Paper – 14 – Strategic Financial Management

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Full Marks : 100 **Time allowed: 3 hours**

Answer Question No. 1 which is compulsory and carries 20 marks

and any five from Question No. 2 to 8.

Section A [20 marks]

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

(i) Unlevered beta and effective tax rate of S Ltd is 0.8 and 35 percent respectively. The company intends to undertake a project with 60 percent debt financing. Assuming risk free rate of 7.5 % and market premium 8 %, calculate cost of equity (rounded up to two decimal points)

(A) 13.90%

(B) 20.14%

(C) 16.40%

(D) none of (A), (B) or (C)

(ii) The spot and 6 months forward rates of US $ in relation to the rupee(₹/$) are ₹40.9542/41.1255 and ₹41.8550/9650 respectively. What will be the annualized forward margin(premium with respect to Bid Price)?

(A) 4.10%

(B) 4.40%

(C) 4.50%

(D) None of (A), (B) or (C)

(iii) A mutual Fund had a Net Asset Value (NAV) of ₹72 at the beginning of the year. During the year, a sum of ₹6 was distributed as Dividend besides ₹ 4 as Capital Gain distributions. At the end of the year, NAV was ₹ 84. Total return for the year is :

(A) 30.56%

(B) 31.56%

(C) 40.56%

(D) 41.56%

(iv) The standard deviation of Greaves Ltd. Stock is 24% and its correlation coefficient with market portfolio is 0.5. The expected return on market is 16% with the standard deviation of 20%. If the risk free return is 6%, what will be the required rate of return on Greaves Ltd. Script?

(A)12%

(B) 11%

(C) 13%

(D) 11.5%

(v) Your customer requests you to book a sale forward exchange contract for US $ 2 million delivery 3rd month. The quotes are:

Spot US $ 1= ₹48.050/0.060

1month margin= 0.0850/.0900

2 month margin=0.2650/0.2700

3 month margin=0.5300/0.5350

You are required to make an exchange profit of 0.125%. Ignore telex charges and brokerage.

(A) ₹120000

(B) ₹230000

(C) ₹75000

(D) ₹100000

(vi) The Sterling is trading at ₹1.6100 today. Inflation in UK is 4%and that in USA is 3%. What could be spot rate($/£) after 2 years?

(A) 1.5792

(B) 1.5892

(C) 1.5992

(D) 1.5939

(vii) The capital structure of a company is as under:

300000 Equity shares of ₹10 each

32000, 12% Preference shares of ₹100 each

General Reserve ₹1500000

Securities Premium Account ₹500000

25000, 14% Fully Secured Debentures of ₹100 each

Term Loan of ₹1300000.

Based on these, the leverage of the company is:

(A) 60.22%

(B) 58.33%

(C) 55.21%

(D) 62.10%

(viii) Historically, when the market return changed 10%, the return on stock of Arihant Ltd changed by 16%. If variance of market is 257.81, what would be the systematic risk for Arihant Ltd?

(A) 320%

(B) 480%

(C) 660%

(D) Insufficient information.

(ix) The beta co-efficient of equity stock of ARISTO LTD is 1.6. The risk free rate of return is 12% and the required rate of return is 15% on the market portfolio. If dividend expected during the coming year ₹2.50 and the growth rate of dividend and earnings is 8%, at what price the stock of ARISTO LTD. Can be sold (based on CAPM)?

(A) ₹12.50

(B) ₹16.80

(C) ₹28.41

(D) Insufficient Information.

(x) The ratio of current assets (₹3,00,000) to current liabilities (₹2,00,000) is 1.5 : 1. The accountant of this firm is interested in maintaining a current ratio of 2 : 1 by paying some part of current liabilities. Hence, the amount of current liabilities which must be paid for this purpose is

(A) ₹1,00,000

(B) ₹2,00,000

(C) ₹ 2,50,000

(D) ₹ 1,50,000

Answers: 1

(i) (B) 20.14%

Levered beta= 0.8*[1+ (1- 0.35)*(60/40)] = 1.58

Cost of Equity = 7.5 +1.58*8 = 20.14

(ii) (B) 4.40%

Forward Margin(premium with respect to Bid Price):

= [(₹ 41.8550 - ₹40.9542)/₹40.9542]*12/6*100

= 0.04399*100=43.99 i. e 4.40% per annum

(iii) (A) 30.56%

Capital Appreciation = Closing NAV- Opening NAV = 84 - 72 = ₹12.

Return = [Cash Dividend + Capital Appreciation + Capital gain]/Opening NAV.

= [6 + 4 + 12]/72 = 22/72 = 0.3056 = 30.56%

(iv) (A)12%

Given,

R_f (risk free return)=6%

R_m (market return)=16%

σ_m(standard deviation of market return)= 20%

σ_g (standard deviation of Greaves stock)= 24%

ρ_{gm} (correlation coefficient of Greaves with the market -0.5

Beta of Greaves stock(β_g) = $\rho_{gm} * \sigma_g * \sigma_m / (\sigma_m)^2$

= 0.5*0.24*0.20/(0.20)^2 = 0.6

The required return $= R_f + \beta_g(R_m - R_f)$

$= 6\% + 0.6(16-6)\%$

$=12\%$

(v) 3 month interbank rate(ask) with margin= ₹(48.060+0.5350)

= ₹48.5950

With exchange profit @ 0.125%, the quote will be ₹48.5950 × 1.00125 = ₹48.66

Profit = ₹(48.66 - 48.60)*2m USD= ₹120000.

(vi) (A) 1.5792

$S(\$/£)= F(\$/£) *(1 + r\$)^2 /(1 + r£)^2$

$= 1.61*(1 + 0.03)^2 /(1 + 0.04)^2$

= 1.5792

(vii) (B) 58.33%

a. Fixed Income Funds= ₹(32,00,000 + 25,00,000 +13,00,000)

b. Equity Funds= ₹(30,00,000 +15,00,000 + 5,00,000)

Leverage=a/(a + b)= ₹70,00,000/₹120,00,000 =58.33%

(viii) (C) 660%

10% increase in Market return resulted in 16% increase in Arihant Ltd. Stock. Thus the Beta(β) for Arihant Ltd. Stock is 1.60(i. e 16%/10%)

Now Systematic Risk is $\beta^2 \sigma m^2 = (1.60)^2(257.81)=659.99\%=660\%$

(ix) (C) ₹28.41

Expected rate of Return (CAPM)

Re

$= Rf + \beta(Rm - Rf)$

$=12\% + (1.6(15\% - 12\%) =12\% + 4.8\% = 16.85\%$

Price of stock (Dividend Growth Formula)

$Re = D_1/(P_0+g)$

$0.168 = 2.50/(P_0 + 0.08)$

Or, $0.168 - 0.08 = 2.50/P_0$

Or, $P_0 = 2.50/0.088 =$ ₹28.41

(x) (A) ₹1,00,000

Current Ratio = Current Asset/Current Liabilities = 300000-X/200000-X =2

Or,(300000 - X) =2(200000-X)

Or, X =100000

Section B [80 marks]

Answer any 5 questions from this section

2(a) Das Ltd. a manufacturing company produces 25,000 litres of special lubricants in its plant. The existing plant is not fully depreciated for tax purposes and has a book value of ₹ 3 lakhs (it was bought for ₹ 6 lakh six years ago). The cost of the product is as under:

Particulars	Cost/Litre (₹)
Variable costs	60.00
Fixed Overheads	15.00
	75.00

It is expected that the old machine can be used for further period of 10 Years by carrying out suitable repairs at a cost of ₹2 lakh annually.

A manufacturer of machinery is offering a new machine with the latest technology at ₹10 lakhs after trading off the old plant (machine) for ₹1 lakh. The projected cost of the product will then be:

Particulars	Cost/Litre (₹)
Variable costs	45.00
Fixed Overheads	20.00
	65.00

The fixed overheads are allocations from other department plus the depreciation of plant and machinery. The old machine can be sold for ₹ 2 lakh in the open market. The new machine is expected to last for 10 years at the end of which, its salvage value will be ₹1 lakhs. Rate of corporate taxation is 50%. For tax purposes, the cost of the new machine and that of the old one may be depreciated in 10 years. The minimum rate of return expected is 10%

It is also anticipated that in future the demand for the demand for the product will remain at 25,000 litres.

Advise whether the new machine can be purchased Ignore capital gain taxes.

[Given: PVIFA (10%, 10 years) = 6.145, PVIF (10%, 10 years) = 0.386] [6 marks]

2(b) Following are the estimates of the net cash flows and probability of a new project of M/s X Ltd.:

Particulars	Year	P = 0.3	P = 0.5	P = 0.2
Initial investment	0	4,00,000	4,00,000	4,00,000
Estimated net after tax cash inflows per year	1 to 5	1,00,000	1,10,000	1,20,000
Estimated salvage value (after tax)	5	20,000	50,000	60,000

Required rate of return from the project is 10%. Find:

i) **The expected NPV of the project.**
ii) **The best case and the worst case NPVs.**
iii) **The probability of occurrence of the worst case if the cash flows are: (a) perfectly dependent overtime, (b) independent overtime.**
iv) **Standard deviation and coefficient of variation assuming that there are only three streams of cash flows, which are represented by each column of the table with the given probabilities.**
v) **Coefficient of variation of X Ltd. on its average project which is in the range of 0.95 to 1.0. If the coefficient of variation of the project is found to be less riskier than average, 100 basis points are deducted from the Company's cost of capital.**

Should the project be accepted by X Ltd.? [10 marks]

Answer: 2 (a)

ANKIT LTD

Comparative Analysis:

	Old Machine	New Machine	Differential Cash Flow on new machine (₹) Saving/(Extra Cost) ₹
Production Ltrs	25,000	25,000	
Variable Cost per Ltr (₹)	60	45	
Total Variable Cost (₹)	15,00,000	11,25,000	3,75,000
Annual Cost of Repair (₹)	2,00,000	-----	2,00,000
Depreciation (₹)	30,000	1,00,000	(70,000)
(10.00 + 1.00 – 1.00) / 10			
Total Saving			5,05,000
Less: Tax Saving (50%)			(2,52,500)
Add: depreciation (not being cast outflow)			70,000
			3,22,500

Present Value of Cash flow if new machine is taken:

Year		Cash Flow (₹)	PV Factor (At 10%)	Present Value (₹)
0	Outflow on new Machine (₹10 Lakhs)	10,00,000	1.000	(10,00,000)
1-10	Annual Saving (as above)	3,22,500	6.145 (Cum)	19,81,762
10	Salvage value of new machine	1,00,000	0.386	38,600
				10,20,362

Recommendation: Since NPV is positive, the new plant is to be acquired.

Note: Fixed overhead are allocations from other department and therefore, not relevant for the replacement decision.

2(b) Initial investment (Year 0) = ₹ 4,00,000

Estimated annual net after tax cash inflows (Year 1 to 5)

= (1,00,000 × 0.3) + (1,10,000 × 0.5) + (1,20,000 × 0.2)

= 30,000 + 55,000 + 24,000

= ₹ 1,09,000

Estimated salvage value after tax (Year 5)

= (20,000 × 0.3) + (50,000 × 0.5) + (60,000 × 0.2)

= 6,000 + 25,000 + 12,000

= ₹ 43,000

(i) Calculation of expected NPV of the project of X Ltd.

		₹
P.V. of cash inflows for 1 to 4 years (P.V. @ 10%)	(₹ 1,09,000 × 3.169)	3,45,421
P.V. of cash inflow for Year 5	[(₹ 1,09,000 + ₹ 43,000)×0.621]	94,392
		4,39,813
Less : Initial investment in Year 0		4,00,000
Expected NPV		39,813

(ii) Calculation of Best Case and Worst Case ENPVs

(a) Best Case ENPV of the project = (1,20,000 × 3.79) + (60,000 × 0.621) – 4,00,000

= (4,54,800 + 37,260) – 4,00,000 = ₹ 92,060

(b) Worst Case ENPV of the project = (1,00,000 × 3.790) + (20,000 × 0.621) – 4,00,000

= (3,79,000 + 12,240) – 4,00,000 = (-) ₹ 8,580

(iii) Required Probability of Occurrence

(a) The required probability of occurrence of the worst case if the cashflows are perfectly dependent overtime is 0.3.

(b) The required probability of occurrence of the worst case if the cashflows are independent overtime is (0.3) 5 = 0.00243

(iv) Calculation of Standard Deviation and Coefficient of Variation assuming that there are only three streams of cashflows, which are represented by each column of the table with given probabilities:

Best Case NPV

= (1,10,000 × 3.79) + (50,000 × 0.621) – 4,00,000

= (4,16,900 + 31,050) – 4,00,000 = ₹ 47,950

ENPV

= [- 8,580 × 0.30) +(47,950 × 0.5) + (92,060 × 0.20)

= (2,574) + 23,975 + 18,412 = ₹ 39,813

Standard Deviation of ENPV

$$= \sqrt{0.3(-8,580-39,813)^2 + 0.5(47,950-39,813)^2 + 0.2(92,060-39,813)^2}$$

(in ₹ lakhs)

$$= \sqrt{0.3\,(-0,09-0.40)^2 + 0.5\,(0,48-0.40)^2 + 0.2\,(0.92-0.40)^2}$$

$$= \sqrt{0.07203 + 0.0032 + 0.05408} = \sqrt{0.12931} = 0.35960 \text{ or } ₹\ 35,960$$

Coefficient of Variation = ₹ 35,960 / ₹ 39,813 = 0.90

(v) Calculation of Risk Adjusted ENPV

Coefficient of Variation of industry is in the range of 0.95 to 1.0.

Coefficient of Variation of X Ltd. is 0.90.

The project is less riskier than average. Therefore, 100 basis points are deducted from the company's cost of capital.

Risk adjusted cost of capital of X Ltd. = 10% – 1% = 9%

Year	Expected net cashflow	P.V. factors @ 10%	Present values (₹)
0	(4,00,000)	1.000	(4,00,000)
1 to 4	1,09,000	3.239	3,53,051
5	1,52,000	0.650	98,800
ENPV			51,851

Advise – Since the ENPV is positive based on risk adjusted cost of capital at 9%, it is suggested to accept the project.

3(a) A Mutual Fund Co. has the following assets under it on the close of business as on:

Company	No. of Shares	1st February 2017 Market Price per share (₹)	2nd February 2017 Market Price per share (₹)
L Ltd	20,000	20.00	20.50
M Ltd	30,000	312.40	360.00
N Ltd	20,000	361.20	383.10
P Ltd	60,000	505.10	503.90

Total No. of Units 6, 00,000

i) Calculate Net Assets Value (NAV) of the Fund.

ii) Following information is given: Assuming one Mr. A, submits a cheque of ₹30, 00,000 to the Mutual Fund and the Fund manager of this company purchases 8,000 shares of M Ltd; and the balance amount is held in Bank. In such a case, what would be the position of the Fund?

Find new NAV of the fund as on 2nd February 2017. [6 marks]

3 (b) The following are the data on six portfolios.

Portfolio	Average annual return	Standard Deviation	Correlation with market
P	18.6	27.0	0.81
Q	14.8	18.0	0.65
R	15.1	8.0	0.98
S	22.0	21.2	0.75
T	-9.0	4.0	0.45
U	26.5	19.3	0.63
Market Risk	12.0	12.0	
Risk Free Rate	9.0		

(i) Rank these Portfolios using —

- **Sharpe's Method, and**
- **Treynor's Method.**

(ii) Compare the ranking in part (i) and explain the reasons behind the differences.

[10 marks]

Answer: 3

3(a) (i) NAV of the Fund

$$= \frac{₹4,00,000 + ₹93,72,000 + ₹72,24,000 + ₹3,03,06,000}{6,00,000}$$

$$= \frac{₹4,73,02,000}{6,00,000} = ₹78.8366 \text{ rounded to } ₹ 78.84$$

(ii) The revised position of fund shall be as follows:

Shares	No. of shares	Price	Amount (₹)
L Ltd.	20,000	20.00	4,00,000
M Ltd.	38,000	312.40	1,18,71,200
N Ltd.	20,000	361.20	72,24,000
P Ltd.	60,000	505.10	3,03,06,000
Cash			5,00,800
Total			5,03,02,000

No of units of fund = $6,00,000 + \frac{30,00,000}{78.8366} = 6,38,053$

(iii) On 2nd February 2017, the NAV of fund will be as follows:

Shares	No. of shares	Price	Amount (₹)
L Ltd.	20,000	20.50	4,10,000
M Ltd.	38,000	360.00	1,36,80,000
N Ltd.	20,000	383.10	76,62,000
P Ltd.	60,000	503.90	3,02,34,000
Cash			5,00,800
Total			5,24,86,800

NAV as on 2nd February 2017 = $\frac{₹5,24,86,800}{6,38,053} = ₹ 82.26$ per unit

3(b)

Portfolio	Sharpe's Method $[(R_P - R_F) \div \sigma_P]$	Ranking	$\beta = \rho_{sm} \times \frac{\sigma_s}{\sigma_m}$	Treynor Method $[(R_P - R_F) \div \beta_P]$	Ranking
P	[(18.6 – 9) ÷ 27]= 0.3555	4	[27×0.81÷12] = 1.823	[(18.6-9)÷1.823] = 5.266	5
Q	[(14.8 – 9)÷ 18] = 0.3222	5	[18×0.65÷12] = 0.975	[(14.8-9)÷ 0.975] = 5.95	4
R	[(15.1 – 9) ÷ 8] = 0.7625	2	[8×0.98÷12] = 0.653	[(15.1- 9)÷ 0.653] = 9.342	3
S	[(22 – 9) ÷ 21.2] = 0.6132	3	[21.2×0.75÷12] = 1.325	[(22-9)÷1.325] = 9.811	2
T	[(– 9 – 9) ÷ 4] = – 4.5	6	[4×0.45 ÷12] = 0.15	[(-9-9)÷ 0.15] = -120	6
U	[(26.5 – 9) ÷ 19.3] = 0.9067	1	[19.3 × 0.63 ÷12] =1.013	[(26.5-9)÷1.013] = 17.27	1

Reasons for Difference between Sharpe and Treynor's method:

(a) Sharpe Index considers only the Standard Deviation and leaves market Standard Deviation and the Correlation whereas Treynor considers market Standard Deviation and Correlation.

(b) Greater correlation result in greater value of Beta. This would reduce the points in Treynor.

(c) Portfolio R which is ranked '2' in Sharpe is pushed a position back in Treynor owing to the correlation effect. Also evident in Portfolio P and Q.

4(a) A portfolio Manager has the following four stocks in his portfolio:

Security	No. of shares	Market price per share (₹)	β
VSL	10,000	50	0.9
CSL	5,000	20	1.0
SML	8,000	25	1.5
APL	2,000	200	1.2

Compute the following:

(i) Portfolio Beta

(ii) If the Portfolio Manager seeks to reduce the Beta to 0.8, how much Risk Free investment should he bring in?

(iii) If the Portfolio Manager seeks to increase the Beta to 1.2, how much Risk Free investment should he bring in? [12 marks]

4(b) Calculate the market sensitivity index and the expected return on the Portfolio from the following data;

Standard deviation of an asset	4.5%
Market standard deviation	4.0%
Risk – free rate of return	15.0%
Expected return on market Portfolio	17.0%
Correlation coefficient of Portfolio with market	0.89

What will be the expected return on the Portfolio, if Portfolio beta is 0.5 and the risk free return is 10%. [4 marks]

Answer: 4

4(a) (i) Computation of Portfolio Beta

Security	No. of Shares held	MPS (₹)	Market Value of investments	Beta	Product
[1]	[2]	[3]	[4]	[5]	[6] = [5] × [4]
VSL	10,000	50	5,00,000	0.9	4,50,000
CSL	5,000	20	1,00,000	1.0	1,00,000
SML	8,000	25	2,00,000	1.5	3,00,000
APL	2,000	200	4,00,000	1.2	4,80,000
			12,00,000		**13,30,000**

Therefore, portfolio beta = $\frac{\text{Product}}{\text{Market Value}} = \frac{13,30,000}{12,00,000} = 1.108$

(ii) Reduce Beta to 0.8

Beta can be reduced replacing High Beta stocks in the portfolio with Risk Free investments, which carry a Beta of Zero.

Security	Beta	Proportion (Amt. Invested)	Product
Risk Free Investments	0	x	0
Risky Securities	1.108	1 - x	1.108 – 1.108x
		1	1.108 – 1.108x

Therefore, Portfolio Beta = Product ÷ Amount Invested = $\frac{1.108-1.108x}{1} = 0.8$

Therefore, 1.108x = 1.108 – 0.8 $\Rightarrow$ 1.108x = 0.308 $\Rightarrow$ x = 0.278 or 27.8% for Risk Free Investments and 72.2% for Risky Investments. Therefore, amount to be invested in Risk Free Investments is as follows –

(a) Alternative One – Overall Portfolio value is retained at ₹12,00,000:

Amount to be invested in Risk free Investments = 27.8% of ₹12, 00,000 = ₹3, 33,600 [= value of Risky Investments sold, and replaced by Risk Free Investments]. Therefore, Risky Investments will constitute ₹8, 66,400 (comprising the four securities in the existing ratio)

(b) Alternative Two – Overall Portfolio value is increased:

- Therefore, existing Risky Investments will not be disturbed. Therefore investments in Risky Securities will be ₹12, 00,000 (constituting 72.2%)
- Amount of new Risk Free Investments = $\frac{12,00,000}{72.2\%} \times 27.8\% =$ ₹4, 62,050.

(i) Increase Portfolio Beta to 1.2

Increase in portfolio Beta can be done by replacing Low Beta securities with High Beta securities. Since, it has to be done using Risk Free Securities; amount can be borrowed at Risk Free rate and invested in Risk Securities:

Security	Beta	Proportion (Amt. Invested)	Product
Risk Free Investments	0	x	0
Risky Securities	1.108	1 - x	1.108 – 1.108x
		1	1.108 – 1.108x

Therefore, portfolio Beta = Product ÷ Amount Invested = $\frac{1.108-1.108x}{1} = 1.2$

Therefore, 1.108x = 1.108 – 1.2 $\Rightarrow$ 1.108x = - 0.092 $\Rightarrow$ x = - 0.083 or 8.3% for Risk Free Borrowings. Therefore and 108.3% of existing portfolio value to be Invested in Risky Securities.

Therefore, Amount of Risk Free Borrowings = ₹12, 00,000 × 8.3% = 99,600 to be borrowed at Risk Free rate and Invested in Risky securities in the same proportion as existing.

4(b) Basic Data for computation of Expected Return

Notation	Particulars	Case (a)	Case(b)
σ_P	Standard Deviation of asset	4.5%	4.5%
σ_M	Market Standard Deviation	4.0%	4.0%
ρ_{MP}	Correlation co-efficient of portfolio with market	0.89	0.89
R_F	Risk free rate of return	15%	10%

R_M	Expected return on market Portfolio	17%	17%
β_P	Portfolio Beta	To be ascertained	0.5

Computation of Expected Return

	Case (a)	Case (b)
Portfolio Beta $\beta_P = \sigma_P \div \sigma_M \times \rho_{MP}$	4.5 ÷ 4 × 0.89 = 1.001	0.5
Expected Return = $R_F + \beta_P \times (R_M - R_F)$	0.15 + [1.001 × (0.17 - 0.15)] = 17.002%	0.10 +[0.5×(0.17 - 0.10)] = 13.5%

5 (a) Given the following information—

BSE Index 50,000

Value of Portfolio ₹1,01,00,000

Risk Free Interest Rate 9% p.a.

Dividend Yield on Index 6% p.a.

Beta of Portfolio 2.0

We assume that a futures contract on the BSE index with 4 months maturity is used to hedge the value of portfolio over next 3 months. One future contract is for delivery of times the index. Based on the information, Calculate — (i) Price of future contract, (ii) The gain on short futures position if index turns out to be 45,000 in 3 months. [8 marks]

5 (b) The market received rumour about PQR Corporation's tie-up with a multinational company. This has induced the market price to move up. If the rumour is false, PQR Corporation stock price will probably fall dramatically. To protect from this an investor has bought the call and put options.

He purchased one 3 months call with a striking price of ₹42 for ₹2 premium, and paid ₹1 per share premium for a 3 months put with a striking price of ₹40.

(i) Determine the Investor's position if the tie up offer bids the price of PQR Corporation's stock up to ₹44 in 3 months.

(ii) Determine the Investor's ending position, if the tie-up programme fails and the price of the stock falls to ₹36 in 3 months. [8 marks]

Answer: 5

5 (a)

(i) Computation of Price of Futures Contract

Securities of	R Ltd.
Spot Price [S_X]	₹50,000
Dividend Yield Expected [y]	6% or 0.06
Tenor / Time Period [t] in Years	4 Months or 0.3333 Year
Risk Free Interest Rate [r]	9% or 0.09
Price of Futures Contract [TFP_X] $TFP_X = S_X \times e^{(r-t)\times t}$	= ₹ 50,000 × $e^{(0.09 - 0.06)\times 0.3333}$ = ₹50,000 × $e^{0.03 \times 0.3333}$ = ₹ 50,000 × $e^{0.01}$ = ₹ 50,000 × 1.0101 = ₹ **50,505**

Therefore, price of the Futures Contract is ₹ 50,505 or ₹50,500 (Approx)

(ii) Gain on Short Futures Position

(a) Computation of No. of Contracts to be entered into:

Particulars	Value
Portfolio Value	₹ 101,00,000
4-Month's Futures Price per Unit of BSE Index	₹50,500
No. of Units per BSE Index Futures Contract	50
Value per BSE Index Futures Contract [50 Units × ₹50,500 per Unit]	₹ 25,25,000
No. of Contract to be entered [Portfolio Value × Beta of Portfolio w.r.t Index ÷ Value per BSE Index Futures Contract] = [₹101,00,000 × 2.0 ÷ ₹25,25,000]	8 Contracts

(b) Computation of Gain on Short Futures Position

Particulars	Value
Position	SELL
Contracted Sale Price per Unit of BSE Index Less: Index Position in 3-Months	₹ 50,500 ₹ 45,000
Gain per Unit of BSE Index Future	₹ 5,500
No. of Units per Contract	50
Gain per Contract [₹5,500 × 50 Units]	₹ 2,75,000
No. of Contract entered into	8
Total Gain [8 Contracts × ₹2,75,000 per Contract]	22,00,000

Total Gain on Short Futures Position in 3 Months is₹22,00,000.

5 (b) Cost of Call and Put Options

= (₹ 2 per share) × (100 share call) + (₹ 1 per share) × (100 share put)

= ₹ 2 × 100 + ₹1 × 100

= ₹ 300

(i) Price increases to ₹44. Since the market price is higher than the strike price of the put, the investor will exercise it.

Ending position = (- ₹300 cost of 2 option) + (₹2 per share gain on call) × 100

= - ₹ 300 + 200

Net Loss = - ₹ 100

(ii) The price of the stock falls to ₹ 36. Since the market price is lower than the strike price, the investor may not exercise the call option.

Ending position = (- ₹300 cost of 2 option) + (₹ 4 per stock gain on put) x 100

= - ₹ 300 + 400

Gain = ₹100

6(a) Your Company has to make a US $ 1 Million payment in three month's time. The dollars are available now. You decide to invest them for three months and you are given the following information.

- **The US deposit rate is 8% p.a.**
- **The sterling deposit rate is 10% p.a.**
- **The spot exchange rate is $ 1.80 / pound.**
- **The three month forward rate is $ 1.78/ pound.**

(i) Where should your company invest for better results?

(ii) Assuming that the interest rates and the spot exchange rate remain as above, what forward rate would yield an equilibrium situation?

(iii) Assuming that the US interest rate and the spot and forward rates remain as in the original question, where would you invest if the sterling deposit rate were 14% per annum?

(iv) With the originally stated spot and forward rates and the same dollar deposit rate, what is the equilibrium sterling deposit rate? [10 marks]

6(b) An Indian customer who has imported equipment from Germany has approached a bank for booking a forward Euro contract. The delivery is expected six months from now. The following rates are quoted:
($/Euro) spot 0.8453/0.8457
6m-Swap points 15/20

₹/$ spot 46.47/46.57

6m-Swap points 20/30

What rate the bank will quote, if it needs a margin of 0.5%? [6 marks]

Answer: 6

6(a) (i) Invest for better results

Since the US $ are available now, amount can be invested in

a. US $ Deposits @ 8% p.a. or
b. Converted into Sterling Currency at the Spot Rate and invested in UK Deposits.

Alternative 1

Particulars	Value
Invest in $ deposits @ 8% p.a. for 3 months.	
Income = $ 10,00,000 × 8/100 × 3/12	$ 20,000

Alternative 2

	Particulars	Value
1.	Convert Dollars into Pounds at Spot Rate (US $ 10,00,000 ÷ 1.80)	£5,55,556
2.	Invest £5,55,556 in Sterling Deposits at the rate of 10% p.a. for 3 months interest on £5,55,556 @ 10% for 3 months = £5,55,556 10% × 3/12	£13,889
3.	Total Cash Inflow at the end of 3 months [(2)+(3)]	£5,69,445
4.	Amount earned in US $ = [(4) × 1.78 (Forward Rate)]	US $ 10,13,612
5.	Gain in US $ [10,13,612 – 10,00,000]	US $13,612

Gain in **Alternative 1** is higher. Hence, company should invest in US Deposits.

(i) Equilibrium Forward Rate 3 Months Forward; (for 1 £)

= Spot Rate × [(1 + US Interest Rate for 3 Months) / (1 + Sterling Interest Rate for 3 Months]

= $ 1.8 × [(1 + 8%/4) / (1 + 10%/4)] = **$1.7912/ £ [Interest Rate Parity Method]**

Equilibrium 3 months Forward Rate = $ 1.7912 / £

(ii) Investment if Sterling Deposit: Rate is 14%

Particulars	Amount
1. Amount invested in Sterling Deposit Rate	£ 5,55,556
2. Interest Income @ 14% for 3 months £ 5,55.556 × 14 % × 3 / 12	£ 19,444
3. Total Cash Inflow at the end of 3 months [(2)+ (3)]	£ 5,75,000
4. Amount earned in US $ = [(4) × 1.78 (Forward Rate)]	US $ 10,23,500
5. Gain in US $ [10,23,500 - 10,00,000]	US $ 23,500

Conclusion: Gain is highest of all the considered alternatives, therefore amount should be invested in Sterling Deposits @ 14%.

(iii) Equilibrium Sterling Deposit Rate Franc Interest Rate [6 Months] = Assuming Sterling Interest Rate = x, applying the same in Interest Rate Parity Formula for determining Forward Rate —

$$£\,1 = \text{Spot Rate} \times \frac{(1+\text{US Rate for 3 Months})}{(1+\text{Sterling Rate for 3 Months})}$$

1 £ = $1.80 X (1 + 8%/4) / (1 + x/4)

1 £ = $1.80 x (1 + 0.02) / (1 + x/4);

⇒ $1.78 = $1.80 x (1 + 0.02)/ (1 + x/4):

⇒ 1+ x/4 = $ 1.80 × 1.02/$ 1.78

⇒ x/4 = 1.03146 -1 = 0.03146 or 3.146%

⇒ **x = 12.58%**

Equilibrium Sterling Interest Rate = 12.58%

6 (b) For arriving at a quote the bank has to calculate outright forward rates keeping in to consideration the margin of 0.5% as follows:

$/∈ 6m Forward Rates:

Bid rate = 0.8453 + 0.0015=0.8468

Offer rate = 0.8457 + 0.0020=0.8477

$/₹6m Forward rates

Bid rate = 46.47 + 0.20=46.67
Offer rate = 46.57 + 0.30=46.87

In the instant case, the customer needs to pay for imports. He would purchase euros. Therefore he needs a quote of Euro in Rupee terms. Hence, we therefore need to find only ask quote.

(₹/∈) = (₹/$) × ($/∈) = 0.8477 × 46.87

The Bank would quote ₹ 39.73 + 0.5% = ₹ 39.93/∈

7(a) The S. Beverages Ltd has taken a plant on lease, valued at ₹ 20 crore. The lease arrangement is in the form of a leveraged lease. The Kuber Leasing Limited is the equity participant and the Hindusthan Bank Ltd. (HBL) is the loan participant. They fund the investment in the ratio of 2:8. The loan from HBL carries a fixed rate of interest of 19 percent, payable in 6 equated annual installments. 'The lease term is 6 years, with lease rental payable annually in arrear.

(i) Compute the equated annual installment from the point or view of HBL.
(ii) If the lease rate is unknown, and HBL's per-tax yield is 25 percent, what is the minimum lease rake that must be quoted'? [8 marks]

7(b) Securities X and Y have standard deviations of 3% and 9%. Nitin is having a surplus of ₹20 Lakhs for investment in these two securities. How much should he invest in each of these securities to minimize risk, if the correlation co-efficient for X and Y is — (i) -1; (ii) -0.30; (iii) 0; (iv) 0.60 [8 marks]

Answer: 7

7(a) Cost of the asset		₹20cr
Debt Equity ratio		2: 8
Loan raised	(20 × 8 / 10)	₹16cr
Rate of interest		19%

(i) Computation of annual installment

$X \times PVCF_{6yr19\%} = ₹16cr$

$X = 46923573$

(ii) Let the lease rent be X

Net out flow = Lease rent – Loan installment

= X – 46923573

Then,

$(X - 46923573)\ PVCF_{6yr25\%} = 40000000$

X = 60476453.

7(b) **Basic Values of Factors for Determination of Portfolio Risk**

Standard Deviation of Security X	σ_X	3%
Standard Deviation of Security Y	σ_Y	9%
Correlation co-efficient of Securities X and Y	ρ_{XY}	-1,- 0.30, 0,0.60
Weight of Security X	W_X	a
Weight of Security Y	W_Y	1-a

Computation of Investment in Securities

Proportion of Investment in Security X, $W_X = \frac{\sigma_Y^2 - Cov_{XY}}{\sigma_X^2 + \sigma_Y^2 - 2Cov_{XY}}$

Proportion of Investment in Security Y, $W_Y = 1 - W_X$

$Cov_{XY} = \rho_{XY} \times \sigma_X \times \sigma_Y$

If ρ_{XY} is	Cov_{XY} is	Computation	Investment
-1	-27 (-1×3×9)	$W_X = [\sigma_Y^2 - Cov_{XY}]$ $[\sigma_X^2 + \sigma_Y^2 - 2Cov_{XY}]$ $W_X = [9^2 - (-27)]$ $[3^2 + 9^2 - 2 \times (-27)]$ $W_X = [81 + 27]$ $[9 + 81 + 54]$ $W_X = 108/144 = 0.75$	0.750 in X 0.250 in Y ₹15,00,000 in X ₹5,00,000 in Y
-0.3	-8.1 (-0.3 × 3× 9)	$W_X = [\sigma_Y^2 - Cov_{XY}]$ $[\sigma_X^2 + \sigma_Y^2 - 2Cov_{XY}]$ $W_X = [9^2 - (-8.1)]$ $[3^2 + 9^2 - 2 \times (-8.1)]$ $W_X = [81 + 8.1]$ $[9 + 81 + 16.2]$ $W_X = 89.1 / 106.2 = 0.839$	0.839 in X 0.161 in Y ₹16,78,000 in X ₹3,22,000 in Y
0	0 (0 × 3× 9)	$W_X = [\sigma_Y^2 - Cov_{XY}]$ $[\sigma_X^2 + \sigma_Y^2 - 2Cov_{XY}]$ $W_X = [9^2 - 0]$ $[3^2 + 9^2 - 2 \times 0]$ $W_X = [81 - 0]$ $[9 + 81 - 0]$ $W_X = 81/90 = 0.90$	0.900 in X 0.100 in Y ₹ 18,00,000 in X ₹ 2,00,000 in Y
0.60	16.2 (0.6 × 3 × 9)	$W_X = [\sigma_Y^2 - Cov_{XY}]$ $[\sigma_X^2 + \sigma_Y^2 - 2Cov_{XY}]$ $W_X = [9^2 - 16.2]$ $[3^2 + 9^2 - 2 \times 16.2]$ $W_X = [81 - 16.2]$ $[9 + 81 - 32.4]$ $W_X = 64.8 / 57.60 = 1.125 > 1$ At this correlation level, risk reduction is not possible.	Reducing Risk below 3% is not possible.

8. Answer any four questions: [Marks 4*4]

(a) Write down the benefits of Rolling Settlement.
(b) What are the benefits of future trading?
(c) What steps are involved in hedging?
(d) NBFCs lend and make investments and hence their activities are akin to that of banks. – State the differences.
(e) Write short note on Leading and Lagging

Answer: 8

(a)

(1) In rolling settlements, payments are quicker than in weekly settlements. Thus, investors benefit from increased liquidity,

(2) It keeps cash and forward markets separate,

(3) Rolling settlements provide for a higher degree of safety,

(4) From an investor's perspective, rolling settlement reduces delays. This also reduces the tendency for price trends to get exaggerated. Hence, investors not only get a better price but can also act at their leisure.

(b) **Benefits of Futures Trading**

- **Price discovery for commodity players**
  - A farmer can plan his crop by looking at prices prevailing in the futures market
- **Hedging against price risk**

- A farmers can sell in futures to ensure remunerative prices
- A processor/ manufacturing firm can buy in futures to hedge against volatile raw material costs
- An exporter can commit to a price to his foreign clients
- A stockiest can hedge his carrying risk to ensure smooth prices of the seasonal commodities round the year

• **Easy availability of finance**

- Based on hedged positions commodity market players (farmers, processors, manufacturers, exporters) may get easy financing from the banks.

(c) Hedging involves

1. Foreign exchange exposure identification
2. Value of exposure
3. Creation of offsetting positions through derivatives.
4. Measurement of Hedge ratio.

In order to reduce or eliminate currency exposure, internal strategies such as currency invoicing, netting and offsetting, leading and lagging, indexation clause in contract, switching the base of manufacturer etc are resorted to.

(d) NBFCs lend and make investments and hence their activities are akin to that of banks; however there are a few differences as given below:

(i) NBFC cannot accept demand deposits;

(ii) NBFCs do not form part of the payment and settlement system and cannot issue cheques drawn on itself.

(iii) Deposit insurance facility of Deposit Insurance and Credit Guarantee Corporation is not available to depositors of NBFCs, unlike in case of banks.

(e) Leading and Lagging

It refers to the adjustment of the times of payments that are made in foreign currencies. Leading is the payment of an obligation before due date while lagging is delaying the payment of an obligation past due date. The purpose of these techniques is for the company to take advantage of expected devaluation or revaluation of the appropriate currencies. Lead and lag payments are particularly useful when forward contracts are not possible.

It is more attractive to use for the payments between associate companies within a group. Leading and lagging are aggressive foreign exchange management tactics designed to take the advantage of expected exchange rate changes. Buckley (1988) supports the argument.