

Mock Test Paper - Series II: September, 2026

Date of Paper: 26th September, 2026

Time of Paper: 2 P.M. to 5 P.M.

FINAL COURSE: GROUP – I

PAPER – 2: ADVANCED FINANCIAL MANAGEMENT

ANSWER TO PART – I CASE SCENARIO BASED MCQS

1. Option (c)
2. Option (a)
3. Option (d)
4. Option (c)
5. Option (c)
6. Option (b)
7. Option (d)
8. Option (c)
9. Option (c)
10. Option (b)
11. Option (b)
12. Option (a)
13. Option (b)
14. Option (d)
15. Option (c)
16. Option (c)
17. Option (c)
18. Option (d)
19. Option (a)
20. Option (d)
21. Option (a)
22. Option (b)
23. Option (b)

ANSWERS OF PART – II DESCRIPTIVE QUESTIONS

1. (a) (i) **Interest rate futures**

$$\text{Number of contracts sold} = \frac{2,00,00,000}{2,00,000} \times \frac{6 \text{ months}}{3 \text{ months}} = 200 \text{ contracts}$$

The value of one tick is $0.0001 \times ₹ 2,00,000 \times 3/12 = ₹ 5.00$

(1) Interest rates increase by 2% and the Futures rate falls by 2%.

		₹
Cash Market		
Extra interest paid ($2\% \times 6/12 \times ₹ 2,00,00,000$)		(2,00,000)
Futures Market		
On 31 December 2025:		
Sell 200 ₹ 2,00,000 June GOI Treasury Bonds Futures at (effectively 13.75% per year interest)	86.25	
After interest rate increase:		
Buy 200 ₹ 2,00,000 June GOI Treasury Bonds Futures at (effectively 15.75% per year interest)	<u>84.25</u> <u>2.00</u>	
Total Gain in Ticks per contract (2.00×100)	= 200 ticks	
Gain on Futures contracts = 200 contracts x 200 ticks x ₹ 5.00		2,00,000
Overall Net Gain (Loss) on the Strategy	=	NIL

(2) Interest rates increase by 2% and the futures market price falls by 1.5%

		₹
Cash Market		
Extra interest paid (as above)		(2,00,000)
Futures Market		
On 31 December 2025:		
Sell 200 ₹ 2,00,000 June GOI Treasury Bonds Futures at (effectively 13.75% per year interest)	86.25	

After interest rate increase:		
Buy 200 ₹ 2,00,000 June GOI Treasury Bonds Futures at effectively 15.25% per year interest)	<u>84.75</u> <u>1.50</u>	
Total Gain in Ticks per Contract (1.50 x 100)	= 150 ticks	
Gain on Futures contracts = 200 contracts x 150 ticks x ₹ 5.00	=	1,50,000
Overall Net Gain (Loss) on the Strategy		₹ (50,000)

(3) Interest rates fall by 1% and the futures market price increases by 0.75%

		₹
Cash Market		
Saving of interest (1% x 6/12 x ₹ 2,00,00,000)		1,00,000
Futures Market		
On 31 December 2025:		
Sell 200 ₹ 2,00,000 June GOI Treasury Bonds Futures at (effectively 13.75% per year interest)	86.25	
After interest rate reduction:		
Buy 200 ₹ 2,00,000 June GOI Treasury Bonds Futures at effectively 13% per year interest)	<u>87.00</u> <u>(0.75)</u>	
Total Loss in Ticks per Contract (0.75 x 100)	= 75 ticks	
Loss on Futures contracts = 200 contracts x 75 ticks x ₹ 5.00	=	(75,000)
Overall Net Gain on the Strategy		₹ 25,000

Summary:

Scenario	(1) ₹	(2) ₹	(3) ₹
Cash market interest paid:			
(16% x 6/12 x ₹ 2,00,00,000)	16,00,000	16,00,000	---
(13% x 6/12 x ₹ 2,00,00,000)	---	---	13,00,000

(Gain)/Loss on Futures Contracts	(2,00,000)	(1,50,000)	75,000
Overall Cost	₹ 14,00,000	₹ 14,50,000	₹ 13,75,000

(ii) Interest rate guarantees

The cost (premium) of the guarantee is ₹ 2,00,00,000 x 0.2% = ₹ 40,000, payable whether or not the guarantee is 'exercised'.

(1) & (2) Interest rates increase by 2%

As interest rates have risen to 16%, the guarantee at 14% will be used i.e.

	₹
Cash market cost (14% x 6/12 x ₹ 2,00,00,000)	14,00,000
Premium	40,000
	<u>₹ 14,40,000</u>

This is more expensive than the Futures hedge for (1) and cheaper than for (2).

(3) Interest rates fall by 1%

As interest rates have fallen to 13%, the guarantee at 14% will not be used i.e.

	₹
Cash market cost (13% x 6/12 x ₹ 2,00,00,000)	13,00,000
Premium	40,000
	<u>₹ 13,40,000</u>

This is cheaper than the Futures hedge as the guarantee has allowed the company to take advantage of lower cash market interest rates. **(12 Marks)**

(b) Following are some indicators to identify the Interest Rate Risk:

1. Monetary Policy of the Government.
2. Any action by Government such as demonetization etc.
3. Economic Growth
4. Release of Industrial Data
5. Investment by foreign investors
6. Stock market changes

(2 Marks)

2. (a) (i) Performance = $(1 + y_1) * (1 + y_2) * (1 + y_3) - 1$

Performance of Equity Manager X = $(1 + 0.109) * (1 + 0.059) * (1 + 0.08) - 1 = 0.2584$ i.e. 25.84%

Performance of Equity Manager Y = $(1 + 0.075) * (1 + 0.025) * (1 + 0.10) - 1 = 0.2121$ i.e. 21.21%

Evaluation of performance of Equity Managers

Manager	Return delivered in last 3 years	Benchmark Return	Excess Return	Performance
X	25.84%	21.74%	4.10%	Outperformed
Y	21.21%	21.74%	-0.53%	Underperformed

(ii) The following are two risk-adjusted performance measures based on the portfolio's beta:

- Treynor measure (proportional outperformance): $T = (R_p - r_f) / \beta_p$
- Jensen measure (absolute outperformance): $J = R_p - R_b$

R_p is the return on the portfolio

R_b is the return as per CAPM

To calculate both above measures first we shall calculate the beta (β) of the portfolios of both managers as follows:

Calculate β where $\beta_i = \text{Covariance } (R_i, R_m) / \text{Variance } (R_m)$

$$\beta_X = 0.0082 / (0.085)^2 = 1.13$$

$$\beta_Y = 0.0061 / (0.085)^2 = 0.84$$

Now we shall calculate both measures as follows:

Manager	Treynor measure	Jensen measure
X	$(8.00\% - 2.75\%) / 1.13$ = 4.65	$8.00\% - [2.75\% + 1.13 (7.00\% - 2.75\%)]$ = 0.45%
Y	$(10\% - 2.75\%) / 0.84$ = 8.63	$10.00\% - [2.75\% + 0.84 (7.00\% - 2.75\%)]$ = 3.68%

- (iii) Over the last 3 years, X outperformed the market and Y underperformed the market. However, based on the both the Treynor and Jensen measures, Y outperformed X on a risk-adjusted basis, meaning that considering the risk appetite of the two managers, Y took less risk and achieved a better return compared to X. **(10 Marks)**

(b) Various risks involved in Collateralized Debt Obligations (CDOs) are as follows:

- (i) Default Risk
- (ii) Interest Rate Risk
- (iii) Liquidity Risk
- (iv) Prepayment Risk
- (v) Reinvestment Risk
- (vi) Foreign Exchange Risk

(4 Marks)

3. (a) (i) This arrangement is called the Tri-party Repo.

(ii) Dirty Price

= Clean Price + Interest Accrued

$$= 99.42 + 100 \times \frac{10}{100} \times \frac{262}{360} = 106.70$$

(iii) First Leg (Start Proceed)

$$= \text{Nominal Value} \times \frac{\text{Dirty Price}}{100} \times \frac{100 - \text{Initial Margin}}{100}$$

$$= ₹ 8,00,00,000 \times \frac{106.70}{100} \times \frac{100 - 2}{100} = ₹ 8,36,52,800$$

(iv) Second Leg (Repayment at Maturity) = Start Proceed x

$$(1 + \text{Repo rate} \times \frac{\text{No. of days}}{360})$$

$$= ₹ 8,36,52,800 \times (1 + 0.0565 \times \frac{14}{360}) = ₹ 8,38,36,604$$

(v) To compute the effective annualized cost of fund to MFA, first we shall compute commission payable to Bank C

$$\text{Commission} = ₹ 8,00,00,000 \times 0.15\% \times \frac{14}{360} = ₹ 4,667$$

$$\begin{aligned} \text{Total Cost of Borrowing} &= \text{Repo Interest} + \text{Commission to Bank C} \\ &= (₹ 8,38,36,604 - ₹ 8,36,52,800) + ₹ 4,667 \\ &= ₹ 1,83,804 + ₹ 4,667 = ₹ 1,88,471 \end{aligned}$$

$$\text{Effective Cost of Funds for 14 days} = \frac{1,88,471}{8,36,52,800} = 0.002253 \text{ i.e. } 0.2253\%$$

$$\text{Annualized Effective Cost} = 0.2253\% \times \frac{360}{14} = 5.79\% \text{ (approx.) } \quad \mathbf{(6 \text{ Marks})}$$

(b) The various types of risks to which an investors are exposed in any securitization transaction are as follows:

- (i) *Credit risk or Counterparty risk:* It is the prime risk wherein investors are prone to the risk of bankruptcy and non-performance of the servicer.
- (ii) *Legal risks:* Since in the Indian context it is a recently developed concept there is an absence of conclusive judicial precedent or explicit statutory provisions on securitization transactions. As a result, any dispute over the legal ownership of the assets is likely to result in uncertainty regarding investor pay-outs from the pool cash flow.
- (iii) *Market risks:* Market risks represent risks external to the transaction and include market-related factors that impact the performance of the transaction. Some of these risks are as follows:
 - (1) *Macroeconomic risks:* The performance of the underlying loan contracts depends on macroeconomic factors, such as industry downturns or adverse price movements of the underlying assets.
 - (2) *Prepayment risks:* A change in the market interest rate represents a difficult situation for investors because it is a combination of prepayment risk and volatile interest rates. With a reduction in interest rates generally prepayment of retail loans increases, resulting in reinvestment risk for investors because investors may receive their monies ahead of schedule and may not be able to reinvest the amount at the same yield.
 - (3) *Interest rate risks:* This risk is prominent where the loans in the pool are based on a floating rate and investor pay-outs are based on a fixed rate or vice versa. It results in an interest rate mismatch and can lead to a situation where the pool cash inflow, even at 100% collection efficiency, is not sufficient to meet investor pay-outs.

Interest rate swaps can be used to hedge this type of risk to some extent. (4 Marks)

- (c) To assess the Fund's performance vis-à-vis the benchmark we shall compute the Tracking Error as follows:

Year	Index Return (%)	Mutual Fund Return (%)	Diff. (%)	(Diff. – Mean Diff.)	(Diff. – Mean Diff.) ²
1	8.00	7.00	-1.00	-1.10	1.21
2	3.00	2.00	-1.00	-1.10	1.21
3	9.00	8.00	-1.00	-1.10	1.21
4	6.00	9.00	+3.00	2.90	8.41
5	5.00	5.50	+0.50	0.40	0.16
Total			+0.50		12.20

$$\bar{d} = \text{Average differential return} = \frac{0.50}{5} = 0.10$$

The Tracking Error is calculated as follows:

$$TE = \sqrt{\frac{\sum (d - \bar{d})^2}{n-1}}$$

$$TE = \sqrt{\frac{12.20}{4}} = 1.75\%$$

Since the Tracking Error is only 1.75%, it can be inferred that the Fund has closely tracked the Benchmark Index. (4 Marks)

OR

Following are some of the important lessons can be learnt from the above-mentioned case studies of Derivative Mishaps.

- (i) **Don't buy any derivative product that you don't understand:** This is an important lesson for non-financial corporation not to undertake a trade or derivative product that they do not understand. As apparent in case of Orange County, treasurer Robert Citron speculated on derivative instruments even though he has no financial background. Similar things happened in BT's case where both P&G and Gibson Greetings were misguided.

The best way to avoid such loss is to value the instrument in house because outside persons can misguide the corporation about the potential dangers.

(ii) **Due diligence before making Treasury Department as a Profit Centre:**

Though the main objective of establishing a Treasury Department is to reduce financing costs and manage risk optimally. But it has been seen that though initially Treasury Department made limited profits from treasury activities later started taking more risks in anticipation of higher profit. In case study of Orange County the treasurer Citron with initial profit from yield curve play strategy leveraged its position and led to bankruptcy. The best way to avoid this situation is to avoid linking the treasurer's salary with the profit he made for the organization.

(iii) **Specify the Risk Limits:** Proper monitoring is prerequisite for the trader to ensure that he/she should switch from arbitrageur to speculator. As happened in Baring Bank's case where position taken by rouge trade Nick Leeson remained unmonitored and unquestionable by the management.

The best way to avoid the situation of overtrading is to limit the sizes positions that can be taken by a trader, and it should be accurately reported from risk perspective.

(iv) **Separation of Front, Middle and Back Offices:** The three offices though are interlinked but they discharge separate functions. Accordingly, there should be a firewall in the functioning of these offices i.e. person of one office should not have the access to the functioning of other office. Barings bank's case is a classic example where Nick Leeson carried out manipulations in back office (which was under his control also) and hid the losses in error account.

To ensure that these three offices work independently it is essential that role and functions of each office should be clearly defined and followed.

(v) **Carry out Stress Test, Scenario Analysis etc.:** As happened in the case of BT where Gibson Greetings where it was believed that the interest rates shall remain lower and to some extent ignored the possibility of increasing of interest rates by 1%. But it happened and ultimately Gibson Greetings faced a huge loss.

To counter this type of unpredictable situation it is necessary that VAR analysis should always be followed by Scenario Analysis because as tendency a human being normally can anticipate two to three scenarios. It will be better to refer the data of at least 10 to 20 years to anticipate a Black

Swan event. Further even Simulation Test can be applied to analyze the results in various possible situations. **(4 Marks)**

Note: Explain any two lessons out of two above-mentioned lessons.

4. (a) (i)

Working Notes:

1. Calculation of expected selling price of metal per kg for each year:

Particulars	Year 1	Year 2	Year 3
Probability (0.30)	₹ 60.00	₹ 50.00	₹ 35.00
Probability (0.50)	₹ 70.00	₹ 57.50	₹ 42.00
Probability (0.20)	₹ 85.00	₹ 76.25	₹ 52.50
Expected price per kg	₹ 70.00	₹ 59.00	₹ 42.00

2. Calculation of expected junk value of the cab for each year:

Particulars	Year 1	Year 2	Year 3
Expected price per kg	₹ 70.00	₹ 59.00	₹ 42.00
Weight of cab	2,000 kg	2,000 kg	2,000 kg
Expected junk value	₹ 1,40,000	₹ 1,18,000	₹ 84,000

Let us determine the present value under each disposal alternative as follows:

Alternative 1: Disposal at the end of Year 1

Expected cash flow net of Storage Cost at the end of Year 1:

$$₹ 1,40,000 - ₹ 90,000 = ₹ 50,000$$

Hence, Net Present Value (NPV) shall be:

$$₹ 50,000 \times 0.9091 = ₹ 45,455$$

Alternative 2: Disposal at the end of Year 2

Storage costs are incurred for both Years 1 and 2.

$$\begin{aligned} \text{PV of Storage Cost Incurred} &= (₹ 90,000 \times 0.9091) + (₹ 1,05,000 \times 0.8264) \\ &= ₹ 81,819 + ₹ 86,772 = ₹ 1,68,591 \end{aligned}$$

PV of junk value:

$$₹ 1,18,000 \times 0.8264 = ₹ 97,515$$

Therefore, net present value is:

$$₹ 97,515 - ₹ 1,68,591 = - ₹ 71,076$$

Alternative 3: Disposal at the end of Year 3

PV of storage costs:

$$\begin{aligned} & (₹ 90,000 \times 0.9091) + (₹ 1,05,000 \times 0.8264) + (₹ 1,19,000 \times 0.7513) \\ & = ₹ 81,819 + ₹ 86,772 + ₹ 89,405 = ₹ 2,57,996 \end{aligned}$$

PV of junk value:

$$₹ 84,000 \times 0.7513 = ₹ 63,109$$

Therefore, net present value is:

$$₹ 63,109 - ₹ 2,57,996 = - ₹ 1,94,887$$

Summary Table

Disposal at the end of	Net PV
Year 1	₹ 45,455
Year 2	(₹ 71,076)
Year 3	(₹ 1,94,887)

Decision: Since the highest net present value is ₹ 45,455 when the cabs are disposed of at the end of Year 1.

(ii) Under the revised scenario, the Year 3 expected selling price per kg is:

$$(0.30 \times ₹ 132.50) + (0.50 \times ₹ 200) + (0.20 \times ₹ 311) = ₹ 39.75 + ₹ 100 + ₹ 62.20 = ₹ 201.95 \text{ per kg}$$

Therefore, revised expected junk value per cab:

$$₹ 201.95 \times 2,000 = ₹ 4,03,900$$

$$\text{PV of junk value} = ₹ 4,03,900 \times 0.7513 = ₹ 3,03,450$$

PV of storage costs remains. Hence, the revised Year 3 net present value is:

$$₹ 3,03,450 - ₹ 2,57,996 = ₹ 45,454$$

Decision: Even after the substantial increase in the expected scrap metal

price at the end of Year 3, the management would be indifferent between disposing of the cabs at the end of Year 1 and retaining them until the end of Year 3. However, considering that the additional waiting period of two years is relatively long, it is advisable to dispose of the cabs at the end of Year 1. **(10 Marks)**

(b) Following are major characteristics of Venture Capital Financing:

- (i) Long time horizon:** The fund would invest with a long-term horizon in mind. Minimum period of investment would be 3 years and maximum period can be 10 years.
- (ii) Lack of liquidity:** When VC invests, it takes into account the liquidity factor. It assumes that there would be less liquidity on the equity it gets and accordingly it would be investing in that format. They add an illiquidity premium in the price and required return.
- (iii) High Risk:** VC would not hesitate to take risk. It works on principle of high risk and high return. So, high risk would not eliminate the investment choice for a venture capital.
- (iv) Equity Participation:** Most of the time, VC would be investing in the form of equity of a company. This would help the VC participate in the management and help the company grow. Besides, a lot of board decisions can be supervised by the VC if they participate in the equity of a company and have a Board seat. **(4 Marks)**

5. **(a)** (i) From ABN-Amro Bank's perspective, its account maintained with Canara Bank is a **Nostro Account** and from ABN-Amro Bank's perspective Canara Bank's £ account maintained with Bank of London is a **Loro Account**.

(ii) Equivalent amounts in US\$ and £

A. ₹ 30 million against US dollars (US\$)

The quoted rate is ₹ 91.3625/91.3700

Since ABN-Amro Bank is selling US dollars and purchasing Indian rupees, the applicable rate is the buying rate of US dollars, i.e. ₹ 91.3625 per US\$.

Therefore, US\$ to be credited shall be:

$\text{₹ } 30,000,000 / \text{₹ } 91.3625 = \text{US\$ } 328,362$

B. ₹ 50 million against British pounds

The quoted rates are: ₹ 1 = 1/ US\$ 91.3625 and

£ 1 = US\$ 1.4060/1.4070

Since ABN-Amro Bank is selling pounds and purchasing Indian rupees, the applicable buying rate for pounds is the bid rate of US\$ 1.4060 per £.

Therefore, the cross rate of ₹ per £ is:

$$\text{₹/£} = \text{₹ } 91.3625 \times 1.4060 = \text{₹ } 128.4557/\text{£}$$

Hence, the amount of pounds required is: ₹ 50,000,000/ ₹ 128.4557 = £ 389,239

Accordingly, £ 389,239 will be credited to Canara Bank's £ account with Bank of London, London. **(6 Marks)**

(b) Working Notes:

Let us first calculate the Net asset value and Earning capitalization value per share of both companies as follows:

(i) Net asset value

H Ltd.	$\frac{\text{₹ } 1300 \text{ Crores} - \text{₹ } 300 \text{ Crores}}{3.50 \text{ Crores}} = \text{₹ } 285.71$
B Ltd.	$\frac{\text{₹ } 31.50 \text{ Crores}}{0.65 \text{ Crores}} = \text{₹ } 48.46$

(ii) Earning capitalization value

H Ltd.	$\frac{\text{₹ } 300 \text{ Crores} / 0.08}{3.50 \text{ Crores}} = \text{₹ } 1071.43$
B Ltd.	$\frac{\text{₹ } 10 \text{ Crores} / 0.08}{0.65 \text{ Crores}} = \text{₹ } 192.31$

(iii) Ratio of Issue of Shares =
$$\frac{11,61,550 \text{ shares}}{65,00,000 \text{ shares}} = 0.1787 \text{ i.e. } 0.1787 \text{ share of}$$

H Ltd. for 1 share of B Ltd.

Now let us assume weight assigned to valuation as per Net Asset basis and Earnings capitalization method is A and B respectively.

Accordingly,

$$A + B = 1 \quad (1)$$

$$\frac{\frac{\text{₹ } 48.46 \times A + \text{₹ } 192.31 \times B}{(A+B)}}{\frac{\text{₹ } 285.71 \times A + \text{₹ } 1071.43 \times B}{(A+B)}} = 0.1787 \quad (2)$$

On solving simultaneous equations (1) and (2) we shall get values as follows:

$$A = 0.2456 \text{ i.e. } 24.56\% \text{ or } 25\%$$

$$B = 0.7544 \text{ i.e. } 75.44\% \text{ or } 75\%$$

Thus, the weights assigned for the value of shares arrived on Net Asset basis and Earnings capitalization method are 24.56% or 25% and 75.44% or 75% respectively for both H Ltd. and B Ltd. **(8 Marks)**

6. (a) (i) To estimate change in asset value due to change in interest rate, first we must calculate current price or value and duration of asset as follows:

Year	Value of Asset	PVF	PV (₹ Crore)	PV X Year
1	₹ 2 Crore	0.9615	1.9230	1.9230
2	₹ 2 Crore	0.9246	1.8492	3.6984
			3.7722	5.6214

$$\text{Duration of Asset} = 5.6214/3.7722$$

$$= 1.4902$$

$$\text{The yield on Bond} = (100/96.1538) - 1 = 0.04 \text{ i.e., } 4\%$$

$$\text{Accordingly, the Modified Duration of Asset} = 1.4902 / (1 + 0.04)$$

$$= 1.4329$$

Thus, the value of asset will change increases/decrease by:

$$= 0.10\% \times 1.4329 \times \text{₹ } 3.7722 \text{ crore}$$

$$= \text{₹ } 0.5405 \text{ Lac}$$

- (ii) The No. of Interest Rate Future Contract to be short to hedge against Interest Rate risk shall be computed as follows:

$$\text{No of IRF} = (\text{₹ } 3.7722 \text{ Crore} \times 1.4329) / (5 \times \text{₹ } 1,00,000)$$

$$= 108.10$$

Since number of contracts to be rounded off to whole number the contracts of Interest Rate Futures to be short is 108 contracts.

- (iii) Let the yield is changed by Z percentages points. The value of Portfolio will change by:

$$-5 \times 108 \times ₹ 1,00,000 \times \Delta z + ₹ 3.7722 \text{ crore} \times 1.4329 \times \Delta z = \text{Zero (Approx.)}$$

This difference in approximation is due to rounding off number of IRF Contracts to the whole numbers. **(8 Marks)**

- (b) (i) Stock X:

$$\text{Variance} = 0.5 (10 - 13)^2 + 0.5 (16 - 13)^2 = 9$$

$$\text{Standard deviation} = \sqrt{9} = 3\%$$

Stock Y:

$$\text{Variance} = 0.5 (12 - 15)^2 + 0.5 (18 - 15)^2 = 9$$

$$\text{Standard deviation} = 3\%$$

- (ii) Covariance of stocks X and Y

$$\text{Cov}_{XY} = 0.5 (10 - 13) (12 - 15) + 0.5 (16 - 13) (18 - 15) = 9$$

- (iii) Correlation of coefficient

$$R_{XY} = \frac{\text{Cov}_{XY}}{\sigma_X \sigma_Y} = \frac{9}{3 \times 3} = 1$$

Since Coefficient of Correlation between the Securities is 1 there will no risk reduction through diversification.

- (iv) Expected return of the portfolio X and Y

$$E(X) = (10 + 16) / 2 = 13\%$$

$$E(Y) = (12 + 18) / 2 = 15\%$$

$$R_p = \sum_{i=1}^N X_i R_i = 0.4(13) + 0.6(15) = 14.2\%$$

Portfolio Risk

$$\begin{aligned} \sigma_P &= \sqrt{W_X^2 \sigma_X^2 + W_Y^2 \sigma_Y^2 + 2X_X X_Y (\sigma_X \sigma_Y \sigma_{XY})} \\ &= \sqrt{(0.4)^2 (3)^2 + (0.6)^2 (3)^2 + 2(0.4)(0.6)(3)(3)(1)} \end{aligned}$$

$$= \sqrt{1.44 + 3.24 + 4.32} = 3\%$$

- (v) Since the two securities have identical standard deviations and a perfect positive correlation of +1, there is no unique optimal weight. Every combination of X and Y has the same portfolio risk of 3%. However, since Security Y has higher expected return, but same risk is should be opted for. **(6 Marks)**