Mutual Funds

Illustration 38:

M/s. Wealth Builders, an Asset Management Company (AMC), launched a dividend bonus scheme on 1st April 2019. The fund demonstrated strong performance over the years.

Key events are as follows:

- On 30th September 2021, the fund declared a bonus of 1:4 (one bonus unit for every four existing units held).
- On 30th September 2023, a second bonus of 2: 5 (two bonus units for every five existing units held) was declared.

Ms. Investor made a lump-sum investment of ₹ 25 lakhs in the scheme at its inception and remained invested throughout. As of 31st March 2025, her investment has generated an average annual yield of 16.8%.

The Net Asset Value (NAV) of the scheme on various dates is provided below:

Particulars	30.09.2021	30.09.2023	31.03.2025
NAV (in ₹)	78	88	110

Required: Determine the opening NAV per unit as on 1st April 2019 for Ms. Investor's holding. **(Jan 26 – Q 1(a) 6 Marks)**

("Round off all intermediate and final calculations to two decimal places.")

Solution:

Given:

Issue Date 1/04/19		
Original NAV	?	
30/9/21	78	Bonus 1 for 4
30/9/23	88	Bonus 2 for 5
31/3/2025	110	
Investment	₹ 25 Lacs	

Average Annual yield for 6 years = 16.8%

=>Holding period Yield = 16.8 x 6 = 100.8%

Let opening NAV be Y and opening units be X then XY = ₹25 Lacs

Bonus on 30/9/21 - 1 for 4

- ⇨ For X units X/4 units are allotted as bonus: Revised units = X + X/4 = 5X/4 units

Bonus on 30/9/23 – 2 for 5

- ⇨ Revised units = 5X/4 + [5X/4] x 2/5
  = 2X/4 + 5X/4
  Revised units =7X/4

  Closing Investment Value = ₹110 x 7X/4 Units = ₹192.5 X------(1)
  Opening Investment Value = ₹25 Lacs = XY ----------(2)
  Closing investment based on yield = ₹25 x (1+100.8%) = ₹50.2 Lacs --------(3)

  Equating (1) and (3) ₹192.5X = ₹50.2 Lacs
- ⇨ X = ₹50.2 lacs /₹192.5
- ⇨ X = 26077.92 Units
- ⇨ Substituting value of X in (2)
- ⇨ Y = ₹25 lacs / 26077.92 Units
- ⇨ Y = ₹95.87/Unit

Opening Units = 26077.92 & Opening NAV = ₹98.57/unit

Mutual Funds

Illustration 39:

Stork Capital, a SEBI Registered Mutual Fund, launched its first New Fund Offer (NFO) on June 1, 2024, with a face value of ₹ 10 per unit. The fund received subscriptions for 180 lakh units.

An underwriting agreement was in place with Griffin Securities Ltd., which agreed to underwrite the entire issue of 200 lakh units for a commission of 2.0%. The fund's financial activities are summarized below:

- Initial investments in various capital market instruments amounted to ₹ 1,780 lakhs.
- Marketing expenses for the NFO were ₹ 25 lakhs.
- During the financial year ended March 31, 2025, the fund sold securities with a cost of ₹ 250 lakhs for ₹ 280 lakhs.
- The fund subsequently purchased new securities for ₹ 265 lakhs.
- Management expenses are regulated by SEBI and cannot exceed 0.50% of the average funds invested during the year. The actual management expenses incurred were ₹ 5.50 lakhs, of which ₹ 50,000 was outstanding at year-end.
- Dividends earned on investments amounted to ₹ 5.0 lakhs, of which ₹ 40,000 was yet to be collected.
- The fund's policy is to distribute 80% of all realized earnings (capital gains and dividends).
- The market value of the investment portfolio as of March 31, 2025, was ₹ 2,150.50 lakhs.

Required: Determine the closing per unit Net Asset Value (NAV) of the fund as on March 31, 2025. Show all necessary workings. (Q 6a Jan 26 - 6 Marks Similar to FR Nov 2011)

(Note: Round off all intermediate and final calculations to two decimal places.)

Solution:

(1) Computation of Opening Cash Balance

Particulars	**Amount (₹ in Lakhs)**
Proceeds from NFO (200 Lakh units @ ₹ 10)	2000.00
Less: Initial Purchase of Securities	(1780.00)
Less: Underwriting Commission (2% of 2000)	(40.00)
Less: Meeting Expenses	(25.00)
Opening Cash Balance	**155.00**

(2) Computation of Closing Balance

Particulars	Amount (₹ in Lakhs)
Opening Cash Balance	155.00
Add: Cash Inflows	
Proceeds from Sale of Securities	280.00
Dividend Received (₹ 5.00 Lakh Earned – ₹ 0.40 Lakh uncollected)	4.60
Less: Cash Outflows	
Cost of New Securities Purchased	(265.00)
Management Expenses	(5.00)
Capital Gains Distributed [80% of (₹ 280 sale – ₹ 250 cost)]	(24.00)
Dividend Distributed (80% of ₹ 5.00 Lakh total earned)	(4.00)
Closing Cash Balance	141.60

(3) Management Expenses

	Amount (₹ in Lakhs)
A. Actual Expenses Incurred	5.50
B. SEBI Limit (0.50% of Average Funds)	
- Opening Investment	1780.00
- Closing Investment (1780 – 250 + 265)	1795.00
- Average Fund Invested	1787.50
- SEBI Limit (0.50% of ₹ 1787.50)	8.94
Chargeable Expenses (Lower of A or B)	5.50
Less: Amount unpaid (Outstanding)	(0.50)
Management Expenses Paid	**5.00**

(4) Net Asset Value (NAV) as on March 31, 2025

Particulars	Amount (₹ in Lakhs)
Assets:	
Closing Cash Balance	141.60
Closing Market Value of Investment	2150.50
Accrued Dividends (Receivable)	0.40
Total Assets	2292.50
Less: Liabilities	
Outstanding Management Expenses	(0.50)
Closing Net Assets (A)	2292.00
Total Units Outstanding (in Lakhs) (B)	200.00
NAV per Unit (A/B)	**₹ 11.46**

M&A & Corporate restructuring

Illustration 60: Ujwal Bank Ltd. (UBL) and Suraksha Bank Ltd. (SBL) are Scheduled Banks to merge.

UBL is strong Private Sector Bank with stable capital adequacy, while SBL has negative CRAR due to heavy NPAs. Data of both the Banks is as follows:

Particulars	UBL	SBL
Book Value per share (₹)	50	**25**
Market Price per share (₹)	200	**50**
CRAR%	12	**(-) 2**
NPA%	2	**12**
No. of shares in thousands	50000	**20000**
Price Earning Ratio (PE Ratio)	**20**	**10**

Weights for swap ratio are Book Value per share 20%, Market Price per share 40%, CRAR (%) 20% and balance for NPA%. (Jan 26 – MCQ 6 Marks)

From the information given above, choose the correct answer

1. The swap ratio based on information given shall be for 1 share of UBL for ……shares of SBL.

(A) 1.07

(B) 0.20 (Ratio is actually 1 Share of UBL for 5 shares of SBL – Question is incorrectly framed)

(C) 0.86

(D) 1.73 **(2 Marks)**

2. Based on swap ratio total number of shares issued by UBL to SBL shall be___ (in Thousands).

(A) 21,400 shares

(B) 24,000 shares

(C) 17,200 shares

(D) 4,000 shares 20000 shares of SBL * 0.2 = 4000 shares **(2 Marks)**

3. Post merger Earning Per Share (EPS) of UBL shall be ₹ _____.

(A) ₹ 11.11

(B) ₹ 12.50

(C) ₹ 8.50

(D) ₹ 10.00 **(2 Marks)**

Solution:

(1)

Metric	Weight	UBL	SBL	Ratio
Book Value	20%	50	25	2:1
Market price	40%	200	50	4:1
CRAR %	20%	12	-2	6:-1
NPA	20%	2	12	6:1 (Not 1:6 because lower the NPA the better)

These both cancel out each out

Final Weights :

20% 2: 1 i.e 1 share of UBL for every 2 shares of SBL = $\frac{1}{2}$ = 0.5

40% 4:1 i.e 1 share of Ubl for 4 shares of SBL = $\frac{1}{4}$ = 0.25

20% x 0.5 + 40% x 0.25 = 10% + 10% = 20% = 0.20

⇨ 1 share of UBL for 5 shares of SBL

(3)

Metric	UBL	SBL	Total
MP	200	50	
PE	20	10	
=>EPS(MP/PE)	10	5	
Shares	50000	20000	
PAT (Shares x EPS)	500000	100000	600000
Shares post swap (From Q 2)	50000	4000	54000
Revised EPS			600000/54000 = 11.11

Derivatives – Futures & Options

Illustration 38:

Ms. Priya initiated the following option strategy on Omega Industries Limited's equity shares: Transactions executed:

(1) Bought one European Call Option with the following terms:

- Premium paid : ₹ 42 per share
- Strike Price : ₹ 620
- Maturity : 3 months

(2) Bought one European Put Option with the following terms:

- Premium paid : ₹ 8 per share
- Strike Price : ₹ 480
- Maturity : 3 months

Additional Information:

- Current Market Price (CMP) of Omega Industries: ₹ 550 per share
- Lot size: 150 shares per contract
- Ms. Priya holds the positions until expiration

Required:

(i) Calculate the net profit/loss in the following scenarios at expiration

- Share price remains unchanged at ₹ 550
- Share price declines to ₹ 380
- Share price appreciates to ₹ 680

(ii) Determine the upper and lower breakeven points for this strategy.
(Jan'26 Q 1 (c) 4 Marks)

(Note: Round off all intermediate and final calculations to four decimal places.)

Solution:

			BC			BP
Premium	42	42	42	8	8	8
Strike	620	620	620	480	480	480
Maturity	3 Months	3 Months	3 Months	3 Months	3 Months	3 Months
CMP	550	550	550	550	550	550
Lot size	150	150	150	150	150	150
Holding period	Till	Till	Till	Till	Till	Till

	Maturity	Maturity	Maturity	Maturity	Maturity	Maturity
Market price	550	380	680	550	380	680
BC	620	620	620	-	-	-
BP	-	-	-	480	480	480
Option Exercised	**No**	**No**	**Yes**	**No**	**Yes**	**No**
Payoff	**-**	**-**	**60**	**-**	**100**	**-**
Premia Paid	-42	-42	-42	-8	-8	-8
Net Gain	**-42**	**-42**	**18**	**-8**	**92**	**-8**
Lot Size	150	150	150	150	150	150
Overall Gain	**-6300 (42 x 150)**	**-6300**	**2700**	**-1200**	**13800**	**-1200**

Combined Gain Loss

MP	*550*	*380*	*680*
Net gain on BC	*-6300*	*-6300*	2700
Net Gain on BP	*-1200*	*13800*	*-1200*
Net Gain / Loss	***-7500***	***7500***	***1500***

Breakeven price:

CMP = 550

Total Premia paid for BC & BP (42+8) = 50

Strike of Call 620

Strike of Put 480

Break Even Price (BEP) Upper band = 620 + 50 = 670

Break Even Price (BEP) Lower band = 480 - 50 = 430

Derivatives – Futures & Options

Illustration 39:

A speculator purchases BFL Ltd. May Futures (lot of 125 shares) at 7750 and chooses to

Write BFL 7790 May call option with a premium of ₹ 30 (lot of 125 shares). As on May 18, spot prices rise and so the futures price and call premium. Futures price rise to 7780. Call premium also rises to ₹ 36. Brokerage for the transaction is 0.02% for the transaction value of futures and strike price net of call premium for options.

You are required to calculate:

(i) Profit/Loss on Futures net of transaction costs.

(ii) Profit/Loss on options net of transaction costs.

(iii) Overall profit from both the positions net of costs.

(iv) Total Brokerage cost. (Jan 26, Q 3 (a) 6 Marks)

Solution:

(1)

Buy futures	**Original contract (may end)**	**7750**
CMP of Futures May 18	Increase	7780
Gain		**30**
Lot size		125
Gross Gain	**(125 x 30)**	**3750**
Brokerage on Buying	7750 x 0.02%	1.55
Brokerage on Buying	7780 x 0.02%	1.556
Total Brokerage per lot		3.106
Total brokerage	**125 x 3.106**	**388.25**
Net Gain	**3750 – 388.25**	**3361.75**

(2)

Sell Call @ strike of 7790 at CMP – Premia	**For May end**	**30**
Buy call @ revised futures price of 7780	May 18th	36
Net Loss per call		-6
Lot size		125
Gross Loss	**- 6 x 125**	**-750**
Brokerage on Call		
Sell Call	(7790 – 30) x 0.02%	1.5520
Buy call	(7790 – 36) x 0.02%	1.5508
Total Brokerage		3.1028
Lot size		125
Total Brokerage	**125 x 3.1028**	**387.85**
Net Loss on Options	-750-387.85	-1137.85
(3) Combined Profit on Futures + Options	3361.75-1137.85	2223.90
(4) Total Brokerage	**388.25+387.85**	**776.10**

Forex

Illustration 105

XYZ Ltd. has imported goods to the extent of US$ 8 Million. The payment terms are as under:

(1) 1% discount if full amount is paid immediately, or

(2) 60 days interest free credit. However, in case of a further delay up to 30 days, interest at the rate of 8% p.a. will be charged for additional days after 60 days. XYZ Ltd. has ₹ 25 Lakh available and for remaining it has an offer from bank for a loan upto 90 days @ 9.0% p.a.

The quotes for foreign exchange are as follows:

Spot Rate INR/ USS (buying) ₹ 66.98

60 days Forward Rate INR/ US$ (buying) ₹ 67.16 90 days Forward Rate INR/ US$ (buying) ₹ 68.03

Advise which one of the following options would be better for XYZ Ltd.:

(i) Pay immediately after utilizing cash available and for balance amount take 90 days loan from bank.

(ii) Pay the supplier on 60th day and avail bank's loan (after utilizing cash) for 30 days.

(iii) Avail supplier's offer of 90 days credit and utilize cash available.

Further presume that the cash available with XYZ Ltd. will fetch a return of 4% p.a. in India till it is utilized.

Note:

- Assume year has 360 days.
- Ignore Taxation.
- Cashflows ₹ in Crore.
- Round off all intermediate and final calculations to four decimal places. (Jan 26 Q 2a 6 Marks)

Solution:

Option 1:

Pay immediately

	Working	Amount in Rs. Cr
Payment in USD today	**8 Mio USD x 99% x 66.98 / 1 cr**	**53.0482**
Less: Money in hand		**0.25**
Net amount paid today		**52.7982**
Interest on Money borrowed	**52.7982 x 90/360 x 9%**	**+1.1880**

@9% pa for 90 days		
Total Cash Outflow (Per faculty)		**53.9862**
Add Cash paid from existing balance Including opportunity cost	**0.25 x 4% x 90/360 = 0.0025**	**0.2525**

Cash outflow considered by ICAI 54.2387

Pay supplier in 60 days

	Working	Amount in Rs. Cr
Payment in USD after 60 days	**8 Mio USD x 67.16/ 1 cr**	**53.728**
Less: Money in hand after 60 days at 4% int	**0.25 + 0.25x 60/360*4%**	**-0.2517**
Net amount paid after 60 days		**53.4763**
Interest on Money borrowed @9% pa for 30 days	**53.4763 x 30/360 x 9%**	**+0.4011**
Total Cash Outflow after 90 days (Per faculty)		**53.8774**
Add Cash paid from existing balance	**0.0025**	**0.2500**

Cash outflow considered by ICAI 54.1274

Pay supplier by taking create for 90 days

	Working	Amount in Rs. Cr
Payment in USD after 90 days	**8 Mio**	
Add Interest @ 8% for 30 days	**8 Mio x 8% x 30/360 = 53,333**	
Total amount paid after 90 days	**8,053,333 x 68.03**	**54.7868**
Less: Surplus money incl interest	**0.25 + 0.25 x 90/360 x 9%**	**-0.2525**
Total Cash Outflow after 90 days (Per faculty)		**54.5343**

Cash outflow considered by ICAI 54.5343 – 0.2500 54.7843

Forex

Illustration 106:

Following are the direct quotes available in the international market: GBP1 = EURO 1.2950/65 (Direct rate)

GBP1 = USD 1.6025/6000 EURO1 = USD 1.2375/9000

You are required to:

(i) Calculate Bid & Ask Cross Rates for Euro per Pound (Euro/Pound)

(ii) Prove that arbitrage gains are not possible if-

(a) You buy Pounds against Euro under direct route and sell through cross rate route.

(b) You sell Pounds against Euro under direct route and buy through cross rate route.

(Q 3b Jan 26 4 Marks)

Solution:

	Bid	Ask ICAI Interpretation	Ideal Interpretation
GBPEUR i.e EUROs per GBP	**1.2950**	**1.2965**	**1.2965**
GBPUSD i.e USD per GBP	**1.6025**	**1.6000**	**1.6060**
EURUSD i.e USD per Euros	**1.2375**	**1.9000**	**1.2390**

(1) Cross Rates working using ICAI interpretation – faculty working

	Bid	Ask ICAI Interpretation
GBPEUR i.e EUROs per GBP = Euro / USD x USD / GBP	**B x B** **1.6025 x 1/1.9000**	**A X A** **1.6000x 1/1.2375**
Euro Per GBP	0.8434	1.2929

Since Euro Per USD quote is not available and only USD per Euro is available Bid and ask will be interchanged when we compute Euro per USD as 1 / (USD per Euro)

2(a)

Arbitrage on Buying pound direct and selling pounds through cross

Buy 1 GBP Direct	*Sell Euro*	*-1.2965*
Sell 1 GBP Cross	***Buy Euro***	***+0.8434***
Net flow		***0.4531 Loss***

There is an arbitrage loss

2(b)

Arbitrage on Selling pound direct and Buying pounds through cross

Sell 1 GBP Direct	*Buy Euro*	*+1.2950*
Buy 1 GBP Cross	***Sell Euro***	***-1.2929***
Net flow		*0.0021 Gain*

There is an arbitrage Profit

(1) Cross Rates working using ICAI interpretation – ICAI working – incorrect in faculty opinion

	Bid	Ask ICAI Interpretation
GBPEUR i.e EUROs per GBP = Euro / USD x USD / GBP	**B x B** **1.6025 x 1/1.2375**	**A X A** **1.6000x 1/1.9000**
Euro Per GBP	0.8421	1.2950

ICAI has multiplied Bid with Bid and ask with ask. It has taken an interpretation that bid is lower value and ask is higher value in USD EUR per USD quote which is incorrect

2(a)

Arbitrage on Buying pound direct and selling pounds through cross

Buy 1 GBP Direct	*Sell Euro*	*-1.2965*
Sell 1 GBP Cross	***Buy Euro***	***+0.8421***
Net flow		***0.4544 Loss***

There is an arbitrage loss

2(b)

Arbitrage on Selling pound direct and Buying pounds through cross

Sell 1 GBP Direct	*Buy Euro*	*+1.2950*
Buy 1 GBP Cross	***Sell Euro***	***-1.2950***
Net flow		*No Gain or loss*

There is an No arbitrage Profit or loss

Financial Policy & Corporate Strategy

Illustration2:

MNC Limited company's financial statements for FY 2024-25 are provided:

Income Statement	(₹ in Cr.)
Sales revenues	7500
Costs and expenses	7300
Income before taxes	200
Taxes (30%)	60
Net income	**140**

MNC Limited's Balance Sheet as at 31st March, 2025

Liabilities	(₹ in Cr.)	Assets	(₹ in Cr.)
Equity	2000	Net Fixed Assets	4000
Long term Debt	2500	Current Assets	2000
Current Liabilities	1500		
	6000		**6000**

Additional Information:

(i) The company expects a 40% sales growth next financial year.

(ii) The company will have a 25% dividend payout ratio next year.

(iii) All costs, current assets and current liabilities are expected to increase with sales.

(iv) Except retained earnings no new Equity is to be raised.

Required:

Compute External Funding Requirement through raising Long-term Debt:

(1) If the company is operating at 65% capacity usage for fixed assets.

(2) If the company is operating at 95% capacity usage for fixed assets.

(Q2b Jan 26 4 Marks)

Solution:

EFR = $F_0 x\ S_1/S_0$ – F_0 + $NCA_0 x\ (S_1-S_0)\ /S_0$ – Net profit (1- Dividend)

EFR under normal circumstances = 4000 x 10500/7500 – 4000 + 500x (7500x 0.4)/7500 – 147 (WN1)

EFR = 1600 +200-147 ------ (1)

EFR = 1653

(A)

If company is currently operating at 65% capacity and there is a 40% growth in Sales same will get reflected in FA, NCA & PL

Revised fixed assets utilization = 65% x 1.4 = 91%

Since it is less than 100% there no requirement to ad FA

Revised EFR = 0 +200 -147 = 53

Money raised by LT debt = ₹ 53 Cr

Revised Balance sheet

Liabilities		**(₹ in Cr.)**	**Assets**		**(₹ in Cr.)**
Equity	2000 + 147	2147	Net Fixed Assets	4000+0	4000
Long term Debt	2500+53	2553	Current Assets	2000+800	2800
Current Liabilities	1500+600	2100			
Total		**6800**			**6800**

(B)

If company is currently operating at 95% capacity and there is a 40% growth in Sales same will get reflected in FA, NCA & PL

Revised fixed assets utilization = 95% x 1.4 = 133%

Additional requirement for FA = 0.33 x 4000 = 1320

Revised EFR = 1320 +200 -147 = 1373

Money raised by LT debt = ₹ 1373 Cr

Revised Balance sheet

Liabilities		(₹ in Cr.)	Assets		(₹ in Cr.)
Equity	2000 + 147	2147	Net Fixed Assets	4000+1320	5320
Long term Debt	2500+1373	3873	Current Assets	2000+800	2800
Current Liabilities	1500+600	2100			
Total		**8120**			**8120**

Working Note 1:

Revised P&L

	Old	Increase	Revised
Sales	7500	7500 x 40% = 3000	10500
Cost	7300	7300 x 40% = 2920	10220
PBT	200	200 x 40% = 80	280
Tax @ 30%	60	30% of 80 =24	84
PAT	140	56	196
Less: Dividend			25% of 196 = 49
Retained Earnings			**196-49 = 147**

Interest Rate Risk Management

Illustration 35:

Name	Status	Principal Amount (₹ in millions)	Duration of loan/ deposit (time)	Interest rates of Borrowing/ Lending	Strike Rate (PLR) (K)	Premium (%) (lumpsum) (P)	If PLR rate at the end of first 6-months (Reset Period)
AB Ltd.	Borrower	₹ 5.00	5 Year	PLR+0.5	8% p.a.	0.4%	10% p.a.
XY Ltd.	**Depositor**	**₹ 2.00**	**3 Year**	**PLR-0.5**	**8% p.a.**	**0.5%**	**6% p.a.**

You are required to:

(i) Elaborate the strategy to be adopted by both the companies to hedge against the risk of interest rate fluctuations.

(ii) Premium paid/received based on the strategy to be adopted in (i) using 8% p.a. as the reference rate.

(iii) Net Gain/loss due to hedging to both the companies. (Q4a, Jan'26 6 Marks)

Solution:

Strategy to be adopted:

(1) AB Limited Buy a cap for 5 years on balance maturity left with strike rate of 8%for Rs.5 Mio

XY Limited Buy a Floor for 3 years on balance maturity left with strike rate of 8%for Rs.2 Mio

(2) AB Limited Lumpsum premia = 0.4% x 5 Mio = 20,000
Equalized annual premium = 20000/ PVIFA (5 years x frequency of 2, 4% i.e 8%/2) – Assuming 8% pa is the discounting rate
= 20000/8.1108
= 2465.82
= Rounded off to Rs.2466

XY Limited Lumpsum premia = 0.5% x 2 Mio = 10,000
Equalized annual premium = 10000/ PVIFA (3 years x frequency of 2, 4% i.e 8%/2) – Assuming 8% pa is the discounting rate
= 10000/5.242
= 1907.62 = Rounded off to Rs.1908

3)

AB Limited Net gain or loss on 1st reset date

Loan rate	PLR + 0.5%
CAP on PLR	8%
PLR on 1st Reset date	10%
Gain made on account of CAP	2% (10-8)
Gain in ₹ 2% x 5 Mio x ½	₹50,000
Less: Equivalized annual Premia	₹2466
Net gain / Loss	**₹47,534**

XY Limited Net gain or loss on 1st reset date

Deposit rate	PLR - 0.5%
CAP on PLR	8%
PLR on 1st Reset date	6%
Gain made on account of CAP	2% (8-6)
Gain in ₹ 2% x 2 Mio x ½	₹20,000
Less: Equivalized annual Premia	₹1908
Net gain / Loss	**₹18,092**

Portfolio Management

Illustration 92:

Mrs. SRS is your HNI Client and wants to invest in stock market. She has got the following information about individual securities and wants to select the securities to form an optimal portfolio from amongst these securities:

Security	Expected Return (%)	Unsystematic Risk (%)	Beta
A	5	25	0.5
B	25	20	2.5
C	15	10	1.0
D	10	10	1.5
E	**20**	**18**	**1.8**

Market Index Variance is 25% and the Risk-Free Rate of Return is 7%. Required:

Based on this information, help Mrs. SRS to:

(i) Prepare ranked table using Treynor's Ratio.

(ii) Calculate Cut-off Point.

(iii) Identify the securities to be included in optimal portfolio.

(Q 5a Jan 26 8 Marks)

Solution:

Steps:

1. **Compute Treynor Ratio**
2. **Rank stocks from highest to Lowest**
3. **Compute Ci for all stocks cumulative from 1st stock till that stock**

Formula 👇

$$C_i = \frac{\sigma_m^2 \sum_{i=1}^{N} \frac{(R_i - R_f)\beta_i}{\sigma_{ei}^2}}{1 + \sigma_m^2 \sum_{i=1}^{N} \frac{\beta_i^2}{\sigma_{ei}^2}}$$

4. **Highest C1 is cutoff point**
5. **Stock till cut off are part of Optimal portfolio**
6. **Stock below cutoff are ignored**

7.Compute weight of each stock in optimal portfolio XiO

8. No Short sales (–ve weights) are permitted. Weights 👇

$$X_i^0 = \frac{Z_i}{\sum_{j=1}^{N} Z_i}$$

where

$$Z_i = \frac{B_i}{\sigma_{ei}^2}\left(\frac{R_i - R_0}{B_i} - C^*\right)$$

Treynor Ratio

Security	*Ri*	*bi*	*Ri - Rf*	*Ri - Rf / bi*	*Ranking*
A	*5*	*0.5*	*-2*	*-4*	*5*
B	*25*	*2.50*	*18*	*7.20*	*3*
C	*15*	*1.00*	*8*	*8.00*	*1*
D	*10*	*1.50*	*3*	*2.00*	*4*
E	***20***	***1.80***	***13***	***7.22***	***2***

Security	$R_i - R_f$	β_i	σ^2_{ei}	$\frac{(R_i - R_f) \times \beta_i}{\sigma^2_{ei}}$	$\sum_{e=1}^{N} \frac{(R_i - R_f) \times \beta_i}{\sigma^2_{ei}}$	$\frac{\beta_i^2}{\sigma^2_{ei}}$	$\sum_{e=1}^{N} \frac{\beta_i^2}{\sigma^2_{ei}}$	C_i
C	8	1.0	10	0.80	0.80	0.10	0.10	5.71
E	13	1.80	18	1.30	2.10	0.18	0.28	6.56
B	18	2.50	20	2.25	4.35	0.313	0.593	6.87
D	3	1.50	10	0.45	4.80	0.225	0.818	5.59
A	-2	0.50	25	-0.04	4.76	0.01	0.828	5.48

CC = 25 x 0.80 / [1 + (25 x 0.10)] = 5.71
CE = 25 x 2.10 / [1 + (25 x 0.28)] = 6.56 2
CB = 25 x 4.35 / [1 + (25 x 0.593)] = 6.87747
CD = 25 x 4.80 / [1 + (25 x 0.818)] = 5.5976
CA = 25 x 4.76 / [1 + (25 x 0.828)] = 5.487
Cut-off Point: 6.87 747

Stocks C, E & B are selected

Weights – Additional point solved by faculty

$Z_x = \frac{\beta_i}{\sigma_{ei}^2} * \left[\frac{R_i - R_f}{\beta_i} - C^*\right]$

Z_C = (1/10) x (8- 6.87747) = 0.112253

Z_E= (1.8/18)x (7.22- 6.87747) = 0.034253

Z_B= (2.5/20)x (7.2- 6.87747) = 0.04031625

$Z_C + Z_E + Z_B$ = 0.1868225

Weights

Z_C = 60.09% (0.112253/0.1868225)

Z_E=18.33% (0.034253/0.1868225)

Z_B = 21.58%(0.04031625/0.1868225)