost [B×C]	10,00,000	16,80,000	12,80,000	39,60,000
E	Fixed overhead cost [A-D]				13,20,000

(ii) Budget showing next year's position of total product wise contribution and profitability

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Selling price per unit	60	96	48	
B	Contribution per unit	20	46	8	
C	Quantity to be sold	2,80,000 [112% of 2,50,000]	2,66,000 [95% of 2,80,000]	3,68,000 [115% of 3,20,000]	
D	Total Contribution [B×C]	56,00,000	1,22,36,000	29,44,000	2,07,80,000
	Fixed Overheads [Refer WN-2]				13,20,000
	Profit				1,94,60,000

Working Notes:

2. Segregation of Overheads into variable and fixed in next year

	Particulars	Product X (₹)	Product Y (₹)	Product Z (₹)	Total (₹)
A	Total overhead cost	-	-	-	55,08,000
B	Labour hour per unit [Direct wages Cost ÷ Re.1]	4	6	4	

C	Quantity produced	2,80,000	2,66,000	3,68,000	
D	Total variable overhead cost [B×C]	11,20,000	15,96,000	14,72,000	41,88,000
E	Fixed overhead cost [A-D]				13,20,000

Q4. Nov 2022 Exam, 5 marks

Define Budget Manual. What are the salient features of Budget Manual?

Answer

Budget Manual: The budget manual is a booklet specifying the objectives of an organisation in relation to its strategy. The budget is made to decide how much an organisation would earn and spend and in what manner. In the budget, the organisation sets its priorities too.

Effective budgetary planning relies on the provision of adequate information to the individuals involved in the planning process. Many of these information needs are contained in the budget manual. A budget manual is a collection of documents that contains key information for those involved in the planning process.

CIMA London defines budget manual as, 'A document which sets out the responsibilities of the persons engaged in, the routines of, and the forms and records required for, budgetary control'.

Contents of a budget manual: Typical budget manual may include the following:

- A statement regarding the objectives of the organisation and how they can be achieved through budgetary control;
- A statement about the functions and responsibilities of each executive, both regarding preparation and execution of budgets;
- Procedures to be followed for obtaining the necessary approval of budgets. The authority of granting approval should be stated in explicit terms. Whether, one two or more signatures are required on each document should be clearly stated;
- A form of organisation chart to show who are responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- A timetable for the preparation of each budget.
- The manner of scrutiny and the personnel to carry it out;
- Reports, statements, forms and other record to be maintained.
- The accounts classification to be employed. It is necessary that the framework within which the costs, revenue and other financial accounts are classified must be identical both in the accounts and budget department.
- The reporting of the remedial action.
- The manner in which budgets, after acceptance and issuance, are to be revised or amended, these are included in budgets and on which action can be taken only with the approval of top management
- This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A list of the organization's account codes, with full explanations of how to use them.
- Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc.

Q5. Nov 2022 Exam, 10 marks

SR Ltd. is a manufacturer of Garments. For the first three months of financial year 2022-23 commencing on 1st April 2022, production will be constrained by direct labour. It is estimated that only 12,000 hours of direct labour hours will be available in each month.

For market reasons, production of either of the two garments must be at least 25% of the production of the other. Estimated cost and revenue per garment are as follows:

	Shirt (₹)	Short (₹)
Sales price	60	44
Raw Materials		

Fabric @12 per metre	24	12
Dyes and cotton	6	4
Direct labour @ 8 per hour	8	4
Fixed Overhead @ 4 per hour	4	2
Profit	18	22

From the month of July 2022 direct labour will no longer be a constraint. The company expects to be able to sell 15,000 shirts and 20,000 shorts in July, 2022. There will be no opening stock at the beginning of July 2022.

Sales volumes are expected to grow at 10% per month cumulatively thereafter throughout the year. Following additional information is available:

- The company intends to carry stock of finished garments sufficient to meet 40% of the next month's sale from July 2022 onwards.
- The estimated selling price will be same as above.

Required:

- Calculate the number of shirts and shorts to be produced per month in the first quarter of financial year 2022-2023 to maximize company's profit.
- Prepare the following budgets on a monthly basis for July, August and September 2022:
 - Sales budget showing sales units and sales revenue for each product.
 - Production budget (in units) for each product

Answer

I. Calculation of number of shirts & shorts to be produced per month:

Contribution per labour hour:

		Shirts (₹)	Shorts (₹)
A	Sales Price per unit	60	44
B	Variable Cost:		
	- Raw materials	30	16
	- Direct labour	8	4
		38	20
C	Contribution per unit [A-B]	22	24
D	Labour hour per unit	1 hour	0.5 hour
E	Contribution per labour hour [C÷D]	22	48

Production plan for the first three months:

Since, Shorts has the higher Contribution per labour hour, it will be made first. Shirts will be 25% of Shorts. The quantity will be determined as below:

Let the Quantity of Shorts be X and Shirts will be 0.25 X, then

(Qty. of Shorts × labour hour per unit) + (Qty. of Shirts × labour hour per unit) = Total labour hours available

Or, $(X \times 0.5 \text{ hour}) + (0.25X \times 1 \text{ hour}) = 12,000 \text{ hours}$

Or, $0.5X + 0.25X = 12,000$

Or, $0.75X = 12,000$

Or, $X = 12,000 \div 0.75$

= 16,000 units of Shorts

Therefore, for Shirts = 25% of 16,000 units

= 4,000 units

Production per month for the first quarter will be:

Shorts- 16,000 units &

Shirts- 4,000 units

II. (i) Sales Budget for the month of July, August & September 2022:

		July 2022		August 2022		September 2022	
		Shirts	Shorts	Shirts	Shorts	Shirts	Shorts
A	Sales demand	15,000	20,000	16,500	22,000	18,150	24,200
B	Selling price per unit (₹)	60	44	60	44	60	44
C	Sales Revenue (₹)	9,00,000	8,80,000	9,90,000	9,68,000	10,89,000	10,64,800

(ii) Production budget for the month of July, August & September 2022:

		July 2022		August 2022		September 2022		October 2022	
		Shirts	Shorts	Shirts	Shorts	Shirts	Shorts	Shirts	Shorts
A	Opening stock	0	0	6,600	8,800	7,260	9,680		
B	Sales demand	15,000	20,000	16,500	22,000	18,150	24,200	19,965	26,620
C	Closing stock	6,600	8,800	7,260	9,680	7,986	10,648		
D	Production [B+C-A]	21,600	28,800	17,160	22,880	18,876	25,168		

Q6. Dec 2021 Exam, 5 marks

The Accountant of KPMR Ltd. has prepared the following budget for the coming year 2022 for its two products 'AYE' and 'ZYE':

Particulars	Product 'AYE'	Product 'ZYE'
Production and Sales (in Units)	4,000	3,000
	Amount (in ₹)	Amount (in ₹)
	200	180
Selling Price per unit	80	70
Direct Material per unit	40	35
Direct Labour per unit	20	25
Variable Overhead per unit	10	10
Fixed Overhead per unit		

After reviewing the above budget, the management has called the marketing team for suggesting some measures for increasing the sales. The marketing team has suggested that by promoting the products on social media, the sales quantity of both the products can be increased by 5%. Also, the selling price per unit will go up by 10%. But this will result in increase in expenditure on variable overhead and fixed overhead by 20% and 5% respectively for both the products.

You are required to prepare flexible budget for both the products:

- Before promotion on social media,
- After promotion on social media.

Answer

(i) Flexible Budget (before promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,000	3,000	
		Amount (₹)	Amount (₹)	Amount (₹)
A	Sales Value	8,00,000 (₹ 200 × 4,000)	5,40,000 (₹ 180 × 3,000)	13,40,000
B	Direct Materials	3,20,000 (₹ 80 × 4,000)	2,10,000 (₹ 70 × 3,000)	5,30,000
C	Direct labour	1,60,000 (₹ 40 × 4,000)	1,05,000 (₹ 35 × 3,000)	2,65,000
D	Variable Overheads	80,000 (₹ 20 × 4,000)	75,000 (₹ 25 × 3,000)	1,55,000
E	Total Variable Cost (B+C+D)	5,60,000	3,90,000	9,50,000
F	Contribution (A-E)	2,40,000	1,50,000	3,90,000
G	Fixed Overhead	40,000 (₹ 10 × 4,000)	30,000 (₹ 10 × 3,000)	70,000
H	Profit (F-G)	2,00,000	1,20,000	3,20,000
I	Profit per unit	50	40	

(ii) Flexible Budget (after promotion)

	Particulars	Product 'AYE'	Product 'ZYE'	Total
	Production & Sales (units)	4,200 (4,000 × 105%)	3,150 (3,000 × 105%)	

		Amount (₹)	Amount (₹)	Amount (₹)
A	Sales Value	9,24,000 (₹ 220 × 4,200)	(₹ 198 × 3,150) 15,47,700	6,23,700
B	Direct Materials	3,36,000 (₹ 80 × 4,200)	2,20,500 (₹ 70 × 3,150)	5,56,500
C	Direct labour	1,68,000 (₹ 40 × 4,200)	1,10,250 (₹ 35 × 3,150)	2,78,250
D	Variable Overheads	1,00,800 (₹ 24 × 4,200)	94,500 (₹ 30 × 3,150)	1,95,300
E	Total Variable Cost (B+C+D)	6,04,800	4,25,250	10,30,050
F	Contribution (A-E)	3,19,200	1,98,450	5,17,650
G	Fixed Overhead	42,000 (₹ 40,000 ×105%)	31,500 (₹30,000 ×105%)	73,500
H	Profit (F-G)	2,77,200	1,66,950	4,44,150
I	Profit per unit	66	53	

Q7. July 2021 Exam, 10 marks

PSV Ltd. manufactures and sells a single product and estimated the following related information for the period November, 2020 to March, 2021.

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021
Opening Stock of Finished Goods(in Units)	7,500	3,000	9,000	8,000	6,000
Sales (in Units)	30,000	35,000	38,000	25,000	40,000
Selling Price per unit (in ₹)	10	12	15	15	20

Additional Information:

- Closing stock of finished goods at the end of March, 2021 is 10,000 units.
- Each unit of finished output requires 2 kg of Raw Material 'A' and 3 kg of Raw Material 'B'.

You are required to prepare the following budgets for the period November, 2020 to March, 2021 on monthly basis:

- Sales Budget (in ₹)
- Production budget (in units) and
- Raw material Budget for Raw material 'A' and 'B' separately (in units)

Answer

(i) Sales Budget

(in ₹)

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021	Total
Sales (in Units)	30,000	35,000	38,000	25,000	40,000	1,68,000
Selling Price per unit (₹)	10	12	15	15	20	-
Total Sales (₹)	3,00,000	4,20,000	5,70,000	3,75,000	8,00,000	26,45,000

(ii) Production Budget (in units)

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021	Total
Sales (in Units)	30,000	35,000	38,000	25,000	40,000	1,68,000
Add: Closing stock of finished goods	3,000	9,000	8,000	6,000	10,000	36,000
Less: Opening	33,000	44,000	46,000	31,000	50,000	2,04,000

stock of finished goods	7,500	3,000	9,000	8,000	6,000	33,500
Less: Opening stock of finished goods						
Units to be produced	25,500	41,000	37,000	23,000	44,000	1,70,500

(iii) Raw material budget (in units)

For Raw material 'A'

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	2	2	2	2	2	2
Total raw material consumption (Kg.): (a × b)	51,000	82,000	74,000	46,000	88,000	3,41,000

For Raw material 'B'

Particulars	November, 2020	December, 2020	January, 2021	February, 2021	March, 2021	Total
Units to be produced: (a)	25,500	41,000	37,000	23,000	44,000	1,70,500
Raw material consumption p.u. (kg.): (b)	3	3	3	3	3	3
Total raw material consumption (Kg.): (a × b)	76,500	1,23,000	1,11,000	69,000	1,32,000	5,11,500

Q8. Jan 2021 Exam, 5 marks

State the limitations of Budgetary Control System.

Answer

Limitations of Budgetary Control System

Points	Description
1. Based on Estimates	Budgets are based on a series of estimates, which are based on the conditions prevalent or expected at the time budget is established. It requires revision in plan if conditions change.
2. Time factor	Budgets cannot be executed automatically. Some preliminary steps are required to be accomplished before budgets are implemented. It requires proper attention and time of management. Management must not expect too much during the initial development period.
3. Co-operation Required	Staff co-operation is usually not available during the initial budgetary control exercise. In a decentralised organisation, each unit has its own objective and these units enjoy some degree of discretion. In this type of organisation structure, coordination among different units is required. The success of the budgetary control depends upon willing co-operation and teamwork,
4. Expensive	The implementation of budget is somewhat expensive. For successful implementation of the budgetary control, proper organisation structure with responsibility is prerequisite. Budgeting process start from the collection of information to for preparing the budget and performance analysis. It consumes valuable resources (in terms of

	qualified manpower, equipment, etc.) for this purpose; hence, it is an expensive process.
5. Not a substitute for management	Budget is only a managerial tool and must be intelligently applied for management to get benefited. Budgets are not a substitute for good management.
6. Rigid document	Budgets are sometime considered as rigid documents. But in reality, an organisation is exposed to various uncertain internal and external factors. Budget should be flexible enough to incorporate ongoing developments in the internal and external factors affecting the very purpose of the budget.

Q9. Nov 2020 Exam, 5 marks

G Ltd. manufactures a single product for which market demand exists for additional quantity. Present sales of ₹ 6,00,000 utilises only 60% capacity of the plant. The following data are available:

- (1) Selling price : ₹ 100 per unit
 (2) Variable cost : ₹ 30 per unit
 (3) Semi-variable expenses : ₹ 60,000 fixed + ₹ 5 per unit
 (4) Fixed expenses : ₹ 1,00,000 at present level, estimated to increase by 25% at and above 80% capacity.

You are required to prepare a flexible budget so as to arrive at the operating profit at 60%, 80% and 100% levels.

Answer

Flexible Budget			
Activity Level	60%	80%	100%
Production (units)	6,000	8,000	10,000
	(₹)	(₹)	(₹)
Sales @ ₹ 100 per unit	6,00,000	8,00,000	10,00,000
Variable Cost (@ ₹ 35 (₹ 30 + ₹ 5) per unit)	2,10,000	2,80,000	3,50,000
Contribution (A)	3,90,000	5,20,000	6,50,000
Fixed Cost (part of semi-variable cost)	60,000	60,000	60,000
Other Fixed Cost	1,00,000	1,25,000	1,25,000
Total Fixed Cost (B)	1,60,000	1,85,000	1,85,000
Operating Profit (A – B)	2,30,000	3,35,000	4,65,000

Q10. Nov 2020 Exam, 5 marks

What are the important points an organization should consider if it wants to adopt Performance Budgeting?

Answer

For an enterprise that wants to adopt Performance Budgeting, it is thus imperative that:

- the objectives of the enterprise are spelt out in concrete terms.
- the objectives are then translated into specific functions, programmes, activities and tasks for different levels of management within the realities of fiscal constraints.
- realistic and acceptable norms, yardsticks or standards and performance indicators should be evolved and expressed in quantifiable physical units.
- a style of management based upon decentralised responsibility structure should be adopted, and
- an accounting and reporting system should be developed to facilities monitoring, analysis and review of actual performance in relation to budgets.

Q11. Nov 2019 Exam, 5 marks

Define Zero Base Budgeting and mention its various stages.

Answer

Zero-based Budgeting: (ZBB) is an emergent form of budgeting which arises to overcome the limitations of incremental (traditional) budgeting system. Zero-based Budgeting (ZBB) is defined as 'a method of budgeting which requires each cost element to be specifically justified, although the activities to which the budget relates are being undertaken for the first time, without approval, the budget allowance is zero'.

ZBB is an activity based budgeting system where budgets are prepared for each activities rather than functional department. Justification in the form of cost benefits for the activity is required to be given. The activities are then evaluated and prioritized by the management on the basis of factors like synchronisation with organisational objectives, availability of funds, regulatory requirement etc.

ZBB is suitable for both corporate and non-corporate entities. In case of non-corporate entities like Government department, local bodies, not for profit organisations, where these entities need to justify the benefits of expenditures on social programmes like mid-day meal, installation of street lights, provision of drinking water etc.

ZBB involves the following stages:

- i. Identification and description of Decision packages
- ii. Evaluation of Decision packages
- iii. Ranking (Prioritisation) of the Decision packages
- iv. Allocation of resources

Q12. May 2019 Exam, 5 marks

What are the cases when a flexible budget is found suitable?

Answer

Flexible budgeting may be resorted to under following situations:

- i. In the case of new business venture due to its typical nature it may be difficult to forecast the demand of a product accurately.
- ii. Where the business is dependent upon the mercy of nature e.g., a person dealing in wool trade may have enough market if temperature goes below the freezing point.
- iii. In the case of labour-intensive industry where the production of the concern is dependent upon the availability of labour.

Suitability for flexible budget:

1. Seasonal fluctuations in sales and/or production, for example in soft drinks industry;
2. a company which keeps on introducing new products or makes changes in the design of its products frequently;
3. industries engaged in make-to-order business like ship building;
4. an industry which is influenced by changes in fashion; and
5. General changes in sales.

Q13. Nov 2018 Exam, 10 marks

An electronic gadget manufacturer has prepared sales budget for the next few months. In this respect, following figures are available:

Months	Electronic gadgets' sales
January	5000 units
February	6000 units
March	7000 units
April	7500 units
May	8000 units

To manufacture an electronic gadget, a standard cost of ₹ 1,500 is incurred and it is sold through dealers at an uniform price of ₹ 2,000 per gadget to customers. Dealers are given a discount of 15% on selling price.

Apart from other materials, two units of batteries are required to manufacture a gadget. The company wants to hold stock of batteries at the end of each month to cover 30% of next month's production and to hold stock of manufactured gadgets to cover 25% of the next month's sale.

3250 units of batteries and 1200 units of manufactured gadgets were in stock on 1st January.

Required:

(i) Prepare production budget (in units) for the month of January, February, March and April.

(ii) Prepare purchase budget for batteries (in units) for the month of January, February and March and calculate profit for the quarter ending on March.

Answer

(i) Preparation of Production Budget (in Units)

	January	February	March	April	May
Sales	5,000	6,000	7,000	7,500	8,000
Add: Closing stock (25% of next month's sales)	1,500	1,750	1,875	2,000	
Less: Opening Stock	(1200)	(1500)	(1750)	(1875)	
Production of electronic Gadgets	5,300	6,250	7,125	7,625	

(ii) Preparation of Purchase budget

	January	February	March	April
Consumption/production of Batteries (@ 2 per Gadget)	10,600	12,500	14,250	15,250
Add: Closing Stock (30% of next month's production)	3750	4275	4275	
Less: Opening Stock	3250	3750	4275	
Purchase of Batteries	11,100	13,025	14,550	

Statement Showing Profit

	January	February	March	Total
Sales(A)	5,000	6,000	7,000	18,000
Selling Price per unit*	₹. 2,000	₹. 2,000	₹. 2,000	₹. 2,000
Less: Discount @15% of selling price	300	300	300	300
Less: Standard cost of Manufacturing per gadget Cost	1500	1500	1500	1500
Profit (B) (selling Price-discount-cost)	200	200	200	200
Total Profit (A × B)	₹.10,00,000	₹.12,00,000	₹.14,00,000	₹.36,00,000

Q14. May 2018 Exam, 5 marks

Why is 'Zero Base Budgeting' (ZBB) considered superior to 'Traditional Budgeting'? Explain.

Answer

Zero based budgeting is superior to traditional budgeting: Zero based budgeting is superior to traditional budgeting in the following manner:

- It provides a systematic approach for evaluation of different activities.
- It ensures that the function undertaken are critical for the achievement of the objectives.
- It provides an opportunity for management to allocate resources to various activities after a thorough – cost benefit analysis.
- It helps in the identification of wasteful expenditure and then their elimination. If facilitates the close linkage of departmental budgets with corporate objectives.
- It helps in the introduction of a system of Management by Objectives

Q15. May 2023 RTP | Nov 2023 RTP

XY Co. Ltd manufactures two products viz., X and Y and sells them through two divisions, East and West. For the purpose of Sales Budget to the Budget Committee, following information has been made available for the year 2022-23:

Product	Budgeted Sales		Actual Sales	
	East Division	West Division	East Division	West Division
X	400 units at ₹ 9	600 units at ₹ 9	500 units at ₹ 9	700 units at ₹ 9

Y	300 units at ₹ 21	500 units at ₹ 21	200 units at ₹ 21	400 units at ₹ 21
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Adequate market studies reveal that product X is popular but underpriced. It is expected that if the price of X is increased by ₹ 1, it will, find a ready market. On the other hand, Y is overpriced and if the price of Y is reduced by ₹ 1 it will have more demand in the market.

The company management has agreed for the aforesaid price changes. On the basis of these price changes and the reports of salesmen, following estimates have been prepared by the Divisional Managers: Percentage increase in sales over budgeted sales

Product	East Division	West Division
X	+ 10%	+ 5%
Y	+ 20%	+ 10%

With the help of intensive advertisement campaign, following additional sales (over and above the above-mentioned estimated sales by Divisional Managers) are possible:

Product	East Division	West Division
X	60 units	70 units
Y	40 units	50 units

You are required to prepare Sales Budget for 2023-24 after incorporating above estimates and also show the Budgeted Sales and Actual Sales of 2022-23.

Answer

Statement Showing Sales Budget for 2023-24

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	500 ¹	10	5,000	400 ³	20	8,000	13,000
West	700 ²	10	7,000	600 ⁴	20	12,000	19,000
Total	1,200		12,000	1000		20,000	32,000

Workings

1. $400 \times 110\% + 60 = 500$ units
2. $600 \times 105\% + 70 = 700$ units
3. $300 \times 120\% + 40 = 400$ units
4. $500 \times 110\% + 50 = 600$ units

Statement Showing Sales Budget for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	400	9	3,600	300	21	6,300	9,900
West	600	9	5,400	500	21	10,500	15,900
Total	1,000		9,000	800		16,800	25,800

Statement Showing Actual Sales for 2022-23

Division	Product X			Product Y			Total
	Qty.	Rate (₹)	Amt. (₹)	Qty.	Rate (₹)	Amt. (₹)	Amt. (₹)
East	500	9	4,500	200	21	4,200	8,700
West	700	9	6,400	400	21	8,400	14,700
Total	1,200		10,900	600		12,600	23,400

Q16. Nov 2022 RTP

Following information is available for DK and Co.:

Standard working hours 9 hours per day of 5 days per week

Maximum capacity 50 employees

Actual working 40 employees

Actual hours expected to be worked per four week 7,200 hours

Std. hours expected to be earned per four weeks 9,000 hours

Actual hours worked in the four- week period 6,750 hours

Standard hours earned in the four- week period 7,875 hours.

The related period is of 4 weeks. In this period there was a one special day holiday due to national event.

You are required to CALCULATE the following ratios:

- i. Efficiency Ratio
- ii. Activity Ratio
- iii. Calendar Ratio
- iv. Standard Capacity Usage Ratio
- v. Actual Capacity Usage Ratio
- vi. Actual Usage of Budgeted Capacity Ratio

Answer

Maximum Capacity in a budget period

$$= 50 \text{ Employees} \times 9 \text{ Hrs.} \times 5 \text{ Days} \times 4 \text{ Weeks} = 9,000 \text{ Hrs.}$$

Budgeted Hours = 40 Employees $\times$ 9 Hrs. $\times$ 5 Days $\times$ 4 Weeks = 7,200 Hrs.

Actual Hrs. = 6,750 Hrs. Standard Hrs. for Actual Output
= 7,875 Hrs.

Budget No. of Days = 20 Days (4 Weeks $\times$ 5 Days)

Actual No. of Days = 20 – 1 = 19 Days

$$\begin{aligned} \text{(i) Efficiency Ratio} &= \frac{\text{Standard Hrs}}{\text{Actual Hrs}} \times 100 \\ &= \frac{7,875 \text{ hours}}{6,750 \text{ hours}} \times 100 = 116.67\% \end{aligned}$$

$$\begin{aligned} \text{(ii) Activity Ratio} &= \frac{\text{Standard Hrs}}{\text{Budgeted Hrs}} \times 100 \\ &= \frac{7,875 \text{ hours}}{7,200 \text{ hours}} \times 100 = 109.375\% \end{aligned}$$

$$\begin{aligned} \text{(ii) Calendar Ratio} &= \frac{\text{Available working days}}{\text{Budgeted working days}} \times 100 \\ &= \frac{19 \text{ days}}{20 \text{ days}} \times 100 = 95\% \end{aligned}$$

$$\begin{aligned} \text{(iv) Standard Capacity Usage Ratio} &= \frac{\text{Budgeted Hours}}{\text{Max. possible hours in the budgeted period}} \times 100 \\ &= \frac{7,200 \text{ hours}}{9,000 \text{ hours}} \times 100 = 80\% \end{aligned}$$

$$\begin{aligned} \text{(v) Actual Capacity Usage Ratio} &= \frac{\text{Actual Hours worked}}{\text{Max. possible working hours in a period}} \times 100 \\ &= \frac{6,750 \text{ hours}}{9,000 \text{ hours}} \times 100 = 75\% \end{aligned}$$

$$\begin{aligned} \text{(vi) Actual Usage of Budgeted Capacity Ratio} &= \frac{\text{Actual working Hours}}{\text{Budgeted Hours}} \times 100 \\ &= \frac{6,750 \text{ hours}}{7,200 \text{ hours}} \times 100 = 93.75\% \end{aligned}$$

Q17. May 2022 RTP | May 2024 RTP

Maharatna Ltd., a public sector undertaking (PSU), produces product A. The company is in process of preparing its revenue budget for the year 2022. The company has the following information which can be useful in preparing the budget:

- i. It has anticipated 12% growth in sales volume from the year 2021 of 4,20,000 tonnes.
- ii. The sales price of ₹23,000 per tonne will be increased by 10% provided Wholesale Price Index (WPI) increases by 5%.
- iii. To produce one tonne of product A, 2.3 tonnes of raw material are required. The raw material cost is ₹4,500 per tonne. The price of raw material will also increase by 10% if WPI increase by 5%.
- iv. The projected increase in WPI for 2022 is 4%
- v. A total of 6,000 employees works for the company. The company works 26 days in a month.
- vi. 85% of employees of the company are permanent and getting salary as per 5- year wage agreement. The earnings per manshift (means an employee cost for a shift of 8 hours) is ₹ 3,000 (excluding terminal benefits). The new wage agreement will be implemented from 1st July 2022 and it is expected that a 15% increase in pay will be given.
- vii. The casual employees are getting a daily wage of ₹ 850. The wages are linked to Consumer Price Index (CPI). The present CPI is 165.17 points and it is expected to be 173.59 points in year 2022.

- viii. Power cost for the year 2021 is ₹ 42,00,000 for 7,00,000 units (1 unit = 1 Kwh). 60% of power is used for production purpose (directly related to production volume) and remaining are for employee quarters and administrative offices.
- ix. During the year 2021, the company has paid ₹ 60,00,000 for safety and maintenance works. The amount will increase in proportion to the volume of production.
- x. During the year 2021, the company has paid ₹ 1,20,000 for the purchase of diesel to be used in car hired for administrative purposes. The cost of diesel will increase by 15% in year 2022.
- xi. During the year 2021, the company has paid ₹ 6,00,000 for car hire charges (excluding fuel cost). In year 2022, the company has decided to reimburse the diesel cost to the car rental company. Doing this will attract 5% GST on Reverse Charge Mechanism (RCM) basis on which the company will not get GST input credit.
- xii. Depreciation on fixed assets for the year 2021 is ₹ 80,40,00,000 and it will be 15% lower in 2022.

Required:

From the above information PREPARE Revenue (Flexible) budget for the year 2022 and also show the budgeted profit/ loss for the year.

Answer

Revenue Budget (Flexible Budget) of Maharatna Ltd. for the Year 2022

	Particulars	PY 2021	CY 2022
A	Sales Volume (Tonnes)	4,20,000	4,70,400 [112%×4,20,000]
B	Selling Price per tonne (₹)	23,000 (₹ in lakh)	23,000 (₹ in lakh)
C	Sales value [A×B]	96,600	1,08,192
D	Raw material Cost:		
i.	Qty. of Material [2.3 tonnes × A] (tonnes)	9,66,000	10,81,920
ii	Price per tonne (₹)	4,500	4,500
(iii)	Total raw material cost (₹ in lakh) [(i)×(ii)]	43,470	48,686.40
E	Wages & Salary Cost:		
(i)	Wages to casual employees (15% × 6,000 = 900 employees)	2,386.80 [900 × 26 × 12 × ₹ 850]	2,508.47 [900 × 26 × 12 × ₹ 893.33]
(ii)	Salary to permanent employees (85% × 6,000 = 5,100 employees)	47,736 [5100 × 26 × 12 × ₹ 3,000]	51,316.20 [(5100 × 26 × 6 × ₹ 3,000) + (5100 × 26 × 6 × ₹ 3,450)]
(iii)	Total wages & salary [(i)+(ii)]	50,122.80	53,824.67
F	Power cost:	4,20,000	4,70,400
(i)	For production (units)	[60% × 7,00,000]	[112% × 4,20,000]
(ii)	For employees & offices (units)	2,80,000	2,80,000
(iii)	Total Power consumption (units) [(i)+(ii)]	7,00,000	7,50,400
(iv)	Power rate per unit (₹) [₹42,00,000 ÷ 7,00,000]	6.00	6.00
(v)	Total power cost [(iii)×(iv)]	42	45.024
G	Safety and maintenance Cost [112% × 60,00,000]	60	67.20
H	Diesel cost	1.2	-
I	Car Hire charge:		
(i)	Car hire charge	6	6
(ii)	Fuel reimbursement cost [115% × 1.2]	-	1.38
(iii)	GST@5% on RCM basis	-	0.369

	[5%×(i+ii)]		
	(iv) Total Car hire charge cost	6	7.749
	[(i)+(ii)+(iii)]		
J	Depreciation [85% × 8040]	8,040	6,834
K	Total Cost [Sum of D to J]	1,01,742	1,09,465.043
L	Profit/ (Loss) [C-L]	(5,142)	(1273.043)

Q18. Nov 2021 RTP

The accountant of manufacturing company provides you the following details for year 2019-20:

Particulars	(₹)
Direct materials	28,00,000
Direct Wages	16,00,000
Fixed factory overheads	16,00,000
Variable factory overheads	16,00,000
Other variable costs	12,80,000
Other fixed costs	12,80,000
Profit	18,40,000
Sales	1,20,00,000

During the year, the company manufactured two products A and B and the output and costs were:

Particulars	A	B
Output (units)	2,00,000	1,00,000
Selling price per unit	₹ 32.00	₹ 56.00
Direct materials per unit	₹ 8.00	₹ 12.00
Direct wages per unit	₹ 4.00	₹ 8.00

Variable factory overhead is absorbed as a percentage of direct wages. Other variable costs have been computed as: Product A ₹ 4.00 per unit; and B ₹ 4.80 per unit.

During 2020-21, it is expected that the demand for product A will fall by 25% and for B by 50%. It is decided to manufacture a new product C, the cost for which is estimated as follows:

Particulars	C
Output (units)	2,00,000
Selling price per unit	₹ 28.00
Direct materials per unit	₹ 6.40
Direct wages per unit	₹ 4.00

It is anticipated that the other variable costs per unit of Product C will be same as for product A. PREPARE a budget to present to the management, showing the current position and the position for 2020-21. COMMENT on the comparative results.

Answer

Budget Showing Current Position and Position for 2020-21

	Position for 2019-20			Position for 2020-21			
	A	B	Total (A+B)	A	B	C	Total (A+B+C)
Sales (units)	2,00,000	1,00,000	–	1,50,000	50,000	2,00,000	–
(A) Sales	₹ 64,00,00	₹ 56,00,00	₹ 1,20,00,00	₹ 48,00,00	₹ 28,00,00	₹ 56,00,00	₹ 1,32,00,00
Direct Material	0	0	00	0	0	0	00
Direct wages	16,00,00	12,00,00	28,00,000	12,00,00	6,00,000	12,80,00	30,80,000
Factory overhead (variable)	0	0	16,00,000	0	4,00,000	8,00,000	18,00,000
Other variable costs	8,00,000	8,00,000	16,00,000	6,00,000	4,00,000	8,00,000	18,00,000
	8,00,000	8,00,000	12,80,000	6,00,000	2,40,000	8,00,000	16,40,000
	8,00,000	4,80,000		6,00,000			

(B) Marginal Cost	40,00,000	32,80,000	72,80,000	30,00,000	16,40,000	36,80,000	83,20,000
(C) Contribution (A-B)	24,00,000	23,20,000	47,20,000	18,00,000	11,60,000	19,20,000	48,80,000
Fixed costs							
– Factory			16,00,000				16,00,000
– Others			12,80,000				12,80,000
(D) Total fixed cost			28,80,000				28,80,000
Profit (C – D)			18,40,000				20,00,000

Comments: Introduction of Product C is likely to increase profit by ₹ 1,60,000 (i.e. from ₹ 18,40,000 to ₹ 20,00,000) in 2020-21 as compared to 2019-20 even if the demand for Product A & B falls. Therefore, introduction of product C is recommended.

Q19. May 2021 RTP

RS Ltd manufactures and sells a single product and has estimated sales revenue of ₹ 302.4 lakh during the year based on 20% profit on selling price. Each unit of product requires 6 kg of material A and 3 kg of material B and processing time of 4 hours in machine shop and 2 hours in assembly shop. Factory overheads are absorbed at a blanket rate of 20% of direct labour.

Variable selling & distribution overheads are ₹ 60 per unit sold and fixed selling & distribution overheads are estimated to be ₹ 69,12,000.

The other relevant details are as under:

Purchase Price: Material A ₹ 160 per kg

Materials B ₹ 100 per kg

Labour Rate: Machine Shop ₹ 140 per hour

Assembly Shop ₹ 70 per hour

	Finished Stock	Material A	Material B
Opening Stock	2,500 units	7,500 kg	4,000 kg
Closing Stock	3,000 units	8,000 kg	5,500 kg

Required:

- CALCULATE number of units of product proposed to be sold and selling price per unit,
- PREPARE Production Budget in units, and
- PREPARE Material Purchase Budget in units.

Answer

Workings:

Statement Showing "Total Variable Cost for the year"

Particulars	Amount (₹)
Estimated Sales Revenue	3,02,40,000
Less: Desired Profit Margin on Sale @ 20%	60,48,000
Estimated Total Cost	2,41,92,000
Less: Fixed Selling and Distribution Overheads	69,12,000
Total Variable Cost	1,72,80,000

Statement Showing "Variable Cost per unit"

Particulars	Variable Cost p.u. (₹)
Direct Materials:	
A: 6 Kg. @ ₹ 160 per kg.	960
B: 3 Kg. @ ₹ 100 per kg.	300
Labour Cost:	
Machine Shop: 4 hrs. @ ₹ 140 per hour	560

Assembly Shop: 2 hrs. @ ₹ 70 per hour	140
Factory Overheads: 20% of (₹ 560 + ₹ 140)	140
Variable Selling & Distribution Expenses	60
Total Variable Cost per unit	2,160

(i) Calculation of number of units of product proposed to be sold and selling price per unit:

Number of Units Sold = Total Variable Cost / Variable Cost per unit

= ₹ 1,72,80,000 / ₹ 2,160

= 8,000 units

Selling Price per unit = Total Sales Value / Number of Units Sold

= ₹ 3,02,40,000 / 8,000 units

= ₹ 3,780

(ii) Production Budget (units)

Particulars	Units
Budgeted Sales	8,000
Add: Closing Stock	3,000
Total Requirements	11,000
Less: Opening Stock	(2,500)
Required Production	8,500

(iii) Materials Purchase Budget (Kg.)

Particulars	Material A	Material B
Requirement for Production	51,000 (8,500 units × 6 Kg.)	25,500 (8,500 units × 3 Kg.)
Add: Desired Closing Stock	8,000	5,500
Total Requirements	59,000	31,000
Less: Opening Stock	(7,500)	(4,000)
Quantity to be purchased	51,500	27,000

Q20. May 2021 RTP

DESCRIBE the salient features of budget manual.

Answer

Salient features of Budget Manual

- Budget manual contains much information which is required for effective budgetary planning.
- A budget manual is a collection of documents that contains key information for those involved in the planning process.
- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results is included in Budget Manual.
- Budget Manual contains a form of organisation chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- It contains a timetable for the preparation of each budget.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion is included in Budget Manual.

Q21. Nov 2020 RTP

The information of Z Ltd. for the year ended 31st March 2020 is as below:

Particulars	(₹)
-------------	-----

Direct materials	17,50,000
Direct Wages	12,50,000
Fixed factory overheads	9,50,000
Variable factory overheads	12,00,000
Other variable costs	6,00,000
Other fixed costs	4,00,000
Profit	8,50,000
Sales	70,00,000

During the year, the company manufactured two products, X and Y, and the output and cost were:

Particulars	X	Y
Output (units)	8,000	4,000
Selling price per unit	600	550
Direct materials per unit	140	157.50
Direct wages per unit	90	132.50

Variable factory overheads are absorbed as a percentage of direct wages and other variable costs are computed as:

Product X – ₹40 per unit and Product Y- ₹70 per unit.

For the FY 2020-21, due to a pandemic, it is expected that demand for product X and Y will fall by 20% & 10% respectively. It is also expected that direct wages cost will raise by 20% and other fixed costs by 10%. Products will be required to be sold at a discount of 20%.

You are required to:

- PREPARE product- wise profitability statement on marginal costing method for the FY 2019-20 and
- PREPARE a budget for the FY 2020-21.

Answer

(i) Product-wise Profitability Statement for the FY 2019-20:

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	8,000	4,000	
Selling price per unit	600	550	
Sales value	48,00,000	22,00,000	70,00,000
Direct material	11,20,000 (₹140×8,000)	6,30,000 (₹157.50×4,000)	17,50,000
Direct wages	7,20,000 (₹90×8,000)	5,30,000 (₹132.5×4,000)	12,50,000
Variable factory overheads	5,47,200 (76%of 7,20,000)	4,02,800 (76%of 5,30,000)	9,50,000
Other variable costs	3,20,000 (₹40×8,000)	2,80,000 (₹70×4,000)	6,00,000
Contribution	20,92,800	3,57,200	24,50,000
Fixed factory overheads	-	-	12,00,000
Other fixed costs	-	-	4,00,000
Profit			8,50,000

(ii) Preparation of Budget for the FY 2020-21:

Particulars	Product-X (₹)	Product-Y (₹)	Total (₹)
Output (units)	6,400 (8,000×80%)	3,600 (4,000×90%)	
Selling price per unit	480 (600×80%)	440 (550×80%)	
Sales value	30,72,000	15,84,000	46,56,000
Direct material	8,96,000 (₹140×6,400)	5,67,000 (₹157.50×3,600)	14,63,000
Direct wages	6,91,200 (₹108×6,400)	5,72,400 (₹159×3,600)	12,63,600
Variable factory overheads	5,25,312	4,35,024	9,60,336

Other variable costs	(76% of 6,91,200) 2,56,000 (₹40×6,400)	(76% of 5,72,400)\2,52,000 (₹70×3,600)	5,08,000
Contribution	7,03,488	(2,42,424)	4,61,064
Fixed factory overheads	-	-	12,00,000
Other fixed costs (110% of ₹4,00,000)	-	-	4,40,000
Profit/ (Loss)			(11,78,936)

Q22. May 2020 RTP

A Vehicle manufacturer has prepared sales budget for the next few months, and the following draft figures are available:

Month	No. of vehicles
October	40,000
November	35,000
December	45,000
January	60,000
February	65,000

To manufacture a vehicle a standard cost of ₹11,42,800 is incurred and sold through dealers at a uniform selling price of ₹17,14,200 to customers. Dealers are paid 15% commission on selling price on sale of a vehicle.

Apart from other materials, four units of Part - X are required to manufacture a vehicle. It is a policy of the company to hold stocks of Part-X at the end of each month to cover 40% of next month's production. 48,000 units of Part-X are in stock as on 1st October.

There are 9,500 nos. of completed vehicles in stock as on 1st October and it is policy to have stocks at the end of each month to cover 20% of the next month's sales.

You are required to -

- PREPARE Production budget (in nos.) for the month of October, November, December and January.
- PREPARE a Purchase budget for Part-X (in units) for the months of October, November and December.
- CALCULATE the budgeted gross profit for the quarter October to December.

Answer

i. Preparation of Production Budget (in units)

	October	November	December	January
Demand for the month (Nos.)	40,000	35,000	45,000	60,000
Add: 20% of next month's demand	7,000	9,000	12,000	13,000
Less: Opening Stock	(9,500)	(7,000)	(9,000)	(12,000)
Vehicles to be produced	37,500	37,000	48,000	61,000

ii. Preparation of Purchase budget for Part-X

	October	November	December
Production for the month (Nos.)	37,500	37,000	48,000
Add: 40% of next month's production	14,800 (40% of 37,000)	19,200 (40% of 48,000)	24,400 (40% of 61,000)
	52,300	56,200	72,400
No. of units required for production			
	2,09,200 (52,300 × 4 units)	2,24,800 (56,200 × 4 units)	2,89,600 (72,400 × 4 units)
Less: Opening Stock	(48,000)	(59,200) (14,800 × 4 units)	(76,800) (19,200 × 4 units)
No. of units to be purchased	1,61,200	1,65,600	2,12,800

(iii) Budgeted Gross Profit for the Quarter October to December

	October	November	December	Total
Sales in nos.	40,000	35,000	45,000	1,20,000
Net Selling Price per unit* (₹)	14,57,070	14,57,070	14,57,070	
Sales Revenue (₹ in lakh)	5,82,828	5,09,974.50	6,55,681.50	17,48,484
Less: Cost of Sales (₹ in lakh) (Sales unit × Cost per unit)	4,57,120	3,99,980	5,14,260	13,71,360
Gross Profit (₹ in lakh)	1,25,708	1,09,994.50	1,41,421.50	3,77,124

* Net Selling price unit = ₹17,14,200 – 15% commission on ₹17,14,200 = ₹14,57,070.

Q23. Nov 2019 RTP

KLM Limited has prepared its expense budget for 50,000 units in its factory for the year 2019-20 as detailed below:

	(₹ per unit)
Direct Materials	125
Direct Labour	50
Variable Overhead	40
Direct Expenses	15
Selling Expenses (20% fixed)	25
Factory Expenses (100% fixed)	15
Administration expenses (100% fixed)	8
Distribution expenses (85% variable)	20
Total	298

PREPARE an expense budget for the production of 35,000 units and 70,000 units

Answer

Expense Budget of KLM Ltd.

Particulars	50,000 Units (₹)	35,000 Units (₹)	70,000 Units (₹)
Direct Material	62,50,000 (50,000 × 125)	43,75,000 (35,000 × 125)	87,50,000 (70,000 × 125)
Direct Labour	25,00,000 (50,000 × 50)	17,50,000 (35,000 × 50)	35,00,000 (70,000 × 50)
Variable Overhead	20,00,000 (50,000 × 40)	14,00,000 (35,000 × 40)	28,00,000 (70,000 × 40)
Direct Expenses	7,50,000 (50,000 × 15)	5,25,000 (35,000 × 15)	10,50,000 (70,000 × 15)
Selling Expenses (Variable)*	10,00,000 (50,000 × 20)	7,00,000 (35,000 × 20)	14,00,000 (70,000 × 20)
Selling Expenses (Fixed)* (5 × 50,000)	2,50,000	2,50,000	2,50,000
Factory Expenses (Fixed) (15 × 50,000)	7,50,000	7,50,000	7,50,000
Administration Expenses (Fixed) (8 × 50,000)	4,00,000	4,00,000	4,00,000
Distribution Expenses (Variable)**	8,50,000 (17 × 50,000)	5,95,000 (17 × 35,000)	11,90,000 (17 × 70,000)
Distribution Expenses (Fixed)** (3 × 50,000)	1,50,000	1,50,000	1,50,000
	1,49,00,000	1,08,95,000	2,02,40,000

*Selling Expenses: Fixed cost per unit = ₹25 × 20% = ₹5

Fixed Cost = ₹5 × 50,000 units = ₹2,50,000

Variable Cost Per unit = ₹25 – ₹5 = ₹20

**Distribution Expenses: Fixed cost per unit = ₹20 × 15% = ₹3

Fixed Cost = ₹3 × 50,000 units = ₹1,50,000 Variable cost per unit = ₹20 – ₹3 = ₹17

EXPLAIN the meaning of Budget Manual

Answer

Budget Manual: A budget manual is a collection of documents that contains key information for those involved in the planning process. Typical contents could include the following:

- An introductory explanation of the budgetary planning and control process, including a statement of the budgetary objective and desired results.
- A form of organisation chart to show who is responsible for the preparation of each functional budget and the way in which the budgets are interrelated.
- A timetable for the preparation of each budget. This will prevent the formation of a 'bottleneck' with the late preparation of one budget holding up the preparation of all others.
- Copies of all forms to be completed by those responsible for preparing budgets, with explanations concerning their completion.
- A list of the organization's account codes, with full explanations of how to use them.
- Information concerning key assumptions to be made by managers in their budgets, for example the rate of inflation, key exchange rates, etc

Q25. May 2019 RTP

S Ltd. has prepared budget for the coming year for its two products A and B.

	Product A (₹)	Product B (₹)
Production & Sales unit	6,000 units	9,000 units
Raw material cost per unit	60.00	42.00
Direct labour cost per unit	30.00	18.00
Variable overhead per unit	12.00	6.00
Fixed overhead per unit	8.00	4.00
Selling price per unit	120.00	78.00

After some marketing efforts, the sales quantity of the Product A & B can be increased by 1,500 units and 500 units respectively but for this purpose the variable overhead and fixed overhead will be increased by 10% and 5% respectively for the both products.

You are required to PREPARE flexible budget for both the products:

- a) Before marketing efforts
- b) After marketing efforts.

Answer

a) Flexible Budget before marketing efforts:

	Product A (₹) 6,000 units		Product B (₹) 9,000 units	
	Per unit	Total	Per unit	Total
Sales	120.00	7,20,000	78.00	7,02,000
Raw material cost	60.00	3,60,000	42.00	3,78,000
Direct labour cost per unit	30.00	1,80,000	18.00	1,62,000
Variable overhead per unit	12.00	72,000	6.00	54,000
Fixed overhead per unit	8.00	48,000	4.00	36,000
Total cost	110.00	6,60,000	70.00	6,30,000
Profit	10.00	160,000	8.00	72,000

(b) Flexible Budget after marketing efforts:

	Product A (₹) 7,500 units		Product B (₹) 9,500 units	
	Per unit	Total	Per unit	Total
Sales	120.00	9,00,000	78.00	7,41,000

Raw material cost	60.00	4,50,000	42.00	3,99,000
Direct labour cost per unit	30.00	2,25,000	18.00	1,71,000
Variable overhead per unit	13.20	99,000	6.60	62,700
Fixed overhead per unit	6.72	50,400	3.98	37,800
Total cost	109.92	8,24,400	70.58	6,70,500
Profit	10.08	75,600	7.42	70,500

Q26. Nov 2018 RTP

Gaurav Ltd. is drawing a production plan for its two products Minimax (MM) and Heavyhigh (HH) for the year 20X8-X9. The company's policy is to hold closing stock of finished goods at 25% of the anticipated volume of sales of the succeeding month. The following are the estimated data for two products:

	Minimax (MM)	Heavyhigh (HH)
Budgeted Production units	1,80,000	1,20,000
	(₹)	(₹)
Direct material cost per unit	220	280
Direct labour cost per unit	130	120
Manufacturing overhead	4,00,000	5,00,000

The estimated units to be sold in the first four months of the year 20X8-X9 are as under

	April	May	June	July
Minimax	8,000	8,000	12,000	16,000
Heavyhigh	6,000	8,000	9,000	14,000

PREPARE production budget for the first quarter in month-wise

Answer

Production budget of Product Minimax and Heavyhigh (in units)

	April		May		June		Total	
	MM	HH	MM	HH	MM	HH	MM	HH
Sales	8,000	6,000	10,000	8,000	12,000	9,000	30,000	23,000
Add: Closing Stock (25% of next month's sale)	2,500	2,000	3,000	2,250	4,000	3,500	9,500	7,750
Less: Opening Stock	2,000*	1,500*	2,500	2,000	3,000	2,250	7,500	5,750
Production units	8,500	6,500	10,500	8,250	13,000	10,250	32,000	25,000

*Opening stock of April is the closing stock of March, which is as per company's policy 25% of next months sale.

Production Cost Budget

Element of cost	Rate (₹)		Amount (₹)	
	MM (32,000 units)	HH (25,000 units)	MM	HH
Direct Material	220	280	70,40,000	70,00,000
Direct Labour	130	120	41,60,000	30,00,000
Manufacturing Overhead (4,00,000/ 1,80,000 × 32,000) (5,00,000/ 1,20,000 × 25,000)			71,111	1,04,167
			1,12,71,111	1,01,04,167

Q27. May 2018 RTP

G Ltd. manufactures two products called 'M' and 'N'. Both products use a common raw material Z. The raw material Z is purchased @ ₹ 36 per kg from the market. The company has decided to review inventory management policies for the forthcoming year.

The following information has been extracted from departmental estimates for the year ended 31st March 2018 (the budget period):

	Product M	Product N
Sales (units)	28,000	13,000
Finished goods stock increase by year-end	320	160
Post-production rejection rate (%)	4	6
Material Z usage (per completed unit, net of wastage)	5 kg	6 kg
Material Z wastage (%)	10	5

Additional information:

- Usage of raw material Z is expected to be at a constant rate over the period.
- Annual cost of holding one unit of raw material in stock is 11% of the material cost.
- The cost of placing an orders is ₹ 320 per order.
- The management of G Ltd. has decided that there should not be more than 40 orders in a year for the raw material Z.

Required:

- PREPARE functional budgets for the year ended 31st March 2018 under the following headings:
 - Production budget for Products M and N (in units).
 - Purchases budget for Material Z (in kgs and value).
- CALCULATE the Economic Order Quantity for Material Z (in kgs).
- If there is a sole supplier for the raw material Z in the market and the supplier do not sale more than 4,000 kg. of material Z at a time. Keeping the management purchase policy and production quantity mix into consideration, CALCULATE the maximum number of units of Product M and N that could be produced.

Answer**(i) (a) Production Budget (in units) for the year ended 31st March 2016**

	Product M	Product N
Budgeted sales (units)	28,000	13,000
Add: Increase in closing stock	320	160
No. good units to be produced	28,320	13,160
Post production rejection rate	4%	6%
No. of units to be produced	29,500	14,000
	28,320	13,160
	0.96	0.94

(b) Purchase budget (in kgs and value) for Material Z

	Product M	Product N
No. of units to be produced	29,500	14,000
Usage of Material Z per unit of production	5 kg.	6 kg.
Material needed for production	1,47,500 kg.	84,000 kg.
Materials to be purchased	1,63,889 kg.	88,421 kg
	1,47,500	84,000
	0.90	0.95
Total quantity to be purchased	2,52,310 kg.	
Rate per kg. of Material Z	₹36	
Total purchase price	₹90,83,160	

(ii) Calculation of Economic Order Quantity for Material Z

$$EOQ = \sqrt{\frac{2 \times 2,52,310 \text{ kg.} \times 320}{36 \times 11\%}}$$

$$= \sqrt{\frac{16,14,78,400}{₹3.96}}$$

= 6,385.72 kg.

(iii) Since, the maximum number of order per year can not be more than 40 orders and the maximum quantity per order that can be purchased is 4,000 kg. Hence, the total quantity of Material Z that can be available for production:

= 4,000 kg. × 40 orders = 1,60,000 kg.

	Product M	Product N
Material needed for production to maintain the same production mix	1,03,929 kg. $1,60,000 \times \frac{1,63,889}{2,52,310}$	56,071 kg. $1,60,000 \times \frac{88,421}{2,52,310}$
Less: Process wastage	10,393 kg.	2,804 kg.
Net Material available for production	93,536 kg.	53,267 kg.
Units to be produced	18,707 units $\frac{93,536 \text{ kg.}}{5 \text{ kg.}}$	8,878 units $\frac{53,267 \text{ kg.}}{6 \text{ kg.}}$

Q28. May 2018 RTP

STATE the advantages of Zero-based budgeting.

Answer

The advantages of zero-based budgeting are as follows:

- It provides a systematic approach for the evaluation of different activities and rank them in order of preference for the allocation of scarce resources.
- It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.
- It provides an opportunity to the management to allocate resources for various activities only after having a thorough cost-benefit-analysis. The chances of arbitrary cuts and enhancement are thus avoided.
- The areas of wasteful expenditure can be easily identified and eliminated.
- Departmental budgets are closely linked with corporation objectives.
- The technique can also be used for the introduction and implementation of the system of 'management by objective.' Thus, it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

□