FINAL EXAMINATION
GROUP III
(SYLLABUS 2016)

SUGGESTED ANSWERS TO QUESTIONS
JUNE 2019

Paper- 14: STRATEGIC FINANCIAL MANAGEMENT

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

The figures in the margin on the right side indicate full marks.
Working Notes should form part of the respective answers.

Wherever necessary, candidates may make appropriate assumptions and clearly state them. No present value factor table or other statistical table will be given in addition to this question paper. Candidates may use the values tabulated at the end of this question paper.

*This paper contains two sections, **A** and **B**. Section A **is** compulsory and contains question no. 1 for **20 marks**. **Section B** contains question numbers 2 to 8, each carrying **16 marks**.*

*Answer **any five** questions from **Section B**.*

Section – A

Answer all the questions. Each question carries two marks.

1. (a) **Choose the Correct Option from the four alternatives given (1 mark is for the correct choice and 1 mark for justification/workings. You may present only the Roman numeral, your choice and the reason/workings, without copying the question.)** 2x10=20

   (i) A company is considering four projects A, B, C and D with the following information:

	Project A	Project B	Project C	Project D
Expected NPV (₹)	60,000	80,000	70,000	90,000
Standard deviation (₹)	4,000	10,000	12,000	14,000

   Which project will fit the requirement of low risk apetite?

   (A) Project A

   (B) Project B

   (C) Project C

   (D) Project D

(ii) From the following quotes of a bank, determine the rate at which Yen can be purchased with Rupees.

₹/£ Sterling	75.31 – 33
£ Sterling/Dollar ($)	1.563 – 65
Dollar ($)/Yen (¥)	1.048/52 [per 100 Yen]

(A) ₹ 124.02

(B) ₹ 142.02

(C) ₹ 412.02

(D) ₹ 214.02

(iii) The spot Value of Nifty is 4430. An investor bought a one month Nifty 4410 call option for a premium of ₹ 12. The option is:

(A) In the money

(B) At the money

(C) Out of the money

(D) Insufficient data

(iv) A certain mutual fund has a return of 17% with standard deviation of 3.5% and the sharpe ratio is 4. The risk free rate is

(A) 12.5%

(B) 4%

(C) 3%

(D) 7.5%

(v) The following information of a project are given below:

Expected cash flow (₹)	Probability
6,000	0.20
16,000	0.80

If certainty equivalent coefficient is 0.7, what will be certain (Risk less) cash flows of the project?

(A) ₹ 12,000

(B) ₹ 9,800

(C) ₹ 9,000

(D) ₹ 15,400

(vi) The spot and 6 months forward rates of US dollar in relation to the rupee (₹/$) are ₹ 74.532/75.4143 and ₹ 75.1278/76.2538 respectively. What will be the annualized forward margin (with respect to Ask price)?

(A) 2.42%

(B) 1.60%

(C) 2.23%

(D) 2.31%

(vii) B can earn a return of 18% 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 1% and annual recurring expenses are 2%. How much should be Mutual Fund earn to provide B, a return of 18%?

(A) 18.18%

(B) 20.18%

(C) 22.18%

(D) 21%

(viii) You are given the following information of a stock:

Strike Price	₹ 400
Current stock price	₹ 370
Risk free rate of interest	5%

Theoretical minimum price of a European 6 months' put option after six months is

(A) ₹ 9.37

(B) ₹ 20.12

(C) ₹ 30.76

(D) ₹ 20.63

(ix) MS Ltd. is planning to invest in USA. The annual rates of inflation are 8% in India and 3% in USA. If spot rate is currently ₹ 75·50/$, what spot rate can the company expect after 3 years?

(A) ₹ 65.49

(B) ₹ 79.16

(C) ₹ 87.04

(D) ₹ 72.00

If the covariance between the returns on a portfolio BC and returns on the market index is 25 and the variance of returns on the market index is 20, what will be the systematic risk of BC under the variance approach?

(A) 1.25

(B) 1.56

(C) 5.45

(D) 31.25

Answer:

(i) (A) Risk per unit of NPV = $\dfrac{\sigma}{\overline{X}} = \dfrac{\text{Std dev}}{\text{NPV}}$

A = $\dfrac{4000}{60000}$ = 0.066

B = 0.125

C = 0.17

D = 0.16

Hence A is chosen as least risky relative to NPV.

(ii) (A) Yen to be purchased with ₹

75.33 ₹ to purchase 1£

1.565 £ for 1 $

1.052 $ for 100 Yen

∴ ₹/100 Yen = $\dfrac{75.33}{1£} \times \dfrac{1.565\,£}{1\$} \times \dfrac{1.052\,\$}{100\,\text{Yen}}$

= 124.02

(iii) (A) In an option, only the premium is paid up front, which is ₹ 12; ₹ 4,410 is the strike price

Current spot price = 4430 > 4410.

Hence it is in the money.

(iv) (C) $\dfrac{R_P - R_F}{\sigma}$ = sharpe ratio, $R_P - R_F = \sigma \times$ sharpe ratio

∴ $R_F = R_P - \sigma \times$ sharpe ratio

= 17% – 3.5% × 4

= 17 – 14

= 3%

(v) **(B)** (Expected cash flow with risk) = [6,000 × .2 + 16,000 × .8]

$\therefore$ Certainty adjusted = [6,000 × .2 + 16,000 × .8] × .7

= 9,800

(vi) **(C)** Ask price diff = 76.2538 – 75.4143

= 0.8395

6 m margin = $\dfrac{0.8395}{75.4143}$ × 100%

Annualised = $\dfrac{0.8395}{75.4143}$ × 100% × 2 = 2.23%

(vii) **(B)** $\dfrac{18}{99\%}$ + 2% = 18.18 %+ 2% = 20.18%

[Initially, only 99% is available for investment]

(viii) **(B)** Spot price today = 370; Strike price = 400

= 400 × $e^{-5\% \times \frac{6}{12}}$

= 400 × $e^{\frac{-.05}{2}}$ = 400x $e^{-.025}$

= $\dfrac{400}{1.02532}$

= 390.12

Put option value = 390.12 – 370

= 20.12

(ix) **(C)** 75.50 will become (75.50) (1.08)³ = 75.50 ×1.26

= 95.10

1 $ will become (1.03)³ = 1.09

$\therefore$ Expected rate = $\dfrac{95.10}{1.092}$ = 87.08

(x) **(D)** Sys. risk = $\beta^2_{port\ folio} \times \sigma^2_m$; $\beta = \dfrac{25}{20}$= 1.25

= (1.25)² × 20

= 31.25

Section-B

Answer any five *questions.*

2. KJ Hospital wants to install a testing equipment. It wants to analyse whether to purchase the machine from a bank borrowing or to lease it from LR. The following information is given:

(i)	Cost of the equipment	₹ 50 lacs	to be paid at the beginning of the 1st year
	Life	5 years	
(iii)	Residual value	₹ 5 lacs	at the end of the 5th year
(iv)	Depreciation	Cost less residual value, written off equally p.a. for the life of the asset	
	Annual Lease Rent	₹ 12 lacs	Payable at the end of each year from year 1 to year 5
(vi)	If asset is purchased, bank loan available at	10% interest per annum	Year-end payment includes ₹10 lacs each year towards principal and additionally, interest on the balance outstanding at the beginning of the year.
(vii)	Annual maintenance charges to be incurred by KJ if the equipment is purchased	₹ 2 lacs per annum	payable at the end of each year
(viii)	Tax rate applicable for KJ and LR	40%	Assume KJ and LR are profitable
(ix)	After-tax weighted average cost of capital	12% p.a.	For both LR and KJ
(x)	Long term capital gains tax	20%	LR (For sale value in excess of the residual value)

The lessor LR is an investor company that specializes in the leasing of various medical equipments across the country. LR would buy the equipment from its own funds, maintain the machine incurring ₹ 1 lac p.a. (year end). LR is confident of reworking the equipment at the end of 5 years at no extra cost and finding a rural hospital which would pay ₹ 13 lacs for it at the end of the 5th year. However, for its depreciation, it would write off equal amounts each year considering (i) to (iv) as for KJ. The lessor is also a profit-making company with a 40% corporate tax rate and 20% tax rate on long term capital gains.

(a) For KJ, present statements of discounted cash flows under the options of buying the machine with borrowed funds and leasing, using the appropriate discount rate. Present year wise annual cash flows (in ₹ lacs, up to two decimal places), without netting off, arrive at the sub totals of pre-discounted cash flows for each year and then apply PV factors (up to three decimals as given) and then arrive at the total present value Use '+' for inflows and '- or ( )' for outflows.

(b) Evaluate the viability of the proposal for the lessor LR. Comment on the situation.   16

Answer:

2. (a) Outright Purchase option

End of year	Principal Opening Balance	Inter est	Main tenance	Deprecia tion	Total Expenses for tax benefit	Tax shield 40%	Cash outflow Prin+ Int + Maint	Cash Flow after tax shield	PV factor 6%	PV of cash flows
0	50									
1	40	5	2	9	16	6.4	17	10.6	0.943	-9.99
2	30	4	2	9	15	6	16	10	0.890	-8.90
3	20	3	2	9	14	5.6	15	9.4	0.840	-7.89
4	10	2	2	9	13	5.2	14	8.8	0.792	-6.96
5	0	1	2	9	12	4.8	13	8.2	0.747	-6.12
5	salvage value							5	0.747	+3.73
Total										-36.13

Evaluation of leasing option:

End of year	1	2	3	4	5
Lease Rent	12	12	12	12	12
Tax savings	4.8	4.8	4.8	4.8	4.8
Net outflow	(7.2)	(7.2)	(7.2)	(7.2)	(7.2)

Annuity factor (6%, 5 years) = 4.212

PV of lease outflows for KJ = 4.212 × (7.2) = (30.32)

Leasing is better.

(Lease vs. borrow should be evaluated at after tax cost of debt, i.e. 10% × (1-40%) = 6%)

(b)

From the Lessor's view point, it is a capital budgeting problem and has to be evaluated at after tax cost of capital, i.e. 12%

Cash outflow at the beginning of year 1 =₹ 50 lacs.

Salvage value = ₹ 13 lacs, WDV =₹ 5 lacs. Hence Long term capital gains = 8 × 20 % = ₹1.6 lacs.

Terminal Cash flows = 13- 1.6 =₹ 11.40 lacs

Depreciation available = (50-5)/5 = ₹ 9 lacs. Tax shield per annum on depreciation =₹ 3.60 lacs.

Annual fixed lease rentals = ₹ 12 lacs. After tax LR = .6 × 12 = ₹ 7.2 lacs.

Annual Maintenance charges = 1 lac, after tax = ₹ 0.60 lac

(₹)

End of year	0	1	2	3	4	5	5
Capital Cost	-50						
Lease Rent		+7.2	+7.2	+7.2	+7.2	+7.2	
Tax Shield on Depn		+3.6	+3.6	+3.6	+3.6	+3.6	
Maintenance		- 0.6	- 0.6	- 0.6	- 0.6	- 0.6	
Total Undiscounted Cash flows	-50	+10.20	+10.20	+10.20	+10.20	+10.20	+11.40
PV factor at 12%	1	3.605					0.567
PV of cash flows	-50	+36.77					+6.46
Net	-6.77						

It is not viable for the lessor, LR.

For the lessor, this is an investment proposal of his business. Hence he has to evaluate it at the weighted average cost of his capital, which is 12%.

Comment: For feasibility, the lessor has to increase the lease rents. But he cannot do so to give a positive NPV since it will then be infeasible for the lessee, KJ. Then KJ will go for outright purchase instead of lease. Hence, LR should only consider using borrowed funds, so that at least he can take the marginal after tax cost of capital to justify this venture. However, in the long run, it has to earn a positive NPV at the weighted average after tax cost of capital to justify acceptability. He could work on decreasing the initial cost, since he may be buying many such machines and therefore be eligible for substantial discounts. He could aim at a better residual value. Most importantly, he should lower his cost of capital to be competitive.

3. (a) **IP, an importer in India has imported a machine from USA for US $ 20,000 for which the payment is due in three months. The following information is given:**

Foreign Exchange Rates (₹/US $)				Money Market Rates (p.a.) (Compounded annually)		
	Bid	Ask			Deposit	Borrowing
Spot	74.60	74.90		USS	6%	9%
3 months forward	75.50	75.90		Rupees	7%	11%

(i) Show with appropriate supporting calculations whether a money market hedge is possible or not.

(ii) Compute the cost (in annualized percentage) of a Forward Contract Hedge.

(iii) Present rupee outflows under (i) and (ii) and advise the importer on the best course of action to minimize rupee outflow.

(Exchange rate and values should be shown upto two decimal places) **8**

(b) An investor had purchased a 4 month call option on the equity shares of N Ltd. of ₹ 10 of which the current market price is ₹ 132 and the exercise price is ₹ 150. You expect the price to range between ₹ 120 to ₹ 190. The expected share price of N Ltd. and related probability is given below:

Expected Price (₹)	120	140	160	180	190
Probability	0.05	0.20	0.50	0.10	0.15

You are required to compute the following:
(i) Expected share price at the end of 4 months
(ii) Value of call option at the end of 4 months, if the expected price prevails.
(iii) In case the option is held to its maturity, what will be the expected value of the call option? **8**

Answer:

3. (a)

(i) After 3 months, the importer will purchase US$, i.e. it is a payable. For money market hedge, he should create a US$ asset by borrowing ₹, investing in $ @ $ Deposit rate and receiving $ at the end of three months.

$$= \text{Spot Ask Rate} \times \frac{(1 + ₹ \text{ borrowal rate for 3 months})}{(1 + \$ \text{ deposit rate for 3 months})}$$

$$= 74.9 \times \frac{\left(1 + \frac{0.11}{12} \times 3\right)}{\left(1 + \frac{0.06}{12} \times 3\right)}$$

$$= 74.9 \times \frac{1.0275}{1.015} = ₹ 75.82$$

This value 75.82 is less than the three months' forward ask rate of ₹ 75.90. Hence money market hedge is possible.

(ii)

$$\left[\frac{1 + \frac{0.11}{12} \times 3}{1 + \frac{0.06}{12} \times 3} - 1\right] \times 100 \times 12/3$$

Effective rate of money market hedge = $\left[\frac{1.0275}{1.015} - 1\right] \times 400 = 4.926\%$

Under forward contract hedge, effective rate annualized

$$= \frac{\text{(Forward Ask – Spot Ask)}}{\text{Spot Ask}} \times 100 \times \frac{12}{3}$$

$$= \frac{1}{74.90} \times \frac{100 \times 12}{3} = 5.34\%$$

(iii) Money market hedge:

$$\text{Amount to be borrowed} = \left(\frac{20,000}{1 + \frac{6\%}{12} \times 3} \right) \times 74.90$$

$$= \frac{20,000}{1.015} \times 74.90 = 19,704.43 \, \$ \times 74.90 \, ₹/\$$$

$$= ₹ \, 14,75,861.81$$

Rupee needed today = 74.90 × 19704.43 = ₹ 14,75,861.81

Interest on this sum if borrowed today at 2.75% for 3 m (i.e. 11% pa) = ₹ 40586.20

Rupee outflow after 3 m = ₹ 15,16,448

Forward Contract Hedge:

Book a forward contract to purchase $ at 75.90 after 3 months.

Outflow after 3 m = 20,000 x 75.90 = ₹ 15,18,000

No initial outflow is required.

Equivalent outflow today = 15,18,000/1.0275 = ₹ 14,77,372.26

	Money Market	**Forward Contract**	**Difference**
Today's rupee outflow	14,75,861.81	14,77,372.26	1510.45
Rupee outflow after 3 m	15,16,448	15,18,000	1552

1510.45 today will become 1510.45 x 1.0275 = 1552 after 3 m.

Cash outflow under Money Market hedge is lowest, therefore it should be preferred.

3. (b)

Price Pi after 4 m	Probability	Price x prob	If held till maturity	Call value	Call value × probability
120	0.05	6	Call lapses	0	0
140	0.20	28	Call lapses	0	0
160	0.50	80	Call exercised	+10	5

180	0.10	18	Call exercised	+30	3
190	0.15	28.5	Call exercised	+40	6
Total		160.50			14

(I)   Expected share price after 4 months = ₹ 160.50

(ii) If price after 4 m = 160.50, value of call = 160.50 - 150 = 10.50. Since exercise price < market price, call will be exercised.

(iii) Expected value of the option = ₹ 14

(iv) Expected pay off = Expected value of the option less option premium. Hence option premium should be at the most ₹ 13 to make it worthwhile. At ₹ 14, pay-off is zero and there is indifference,

4. (a) EC Limited is considering a new project with initial investment. It is estimated that IRR of the project is 16% having an estimated life of 5 years. The Finance Manager has studied that project with sensitivity analysis and informs that annual fixed cost sensitivity is 7.8416%, whereas cost of capital (discount rate) sensitivity is 60%.

Other information available are:

Profit Volume Ratio (P/V) is   70%

Variable cost   ₹ 60 per unit

Annual Cash Flow (year end)   ₹ 57,500

Ignore depreciation on initial investment and taxes.

Calculate:

(i)   Initial investment of the project

(ii) Net Present Value of the project

(iii) Annual Fixed Cost

(iv) Estimated annual sales units

(v)   Break Even Units   8

(b) The expected returns on two stocks for particular market returns are given in the following table:

Market Return	Stock A	Stock B
7%	4%	9%
25%	40%	18%

You are required to calculate:

(i)   The beta of the two stocks.

(ii) **The expected return of each stock, if the market return is 60% likely to be 7% and 40% likely to be 25%.**

(iii) **The security market line (SML), if risk free rate is 7.5% and market return is with likelihood as per (ii).**

(iv) **The Alpha of the two stocks.** 8

Answer:

4. (a)

(i) Initial Investment

At IRR of 16%, NPV = 0, Hence,

Initial Cost of Investment = PVIFA (16%, 5) × Cash Flow (Annual)

$$= 3.274 \times ₹ 57,500$$

$$= ₹ 1,88,255$$

(ii) Net Present Value (NPV)

Let Cost of capital be x, then, (16-x)/x = 60%; x= 10%

Thus, NPV of the project = [Annual Cash Flow x PVIFA (10%, 5)] - Initial Investment

$$= (₹ 57,500 \times 3.791) - ₹ 1,88,255$$

$$= ₹ 29,727.50$$

(iii) Annual Fixed Cost

Let change in the Fixed Cost which makes NPV zero is X. Then,

₹ 29,727.50 - 3.791 X = 0

Thus X = ₹ 7,841.60

Let original Fixed Cost be Y. Then,

Y x 7.8416% = ₹ 7,841.60

Y = ₹ 1,00,000

Thus, Fixed Cost = ₹ 1,00,000

(iv) Estimated Annual Units of sales

Selling Price per unit = ₹ 60/(100% - 70%) = ₹ 200

(Annual Cash Flow + Fixed Cost)/ P/V Ratio = Sales Value

(₹ 57,500 + ₹ 1,00,000)/0.70 = ₹ 2,25,000

Sales in Units = ₹ 2,25,000/ ₹ 200 = 1,125 units.

(v) Break Even Units

Fixed Cost/ Contribution per Unit = 1,00,000/140 = 714.285 units

Answer:

4.(b)

(i)   Change in stock return = β *(Change in market return)*

A : (40-4) = β (25 – 7)

$$\beta = \frac{36}{18} = 2$$

B : (18 – 9) = β (25 – 7)

$$\beta = \frac{9}{18} = 0.5$$

(ii)   Expected returns of the stock A: 60 % x 4 + 40 % x 40 = 2.4 + 16 = 18.40%

Stock B: 60 % x 9 + 40 % x 18 = 5.40 + 7.2 = 12.60%

(iii)   Expected return of market = 60% x 7 + 40% x 25 = 4.2 + 10 = 14.20%

Security market line SML is the line drawn with betas on x axis and expected return on the y axis and risk free rate = 7.5 % when x = 0, i.e. at zero beta.

Expected return based on SML = y = 7.5 % + β (14.20 % - 7.5%)

SML: y = 7.5% + β (6.7)%

(iv)   For stock A, expected return y = 7.5 + 2 x 6.7 = 7.5+13.4 = 20.9

Average return = 18.40.

Alpha of A = – 20.9+18.4 = – 2.5%

For Stock B, expected return y = 7.5+0.5 x 6.7 = 7.5+3.35 = 10.85

Average return = 12.60.

Alpha of B = – 10.85 + 12.60 = 1.75%

5. (a)   **During a five year period, the relevant results for the aggregate market are that the risk-free rate (r_f) is 8% and the return on market (r_m) is 14%. For that period, the results of five portfolio managers are as follows:**

Portfolio Manager	Actual Average Return (%)	Beta (/B)
A	13	0.80
B	14	1.05
C	17	1.25
D	13	0.90
E	15	0.95

Using CAPM model, you are required to

(i) calculate the expected rate of return for each portfolio manager and compare the actual returns with the expected returns; and

(ii) find which of the mangers need to be warned for under-performance?   8

(b) A mutual fund made an issue of 20,00,000 units of ₹ 10 each at the beginning of the year. No entry load was charged. It made the following investments:

Particulars	Amount (₹)
1,00,000 Equity shares of ₹ 100 each @ ₹ 160	1,60,00,000
8% Government Securities	16,00,000
11% Debentures (unlisted)	10,00,000
10% Debentures (listed)	10,00,000
Total	1,96,00,000

During the year, dividends of ₹ 24,00,000 were received on equity shares. Interest on all securities was received for a full year as on the valuation date. Equity shares have a value of ₹ 180 per share as on valuation date and unlisted debentures are to be valued at 85% of the invested value. Initial expenses were ₹ 3 lacs, which are fully charged to the scheme in the first year. Up to the end of the year, operational expenses incurred were ₹ 4 lacs, of which ₹ 1.5 lacs remains payble next year. Just before the year end, 60,000 units were redeemed when the NAV was ₹ 12.5 NAV per unit and an exit load of 1 % was charged. Find the NAV per unit as on valuation date which is at the end of the year.   8

Answer:

5. (a)

(i) CAPM Equation:

$R_j = R_f + \beta \ (R_m - R_f)$

Where R_j = Expected rate of return

R_f = Risk free rate

R_m = Return on Market

β = Beta

The expected rates of return are as follows:

Portfolio Manager	Expected Return (%)	Actual Average Return (%)	Difference between Actual & Expected Returns
A	8% + 0.80 (14%-8%) = 12.8	13	+ 0.2
B	8% + 1.05(14%-8%)= 14.3	14	- 0.3
C	8% + 1.25(14%-8%)= 15.5	17	+1.5

| D | 8% + 0.90(14%-8%)= 13.4 | 13 | - 0.4 |
| E | 8% + 0.95(14%-8%)= 13.7 | 15 | +1.3 |

(ii) Managers B and D did not perform upto expectation ,they have to be warned.

(b)   **(₹)**

    Investments made as per question   196,00,000

    Initial Expenses   3,00,000

    Cash balance (initial)   1,00,000

    Amount collected = 20 lakh units × ₹ 10 /u.   200,00,000

Value of Investments at valuation date	**(₹)**	**Income(₹)**
Equity share	1,80,00,000	24,00,000
8% Govt. securities	16,00,000	1,28,000
11% Debenture (Unlisted)	8,50,000	1,10,000
10% Debenture (Listed)	10,00,000	1,00,000
	214,50,000 (A)	**27,38,000**

Less :	Redemption ₹ 12.5 × 60,000U	(7,50,000)
Add :	Exit load 1%	7,500
Less :	Expenses paid	(2,50,000)
Add :	Cash	1,00,000
		(B) 18,45,000
Total :	Assets (A) + (B)	232,95,500
Less :	Expenses payable	(1,50,0000)
	Net Assets	**₹ 231,45,500**

Units = 20,00,000 – 60,000 = ₹ 19,40,000

NAV per unit = $\frac{231,45,500}{19,40,000}$ = ₹ 11.93

6. (a) An investor has the following constituent holdings in his portfolio:

Security	No. of shares	Price per share (₹)	Share Beta
A	400	500	1.4
B	500	750	1.2
C	200	250	1.6

(i) Find the market value weighted average beta of his portfolio.

(ii) If the investor wants a target beta for his portfolio at 0.9, how would he dispose of his securities and replace them with Government securities if he want to sell in the order of risk? Present the revised tabulation of his holding and prove that the target beta has been achieved by your advice.

(iii) If he is willing to invest further, how much investment should he make in G Sec to make his beta 0.9, without selling any share at all? **10**

(b) An 8.5% bond of ₹1,000 face value with five year maturity at par and a yield to maturity of 10% has ₹954.74 as the current market value. Calculate the price of the bond and compare it with the market price. What action should the holder of the bond take? **6**

Answer:

6. (a)

(i)

Security	Nos	Price(₹)	Value(₹)	Beta	Weight	Weight x Beta
A	400	500	2,00,000	1.4	0.32	0.448
B	500	750	3,75,000	1.2	0.6	0.72
C	200	250	50,000	1.6	0.08	0.128
Total	1100		625000			1.296

Portfolio's beta based on market value weights is = 1.296

(ii) Target beta = 0.9.

We should first replace the riskiest of the securities with Govt. zero beta securities. Then we go for the next riskier one. Hence, C, being of lower market value should be fully replaced by Govt. securities.

If we assume full of A to be sold, then, b x 1.2 = .9 × 625000 = ₹ 562500. Then, solving, we get b = 468750 which is more than ₹ 3,75,000 . This means that any of B should not be sold and that A too should not be sold in full.

Hence, 375000 × 1.2 + a × 1.4 = 625000 × 0.9

450000 + 1.4 a = 562500

Or, a = 112500/1.4 = ₹ 80357.

₹ 80357 value of A should be retained in the portfolio. This amounts to 80357/500

= ₹160.714 shares, which is 161 shares.

Hence the new portfolio will consist of 161 shares of A, 500 shares of B and no share of C and Govt., securities worth ₹ 169500 (50,000 from C and 200000 – 80500 = ₹ 119500 from A)

Proof:

Security	Nos	Price (₹)	Value (₹)	Beta	Weight	Weight x Beta
A	161	500	80,500	1,4	0.1288 = 80500/625000	0.18032
B	500	750	3,75,000	1.2	0.6 = 375000/625000	0.72
C	0	250	0	1.6		0
Govt. Securities			169500	0		0
Total			625000			0.90032

Thus the new portfolio beta will be the targeted 0.9

(iii) Without selling any share, if investment has to be made, say for value 'g' in govt, security, weighted beta

$$= \frac{(6,25,000 \times 1.296) + (g \times 0)}{(6,25,000 + g)} = 0.9$$

= 6,25,000 (1.296 – 0.90) = 0.90 g

$$g = \frac{625000 \times 0.396}{0.90} = ₹ 2,75,000 \text{ market value worth G Sec should be purchased.}$$

6. (b)

Year	PV factor 10%	Cash Flow(₹)	PV at 10% (₹)
1	0.909	85	77.27
2	0.826	85	70.21
3	0.751	85	63.84
4	0.683	85	58.06
5	0.621	85	52.79
5	0.621	1000	621.00
Total			943.17

The bond is overpriced since the present value at 10% is only ₹ 943.17 whereas the market price is ₹ 954.74. Hence it should be sold.

7. (a) Companies X and Y want to raise US$ 50 million each. They have been offered the following rates per annum:

Company	Fixed	Floating
X	7.5	LIBOR + 25 bps
Y	8.45	LIBOR + 37 bps

Bank B, on a commission of 0.2% (fully borne by Y) is arranging an interest rate swap between X and Y. X wants a floating rate and Y wants a fixed rate. Work out the payables and receivables on the swap (in %), given that the benefits (after commission) are shared between X and Y in the ratio 60 : 40. What will be the effective rate of interest payable by X and Y their respective gains (in %) due to the swap? How many dollars does each save per annum due to the swap? **8**

(b) The US $ is selling in India ₹ 75.90. The interest rate for a 6 months borrowing in India is 10% per annum and the corresponding rate in US is 4%.

(i) Do you expect that US$ will be at a premium or at a discount in the Indian Forex Market? Why?

(ii) What will be the expected 6-months forward rate for US $ in India?

(iii) What will be the annualised rate of forward premium or discount? **8**

Answer:

7. (a)

Company	Fixed	Floating
X	7.5	LIBOR + 25 bps
Y	8.45	LIBOR + 37 bps.
Differential	0.95	0.12
Net difference	0.95-0.12 = 0.83	
Bank's Commission	0.20	
Balance Gain 0.83 – 0.20 = 0.63	60% x 0.63 = 0.378	40% × 0.63 = 0.252

	X	Y
Borrow	At fixed rate 7.5%	At floating rate LIBOR + 0.37%
Pay bank	(7.5%)	(LIBOR+ 0.37%)
Collect differential from Y 7.5% - (LIBOR+ 0.25%)	+ 7.25 % - LIBOR	(7.25-LIBOR)
Pay Bank's Commission		(0.2)
Receive gain from Y	+0.378	(0.378)
Net interest = Effective rate of interest	- 0.25-LIBOR + 0.378 = (LIBOR -0.128)	(7.25+0.37+0.2+0.378) = 8.198
Original Interest	LIBOR+ 0.25	8.45

| Gain p.a. due to the swap | 0.378 | 0.252 |
| Gain in dollars p.a. | 0.378% x 50 m
= $ 1,89,000 | 0.252 x 50 m
= $1,26,000 |

(b)

(i) The US $ is expected to quote at a premium in India as the interest rate is higher in India.

(ii) Calculation of Forward Rate:

$$\frac{1+Rh}{1+Rf} = \frac{F1}{E0}$$

Rh is home currency interest rate, Rf is foreign currency interest rate, F1 is end of the period forward rate and Eo is the spot rate.

$$\frac{1+(0.10/2)}{1+(0.04/2)} = \frac{F1}{75.9}$$

or $\frac{1+0.05}{1+0.02} = \frac{F1}{75.9}$

or $\frac{1.05}{1.02} = \frac{F1}{75.9}$

or $\frac{79.70}{1.02} = F1$

or F1 = ₹ 78.14

(iii) Rate of Premium

$\frac{78.14 - 75.9}{75.9} \times \frac{12}{6} \times 100 = 5.90\%$ or 2.95% for 6 months.

8. Answer *any four* out of the following five questions:

(a) **State the differences between Commercial Papre (CP) and Certificate of Deposit (CD) on the following aspects:**   **4**

(i) **Issuer**

(ii) **Conditions to be satisfied by an issuer to be eligible for an issue.**

(b) **State the differences between Indian Treasury Bills and Central Government securities on the following aspects:**   **4**

(i) **Purpose of issue**

(ii) **Tenor**

(c) Name the most appropriate combined trading strategy on the stock of PQ Ltd. in the following independent cases. (You may present only columns I and II in your answer books.) **4**

SI. No.	Strategy	Action		Expiry Date	Strike Price
		Buy	Sell		
I	II	HI	IV	V	VI
(i)		One call One put		30th June 30th June	215 215
(ii)			Two Calls One Put	20th June 20th June	220 220
(iii)			One Call Two Puts	20th June 20th June	230 230
(iv)		One call One Put		20th June 20th June	215 220

(d) State the differences between the commodity market and equity market futures in the following aspects: **4**

(i) Initial Margin

(ii) Basis of price movements

(e) How would you choose indivisible projects under capital rationing? Can there be a situation where a project with lower NPV is chosen while discarding a project with higher NPV? Explain. **4**

PV Factor Table:

Annuity Factors

End of Year Rate	1	2	3	4	5	4 yrs	5 yrs
4%	0.962	0.925	0.890	0.855	0.822	3.632	4.454
4.8%	0.954	0.910	0.869	0.829	0.791	3.562	4.353
6%	0.943	0.890	0.840	0.792	0.747	3.465	4.212
7.2%	0.933	0.870	0.812	0.757	0.706	3.372	4.078
8.5%	0.922	0.849	0.783	0.722	0.665	3.276	3.941
10%	0.909	0.826	0.751	0.683	0.621	3.169	3.791
12%	0.893	0.797	0.712	0.636	0.567	3.038	3.605

e^{-0225}	1.0228	$e^{-0.0225}$	0.978
$e^{0.025}$	1.02532	$e^{-0.25}$	0.975
e^{0-225}	1.2523	$e^{-0.225}$	0.799
$e^{0.25}$	1.2840	$e^{-0.025}$	0.779
$e^{0.5}$	1.6458	e^{-05}	0.608

Annuity factors for 5 years:

Rate	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%
Factor	3.993	3.890	3.791	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127

Answer:

8 (a)

	CP	CD
Issuer	Corporates, Primary Dealers	Scheduled Commercial Banks other than RRBs, Local Area Banks
Eligibility	Tangible net worth not less than ₹4 cr. Working capital limit not to be less than ₹ 4 cr. Credit rating to be at least P-2 of CRISL or PP2/ P2 of D2 of other rating agencies	Banks have to maintain CLR and SLR on the issue price of CDs

(b)

	T Bill	G Sec
Purpose	To tide over short term liquidity shortfalls	To meet Govt, expenditure commitments
Tenor	91 days, 182 days, 364 days.	More than 1 year, up to 30 years.

(c)

Sl. No.	Strategy
I	II
(i)	Straddle or

	Long Straddle
(ii)	Strap
(iii)	Strip
(iv)	Strangle

(d)

Futures	Commodity Market	Equity Market
Initial Margin	Lower in the range of 4-5-6%	Higher in the range of 25-40%
Basis of Price Movements	Purely based on Demand and supply of commodities	Based on expectation of future performance

(e)

Capital Rationing: This refers to prioritizing the projects based on NPV. The available capital is limited and therefore all projects with positive NPV cannot be selected. Hence, projects are arranged in the order of NPV (descending order) and the cumulative project cost is tabulated. When available capital is exhausted, the process of selection has to stop. But in the case of indivisible project, i.e. part project cannot be undertaken and therefore, we may have unutilized capital. Therefore, we may leave out the last one and choose the combination which maximizes the NPV. While doing so, we may have a situation where the project with better NPV is not selected since its selection would involve under utilization of capital. For example, consider the following table:

Project	Capital Outlay	NPV (₹ lacs)	Cumulative outlay
A	200	+250	200
B	225	+200	425
C	400	+180	825
D	175	+100	600

Suppose that available capital is ₹ 600 lacs. If we stop with B, since funds will be insufficient for C, we are not utilizing ₹ 175 lacs of capital. Hence, We can go for D, which has lesser NPV. The project is indivisible. Hence we cannot go for part of C which yields proportional NPV.