

PAPER – 2 : ADVANCED FINANCIAL MANAGEMENT

PART – I Multiple Choice Questions

Case Scenario - I

The Government of India issues a 5-year Sovereign Gold Bond (SGB) at an issue price of ₹ 5,000 per gram. An investor, Mr. JK, has purchased 200 grams SGB under this scheme. The bond carries a coupon rate of 2.5% per annum, calculated as simple interest on the initial investment amount, with interest payable annually. At the end of five years, the bond will be redeemed at the prevailing market price of gold. The annual interest received is taxable at the investor's applicable marginal income tax rate. Any capital gain arising on redemption is taxable at 20% after considering the benefit of indexation. The inflation rate during the holding period is assumed to be 4% per annum.

From the information given above, choose the correct answer to the Question Nos. 1 to 3:

1. *An investor Mr. JK purchases 200 grams of SGB at ₹ 5,000 per gram. The investor falls in the 30% tax bracket. Inflation is 4% per annum. What are the post-tax annual interest income and the approximate real post-tax return (%) on initial investment?*
(A) ₹ 25,000 and 2.25%
(B) ₹ 17,500, and -2.25%
(C) ₹ 17,500 and 1.75%
(D) ₹ 17,500 and -1.75%
(2 Marks)
2. *After 5 years, gold price becomes 6,800 per gram. Inflation is constant at 4% annually. What is the indexed cost of acquisition and taxable capital gain to Mr. JK?*
(A) Indexed cost ₹ 12,00,000; Taxable gain ₹ 1,60,000

(B) Indexed cost ₹ 11,69,860; Taxable gain ₹ 1,90,140

(C) Indexed cost ₹ 12,16,653; Taxable gain ₹ 1,00,343

(D) Indexed cost ₹ 12,16,653; Taxable gain ₹ 1,43,347 **(2 Marks)**

3. Assume SGB redeems at ₹ 6,800 per gram and Mr. JK is in 30% tax bracket. What is the net amount received after capital gains tax (20% with indexation)?

(A) 13,56,331

(B) 13,16,996

(C) 13,31,331

(D) 13,28,000 **(2 Marks)**

Case Scenario - II

NewChem Ltd., a leading chemical manufacturing firm based in Telangana, is evaluating the installation of a new-generation solar power plant to meet the energy needs of its primary manufacturing unit. This initiative is part of NewChem's long-term sustainability and cost-reduction goals.

The total cost of installing the solar plant is ₹ 3.20 crore. Based on the current state electricity tariffs, the plant is projected to generate savings in electricity expenses of ₹ 25 lakh per year in perpetuity.

However, there is regulatory uncertainty. A new state government is expected to take office in one year and it is anticipated that electricity tariffs will be revised. Based on industry analysis, the annual savings from the solar plant could change to one of two possibilities:

Scenario 1 (Low Savings): Savings could decrease to ₹ 15 lakh per year in perpetuity.

Scenario 2 (High Savings): Savings could increase to ₹ 40 lakh per year in perpetuity.

The company's Weighted Average Cost of Capital (WACC) is 9.5% and the current risk-free rate of return, based on 10-year government bonds, is 6.5%.

From the information given above, choose the correct answer to the Questions No. 4 to 6:

4. NewChem Ltd. (Telangana) plans to invest ₹3.20 crore today in a solar power plant generating annual electricity savings of ₹25 lakh in perpetuity. The WACC is 9.5%. After one year, savings may change to ₹40 lakh (high scenario) or ₹15 lakh (low scenario) perpetuity due to tariff revisions.

Calculate NPV if invested today and NPV after one year in both scenarios (in ₹ crore).

(A) Today: - 0.45; High: 1.01; Low: - 1.62

(B) Today: - 0.57; High: 1.21; Low: - 1.42

(C) Today: - 0.57; High: 1.01; Low: - 1.62

(D) Today: - 0.63; High: 0.95; Low: - 1.58

(2 Marks)

5. For NewChem's ₹3.20 crore solar plant (WACC 9.5%), after one year savings will be ₹40 lakh or ₹15 lakh perpetuity. Risk-free rate is 6.5%. Using risk-neutral valuation, compute returns in both scenarios and risk-neutral probability of high savings scenario (%).

(A) High: 31.56%; Low: - 50.63%; Prob: 69.5%

(B) High: 28.45%; Low: - 48.25%; Prob: 65.2%

(C) High: 31.56%; Low: - 50.63%; Prob: 73.8%

(D) High: 35.20%; Low: - 52.15%; Prob: 69.5%

(2 Marks)

6. New-Chem can invest ₹3.20 crore in solar plants today or wait one year, when savings will be ₹40 lakh or ₹15 lakh perpetuity (WACC 9.5%, risk-free 6.5%). Using risk-neutral probability (69.5% high), Compute PV of option to wait one year, discounted at risk-free rate and WACC (in ₹ lakh).

(A) PV at RF rate: ₹70.23 Lakh; WACC: ₹68.50 Lakh

(B) PV at RF rate: ₹68.50 Lakh; WACC: ₹70.23 Lakh

(C) PV at RF rate: ₹44.15 Lakh; WACC: ₹42.30 Lakh

(D) PV at RF rate: ₹19.53 Lakh; WACC: ₹18.98 Lakh

(2 Marks)

Case Scenario - III

XYZ Ltd. is professionally engaged in providing consultancy services related to corporate mergers and acquisitions. It is on an expansion mode and decided to hire freshly qualified Chartered Accountants for the post of "M&A Consultant". For selection of the candidate, each of the candidates needs to pass a written test. Following are some of the questions asked in the test to identify the concepts related to M&A.

You are a examinee in written test paper therefore, you are required to choose the correct option to the Question Nos. 7 to 9:

7. *AB Ltd., the target* company may issue substantial amount of convertible debentures to its existing shareholders to be converted at a future date when it faces a takeover threat. The tactic used by AB Ltd. is called _____.*

- (A) White Knight*
- (B) Poison Put*
- (C) Poison Pill*
- (D) White Squire*

(2 Marks)

** In the question paper, 'target' was mistakenly referred to as 'acquiring'.*

8. *Identify the correct meaning from among the following options when X Ltd, a target company adopts "Greenmail" tactics to defend itself from hostile takeover.*

- (A) When X Ltd. issues bonds that encourage the holder to cash in at higher prices.*
- (B) When X Ltd. offers hefty compensations to its managers if they get ousted due to takeover.*
- (C) When X Ltd, makes a counter bid for the acquirer company.*
- (D) When X Ltd. offers the acquirer a higher price for its shares than the market price.*

(2 Marks)

9. *R Ltd. is a parent company and J Ltd. is its subsidiary company. J Ltd. is growing at a faster pace than R Ltd. and also carries higher valuations than other businesses owned by R Ltd. To unlock the value of J Ltd., and generate*

cash, a strategic avenue which R Ltd. may take is to make J Ltd. go public through an IPO but keep a controlling stake in the newly traded subsidiary. Such tactic adopted by R Ltd. is called _____.

- (A) Split-up
- (B) Carve Out
- (C) Sell-Off
- (D) Spin-Off

(2 Marks)

Case Scenario - IV

Mr. X a portfolio Manager invests ₹25,00,000 in stock Alpha and Beta in ratio of 60 : 40. The daily standard deviation of stock Alpha is 1.20% and stock Beta is 0.90%. The correlation between Alpha and Beta is 0.6. Mr. X wanted to measure VAR for confidence level 99% and 90% level. (Z score: 99% confidence level: 2.33 and 90% confidence level: 1.28) Assume 252 trading days in a year and mean return is zero.

From the information given above, choose the correct answer to the Question Nos. 10 to 12:

10. *What is the approximate annual Value at Risk (VaR) of the portfolio in rupee terms at the given 99% confidence level?*

- (A) ₹57,027
- (B) ₹5,43,162
- (C) ₹9,05,271
- (D) ₹7,94,080

(2 Marks)

11. *What is the approximate diversification benefit (per day) of the portfolio while you calculate amount of VaR at 90% confidence level?*

- (A) ₹11,540
- (B) ₹23,060
- (C) ₹34,580
- (D) ₹3,252

(2 Marks)

12. If the correlation between Stock Alpha and Stock Beta increases from 0.60 to 0.80, what will be the impact on the portfolio's annual Value at Risk (VaR) at the 99% confidence level?

- (A) VaR increase by ₹ 48,085
 (B) VaR decrease by ₹ 48,085
 (C) VaR increase by ₹ 3,029
 (D) VaR decrease ₹ 3,029

(2 Marks)

Case Scenario - V

Green Agro Exports Ltd. entered a 3-month forward contract on January 1, 2026 to buy USD 2,00,000 (import payment due April 1, 2026).

USD-INR Bank Quotes:

Date	Spot Bid	Spot Ask	1M Fwd Bid	1M Fwd Ask	2M Fwd Bid	2M Fwd Ask	3M Fwd Bid	3M Fwd Ask
01.01.2026	83.20	83.55	-	-	-	-	83.60	84.00
01.02.2026	83.80	84.15	-	-	83.95	84.35	-	-
01.03.2026	83.40	83.75	83.70	84.05	84.10	84.45	-	-
01.04.2026	83.20	84.50	84.30	84.65	-	-	-	-

From the information given above, choose the correct answer to the Questions No. 13 to 15:

13. Green Agro Exports Ltd. entered 3-month USD 2,00,000 forward on Jan 1, 2026. On March 1, 2026, what is maturity settlement cost vs. net extra cost of closing original and rebooking 1-month forward?

- (A) Maturity ₹ 1,68,00,000; Extra ₹ 60,000
 (B) Maturity ₹ 1,68,00,000; Extra ₹ 10,000
 (C) Maturity ₹ 1,68,00,000; Extra ₹ 70,000
 (D) Maturity ₹ 1,67,20,000; Extra ₹ 70,000

(2 Marks)

14. If import obligation is settled early on March 1, 2026, what total cash outflow is required that day to close forward contract and make import payment?

(A) ₹ 16,740,000

(B) ₹ 16,810,000

(C) ₹ 16,870,000

(D) ₹ 16,890,000

(2 Marks)

15. Green Agro Exports Ltd. cancels the import and closes the USD 2,00,000 forward contract (Jan 1, 2026; 84.00 Ask). What are the mark-to-market gain/(loss) on the following dates?

(A) Feb 1: - ₹ 10,000; Mar 1: - ₹ 60,000; Apr 1: + ₹ 40,000

(B) Feb 1: + ₹ 10,000; Mar 1: + ₹ 60,000; Apr 1: - ₹ 40,000

(C) Feb 1: - ₹ 30,000; Mar 1: - ₹ 60,000; Apr 1: + ₹ 40,000

(D) Feb 1: - ₹ 10,000; Mar 1: - ₹ 30,000; Apr 1: + ₹ 20,000

(2 Marks)**Answer Key**

MCQ No.	Correct Option
1.	(B)
2.	(D)
3.	(C)
4.	(C)
5.	(A)
6.	No correct option
7.	(C)
8.	(D)
9.	(B)
10.	(C)
11.	(D)
12.	(A)
13.	(C)
14.	(B)
15.	(A)

PART – II Descriptive Questions

Question No.1 is compulsory.

*Candidates are also required to answer any **four** from the remaining **five** questions.*

Working notes should form part of the respective answer.

Question 1

- (a) *Bharat Infrastructure Ltd (BIL), a premier Indian Engineering firm, has been invited to establish and operate a high-speed data center infrastructure in the Republic of Valoria. The initial investment required for the project is 4,000 million Valors (VL).*

Under the agreement, BIL will sell the project back to the Valorian government after 4 years for a guaranteed sale price of 8,000 million VL.

During the four-year operational period, BIL will provide technical maintenance and security protocols at an annual fee of 80 million VL, payable at the end of each year.

To hedge the foreign exchange risk associated with the initial capital investment, BIL's investment bankers have proposed a Currency Swap arrangement with the following terms:

- BIL will swap the principal amount of 4,000 million VL for Indian Rupees immediately (Year 0) at today's spot rate.*
- The swap will be reversed at Year 4, with both parties re-exchanging the same principal amounts at the same spot rate locked in at inception.*
- The bank will charge an annual facilitation fee of 0.30% (calculated on the ₹ principal amount), payable at the end of each year.*

The currency swap covers only the initial investment and terminal principal. BIL's policy is to hedge all other foreign currency cash flows using forward contracts at the respective forward rates prevailing in the market today.

Financial Data:

The current market data and exchange rates (VL/₹) are as follows:

Period	Spot	1 Year Forward	2 Year Forward	3 Year Forward	4 Year Forward
Exchange Rate (VL/₹)	50.00	53.00	56.18	59.55	63.12
PV Factor @ 14%	1.000	0.877	0.769	0.675	0.592

Cumulative PVFA for 4 years at 14%. = 2.913

Assume a risk-adjusted discount rate of 14% per annum. Ignore taxation.

You are required to evaluate the project's financial viability using the Net Present Value (NPV) method, with all cash flows expressed in Indian Rupees (₹ million). **(6 Marks)**

- (b) XYZ Ltd. recently paid a dividend of ₹ 40. The company is entering a 5-year transition phase where its current 15% growth rate will decline linearly to a stable perpetual rate.

Financial Parameters:

- Transition Period: 5 years (declining linearly from Year 1).
- Current Data: ROE of 20% and a retention ratio of 25%.
- Terminal Data (Year 6+): ROE of 12% and a retention ratio of 50%.
- Market Data: Required return of 13% and Market Price of ₹ 850.

You are required to:

- Estimate the intrinsic value per share using the H-Model.
 - Given the current market price of ₹ 850 per share, assess whether the stock is undervalued or overvalued and calculate the percentage deviation from intrinsic value. **(4 Marks)**
- (c) MT Ltd. has approached you for an additional loan of ₹ 20 crores to fund its aggressive expansion plans. The company's current sustainable growth rate is 10%, but it aims to grow at 16% annually. Its debt-to-equity ratio is already at the maximum permissible limit of 2.5:1. Additionally, the industry is experiencing 5% inflation, which is increasing the company's asset financing requirements.

As a credit analyst, you explain the key concerns regarding this loan request and suggest two alternative courses of action available to the company to achieve its growth objectives sustainably. **(4 Marks)**

Answer

(a) Working Notes:

(1) Swap Calculations

- Initial Investment (Year 0): $4,000 \text{ m VL} / 50.00 = ₹ 80.00 \text{ Million}$
- Annual Bank Charges: $₹80.00 \text{ m} \times 0.30\% = ₹ 0.24 \text{ Million p.a. for years 1 to 4.}$
- Swap Terminal Receipt (Year 4): Since the swap is at the spot rate, BIL receives back ₹ 80 million in exchange for 4000 million VL.

(2) Project Cash Flows (₹ in Million)

The annual technical fees and the excess buy-back amount (portion not covered by the swap) are converted using the representative forward rates.

- Year 1 Fee: $80 \text{ m VL} / 53.00 = ₹ 1.51 \text{ m}$
- Year 2 Fee: $80 \text{ m VL} / 56.18 = ₹ 1.42 \text{ m}$
- Year 3 Fee: $80 \text{ m VL} / 59.55 = ₹ 1.34 \text{ m}$
- Year 4 Fee: $80 \text{ m VL} / 63.12 = ₹ 1.27 \text{ m}$
- Year 4 Excess Sale Receipt:

Total Sale Price	8000 m VL
Less: Amount covered by swap reversal	(4000 m VL)
Excess to be converted at Forward Rate	4000 m VL
Forward Rate (4-year)	VL 63.12/₹
₹ Equivalent: $4000 / 63.12$	₹ 63.37 m

DCF Analysis of the Project

(₹ in Million)

Year	Particulars	VL Million	Spot/ Forward Rate	Cash Flow (₹ in Million)	PVF @ 14%	PV (₹ in Million)
0	Initial Investment (Swap)	(4000)	50.00	(80)	1.00	(80.0000)
1	Technical Fee	80	53.00	1.5094	0.877	1.3237
2	Technical Fee	80	56.18	1.4240	0.769	1.0951
3	Technical Fee	80	59.55	1.3434	0.675	0.9068
4	Technical Fee	80	63.12	1.2674	0.592	0.7503
4	Swap Principal Receipt	4000	50.00	80	0.592	47.3600
	Less: PV of Facilitation Fee $(0.30\% \times \frac{4000}{63.12} \times 2.913)$					(28.5641)
						(0.6991)
	Add: PV of Excess Receipt $(\frac{4000}{63.12} \times 0.592)$					(29.2632)
						37.5158
	Net Present Value OR Net Present Value - if cash flows discounted to only two decimals					8.2526
						8.25

* Note: 2.913 is the cumulative PVFA for 4 years at 14%.

Conclusion: Since the NPV is positive ₹ 8.2526 Million or 8.25 Million, BIL should accept the invitation to operate the project in the Valoria.

(b) (i) Estimation of Intrinsic Value of share based on H Model

$$P_0 = \frac{D_0(1 + g_n)}{r - g_n} + \frac{D_0 H_1 (g_c - g_n)}{r - g_n}$$

Where g_n = Normal Growth Rate Long Run $(12\% \times 0.50) = 6\%$

g_c = Current Growth Rate i.e. initial short term growth rate (15%)

H_1 = Half of duration of the transition growth period

Accordingly Intrinsic Value of share shall be:

$$= \frac{₹ 40 (1 + 0.06)}{0.13 - 0.06} + \frac{₹ 40 \times 2.50 (0.15 - 0.06)}{0.13 - 0.06}$$

$$= ₹ 605.71 + ₹ 128.57 = ₹ 734.28$$

Thus, the intrinsic value of share shall be ₹ 734.28.

- (ii) Given the current market price of ₹ 850 per share, it is overvalued.

The percentage deviation from the intrinsic value shall be computed as follows:

$$= \frac{₹ 850 - ₹ 734.28}{₹ 734.28} = 15.76\% \quad \text{Or}$$

$$= \frac{₹ 850 - ₹ 734.28}{₹ 850} = 13.61\%$$

(c) Key Concerns:

- (i) *Excessive Debt Risk:* The loan request creates a potentially risky situation of too much debt and too little equity, as the company's debt-to-equity ratio is already at the maximum limit of 2.5:1.
- (ii) *Growth Rate Mismatch:* The company's planned growth rate (16%) exceeds its sustainable growth rate (10%), which cannot be maintained without increasing financial leverage beyond permissible limits.
- (iii) *Inflationary Impact:* The 5% inflation increases the amount of external financing required and increases the debt-to-equity ratio when measured on a historical cost basis. Thus, inflation lowers the firm's sustainable growth rate.

Alternative Courses of Action:

- (i) *Raise Additional Equity:* The Company must raise additional equity capital to support the higher growth rate while maintaining the debt-to-equity ratio within permissible limits.
- (ii) *Reduce Expansion Rate:* The Company will have to reduce the rate of expansion to a level (10% or lower) that can be sustained without an increase in financial leverage, aligning actual growth with sustainable growth rate.

Question 2

- (a) Mr. RJ own two securities X and Y are priced according to a two-factor Arbitrage Pricing Model. The factor sensitivities and expected returns are as follows:

Particulars	Security X	Security Y
Beta with factor 1 (β_1)	1.2	0.8
Beta with factor 2 (β_2)	0.5	1.4
Expected (actual) return	14%	16%

Additional Information:

Risk-free rate = 6%,

Risk premium for Factor 1 = 4%,

Risk premium for Factor 2 = 5%.

Required:

- (i) Evaluate whether Security X and Security Y are correctly priced under the two-factor Arbitrage Pricing Theory Model.
- (ii) Mr. RJ has ₹ 1,00,000 available and intends to construct a long-short portfolio by taking a long position in Security X* and a short position in Security Y*. You are required to analyses and determine the amount to be invested in Security X* and the amount to be sold short in Security Y* if the desired portfolio sensitivities are 1.40 with respect to Factor 1 and 0.05 with respect to Factor 2. **(6 Marks)**

* In the question paper, Security X and Security Y were mistakenly referred to as Security A and Security B, respectively.

- (b) On 1 July, ALPS Company shares trade at ₹ 2,000. An investor enters the following option: (3-month maturity):

Option	Type	Strike (₹)	Premium (₹)
A	Call	1920	130
B	Call	2000	85
C	Call	2080	45
D	Put	1920	40

<i>E</i>	<i>Put</i>	2000	95
<i>F</i>	<i>Put</i>	2080	155

Contract size = 100 shares.

Risk-free rate = 6% p.a. (continuous compounding not required) and the stock does not pay dividends.

Ignore transaction costs. Assume that investor chosen any one option.

Required:

- (i) Assess the ITM, ATM, OTM of each option A to option F at initiation and evaluate the intrinsic and time value components embedded in the premiums.
- (ii) In the next 3 months expiry price may increase by 150 or may decrease 150. Under each expiry scenario, examine which options will be rationally exercised and appraise the net profit or loss per contract.

(4 Marks)

- (c) The technology start-up, Fincorp Pvt. Ltd., is in its early growth stage and is evaluating multiple sources of financing including Angel Investment, Venture Capital (VC), Convertible Notes, SAFE and IPO.

Evaluate the following statements and state whether they are **True** or **False**, giving brief justification in each case:

- (i) In early-stage start-ups, valuation is primarily based on discounted cash flow (DCF) using stable historical earnings.
- (ii) Venture capital financing typically involves staged funding to reduce agency problems and mitigate investment risk.
- (iii) Bootstrapping reduces dilution risk but may limit growth due to capital constraints.
- (iv) Angel investors generally invest at a later stage than venture capitalists and demand stronger control rights.

(4 Marks)

Answer

- (a) (i) $\lambda_1 = 4\%$ and $\lambda_2 = 5\%$

$$\begin{aligned} \text{APT required return (X)} &= R_f + \lambda_1\beta_1 + \lambda_2\beta_2 + \lambda_3\beta_3 \dots + \lambda_n\beta_n \\ &= 6\% + (1.2 \times 4\%) + (0.5 \times 5\%) = 13.3\% \end{aligned}$$

Expected (actual) return 14% > required return 13.3%, Security X is underpriced (offer higher return than required) or Not correctly priced

$$\begin{aligned}\text{APT required return (Y)} &= R_f + \lambda_1\beta_1 + \lambda_2\beta_2 + \lambda_3\beta_3 \dots + \lambda_n\beta_n \\ &= 6\% + (0.8 \times 4\%) + (1.4 \times 5\%) = 16.2\%\end{aligned}$$

Expected (actual) return 16% < required return 16.2%, Security Y is overpriced (offer lesser return than required) or Not correctly priced or approximately correctly priced

- (ii) Targeted sensitivities $F1 = 1.40$ and $F2 = 0.05$, calculation of amount to be invested in Long position indicated as L and Short position as S

Security X ($F1$) = $\beta_1 = 1.20$; Security Y = $\beta_1 = 0.80$

Security X ($F2$) = $\beta_2 = 0.5$; Security Y = $\beta_2 = 1.4$

Equation $1.20L - 0.8S = 1,40,000$ (i) (sensitivity $1.40 \times 100,000$)

Equation $0.50L - 1.4S = 5,000$ (ii) (sensitivity $0.05 \times 100,000$)

Multiply equation first by 1.4 and second by 0.8 and subtracted (ii) from (i)

$$1.68L - 1.12S = 1,96,000$$

$$0.40L - 1.12S = 4,000$$

$$1.28L = 1,92,000 \text{ so long position } L = ₹ 1,50,000$$

Now put value of L in equation (i)

$$1,80,000 - 0.8S = 1,40,000$$

$$\text{So, amount of short position} = 40,000/0.8 = ₹ 50,000$$

Analysis

Mr. RJ is using ₹ 1,00,000 of his own capital and creating: A larger long exposure ₹ 1,50,000 and financed partly through short selling ₹ 50,000.

OR

This means the portfolio is leveraged, because total exposure (₹ 2,00,000 is greater than own funds) and the portfolio is highly sensitive to Factor 1.

(b) (i) Intrinsic and Time Value

Option	Type	Strike Price (₹)	Spot Price (₹)	Status (₹)	Premium (₹)	IV (₹)	TV (₹)
A	Call	1,920	2,000	ITM	130	80	50
B	Call	2,000	2,000	ATM	85	--	85
C	Call	2,080	2,000	OTM	45	--	45
D	Put	1,920	2,000	OTM	40	--	40
E	Put	2,000	2,000	ATM	95	--	95
F	Put	2,080	2,000	ITM	155	80	75

(ii) Position of Net Profit/ Loss under different scenario

(A) Price increase by ₹ 150

Option	Expected Price (₹)	Status	Profit (₹)	Premium (₹)	Net Profit/ Loss Per Share (₹)	Lot Size	Total Profit/ Loss (₹)
A	2,150	Exercise	230	130	100	100	10,000
B	2,150	Exercise	150	85	65	100	6,500
C	2,150	Exercise	70	45	25	100	2,500
D	2,150	Decline	--	40	- 40	100	- 4,000
E	2,150	Decline	--	95	- 95	100	- 9,500
F	2,150	Decline	--	155	- 155	100	- 15,500

(B) Price decrease by ₹ 150

Option	Expected Price (₹)	Status	Profit (₹)	Premium (₹)	Net Profit/ Loss Per Share (₹)	Lot Size	Total Profit/ Loss (₹)
A	1,850	Decline	--	130	- 130	100	- 13,000
B	1,850	Decline	--	85	- 85	100	- 8,500
C	1,850	Decline	--	45	- 45	100	- 4,500
D	1,850	Exercise	70	40	30	100	3,000
E	1,850	Exercise	150	95	55	100	5,500
F	1,850	Exercise	230	155	75	100	7,500

(c) (i) False

Justification: Early-stage start-ups usually lack stable historical earnings and predictable cash flows. Therefore, DCF is unreliable.

(ii) True

Justification: VC financing is commonly structured in stage (Seed, Series A, B, etc.). Staging: Reduces information asymmetry, moral hazard, Links funding to milestone achievement, Limits downside exposure. Exposure. It is a key risk-management mechanism in venture investing.

(iii) True

Justification: Bootstrapping involves self-financing through personal savings or internal cash flow.

Advantage: No equity dilution, Retained control.

Disadvantages: Limited capital, Slower scaling, Higher founder financial risk.

Thus, growth potential may be constrained.

(iv) False

Justification: Angel investors typically invest in the seed or very early stage, often before institutional VC funding. They usually take minority stakes and exercise relatively informal control compared to VCs. Venture capitalists invest at later stages and demand stronger governance rights such as board seats, veto rights, and protective provisions.

Question 3

(a) *An Indian company is investing in a 2-year project in Europe (EURO).*

Initial Investment = €4,000,000

Annual after-tax operating cash flow = €2,500,000

Life = 2 years

Unlevered cost of capital = 12%

Spot rate = ₹90/€

Corporate tax rate (India) = 30%

Financing Options (50% Debt Required)

Option	Borrowing Currency	Interest Rate (p.a.)
A	India (INR)	9%
B	Euro (EUR)	5%
C	USA (USD)	3%

Additional Data:

Spot USD/INR = ₹ 75

Spot EUR/USD = 1.20

Interest rate in USA = 3% p.a.

Interest rate in Europe = 5% p.a.

Assume: Interest Rate Parity (IRP) holds and No transaction cost

Required:

- Identify which option is the cheapest and why?
- Compute Adjusted Present Value (APV) under cheapest option.

Present Value Factor:	1 st Year	2 nd Year
12%	0.893	0.797
5%	0.952	0.907

(6 Marks)

- A mutual fund offers two plans: Dividend Plan and Bonus Plan. An investor invests ₹ 12,00,000 on 1 April, 2025 in the ratio 60:40 respectively. Initial NAV of both plans is ₹ 48.

Entry load is 2% and exit load is 1% (on redemption value).

Under the Dividend Plan, a dividend of ₹ 5 per unit is declared on 30 September, 2025 when NAV is ₹ 56. After declaration, NAV becomes ₹ 51. The dividend is reinvested at ₹ 51. Closing NAV on 31 March, 2026 is ₹ 54.

Under the Bonus Plan, a bonus issue of 1:4 is declared on 30 September, 2025 when NAV is ₹ 60. After bonus adjustment, NAV becomes ₹ 45, Closing NAV on 31 March, 2026 is ₹ 52.

Ignore taxation.

You are required to:

Evaluate the total return and Holding Period Return under each plan after considering loads and assess which plan provides higher effective return.

(4 Marks)

- (c) "Transfer of NPAs through securitization improves balance sheet health but may involve regulatory and valuation challenges." Comment on the statement above.

(4 Marks)**Answer****(a) (i) Working Notes:**

Applicable Forward Rates as per IRP

	USD/INR	EUR/USD	EUR/INR
Spot	INR 75	USD 1.20	INR 75 x USD 1.20 = INR 90
Year 1 Forward Rate	$INR\ 75 \times \frac{(1.09)}{(1.03)}$ = INR 79.37	$USD\ 1.20 \times \frac{(1.03)}{(1.05)}$ = USD 1.177	INR 79.37 x USD 1.177 = INR 93.42
Year 2 Forward Rate	$INR\ 75 \times \frac{(1.09)^2}{(1.03)^2}$ = INR 83.99	$USD\ 1.20 \times \frac{(1.03)^2}{(1.05)^2}$ = USD 1.155	INR 83.99 x USD 1.155 = INR 97.01

Step 1: Compare borrowing options:

Option A: Borrow in INR @ 9% pre-tax so post tax effective rate = 9×0.7
= 6.3%

Option B: Borrow in EUR @ 5% pre-tax so post tax effective rate = 5×0.7
= 3.5%

Option C: Borrow in USD @ 3%. Here we need to apply IRP between EUR and USD.

So, as per IRP: $F = 1.20 \times 1.03/1.05 = 1.177$, i.e. EUR is expected to depreciate.

If you borrow in USD, effective EUR Cost = $1.03 \times 1.05/1.03 = 1.05 = 5\%$

Post Tax USD effective rate becomes 3.5% which is equal to EUR rate.

Lower interest currency appreciates and wipes out or neutralizes interest advantage in USA, so there is no real advantage if borrowed from USA.

Therefore, Option B Borrow in EUR is the best option.

Step 2: Compute unlevered NPV

Initial Investment in INR = 4 million x 90 = ₹ 360 million

Discount rate = Unlevered cost of capital = 12%

Year 1 = EUR 2.50 Million x 93.42 x 0.893 = ₹ 208.5601 million

Year 2 = EUR 2.50 Million x 97.01 x 0.797 = ₹ 193.2924 million

Total PV = ₹ 401.8525 million

Unlevered NPV = ₹ 401.8525 million – ₹ 360 million = ₹ 41.8525 Million

Step 3: Computation of PV of Tax Shield on Interest

PV of Tax Shield for 2 years discounted @ before tax cost of debt i.e. @ 5%:

= (30,000 x 0.952 x 93.42) + (30,000 x 0.907 x 97.01) = ₹ 5.3077 million

Final APV:

= ₹ 41.8525 million + ₹ 5.3077 million = ₹ 47.1602 million.

Alternative Answer

(i) Working Note:

Applicable Forward Rates as per IRP

	USD/ INR	EUR/ USD	EUR/ INR
Spot	INR 75	USD 1.20	INR 75 x USD 1.20 = INR 90
Year 1 Forward Rate	$INR 75 \times \frac{(1.09)}{(1.03)}$ = INR 79.37	$USD 1.20 \times \frac{(1.03)}{(1.05)}$ = USD 1.177	INR 79.37 x USD 1.177 = INR 93.42
Year 2 Forward Rate	$INR 75 \times \frac{(1.09)^2}{(1.03)^2}$ = INR 83.99	$USD 1.20 \times \frac{(1.03)^2}{(1.05)^2}$ = USD 1.155	INR 83.99 x USD 1.155 = INR 97.01

Option A (Borrowing in INR)

Initial Investment	EUR 40,00,000 x INR 90	INR 36,00,00,000
Debt Required		INR 18,00,00,000
Interest Cost for 2 Years	INR 18,00,00,000 x 9% x 2 (A)	INR 3,24,00,000
Repayment of Debt (B)		INR 18,00,00,000
Total Outflow		INR 21,24,00,000

Option B (Borrowing in EUR)

Initial Investment	EUR 40,00,000 x INR 90	INR 36,00,00,000
Debt Required		EUR 20,00,000
Interest Cost for Year 1 & 2	EUR 20,00,000 x 5%	EUR 1,00,000
Applicable Forward Rate for Year 1		INR 93.42
Interest Payment for Year 1 (A)		INR 93,42,000
Applicable Forward Rate for Year 2		INR 97.01
Interest Payment for Year 2 (B)		INR 97,01,000
Repayment of Debt		EUR 20,00,000
Applicable Forward Rate for Year 2		INR 97.01
Repayment of Debt in INR (C)		INR 19,40,20,000
Total Outflow in INR		INR 21,30,63,000

Option C (Borrowing in USD)

Initial Investment	EUR 40,00,000 x INR 90	INR 36,00,00,000
Debt Required		EUR 20,00,000
Spot Rate of EUR/ USD		USD 1.20
		USD 24,00,000
Interest Cost for Year 1 & 2	USD 24,00,000 x 3%	USD 72,000
Applicable Forward Rate for Year 1		INR 79.37
Interest Payment for Year 1		INR 57,14,640

Applicable Forward Rate for Year 2	INR 83.99
Interest Payment for Year 2	INR 60,47,280
Repayment of Debt	USD 24,00,000
Applicable Forward Rate for Year 2	INR 83.99
Repayment of Debt in INR (C)	INR 20,15,76,000
Total Outflow in INR	21,33,37,920

Since cash outflow is least in case of borrowing in INR same option should be opted for.

- (ii) Computation of Adjusted Present Value under the cheapest option

First, we shall compute the base NPV of the Project as follows:

Year	Cash Flow EUR	Applicable Rate	Amount in INR	PVF	PV
0	-40,00,000	90	-36,00,00,000	1	-36,00,00,000
1	25,00,000	93.42	23,35,50,000	0.893	20,85,60,150
2	25,00,000	97.01	24,25,25,000	0.797	19,32,92,425
NPV					4,18,52,575

Now we shall calculate PV of side effect of Financing in INR.

Year	Interest	Tax Shield	PVF @9%	PV in INR
1	1,62,00,000	48,60,000	0.917	44,56,620
2	1,62,00,000	48,60,000	0.842	40,92,120
				85,48,740

Thus, the Adjusted Present Value of the Project Using the Forward Rate base NPV:

= Base NPV + PV of Tax Shield of Financing

= INR 41,852,575 + INR 85,48,740 = INR 5,04,01,315

(b) Dividend Plan

Particulars	Amount in ₹
Investment amount ₹ 12,00,000 X 0.60 (A)	7,20,000.00
NAV per Unit on 1 April 2025	48.00
Entry Load 2%	0.96
Applicable NAV	48.96
No. of Units acquired	14,705.88
Dividend declared on 30 Sep 2025 per unit	5.00
Total Dividend received	73,529.40
NAV per unit on 30 September 2025 (post Dividend)	51.00
New Units acquired	1,441.75
Revised Holding	16,147.63
NAV per unit on 31 March 2026	54.00
NAV post Exit Load ₹54 x 0.99	53.46
Amount realized on maturity (B)	8,63,252.30
Amount of Gain (B) – (A) = (C)	1,43,252.30
Effective Return (C) / (A)%	19.8962%

Bonus Plan

Particulars	Amount in ₹
Investment amount ₹ 12,00,000 X 0.40 (A)	4,80,000.00
NAV per Unit on 1 April 2025	48.00
Entry Load 2%	0.96
Applicable NAV	48.96
No. of Units acquired	9,803.92
Bonus Units declared for every 4 units on 30 September 2025	1.00

Total Bonus Units received	2,450.98
Revised Holding	12,254.90
NAV per unit on 31 March 2026	52.00
NAV post Exit Load ₹52 x 0.99	51.48
Amount realized on maturity (B)	6,30,882.35
Amount of Gain (B) – (A) = (C)	1,50,882.35
Effective Return (C) / (A)%	31.4338%

Thus, Bonus Plan provides higher effective return.

Alternative Answer

Dividend Plan

Investment in dividend plan ₹ 12,00,000 x 0.60 = ₹ 7,20,000 and Bonus plan = ₹ 4,80,000

Number of Units allotted (dividend plan) = ₹ 7,20,000 - ₹ 14,400 (entry load)/ 48 = 14,700 units

Dividend reinvested amount = 14,700 x 5 = ₹ 73,500

No of units purchased = ₹ 73500 / ₹ 51 = 1441.18, total holding 14700 + 1441.18 = 16141.18 units

Redemption value = 16141.18 x ₹ 54 = ₹ 8,71,623.72 - ₹ 8,716.24 = ₹ 8,62,907.48 (exit load 1% of ₹ 871623)

Total wealth = ₹ 8,62, 907

Gain = ₹ 8,62,907 – ₹ 7,20,000 = ₹ 1,42,907 and holding period return = ₹ 1,42,907/ ₹ 7,20,000 = 19.85%

Bonus Plan

Number of Units allotted (bonus plan) = ₹ 4,80,000 - ₹ 9,600 (entry load)/ ₹ 48 = 9,800 units

Bonus = 9800/4 = 2450 units total units 9800 + 2450 = 12250 units

Gross redemption value at closing price 12250 x ₹ 52 = ₹ 6,37,000

After exit load = ₹ 6,37,000 – ₹ 6,370 = ₹ 6,30,630

Total gain = ₹ 6,30,630 – ₹ 4,80,000 = ₹ 1,50,630

Holding period return = ₹ 1,50,630/ ₹ 4,80,000 = 31.38%

The Bonus Plan gives higher effective return (31.38%) compared to the Dividend Plan (19.85%).

- (c) Transfer of NPAs through securitization allows banks to transfer stressed assets to SPVs or ARCs under the framework of the SARFAESI Act.

Benefits of Transfer of NPAs through securitization:

- By removing NPAs from their books, banks can:
 - Reduce Gross NPAs
 - Improve Asset Quality Ratios
 - Enhance Capital Adequacy
 - Release provisions tied up against bad loans
 - Improve Investor Confidence
 - Enable Banks to focus on fresh lending
- RBI guidelines provide structured mechanisms for securitization through:
 - Risk Retention Norms
 - Valuation Standards
 - Disclosure Requirements
 - Transparency and Market Discipline

Challenges involved in securitization:

1. Valuation Issues
 - Determining fair value of stressed assets is difficult due to uncertain recovery prospects.
 - Overvaluation may shift losses to investors.
 - Undervaluation may cause losses to banks.
2. Regulatory Compliance
 - Strict norms relating to:
 - Minimum holding period
 - Risk retention

- Provisioning
- Disclosure requirements
- These increase procedural complexity.
- 3. Moral Hazard Risk
 - Banks may originate lower-quality loans if they expect to transfer risk through securitization.
- 4. Market Appetite
 - Successful securitization depends on:
 - Investor confidence
 - Demand for security receipts

Conclusion

- Securitization is a powerful tool for NPA management, but it requires:
 - Regulatory prudence
 - Robust valuation mechanisms
 - Long-term financial stability safeguards

Question 4

- (a) A portfolio manager is analysing four equity securities to construct an optimal risky portfolio using Sharpe's Single Index Model. The securities are traded in an efficient market and follow CAPM assumptions.

The following information is available:

Security	Expected Return $E(R_i)$	Beta (β_i)	Residual Variance (σ_{ei}^2)
A	17%	1.4	0.0225
B	15%	1.1	0.0196
C	13%	0.9	0.0144
D	11%	0.6	0.01

Additional information:

Risk-free rate (R_f) = 6%

Market expected return $E(R_m) = 14\%$

Market variance $(\sigma_m^2) = 0.040$

Cut-Off Rate $(C^*) = 7.95$

You are required to:

- (i) Given the cut-off rate, identify the securities to be included in the optimal portfolio.
 - (ii) Compute the proportion of investment in each selected security.
 - (iii) Using CAPM, compute the expected return and valued of each selected security.
 - (iv) Why the portfolio constructed using Sharpe's Model is consistent with CAPM assumptions? **(6 Marks)**
- (b) Consider the recent performance of the closed ended fund.

Period	NAV (₹)	Premium/ Discount %
0	20	0
1	22.5	-5
2	19.5	2.3
3	21	-3.2
4	22.3	4

Required:

- (i) Evaluate the average return per period (based on Geometric mean) for an investor who bought 1000 units* of the closed fund at the invitation and then sold her position at the end of the period 4.
 - (ii) Geometric growth rate in NAV over the same period and interpret the results. **(4 Marks)**
- * In the question paper, 'units' was mistakenly referred to as 'shares'.
- (c) Explain the Elliot Wave Theory of Technical Analysis. **(4 Marks)**

OR

- (c) ABC Ltd. has a ₹ 100 Crores floating-rate loan, reset annually for 4 years. It enters into a collar strategy to hedge against interest rate risk.

Cap Rate = 9.5%

Expected Interest rates & Discounting Factors:

Year	Expected Rate	Discounting Factor
1	7.8	0.96
2	8.6	0.92
3	9.2	0.88
4	10.6	0.84

You are required to identify a Floor Rate that makes the collar a zero cost collar. (Ignore Volatility) **(4 Marks)**

Answer

- (a) (i) Securities whose excess-return to risk ratio is above the cut-off ration of 7.95 are selected and all whose ratios are below are rejected.

Security	Calculation $[E(r_i) - R_f] / \beta_i$	Ratio	C* = Cut off Rate	Decision Rule
A	$(17 - 6) / 1.40$	7.86	7.95	Ratio below C*, Rejected
B	$(15 - 6) / 1.10$	8.18	7.95	Ratio above C*, Selected
C	$(13 - 6) / 0.90$	7.77	7.95	Ratio below C*, Rejected
D	$(11 - 6) / 0.60$	8.33	7.95	Ratio above C*, Selected

Select Security D & B in the optimal portfolio and reject Security A & C from the optimal portfolio selection.

- (ii) Calculation of percentage to be invested in each security:

Using the formula:

$$Z_i = \frac{\beta_i}{\sigma_{ei}^2} \left[\left(\left[\frac{(R_i - R_f)}{\beta_i} - C \right] \right) \right]$$

Z_i values for Security D = $0.60 / 0.0100 \times (8.33 - 7.95) = 60 \times 0.38 = 22.80$

Z_i values for Security B = $1.10 / 0.0196 \times (8.18 - 7.95) = 56.12 \times 0.23 = 12.91$

Weight of D in the Portfolio = $22.80 / (22.80 + 12.91) = 22.80 / 35.71 \times 100 = 63.8\%$

Weight of B in the Portfolio = $12.91 / (22.80 + 12.91) = 12.91 / 35.71 \times 100 = 36.2\%$

(iii) CAPM expected return and Valuation:

Security	Return as per CAPM	Expected Return	Status
B	$6\% + 1.1 \times 8\% = 14.80\%$	15%	Undervalued (Buy)
D	$6\% + 0.6 \times 8\% = 10.80\%$	11%	Undervalued (Buy)

(iv) The portfolio constructed using Sharpe's Single Index Model is fully consistent with CAPM, as it included only securities offering superior risk-adjusted returns.

(b) (i) Market price after premium/ discount

Period	NAV (₹)	P/D%	Premium/Discount	Net (1 - rate)	Market Price = NAV X Net
0	20	0	0	0	0.0000
1	22.5	-5	-0.05	0.95	21.3750
2	19.5	2.3	0.023	1.023	19.9485
3	21	-3.2	-0.032	0.968	20.3280
4	22.3	4	0.04	1.04	23.1920

Gain = Sales price 4th year – Investment, ₹ 23,192 – ₹ 20,000 = ₹ 3,192

Total Return for holding period = $(3192/20000) \times 100 = 15.96\%$

Average return per period = $15.96/4 = 3.99\%$

Geometric return per period = $(1 + 0.1596)^{\frac{1}{4}} - 1 = 1.03771 - 1 = 0.037714$ or 3.771%

Or

Geometric return per period = $\left(\frac{23.1920}{20}\right)^{\frac{1}{4}} - 1 = 1.03771 - 1 = 0.037713$ i.e 3.771%

(ii) GM growth of NAV

$$\text{Growth rate in NAV} = (22.30 - 20) / 20 \times 100 = 11.50\%$$

$$\text{GM growth in NAV} = (1 + 0.115)^{1/4} - 1 = 1.027587 - 1 = 0.027587 \text{ or } 2.76\%$$

Or

$$\text{Geometric Growth in NAV} = \left(\frac{22.30}{20} \right)^{1/4} - 1 = 1.027587 - 1 = 0.027587$$

or 2.76%

Growth rate in NAV is lower than return percent Investment return > NAV growth, the market price has increased more than the NAV.

(c) Inspired by the Dow Theory and by observations found throughout nature, Ralph Elliot formulated Elliot Wave Theory in 1934. This theory was based on analysis of 75 years stock price movements and charts. From his studies, he defined price movements in terms of waves. Accordingly, this theory was named Elliot Wave Theory. Elliot found that the markets exhibited certain repeated patterns or waves. As per this theory wave is a movement of the market price from one change in the direction to the next change in the same direction. These waves are resulted from buying and selling impulses emerging from the demand and supply pressures on the market. Depending on the demand and supply pressures, waves are generated in the prices.

As per this theory, waves can be classified into two parts:-

- Impulsive patterns
- Corrective patterns

Let us discuss each of these patterns.

- (1) Impulsive Patterns-(Basic Waves) - In this pattern there will be 3 or 5 waves in a given direction (going upward or downward). These waves shall move in the direction of the basic movement. This movement can indicate bull phase or bear phase.
- (2) Corrective Patterns- (Reaction Waves) - These 3 waves are against the basic direction of the basic movement. Correction involves correcting the earlier rise in case of bull market and fall in case of bear market.

One complete cycle consists of waves made up of two distinct phases, bullish and bearish. On completion of full one cycle i.e. termination of 8 waves movement, the fresh cycle starts with similar impulses arising out of market trading.

(c) OR

A zero cost collar results when the premium earned by selling a floor exactly offsets the cap premium.

For a zero-cost collar, Value of Cap = Value of Floor.

Since volatility is ignored, intrinsic value method is used.

Calculation of Cap payoff:

Cap pay only when expected rate is $> 9.5\%$

Cap payoff in Year 4 = $100 \times (10.6\% - 9.5\%) = 100 \times 1.1\% = ₹ 1.10$ crore

Total value of Cap = Present value of Cap payoff: $PV 1.10 \times 0.84 = ₹ 0.924$ crore

Calculation of Floor payoff:

Floor pays when: Expected Rate $<$ Floor rate

From expected rates, floor will apply in Year 1, Year 2 and Year 3

Floor payoff = Notional Value of loan $\times (F - R)$

Present Value of Floor payoffs =

Year 1: $PV_1 = 100 (F - 7.8\%) \times 0.96$

Year 2: $PV_2 = 100 (F - 8.6\%) \times 0.92$

Year 3: $PV_3 = 100 (F - 9.2\%) \times 0.88$

Total Floor value (PV) = $100[(F - 7.8\%) \times 0.96 + (F - 8.6\%) \times 0.92 + (F - 9.2\%) \times 0.88]$

Applying the zero-cost condition, Cap Value = Floor Value

$0.924 = 100(F - 7.8\%) \times 0.96 + (F - 8.6\%) \times 0.92 + (F - 9.2\%) \times 0.88]$

$0.924 = 100 [(0.96F - 7.488) + (0.92F - 7.912) + (0.88F - 8.096)]$

$0.924 = 100 [2.76F - 23.496]$

$0.00924 = 2.76F - 23.496$

$$F = 23.50524/2.76 = 8.516\% \text{ or say } 8.5\%$$

Floor rate for zero-cost collar $\approx 8.5\%$ (approx.) or $8.85\%^*$

* If % sign is considered along with variables of right-hand side of equation.

Question 5

- (a) A "momentum-driven" investment consultant is pitching Lumina Cloud Systems (LCS) to your client. The consultant claims LCS is a bargain because its Cash Flow from Operations (CFO), when capitalized at the prime lending rate of 9%, yields a value of ₹ 425 per share. LCS currently trades at ₹ 240 per share.

You are required to perform a Two-Stage FCFE Valuation to verify these claims.

Financial Data & Assumptions:

- Net Income (Base Year): ₹ 180 Crores.
- High-Growth Stage (Years 1-2): Net Income will grow by 25% annually.
- Net Investment in Operating Assets: This is projected to be ₹ 240 Crores in Year 1 and ₹ 280 Crores in Year 2. (Note: This represents capital expenditure less depreciation plus the increase in working capital).
- Debt Policy: The Company finances 30% of its net investment in operating assets through new debt.
- Cost of Equity: The risk-free rate is 6%, the company's Beta is 1.20 and the Equity Risk Premium (ERP) is 5%.
- Stable Stage (Year 3 onwards): Net investment in operating assets will drop to 20% of Net Income each year.
- Outstanding Shares: 60 Crores.

Present Value Factor:	1 st Year	2 nd Year	3 rd Year
12%	0.893	0.797	0.7118

Requirements:

- (i) Calculate the total Present Value of the FCFE for the high-growth period (Stage 1).

- (ii) If the current market price of ₹ 240.00 is considered "fair" by the market, calculate the implied sustainable growth rate for the terminal stage (Year 3 onwards). **(5 Marks)**
- (b) Zenith Commercial Bank's ALCO is evaluating the re-pricing risk for the 0-90 days' time bucket. The following quarterly data is available:
- Financial Data:*
- Rate Sensitive Assets (RSAs): ₹ 12,500 Crores
 - Rate Sensitive Liabilities (RSLs): ₹ 15,800 Crores
 - Quarterly Net Interest Income (NII): ₹ 450 Crores
- Risk Policy:*
- The bank's Earnings at Risk (EaR) limit is 8% of quarterly NII. Hedging is mandatory if the potential NII impact in any scenario exceeds this threshold. You are required to:
- (i) Identify the Gap Position (Positive/Negative) and determine which of the following scenarios is favourable for the bank's NII, providing a brief justification:
- Scenario A: Repo rate increase of 50 bps.
 - Scenario B: Repo rate decrease of 25 bps.
- (ii) Calculate the Earnings at Risk (EaR) in ₹ Crores and as a percentage of NII for both scenarios. Based on the bank's risk policy, advice whether management should activate hedging strategies or not. **(7 Marks)**
- (c) Briefly justify why transaction exposure is generally considered more critical than translation exposure from a financial risk management perspective. **(2 Marks)**

Answer**(a) Working Notes:**

- (1) Computation of Cost of Equity (k_e)

Using the CAPM formula

$$k_e = 6\% + 1.20\% (5\%) = 12\%$$

- (2) Calculation of FCFE for High-Growth Period (Stage 1)

Since 30% of net investment is debt-financed, the equity-funded portion is 70%

Particulars (₹ in Crores)	Year 1	Year 2	Year 3 onwards
Net Income	180×1.25 = 225	225×1.25 = 281.25	281.25
Less: Net Investment (Equity portion 70%)	240×0.70 = 168.00	280×0.70 = 196.00	$281.25 \times 0.20 \times 0.70$ = 39.375
FCFE	57.00	85.25	241.875
PV Factor at 12%	0.893	0.797	
PV of FCFE	50.90	67.94	

(i) Total PV of Stage 1 Cash Flows = ₹ 50.90 Crores + ₹ 67.94 Crores = ₹ 118.84 Crores

(ii) Implied Sustainable Growth Rate (g):

To find the growth rate (g) implied by the market price of ₹ 240, we solve for the Terminal Value (TV₂)

- Total Market Capitalization: ₹ 240 per share $\times$ 60 crore shares = ₹ 14,400 Crores
- PV of Terminal Value (at Year 0): ₹ 14,400 Crores – ₹ 118.84 Crores = ₹ 14,281.16 Crores
- Terminal Value at end of Year 2
= $14,281.16 \times (1.12)^2$ = ₹ 17,914.29 Crores
- FCFE for Year 3 (FCFE₃)

Gordon Growth Model: $17,914.29 = 241.875 \times (1+g) / (0.12 - g)$

Solving for (g):

$$2,149.7148 - 17,914.29g = 241.875 + 241.875g$$

$$g = 0.1051 \text{ i.e. } 10.51\%$$

The market is pricing in an implied sustainable growth rate of 10.51%.

Alternative Presentation

(i) Cash flow from operation per share = ₹ 425 $\times$ 0.09 = ₹ 38.25

Since number of outstanding shares is 60 crore

Total Cash from Operation shall be ₹ 2295 Crore (₹ 38.25 x 60 crore)

$$k_e = 6\% + 1.20 \times 5\% = 12\%$$

₹ Crore

Particulars	Year 1	Year 2
Net Income	225.00	281.25
Net Investment through Equity	168.00	196.00
	57.00	85.25
PVF@12%	0.893	0.797
PV	50.901	67.944

Total Present Value of FCFE for the High Growth Period is ₹ 118.845 Crore.

- (ii) Now let g be the implied sustainable growth rate then FCFE in Year 3 and onward shall be:

$$\begin{aligned}
 &= 281.25 \times (1+g) - [281.25(1+g) \times 0.20 \times 0.70] \\
 &= 281.25 + 281.25g - 39.375 - 39.375g \\
 &= 241.875g + 241.875
 \end{aligned}$$

If ₹ 240 is considered as Fair Value as Fair Value = ₹ 240 x 60 crore
= ₹ 14400 crore

Accordingly,

$$118.845 + \left[\frac{241.875 + 241.875g}{0.12 - g} \right] \times 0.797 = 14400$$

On solving the equation $g = 0.1050$ i.e., 10.50%

- (b) (i) Gap Position & Favorability

- Gap Calculation: ₹ 12,500 crore – ₹ 15,800 crore = - ₹ 3,300 Crore (Negative Gap)
- Un-Favorable Scenario: Scenario A (50 bps). In a negative (liability-sensitive) gap, increase in rates causes liabilities to reprice upward more than assets, leading to a decrease in Net Interest Income.

- Favorable Scenario: Scenario B (-25 bps). In a negative (liability-sensitive) gap, a decrease in rates causes liabilities to reprice downward more than assets, leading to an increase in Net Interest Income.

(ii) EAR in two different scenarios

Scenario A:

$$\text{EAR} = (\text{RSA} - \text{RSL}) \times \text{Change in Interest Rate} \times (1/4)$$

$$= (\text{₹ } 12500 \text{ crore} - \text{₹ } 15800 \text{ crore}) \times 0.50\% \times (1/4)$$

$$\text{EAR} = - \text{₹ } 4.125 \text{ crore}$$

$$\text{Or } (\text{₹ } 12500 \text{ crore} - \text{₹ } 15800 \text{ crore}) \times 0.50\% \times (90/365) = - \text{₹ } 4.0685 \text{ crore}$$

$$\text{EAR in \%} = -4.125/450 = -0.9167\% \text{ Or } -4.0685/450 = -0.90411\%$$

$$\text{Bank Ear} = 8\% \times \text{₹ } 450 \text{ Crore} = \text{₹ } 36 \text{ crore}$$

Since EAR - 0.9167% Or - 0.90410% is less than EaR 8% limits no need of hedging.

Scenario B:

$$\text{EAR} = (\text{RSA} - \text{RSL}) \times \text{Change in Interest Rate} \times (1/4)$$

$$= (\text{₹ } 12500 \text{ crore} - \text{₹ } 15800 \text{ crore}) \times (-0.25\%) \times (1/4)$$

$$\text{EAR} = \text{₹ } 2.0625 \text{ crore Or}$$

$$= (\text{₹ } 12500 \text{ crore} - \text{₹ } 15800 \text{ crore}) \times (-0.25\%) \times (90/365)$$

$$\text{EAR} = \text{₹ } 2.0342 \text{ crore}$$

$$\text{EAR in \%} = 2.0625/450 = 0.4583\% \text{ or } 0.4521\%$$

Since Value is positive no need of hedging.

- (c) Transaction exposure is more critical than translation exposure because it directly affects a firm's actual cash inflows and outflows. It arises from contractual foreign currency transactions such as exports, imports, and foreign currency borrowings. Exchange rate fluctuations between the contract date and settlement date can result in real gains or losses, thereby impacting profitability, liquidity, and working capital management. If left un-hedged, it may even create financial distress.

In contrast, translation exposure arises from the conversion of foreign subsidiaries, financial statements into the parent company's reporting currency. It is an accounting adjustment that does not involve immediate cash flow movement. Therefore, from a risk management perspective, firms give higher priority to managing transaction exposure.

Question 6

(a) Arotech Industries Ltd. (A), a listed engineering major, are evaluating the acquisition of MedGen Labs Pvt. Ltd. (M), an unlisted pharmaceutical laboratory. Financial parameters as of 31 March, 2025 are as follows:

Particulars	Arotech Industries (A)	MedGen Labs (M)
Profit After Tax (PAT)	₹ 6,000 crore	₹ 450 crore
No. of Equity Shares	500 crore	5 crore
P/E Ratio	30x	1.2 x Industry Avg P/E
Market Price / Standalone Fair Value	₹ 360.00	To be determined

Additional Information:

1. Combined Entity: Post-merger PAT is estimated at ₹ 6,850 crore (including synergies). The expected P/E of the combined entity is 34x.
2. Synergy Value: The total synergy gain (increase in combined entity value over the sum of standalone values) is capped at ₹ 34,000 crore.
3. Settlement Offers (Per 1 share of MedGen):
 - Offer 1 (Cash): ₹ 4,000 (Premium of 5.82% over the standalone fair value of MedGen).
 - Offer 2 (Hybrid Equity): ₹ 1,000 Cash + Arotech shares (X) (Premium of 21.69% over standalone fair value).
 - Offer 3 (Hybrid Debt): ₹ 1,150 Cash + 5 Convertible Bonds of Arotech (Premium of 25.66% over standalone fair value).
4. Bond Terms (Arotech): Face Value ₹ 500, 4-year term, 10% discount rate. Each bond converts into 2 Arotech shares or redeems at ₹ 680.24.

You are required to:

- (i) Determine the annual post-merger synergies (PAT basis) and MedGen's standalone P/E ratio.
 - (ii) Calculate the Industry Average P/E and MedGen's Standalone Fair Value per share.
 - (iii) Solve for the number of Arotech shares (X) offered in Offer 2.
 - (iv) Rank all three offers from MedGen's perspective assuming Arotech's share price has fallen to and remains at ₹ 330 at the time of settlement/conversion. **(7 Marks)**
- (b) The current price of F Ltd is ₹ 120 and a European option with an exercise price of ₹ 115 will expire in 50 days. The annual continuously compounded risk free rate of interest is 8%. The standard deviation of annual returns on F Ltd. is 30%.

Value of $(d_1) = 0.5375$; Year = 365 days and value of $e^{-rt} = 0.9891$.

Using Black-Scholes Model, you are required to calculate:

- (i) The Hedge Ratio
- (ii) The probability that price in spot market on expiration would be higher than the exercise price of the call option.
- (iii) Value of call and put options.

Cumulative Area Table extract

	0.00	0.01	0.02	0.030	0.04	0.05
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422

(7 Marks)

Answer

(a) (i) Annual Synergies and MedGen P/E

- Annual Post-Merger Synergies (PAT basis):
Synergy PAT = Combined PAT - (PAT_A + PAT_M)

Synergy PAT = ₹ 6,850 - (₹ 6,000 + ₹ 450) = ₹ 400 crore

- MedGen Standalone P/E Ratio:

Using the Synergy Value cap:

Total Fair Value (M) = Combined Value – Value A - Synergy Value

Total Fair Value (M) = (₹ 6,850 Crores × 34) - (₹ 500 Crores × ₹ 360) – ₹ 34,000 Crore = ₹ 18,900 crore

MedGen P/E = Total Fair Value/PAT_ M

= 18,900/450 = 42x

(ii) Industry Average P/E and Fair Value per share

- Industry Average P/E:
- Industry P/E = MedGen P/E/1.2 = 42/1.2 = 35
- Standalone Fair Value (SFV) per share:

SFV_M = 18,900 cr (Total Value) / 5 cr shares = ₹3,780.00

(iii) Number of Arotech Shares (X) in Offer 2

- Value of Offer 2 per share:
- Value = 3,780(SFV) × 1.2169(Premium) = ₹ 4,599.88 or ₹ 4,600.00
- Solving for X:

1,000(Cash) + X * 360 (Price_ A) = 4,599.88 or 4,600

360X = 3,600 or X = 10 shares

Or

Since ₹ 1,000 cash is not the part of ₹ 4,599.88 or ₹ 4,600 the number of shares to be exchanged can also be computed as follows:

$$\frac{4599.88 \text{ or } 4600}{360} = 12.78 \text{ i.e. } 13 \text{ shares}$$

(iv) Ranking of Offers at ₹ 330 Price Drop

- Revised Valuation of Arotech Convertible Bond:
 1. Redeemable Value of the bond : ₹ 680.24
 2. Conversion Value: 2 shares x ₹ 330 = ₹ 660.00

Higher of above = ₹ 680.24.

- Revised Offer Values (Per MedGen Share):

Offer	Calculation at ₹ 330	Revised Value	Rank
Offer 3	1,150 Cash + (5 x 680.24)	₹ 4,551.20	1
Offer 2	1,000 Cash +(10x330)	₹ 4,300.00	2
Offer 1	Fixed Cash	₹ 4,000.00	3

Note: Offer 3 is the most beneficial as the convertible bonds maintain their value through conversion even at ₹ 330 and would still provide a "debt floor" of ₹ 680.24 even if the price fell much further, unlike Offer 2 which has no downside protection.

Or (Based on 13 shares)

Revised Offer Values (Per MedGen Share):

Offer	Calculation at ₹ 330	Revised Value	Rank
Offer 2	1,000 Cash +(13 x 330)	₹ 5,290.00	1
Offer 3	1,150 Cash + (5 x 680.24)	₹ 4,551.20	2
Offer 1	Fixed Cash	₹ 4,000.00	3

(b) (i) Hedge Ratio i.e. $N(d_1)$

Since d_1 is given, we shall calculate $N(d_1)$ i.e. $N(0.5375)$ and we shall use Interpolation method as follows:

Cumulative Area under Normal Curve for N (0.54)	0.7054
Cumulative Area under Normal Curve for N (0.53)	0.7019
Cumulative Area under Normal Curve for N (0.01)	0.0035
Difference Variable 0.5375 – 0.53	0.0075
The additive value to 0.53 = $\frac{0.0035}{0.01} \times 0.0075$	0.002625
Cumulative Area under Normal Curve for N (0.5375)	0.7045

Thus, Hedge ratio shall be approximately 0.70 or 70%

- (ii) Probability that price in spot market on expiration would be higher than exercise price of the Call is $N(d_2)$

$$d_2 = d_1 - \sigma\sqrt{t}$$

$$d_2 = 0.5375 - 0.30\sqrt{50/365}$$

$$d_2 = 0.4264$$

$N(0.4264)$ we shall use Interpolation method as follows:

Cumulative Area under Normal Curve for $N(0.43)$	0.6664
Cumulative Area under Normal Curve for $N(0.42)$	0.6628
Cumulative Area under Normal Curve for $N(0.01)$	0.0036
Difference Variable $0.4264 - 0.42$	0.0064
The additive value to 0.42 = $\frac{0.0036}{0.01} \times 0.0064$	0.002304
Cumulative Area under Normal Curve for $N(0.4264)$	0.6651

Thus, the probability that price in spot market on expiration would be higher than the exercise of the call option shall be approximately 67%.

- (iii) Value of Call Option

$$OP = SN(d_1) - Xe^{-rt}N(d_2)$$

$$= ₹ 120 \times 0.7045 - ₹ 115 \times 0.9891 \times 0.6651$$

$$= ₹ 84.54 - ₹ 75.65$$

$$= ₹ 8.89$$

Value of Put Option

$$V_P = -V_S + V_C + PV(E)$$

$$= -120 + 8.89 + 0.9891 \times 115$$

$$= ₹ 2.63$$