Paper- 14: STRATEGIC FINANCIAL MANAGEMENT

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Full Marks: 100 **Time Allowed: 3 Hours**

PART – I

Answer Question Number 1 which is compulsory

1. Choose the correct option among four alternative answer. (1 mark for correct choice, 1 mark for justification.) [2×10= 20]

(i) Portfolio beta is 0,30, risk free rate of interest (R_f) is 10%, and expected return on market portfolio (R_m) is 15%, What will be the expected return of the portfolio?

(a) 10%

(b) 10.5%

(c) 11%

(d) 11.5%

(ii) A finance company borrows £15 Million of six months LIBOR + 10.00% for a period of 24 months. The company anticipates a rise in LIBOR, hence it proposes to buy a Cap Option from its Bankers at the strike rate of 8.00%. The lump sum premium is 1.00% for the entire reset periods and the fixed rate of interest is 7.00% per annum. The actual position of LIBOR during the forthcoming reset period is as under:

Reset Period	LIBOR
1	9.00%
2	9.50%
3	10.00%

You are required to show how far interest rate risk is hedged through Cap Option after working out the figures at each stage up to four decimal points and amount nearest to £.

(a) £ 40,168

(b) £ 40,618

(c) £ 40,681

(d) £ 40,861

(iii) A finance company issued 9%, 5 year bonds of ₹1,000 each having a maturity of 3 years. The present rate of interest is 12% for one year tenure. It is expected that Forward rate o interest for 1 year tenure is going to fall by 75 basis points and further by 50 basis points for every next year in further for the same tenure. This bond has a beta value of 1.02 and is more popular in the market due to less credit risk.

What will be the Intrinsic value of bond?

(a) ₹798.28

(b) ₹832.00

(c) ₹582.68

(d) ₹942.48

(iv) The following data is available for a bond:

A bond has a Face Value of ₹1,000, Coupon Rate is 11%, Years to Maturity is 6 years, Redemption Value is ₹1,000 and Yield to Maturity is 15% (Round-off your answer to 3 decimals) What will be the Current Market Price?

(a) ₹834.48

(b) ₹834.84

(c) ₹843.48

(d) ₹843.84

(v) An investor is interested in purchasing equity shares of a manufacturing company which are currently selling at ₹600 each. He expects that price of share may go upto ₹780 or may go down to ₹480 in 3 months.

What combination of share and option should the investor select if he wants a perfect hedge?

(a) 0.50 share
(b) 0.70 share
(c) 0.90 share
(d) 1.00 share

(vi) An investor's Portfolio comprises of shares worth ₹1,20,00,000 at current price and Cash ₹10,00,000. The Beta (β) of Share Portfolio is 1.4.
What will be the current portfolio beta after rounding –off to 4 decimal points?

(a) 1.2923

(b) 1.3025

(c) 2.2923

(d) 2.3025

(vii) An investor can earn a return of 16 per cent by investing in equity shares on his own.

Now he is considering a recently announced equity based mutual fund scheme in which initial expenses are 5.7 per cent and annual recurring expenses are 1.7 per cent. How much should the mutual fund earn to provide the investor a return of 16 per cent?

(a) 16.67%

(b) 17.67%

(c) 18.67%

(d) 19.67%

(viii) There are two projects, Project X & Y. Brand on following data, which project will be selected?

	Project X	Project Y
Investment (₹.)	**50,00,000**	**75,00,000**
Net Cash Inflow (₹.)	**62,50,000**	**91,50,000**

K = 10%

(a) Project X
(b) Project Y
(c) Both X & Y
(d) Neither X nor Y

(ix) Find out the value of 10 year, 12% coupon bond with a par value of ₹ 10,000. Assuming that the yield on this bond is 13%.

(a) ₹ 2,601.1

(b) ₹5,601.1

(c) ₹9,461.2

(d) ₹4,601.1

(x) Government securities are free from

(a) Default risk

(b) Interest rate risk

(c) Purchasing power risk

(d) Re-Investment risk

Answer: (i) (d)

Rule for determining Expected Return on Portfolio under CAPM

Under Capital Asset Pricing Model (CAPM), $R_p = R_f + (\beta \times (R_m - R_f)$

Notation	Particulars	Value
R_p	Expected Return on Portfolio	To be computed
R_f	Risk Free Rate of Interest/ Return	10%
β	Portfolio Beta	0.30
R_m	Expected Return on Market Portfolio	15%

Computation of Expected Return on Portfolio

Expected Return on Portfolio, $R_p = R_f + \beta \times (R_m - R_f)$

$= 10\% + 0.30(15\%-10\%)=11.5\%$

(ii) (d)

First of all we shall calculate premium payable to bank as follows:

$$P = \frac{rp}{\left[(1+i) - \frac{1}{i \times (1+i)^t}\right]} \times A$$

Where

P = Premium

A = Principal Amount

rp = Rate of Premium

i = Fixed Rate of Interest

t = Time

$$= \frac{0.01}{\left[(1/0.035) - \frac{1}{0.035 \times 1.035^4}\right]} \times £15,000,000$$

$$= \frac{0.01}{\left[(28.5714) - \frac{1}{0.04016}\right]} \times £15,000,000$$

$$= \frac{0.01}{[3.671]} \times £15,000,000$$

= £40,861

(iii) (d)

Intrinsic value of Bond

PV of Interest + PV of Maturity Value of Bond
Forward rate of interests

1st Year	12%
2nd Year	11.25%
3rd Year	10.75%

$$\text{PV of interest} = \frac{₹\,90}{(1+0.12)} + \frac{₹\,90}{(1+0.12)(1+0.1125)} + \frac{₹\,90}{(1+0.12)(1+0.1125)(1+0.1075)}$$

$$= ₹\,217.81$$

$$\text{PV of Maturity Value of Bond} = \frac{₹\,1000}{(1+0.12)(1+0.1125)(1+0.1075)} = ₹\,724.67$$

Intrinsic value of Bond = ₹ 217.81 + ₹ 724.67 = ₹ 942.48

(iv) (b)

Calculation of Market Price:

$$TM = \frac{\text{Coupon interest} + \left(\frac{\text{Discount or premium}}{\text{Years left}}\right)}{\frac{\text{Face Value + Market value}}{2}}$$

Discount or premium – YTM is more than coupon rate, market price is less than Face Value i.e. at discount.

Let x be the market price

$$0.15 = \frac{110 + \left\{\frac{(1{,}000 - x)}{6}\right\}}{\frac{1{,}000 + x}{2}}$$

x = ₹ 834.48

(v) (b)

To compute perfect hedge we shall compute Hedge Ratio (Δ) as follows:

$$\Delta = \frac{C_1 - C_2}{S_1 - S_2} = \frac{150 - 0}{780 - 480} = \frac{150}{300} = 0.50$$

Mr. Dayal should purchase 0.50 share for every 1 call option.

(vi) (a)

Current Portfolio

Current Beta for share = 1.4

Beta for cash = 0

$$\text{Current portfolio beta} = \frac{120 \text{ lakhs}}{130 \text{ lakhs}} \times 1.4 + 0 \times \frac{10 \text{ lakhs}}{130 \text{ lakhs}} = 1.2923$$

(vii) (c)

Let the Return on Mutual Funds be ` X

Investor's Expectation denotes the Return from the amount invested.

$$\text{Returns from Mutual Funds} = \frac{\text{Investor's Expectation}}{100 - \text{Issue Expenses}} + \text{Annual Recurring Expenses}$$

$$X = \frac{16}{(100 - 5.7)\%} + 1.7 = 16.96 + 1.7 = 18.67\%$$

Return that the Mutual Fund should earn so as to provide a return of 16% = 18.67%

(viii) (b)

At first, NPV and IRR of the projects are calculated and it has been found that,

$NPV_A < NPV_B$

$IRR_A > IRR_B$

The above results indicate that there is a conflict in ranking of the projects under NPV and IRR. Such conflict is mainly due to the difference in the initial investment of the projects and it can be resolved using incremental approach as follows. Differential Cash Outflows = 25,00,000, Differential Net Cash Inflows = 29,00,000 We know that IRR is the discount rate at which Present Value of Cash Inflows are equal to the Present Value of Cash Outflows.

So, 25,00,000 = 29,00,000 / (1+ r)1

Or, 1 + r = 29,00,000 / 25,00,000 Or, r = 1.16 – 1 = 0.16

IRR (r) of the differential cash flows = 16%, which is greater than Cost of Capital (k).

Therefore, Project with higher non-discounted cash inflows, i.e., **Project X would be selected**.

(ix) (d)

The cash flows for this bond are as follows:

10 annual coupon payments of ₹1200

₹10,000 principal repayment 10 years from now

The value of the bond is:

P = 1200 × (PVIFA13%,10 years)+ 10,000× (PVIF13%,10 years)

P =1200 × 5.426+ 10,000× 0.295

P = 6511.2 +2950

P = ₹9461.2

(x) (a)

Default risk

Government securities are free from default risk since government does not default payment.

PART – II

Answer any five questions from question numbers 2 to 8. Each question carries 16 marks

[16×5= 80]

2. (a) From the following information determine the optimal combination of projects assuming that the projects are divisible.

Project	Required Initial Investment (₹)	NPV at appropriate cost of capital (₹)
A	1,00,000	20,000
B	3,00,000	35,000
C	50,000	16,000
D	2,00,000	25,000
E	1,00,000	30,000

Total fund available is 3, 00,000. **[8]**

(b) The following table presents the proposed cash flows for projects X and Y with their associated probabilities. Which project has a higher preference for acceptance?

	Project X		Project Y	
Possibilities	Cash flow (₹ lakhs)	Probability (₹ lakhs)	Cash flow (₹ lakhs)	Probability (₹ lakhs)
1	21,000	0.10	36,000	0.10
2	24,000	0.20	24,000	0.10
3	27,000	0.30	18,000	0.10
4	30,000	0.20	12,000	0.20
5	33,000	0.20	6,000	0.50

[8]

Answer:(a)

Project	Profitability Index (PI)	Projects arranged in descending order of PI	Cumulative fund exhausted (₹)	Cumulative NPV (₹)
A	20,000/1,00,000 = 0.20	C (0.32)	50,000	16,000
B	0.117	E (0.30)	1,50,000	46,000
C	0.32	A (0.20)	2,50,000	66,000
D	0.125	D (0.125)	50,000 (₹ 2, 00,000 × ¼)	72,250
E	0.30	B (0.117)	-	-
			3,00,000	

Therefore, the optimal combination of projects is C E A and ¼ th of D.

Answer: (b)

Calculation of Expected Value of Cash flow						(₹ lakhs)
		Project X		Project Y		
Possibilities	Cash flow	Probability	Expected value	Cash flow	Probability	Expected value
1	21,000	0.1	2100	36,000	0.10	3600
2	24,000	0.2	4800	24,000	0.10	2400
3	27,000	0.3	8100	18,000	0.10	1800
4	30,000	0.2	6000	12,000	0.20	2400
5	33,000	0.2	6600	6,000	0.50	3000
		1.0	EV = 27600		1.00	EV = 13200

Analysis - The expected monetary value of Project X is greater than Project Y. Therefore, Project X has a higher preference for acceptance.

3. (a) An investor purchased certain units of a Mutual Fund when the Net Asset Value (NAV) was ₹12.65. After 60 Days the NAV per unit of the mutual fund was ₹12.25. In the meantime, the investor received a cash dividend of ₹ 0.50 and a Capital Gain distribution of ₹ 0.30. What is the monthly return on investment? [6]

(b) The Net Asset Value of a Mutual Fund having 200 units was in NAV ₹ 8.75 at the beginning and ₹ 9.45 at the end of the year .

The fund manager considered the following two options:

(A) Pay ₹0.75 per unit as dividend and ₹0.60 per unit as a capital gain, or

(B) These distributions are to be reinvested at an average NAV of ₹8.65 per unit.

What difference it would make in terms of return available and which option is preferable? [10]

Answer:(a)

(a) Dividend = ₹ 0.50

(b) Capital Gain Distribution = ₹ 0.30

(c) Capital Appreciation = (-)₹0.40 (Closing NAV ₹12.25 Less Opening NAV ₹12.65)

(d) Returns = [Dividend + Capital Gain Distribution + Capital Appreciation] ÷ Opening NAV

= [₹ 0.50 + ₹ 0.30 – ₹ 0.40] ÷₹12.65

= ₹0.40 ÷₹12.65= 3.16%

(e) Annualized Return = Return x 365 ÷ Period

= 3.16% X 365 Days ÷ 60 Days = 19.22% p.a

(f) Monthly Return = 19.22% ÷12 = 1.60% per month

Answer:(b)

Basic Data for Computation

Particulars	Value (₹)
Opening NAV	8.75
Closing NAV	9.45
Dividend	0.75
Capital Gain Appreciation [Closing NAV - Opening NAV]	0.70
Capital Gain Distribution	0.60
Price Paid at the year beginning [200 units X ₹8.75]	1,750

Option 1: Returns are distributed to Mutual Fund Holders

(a) Preparation of Fund Balance Sheet

Liabilities	₹	Assets	₹
NAV on Closing Date	1,890	Fund Assets	2,160
Dividend Payable	150		
Capital Gain Distribution	120		
Total	2,160	Total	2,160

- NAV on Closing Date = [9.45 × 200]
- Dividend Payable = [0.75 × 200]
- Capital Gain Distribution = [0.60 × 200]

(b) Returns under Option A = $\left[\frac{\text{Closing Fund Assets} - \text{Opening Asset Value}}{\text{Opening Asset Value}}\right]$

$= \frac{2,160 - 1,750}{1,750}$

= 23.43%

Option B: Returns are reinvested

Total distribution = 150 + 120 = 270

So, units allotted at average NAV of ₹ 8.65 = ₹ 270 ÷ 8.65 = 31.21 units

So, NAV on closing date = (200+31.21) × 9.45 = ₹2184.93

Returns under Option B = $\frac{2184.93 - 1,750}{1,750}$

= 24.85%

Therefore, Option B i.e. reinvestment is preferable.

4. (a) An investor has two portfolios X and Y known to be on minimum variance set for a population of three securities A, B and C having the weights mentioned below:

	Weight (A)	Weight (B)	Weight (C)
Portfolio X	0.30	0.40	0.30
Portfolio Y	0.20	0.50	0.30

It is supposed that there are no restrictions on short sales.

(i) What would be the weight for each stock for a portfolio constructed by investing ₹6,000 in Portfolio X and ₹4,000 in Portfolio Y?

(ii) Suppose the investor invests ₹5,000 out of ₹10,000 in Security A. How he will allocate the balance between security B and C to ensure that his portfolio is on minimum variance set? 10

(b) A limited company has declared and paid annual dividend of ₹4 per share. It is expected to grow @ 20% for the next 2 years and 10% thereafter. The required rate of return of equity investors is 15%. Compute the current price at which equity shares should sell. [6]

$PVIF_{0.15,1}$ = 0.8696
$PVIF0._{15,2}$ = 0.7561

Answer: 4. (a)

(i) Investment in Individual Securities

Security	Portfolio X	Portfolio Y	Total	Weight
A	6,000 x 0.30 = 1,800	4,000 x 0.20 = 800	2,600	2,600 10,000 = 0.26
B	6,000 x 0.40 = 2,400	4,000 x 0.50 = 2,000	4,400	4,400 10,000 = 0.44
C	6,000 x 0.30 = 1,800	4,000 x 0.30 = 1,200	3,000	3,000 10,000 = 0.30
	6,000	4,000	10,000	1.0000

(ii) Investment Strategy to Ensure Minimum Variance

Given the following equations $\rightarrow W_A = 0.50$ (₹5,000 ₹10,000)

$\rightarrow W_A + W_B + W_C = 1$

Therefore it naturally follows that $\rightarrow W_B + W_C = 0.50$ ...(1)

A simple linear equation establishing an equation between two variables W_A and W_B or the Variables WB and WC in the given manner—

$$W_C = a + bW_B$$

Substituting the values of W_A & W_B from the data given (Portfolio X and Y), we get -

$0.30 = a + b \times 0.40$ (for A)

$0.30 = a + b \times 0.50$ (for B)

$b = 0$

$a = 0.30$

$W_C = 0.30 - 0W_B$

or

$W_C + 0W_B = 0.30$ ...(2)

Therefore solving (1) and (2) we get $W_C = 0.30$ and $W_B = 0.20$

Conclusion: Allocation of Funds -
A = ₹5,000 (Given)
B = 0.20 x ₹ 10,000 = ₹ 2,000.
C= 0.30 x ₹10,000 = ₹ 3,000.

Answer: (b)

$D_0 = ₹ 4$

$D_1 = ₹ 4\ (1.20) = ₹ 4.80$

$D_2 = ₹ 4\ (1.20)^2 = ₹ 5.76$

$D_3 = ₹ 4\ (1.20)^2\ (1.10) = ₹ 6.336$

$$P = \frac{D_1}{(1+k_e)} + \frac{D_2}{(1+k_e)^2} + \frac{TV}{(1+k_e)^2}$$

$$TV = \frac{D_3}{(k_e - g)} = \frac{6.336}{0.15 - 0.10} = 126.72$$

$$P = \frac{4.80}{(1+0.15)} + \frac{5.76}{(1+0.15)^2} + \frac{126.72}{(1+0.15)^2}$$

$$= 4.80 \times 0.8696 + 5.76 \times 0.7561 + 126.72 \times 0.7561 = 104.34$$

5. (a) X as a portfolio manager has to manage a portfolio having beta 1.5 whose current market value of ₹67.50 Crores. It is expected that the markets are likely to correct downwards and hedging needs to be adopted using NIFTY Index Futures. Currently Index Futures are quoted at 4500 with each contract underlies 100 units. Examine a situation when markets correct 10% down and also a possibility market trend upwards by 10% against the belief of product X. Assume that X hedged 100% of the portfolio. 10

(b) The Month 1 Year 202X future traded at 16.80, the Month 2 Year 202X 18.00 call at 0.45 and the Month 2 Year 202X 18.00 put at 0.58. Both are options on the February future. Find out whether any arbitrage opportunity exists. [6]

Answer:(a)
Each NIFTY index contract is worth ₹4,500 × 100 = ₹ 4,50,000.
Value of the portfolio is = ₹ 67.50 Crores
Value of Index Futures required to be hedged = Beta times value of portfolio
= 1.5 × 67.50 Crores = ₹101.25 Crores

Number of NIFTY index contracts to be sold (Since we hold (bought) assets, hedging using other asset should be opposite i.e. sell) = 101.25 Crores /450000 = 2250

Table

	Market Rise	Portfolio Gain	Index Futures	Net Gain /Loss
Pessimistic	-10%	1.5 times 10% i.e. 15% fall in portfolio value -10.125 Crores	10% gain in futures; since we have sold +10.125 Crores	Nil
Optimistic	+10%	1.5 times 10% i.e. 15% gain in Portfolio value +10.125 Crores	10% loss in futures; since we have sold -10.125 Crores	Nil

Had X hedged only 50% of his portfolio value, the net gain or loss would not be nil. He would have got only 50% of protection in case of market fall. Thus when market falls by 10%, against his loss of ₹10.125 Crores, he would have gained only ½ of 10.125 Crores in the futures market, since he would have hedged only 50%.

Answer: (b)

(a) Cost of future = ₹16.80

(b) Cost of Pepper = Present Value of Exercise Price + Value of Call - Value of Put

= ₹18 + ₹0.45 –₹0.58 = ₹ 17.87

(c) **Conclusion:** Since there is difference between Spot Price and Futures Price, Arbitrage opportunity exists.

6. (a) A Backpack is priced at $ 105.00 at Washington. The same Backpack is priced at ₹ 4,250 in New Delhi. Determine Exchange Rate in New Delhi.

(i) If, over the next one year, price of the Backpack increases by 7% in New Delhi and by 4% in Washington, determine the price of the Backpack at New Delhi and-Washington? Also determine the exchange rate prevailing at Washington for ₹ 100.

(ii) Determine the appreciation or depreciation in one year from now. [8]

(b) The details of Cash Inflows and Outflows in foreign currency denominations of an Indian export firm, with no foreign subsidiaries —

Currency	Inflow	Outflow	Spot Rate	Forward Rate
US $	4,00,00,000	2,00,00,000	48.01	48.82
French Franc (F Fr)	2,00,00,000	80,00,000	7.45	8.12
UK £	3,00,00,000	2,00,00,000	75.57	75.98
Japanese Yen	1,50,00,000	2,50,00,000	3.20	2.40

(i) Determine the Net Exposure of each foreign currency in terms of Rupees.

(ii) Are any of the exposure positions off-setting to some extent? [8]

Answer: (a)

1. Exchange Rate in New Delhi (Purchasing Power Parity Theory)

Exchange Rate in New Delhi per $ = Bag Price in ₹ at New Delhi/ Backpack Price in $ at Washington

= ₹ 4,250 ÷ USD 105 = ` 40.4762

2. Price in a Year's time

New Delhi = Prevailing Price × (1 + Increase in Rate) = ₹ 4250 × (1 + 7%)

= ₹ 4,250 x 1.07 = ₹ 4,547.50

Washington

= Prevailing Price x (1 + Increase in Rate) = USD 105 × (1 + 4%)

= USD 105 × 1.04 = USD 109.20

3. Exchange Rate in Washington (after one year)

Exchange Rate in Washington per ₹100

= (Bag Price in $ at Washington / Bag Price in ₹ at New Delhi) x ₹ 100

= (USD 109.20 ÷ ₹4,547.50) x ₹ l00= USD 2.4013

4. Depreciation (in %) of ₹ over the year

Depreciation = [(1 + Indian Inflation Rate) / (1 + Washington Inflation Rate)] - 1

= [(1 + 7%) / (1 + 4%)] - 1 = (1.07 / 1.04) - 1 = 2.88% Alternatively

= (Future Spot Rate ₹ / $ - Spot Rate of ₹ / $) ÷ Spot Rate × 100

Future Spot = Backpack in New Delhi / Backpack in Washington in one year

= ₹ 4,547.50 / USD 109.20

= ₹ 41.6438

Depreciation = (Future Spot ₹ 41.6438 - Spot Rate ₹ 40.4762) ÷ Spot Rate ₹ 40.4762 x 100
= ₹ 1.1676 ÷ ₹ 40.4762 × 100 = 2.88%

Answer: (b)

1. Computation of Net Exposure

Particulars	US $	F Fr	UK £	Japan Yen
Inflow (in Lakhs)	400.00	200.00	300.00	150.00
Less: Outflow	(200.00)	(80.00)	(200.00)	(250.00)
Net Exposure (Foreign Currency Terms)	200.00	120.00	100.00	(100.00)
Spot Exchange Rate	48.01	7.45	75.57	3.20
Net Exposure (in Rupee Terms based on Spot Exchange Rate)	9602 [200x48.01]	894 [120 x 7.45]	7557 [100 x 75.57]	(32) [100 x 3.20/10]

Particulars	US $	F Fr	UK£	Japan Yen
Forward Rate [₹,FC]	48.82	8.12	75.98	2.40
Less: Spot Exchange Rate [₹ / FC]	48.01	7.45	75.57	3.20
Forward Premium/ (Discount)	0.81	0.67	0.41	(0.80)
Net Exposure in Rupee Terms based on extent of uncertainty represented by Premium / (Discount)	162.0 [200 x 0.81]	80.4 [120 x 0.67]	41.0 [100 x 0.41]	8.0 [(100) x (0.8)/ 10]

2. Off Setting Position:

(a) Net Exposure in all the currencies are offset by better forward rates. In the case of USD. F Fr and UK Pound, the net exposure is receivable, and the forward rates are quoted at a premium for these currencies.

(b) In case of Japanese Yen, the net exposure is payable, and the forward rate is quoted at a discount. Therefore, a better forward rate is also offsetting the net payable in Japanese Yen.

7. (a) A financing company is considering to enter the IT and Computer leasing business. Mainframe computers can be purchased for ₹2,00,000 each and, in turn, be leased out at ₹50,000 per year for 8 years with the initial payment occurring at the end of first year. You may ignore taxes and depreciation.

(i) Estimate the Annual before Tax Expenses and Internal Rate of Return (IRR) for the company.

(ii) What should be the yearly lease payment charged by the company in order to earn a 20% Annual Compounded Rate of Return before Expenses and Taxes?

(iii) Assume that the firm uses the straight-line method of depreciation, there is no salvage value, the annual expenses are ₹20,000, and the tax rate is 35%. Calculate the yearly lease payment in order to enable the firm to earn 20 percent After Tax Annual Compound Rate of Return.

(iv) Further, assume that Mainframe computer has a resale value of ₹40,000. Determine the revised lease rental to enable the firm to earn 20 %. [10]

(b) On the basis of the following information, compute covariance between the returns on a pair of securities according to the Sharpe single-index model:

Beta for Stock X = 1.183

Beta for Stock Y= 1.021

Beta for Stock Z = 2.322

The variance of the market portfolio = 20.91 [6]

Answer:(a)

(i)	**Cost of the Asset**	₹2,00,000
	Life	8 years
	Lease rent	₹50,000 p.a
	(50,000)$PVCF_{8yrIRR}$ =	2,00,000
	$PVCF_{8yrIRR}$ = 4	
	IRR =18.63%	
(ii)	**Calculation of yearly lease rent to be charged to earn 20% return**	
	Let the yearly Lease Rent be x	
	x$PVCF_{8yr20\%}$ =	200000
	x = 200000 / 3.8372	
	x = ₹52120	

(iii)	Let x be the yearly Lease Rent	
	Computation of cash inflows per annum	
	Lease Rent	x
	(-) Annual expenses	20,000
	(-) Depreciation (200000/8)	25,000
	PBT	x-45,000
	PAT@ (1-35%)	0.65x – 29,250
	CIAT	0.65x – 4,250
	Cash Inflows after tax	
	Present value for 8 years @ 20% = (0.65x – 4250) 3.8372 =	2,00,000
	Yearly Lease Rent x = ₹86,725	
(iv)	**Present value of cash outflows**	
	Cost of Mainframe computer	2,00,000
	Present value of recurring cash inflows	
	Lease Rent	x
	(-) Annual expenses	20,000
	(-) Depreciation [(200000 – 40000)/8]	20,000
	PBT	x – 40,000
	PAT@ (1-35%)	0.65x - 26,000
	CIAT	0.65x-6000
	Present value for 8 years @20%= (0.65x-6,000)3.872	
	Present value of Terminal Cash Inflows	

Resale value ₹40000
Its Present Value (40000 x 0.23257) = ₹9303
At 20%,
Inflows = Outflows
(0.65x – 6,000) 3.8372 + 9303= 2,00,000;
Revised Lease Rent, x = ₹85,687.

Answer: (b)

According to the Sharpe single-index model, the covariance between the returns on a pair of stocks is:

$$\text{SIM}\,\sigma_{ij} = \beta i\, \beta j\, \sigma^2 m$$

Using the betas for Stocks X and X along with the variance of the market portfolio we have:

$$\text{SIM}\sigma_{xy} = 1.183 \times 1.021 \times 20.91 = 25.254$$

Similarly:

$$\text{SIM}\sigma_{xz} = 57.438;\ \text{SIM}\sigma_{yz} = 49.572$$

8. Write short note on (*any four*) [4×4=16]

(a) Swaption
(b) Relationship between Correlation and Diversification
(c) Currency swaps
(d) The RBI's Regulatory Role
(e) Global Depository Receipt

Answer:

(a) Swaption

A swaption is an option on a forward start swap which provides the purchaser the right to either pay or receive a fixed rate. A buyer of a swaption who has the right to pay fixed and receive floating is said to have purchased a 'payers swaption'. Alternatively, the right to exercise into a swap whereby the buyer receives fixed and pays floating is known as a 'receivers swaption'.

Since the underlying swap can be thought of as two streams of cash flows, the right to receive fixed is the same as the right to pay floating. In this sense, swaptions are analogous to foreign exchange options where a call in one currency is identical to a put on the other currency. However, the option terminology of calls and puts is somewhat confusing for swaptions as it is not used consistently in the market. Some participants describe the right to pay fixed as a call since it provides the right to buy the swap (i.e. pay fixed). Others look at a swaption's relationship to the bond market and say that if you pay fixed you are short the bond and therefore look at this swaption as a put. To eliminate any confusion, market participants generally describe swaptions as 'payers' versus 'receivers' with respect to the fixed rate.

Swaptions can be used as hedging vehicles for fixed debt, floating debt or swaps. The primary purposes for entering into a swaption are:

- to hedge call or put positions in bond issues
- to change the tenor of an underlying swap
- to assist in the engineering of structured notes
- to change the payoff profile of the firm

Original interest arose from the issuance of bonds with embedded put features. Often, the price of the bond did not fully reflect the fair value of the embedded option and the issuer would sell a swaption to obtain a lower fixed cost of funds. This application of swaptions continues today for both bonds with call or put features.

(b) Relationship Between Correlation And Diversification:

Relationship Between Securities: The level of diversification of a Portfolio depends on how the investments (in the Portfolio) react with one another. If they offset each other properly, then the value of Portfolio is well protected.

Examination of Correlation: The interaction among the investments can be determined by examining the correlation coefficient between pairs of investments.

Inference from Correlation: The relationship between Correlation and Diversification can be described as follows —

Correlation coefficient	Nature	Diversification
$\rho = +1$	Perfectly positively correlated	(a) Investments do not offset each other and they move in tandem. (b) No diversification.
$\rho = -1$	Perfectly negatively correlated	(a) Investments offset each other totally and they move in opposite direction. (b) Full diversification achieved.
$\rho = 0$	No correlation	(a) No predictability of movement of investments. (b) Not a good diversification.

(c) Currency swaps:

A currency swap is the one in which principal and fixed rate interest payments on a loan in one currency are exchanged for the same in another currency. Akin to interest rate swaps, the currency swaps are also influenced by comparative advantage. The currency swaps are arrangements whereby currencies are exchanged at specified exchange rates and specified intervals. The currency swap is a derivative instrument which takes care of both, principal-only-swap and interest rate swap, together. If a company has borrowed in US$ and wants to convert it into a Rupee loan, it can do a currency swap, wherein it will receive from the bank the principal and interest in US$, and pay the bank a fixed Rupee interest rate and also freeze its principal payment for the entire tenure of the loan. Effectively, the Dollar loan becomes a Rupee loan in Indian Rupees.

(d) The RBI's Regulatory Role:

As the nation's financial regulator, the Reserve Bank handles a range of activities, including:

- Licensing
- Prescribing capital requirements
- Monitoring governance
- Setting prudential regulations to ensure solvency and liquidity of the banks
- Prescribing lending to certain priority sectors of the economy
- Regulating interest rates in specific areas
- Initiating new regulation
- Setting appropriate regulatory norms related to income recognition, asset classification, provisioning, investment valuation.

(e) Global Depository Receipt

These are a class of investment which allows international investors to own shares in foreign companies where the foreign market is hard to access for the retail investor, and without having to worry about foreign currencies and tax treatments. Global Depository Receipts are issued by international investments banks as certificates (the **GDR**) which represents the foreign shares but which can be traded on the local stock exchange. For example a UK investor may be able to buy shares in a Vietnamese company via a GDR issued by a UK investment. The GDR will be denominated in GB Pounds and will be tradable on the London Stock Exchange. The investment bank takes care of currency exchange, foreign taxes etc. and pays dividends on the GDR in GB Pounds.

The concept originally started in the USA with the creation of American Depository Receipts which were created so that US retail investors could buy shares in a foreign company without having to worry about foreign exchange, or foreign taxes.

It should be noted that although the risks of owning the foreign shares directly has been removed, there is now a risk of third party default, because the investment bank owns the underlying assets, and may not be able to pass on the benefits to ADR holders if they get into financial difficulty.

Global Depository Receipts (GDRs) are negotiable certificates issued by depository banks which represent ownership of a given number of a company's shares which can be listed and traded independently from the underlying shares. These instruments are typically used by companies from emerging markets and marketed to professional investors only.

GDRs can be listed on either the Main Market via a Standard Listing or on the Professional Securities Market. A GDR will be used to access two or more markets, usually London and the US. They are often launched for capital raising purposes, so the US element is generally either a Rule 144(a) ADR or a Level III ADR, depending on whether the issuer aims to tap the private placement or public US markets.

These securities are generally traded in US dollars on the Exchange's Electronic Trading Service the International Order Book (IOB). Associated dividends are paid to investors in US dollars. GDRs are settled in either DTC or Euroclear Bank enhancing their cross border liquidity. The more liquid IOB securities have central counterparty clearing ensuring pre and post trade anonymity as well as mitigation of counterparty risk.