FINAL
Group III
Paper 14 : STRATEGIC FINANCIAL MANAGEMENT
(SYLLABUS – 2016)

PART – I : MULTIPLE CHOICE QUESTIONS

(1) Choose the correct option among four alternative answer. (1 mark for correct choice, 1 mark for justification.)

(i) Which of the following is not an investment constraint?
(a) Liquidity
(b) The absence of the need for regular income.
(c) The preferred time horizon
(d) Risk tolerance.

(ii) It is given that ₹/£ quote is ₹100.68 – 102.95 and ₹/$ quote is ₹61.86 – 62.87. What would be the $/£ quote? It is given that ₹/£ quote is ₹100.68 – 102.95 and ₹/$ quote is ₹61.86 – 62.87. What would be the $/£ quote?
(a) $1.6014 - $ 1.6642 (quote).
(b) $1.6014-$1.6542(quote)
(c) $1.6014-$6352(quote)
(d) $1.6014-$6252(quote)

(iii) The theoretical forward price of the following security for 6 months is:
Spot Price (S_x) ₹160
Risk free interest rate 9% [Given: $e^{0.045} = 1.046028$]
(a) ₹166.3645
(b) ₹167.4645
(c) ₹ 167.3645
(d) ₹166.4656

(iv) A project had an equity beta of 1.3 and was going to be financed by a combination of 30% debt and 70% equity. Assuming debt-beta to be zero, the project beta is :
(a) 0.81
(b) 0.71
(c) 0.51
(d) 0.91

(v) An investor buys a call option contract for a premium of ₹ 150. The exercise price is ₹ 15 and the current market price of the share is ₹ 12. If the share price after three months reaches ₹ 20, what is the profit made by the option holder on exercising the option? Contract is for 100 shares. Ignore the transaction charges.
(a) ₹450
(b) ₹350
(c) ₹375
(d) ₹475

(vi) Mr. X can earn a return of 18% by investing in equity shares on his own. Now he is considering recently announced equity based mutual fund scheme in which initial expenses are 6.70% and annual recurring expenses are 1.7%. How much should the mutual fund earn to provide Mr. X a return of 18 per cent?
(a)22
(b)19
(c)24
(d)21

(vii)CNX Nifty is currently quoting at 9100. Each lot is 75. An investor purchases a May Futures contract at 9200. He has been asked to pay 5% margin. What amount of initial margin is he required to deposit? To what level NIFTY futures should in increase to get a gain of 4%?
(a) 9318.4
(b) 9218.4
(c) 9218.5
(d) 9118.4

(viii)P Ltd. has an EPS of ₹ 75 per share. Its Dividend Payout Ratio is 30%. Earnings and dividends of the company are expected to grow at 6% per annum. Find out the cost of equity capital if its market price is ₹ 300 per share.
(a) 11.5%
(b) 12.5%
(c) 13.5%.
(d) 14.5%

(ix) An investor has three alternatives of varying investment values. The data available for each of these alternatives are given below:

Alternative	Expected Return (%)	Standard Deviation of Return
I	23	8.00
II	20	9.50
III	18	5.00

Which alternative would be the best if coefficient of variation is used?
(a) Alternative III is the best as its co-efficient of variation is the lowest.
(b) Alternative II is the best as its co-efficient of variation is the lowest.
(c) Alternative I is the best as its co-efficient of variation is the lowest.
(d) None.

(x) A student ordered a book from USA on 01-05-2018 for $ 90, when the spot rate was ₹ 68.50/$. Payment was made ten days later, on 11-05-2018 when the book was delivered. By this time, the rupee had appreciated by 10%. How much did it cost the student in Rupees? (Ignore transaction and delivery cost).
(a) ₹5304.55
(b) ₹5404.55
(c) ₹5504.55
(d) ₹ 5604.55

Answer:

(i) (b) The absence of the need for regular income. The investment constraints for investments are liquidity, age, need for regular income, time horizon, risk tolerance and tax liability.

(ii) (a) $1.6014 - $ 1.6642 (quote).

The synthetic rate for $ / £ is to be calculated. Here, rupee, the price currency (i.e. common currency)is the cheapest among the three currencies involved in the quotes. The formula is:
$ / £ = [(₹ / £$_{bid}$)/ (₹ / $_{ask}$)]: [(₹/ £$_{ask}$)/(₹/ $_{bid}$)] = [100.68/ 62.87]: [102.95/61.86]
= 1.6014 :1.6642 ; So, $/£ = $1.6014 - $ 1.6642 (quote).

(iii) (c) ₹ 167.3645.
Forward price of securities = ₹ 160 × $e^{(009)(0.50)}$ = ₹ 160 × $e^{0.045}$ = ₹ 160 × 1.046028 = ₹ 167.3645.

(iv) (d) 0.91
B_p is to be ascertained as -
= [β_{equity} + E / (D +E)] + [β_{debt} + E /(D + E)] = (1.30 × 0.70) + (0 × 0.3) =0.91

(v) (b) ₹350
Assuming in call option, the total outgo Premium + Exercise Price = ₹ 150 + (₹ 15 × 100) = ₹ 1650
After 3 months, if share price is ₹ 2000, the net profit = 2000 – 1650 = ₹ 350.

(vi) (d) 21
Let the return on mutual fund be ₹ x. Investors expectation denotes the return from the amount invested.

Return from mutual funds = $\frac{\text{Investor's Expectation}}{(100 - \text{Issue Expenses})}$ + Annual Recurring Expenses

Or x = $\frac{18}{(100 - 6.7)\%}$ + 1.7 = 19.29 + 1.7 = 21%

Hence, Mutual fund should earn so as to provide a return of 18% = 21%.

(vii) (b) 9218.4
Initial margin =(5%*9200*75)=34500
Gain =4%
Return (4% of Initial Margin) = 1380
Return per unit =1380/75=18.4
Index value should rise to = 9200+18.4=9218.4

(viii) (c) 13.5%.

K_e = $\frac{\text{Dividend per Share}}{\text{Market Price per Share}}$ + g(Growth Rate) = $\frac{75 \times 30\%}{300}$ + 6% = 7.5% + 6%
= 13.5%.

(ix) (a) Alternative III is the best as its co-efficient of variation is the lowest.
The Co-efficient of Variation is the ratio of standard deviation to mean.

Alternative	Expected Return (%)	Standard Deviation of Return (%)	Co-efficient of Variation
I	23	8	0.35
II	20	9.5	0.48
III	18	5	0.28

Alternative III is the best as its co-efficient of variation is the lowest.

(x) (d) ₹ 5604.55
Rupee is appreciating by 10%,
Value of dollar is =68.5/(1+10%)×90= ₹ 5604.55

PART – II : SUBJECTIVE QUESTIONS

INVESTMENT DECISIONS

2) A Ltd. company has undertaken market research at a cost of ₹ 4 Lakhs in order to forecast the future Cash Flows of an Investment Project with an expected life of four years as follows:

Year	1	2	3	4
Sales revenue	₹ 25,00,000	₹ 51,40,000	₹ 1,37,80,000	₹ 9,06,000
Costs	₹ 10,00,000	₹ 20,00,000	₹ 50,00,000	₹ 35,00,000

These forecast Cash Flows are before considering inflation of 4.7% p.a., The Capital Cost of the project, payable at the start of first year will be ₹ 40 Lakhs. The Investment Project will have zero scrap value at the end of the fourth year. The level of working capital investment at the start of each year is expected to be 10% of the sales revenue in that year.

Capital allowances would be available on the Capital Cost of the Investment Project on a 25% reducing balances basis. A Ltd. pays tax on Profit at an annual rate of 30% per year with tax being paid one year in arrears.

A Ltd. has a nominal (money terms) after tax Cost of Capital of 12% per year.

Discount Factor at 12% is as under:

Year	1	2	3	4	5
Discount Factor	0.893	0.797	0.712	0.636	0.567

Calculate the net Present Value of the Investment Project in nominal terms and comment on its financial acceptability.

Ans:

Calculation of Net Present value of the investment project using a nominal terms approach.

Year	1	2	3	4	5
Sales Revenue	2617.50	5634.52	15815.74	10887.16	
Less: Costs	1047.00	2192.42	5738.66	4205.86	
Net Revenue	1570.50	3442.10	10077.08	6681.30	
Less: Tax Payable	---	-471.16	-1032.64	-3023.12	(2004.40)
Capital Allowance	---	300.00	225	168.76	506.26
After Tax Cash Flow	1570.50	3270.94	9269.44	3826.94	1498.14
Less: Working Capital	(301.72)	(1018.12)	(492.86)	(1088.72)	
Project Cash Flow	1268.78	2252.82	9762.30	4915.66	(1498.14)
Discount Factor 12%	0.893	0.797	0.712	0.636	0.567
Present Value of Cash Flow	1133.02	1795.50	6950.76	3126.36	(849.44)

P.V. of Future Cash Flow	12156.20
Less: Initial Investment	4000.00
Less: Working Capital	261.76
NPV	₹ 7894.44

The net present value is ₹ 7894440. So the investment project is financially acceptable.

Working Notes:

(₹'000)

Year	1	2	3	4
Sales Revenue	2500	5140	13780	9060
Inflated Sales (by 4.7%)	2617.50	5634.52	15815.74	10887.16

Inflated costs have been calculated accordingly although the normal discount rate is 12% and general rate of inflation is 4.7%.

3) DJ Company has a Capital Structure of 20% debt and 80% equity. The company is considering various investment proposals costing less than ₹ 60 Lakhs. The company does not want to disturb its Present Capital Structure. The cost of raising the debt and equity are as follows:

Project Cost	Cost of debt	Cost of equity
Upto ₹ 10 Lakhs	**9%**	**13%**
Above ₹ 10 lakhs and upto ₹ 40 Lakhs	**10%**	**14%**
Above ₹ 40 lakhs and upto ₹ 80 Lakhs	**11%**	**15%**
Above ₹ 80 lakhs and upto ₹ 2 Crores	**12%**	**15.55%**

Assume that the tax rate is 50%. Compute the cost of two Projects A and B, whose fund requirements are ₹ 16 Lakhs and ₹ 44 Lakhs respectively. If the project are expected to yield after tax return of 11%, determine under what conditions it would be acceptable.

Ans:

Particulars	K_d(Debt)%	K_e(Equity)%	WACC = Ko
% of Debt and Equity	20%	80%	
Upto ₹ 10 Lakhs	9% × 50% = 4.5%	13%	4.5% × 20% = 13% × 80% = 11.30%
Above 10 Lakhs to 40 Lakhs	10% × 50% = 5.0%	14%	5.0% × 20% = 14% × 80% = 12.20%
Above 40 Lakhs to 80 Lakhs	11% × 50% = 5.5%	15%	5.5% × 20% = 15% × 80% = 13.10%
Above 80 Lakhs to 2 Crore	12% × 50% = 6.0%	15.55%	6.00%×20%=15.55%×80% =13.64%

Project	Investment	Wacc	Return	Decision
A	₹ 16 Lakhs	12.20%	11%	ROI<WACC
B	₹ 44 Lakhs	13.10%	11%	ROI<WACC

Project A would be acceptable when its return is greater than WACC (12.20%)
Project A would be acceptable when its return is greater than 13.10%

4) A company is considering two mutually exclusive projects X and Y. Project X costs ₹3,00,000 and Project Y ₹3,60,000. You have been given below the NPV and probability distribution for each project:

Project X		Project Y	
NPV Estimate (₹)	**Probability**	**NPV Estimate (₹)**	**Probability**
30,000	**0.1**	**30,000**	**0.2**
60,000	**0.4**	**60,000**	**0.3**
1,20,000	**0.4**	**1,20,000**	**0.3**
1,50,000	**0.1**	**1,50,000**	**0.2**

Required:
(i) Compute the expected Net Present Value (NPV) of Projects X and Y.
(ii) Compute the risk attached to each project i.e. Standard Deviation of each probability distribution.
(iii) Which Project do you consider more risky?
(iv) Compute the Profitability Index of each Project

Ans:

(i) Project X:

NPV Estimate (₹)	Probability	NPV× Probability (₹)	Deviation from Expected NPV i.e. ₹ 90,000	Square of the Deviation (₹)	Square of the Deviation × Probability (₹)
30,000	0.1	3,000	(-) 60,000	36,00,000,000	3,60,000,000
60,000	0.4	24,000	(-) 30,000	9,00,000,000	3,60,000,000
1,20,000	0.4	48,000	30,000	9,00,000,000	3,60,000,000
1,50,000	0.1	15,000	60,000	36,00,000,000	3,60,000,000
Expected NPV		90,000			14,40,000,000

Project Y:

NPV Estimate (₹)	Probability	NPV × Probability (₹)	Deviation from Expected NPV i.e. ₹ 90,000	Square of the Deviation (₹)	Square of the Deviation × Probability (₹)
30,000	0.2	6,000	(-) 60,000	36,00,000,000	7,20,000,000
60,000	0.3	18,000	(-) 30,000	9,00,000,000	2,70,000,000
1,20,000	0.3	36,000	30,000	9,00,000,000	2,70,000,000
1,50,000	0.2	30,000	60,000	36,00,000,000	7,20,000,000
Expected NPV		90,000			19,80,000,000

(ii) The expected Net Present Value (NPV) of Projects X and Y is ₹ **90,000 each.**

Standard Deviation = $\sqrt{\text{SquareoftheDeviation} \times \text{Probability}}$
In case of Project X: Standard deviation = √(14,40,000,000) = ₹ 37,947
In case of Project Y: Standard deviation = √ (19,80,000,000) = ₹ 44,497

(iii) Co-efficient of variation = Standard deviation / Expected NPV
In case of Project X: Co-efficient of variation = ₹ 37,947 / ₹ 90,000 = **0.42**
In case of Project Y: Co-efficient of variation = ₹ 44,497 / ₹ 90,000 = **0.50**
Project Y is riskier since it has a higher Co-efficient of variation.

(iv) Profitability Index = (Discounted cash inflow/Discounted cash outflow)
In case of Project X: Profitability Index = (₹ 90,000 + ₹ 3,00,000)/₹ 3,00,000 = **1.30**
In case of Project Y: Profitability Index = (₹ 90,000 + ₹3,60,000)/₹ 3,60,000 = **1.25**

5) A Company requires ₹15 Lakhs for the installation of a new unit, which would yield an annual EBIT of ₹ 2,50,000. The Company's objective is to maximise EPS. It is considering the possibility of Issuing Equity Shares plus raising a debt of ₹3,00,000, ₹6,00,000 and ₹9,00,000. The current Market Price per Share is ₹50 which is expected to ₹40 per share if the market borrowings were to exceed ₹7,00,000. The cost of borrowing are indicated as follows:

Level of Borrowing	**Upto ₹2,00,000**	**₹2,00,000 to ₹6,00,000**	**₹6,00,000 to ₹9,00,000**
Cost of Borrowing	**12% p.a.**	**15% p.a.**	**17% p.a.**

Assuming a tax rate of 50%, work out the EPS and the scheme, which you would recommended to the Company.

Ans:

Statement showing EPS under the different schemes (Amount in ₹)

Particulars	Scheme I	Scheme II	Scheme III
Capital Required	15,00,000	15,00,000	15,00,000
Less : Debt Content	3,00,000	6,00,000	9,00,000
Balance Equity Capital required	**12,00,000**	**9,00,000**	**6,00,000**
Market Price per Share	₹50	₹50	₹40
Number of Equity Shares to be issued (Equity Capital ÷ MPS)	24,000	18,000	15,000

Profitability Statement

EBIT	**2,50,000**	**2,50,000**	**2,50,000**
Less: Interest on Debt: First ₹2,00,000 at 12%	24,000	24,000	24,000
Next ₹4,00,000 at 15%	15,000	60,000	60,000
Balance at 17%			51,000
Total Interest	39,000	84,000	1,35,000
EBIT	2,11,000	1,66,000	1,15,000
Less : Tax at 50%	1,05,500	83,000	57,500
EAT	1,05,500	83,000	57,500
Earning Per Share (EPS) = EAI ÷ No. of shares	**4.40%**	**4.61%**	**3.83%**
Average Interest Rate = Total Interest ÷ Debt	**12%**	**14%**	**15%**
ROCE = EBIT ÷ Capital Employed	**16.67%**	**16.67%**	**16.67%**

Conclusion: EPS is maximum under Scheme II and is hence preferable.

Leverage Effect: Use of Debt Funds and Financial Leverage will have a favourable effect only if ROCE>Interest rate. ROCE is 16.67% and hence upto 15% interest rate, i.e. Scheme II, use of debt will have favourable impact on EPS and ROE. However, when interest rate is higher at 17%, financial leverage will have negative impact and hence EPS falls from ₹4.61 to ₹3.83.

MUTUAL FUNDS

6) The following particulars are furnished about three mutual funds scheme A, B and C.

Particulars	Scheme A	Scheme B	Scheme C
Dividend Distributed	**₹ I.60**	**-**	**₹ 1.15**
Capital Appreciation	**₹ 2.77**	**₹ 3.33**	**₹ 1.79**
Opening NAV	**₹ 30**	**₹ 25.15**	**₹ 21.50**
Beta	**1.40**	**1.10**	**1.35**

Ascertain Jensen's Alpha of the three schemes and evaluate their performance, if government of India Bonds carry an interest rate of 6.64% and the NIFTY has increased by 12%.

Ans:

Particulars	Scheme A	Scheme B	Scheme C
Dividend Distributed	₹1.60	-	₹1.15
Add : Capital Appreciation	₹2.77	₹3.33	₹1.79
Total Return (A)	4.37	3.33	2.94
Opening NAV (B)	₹30	₹25.15	₹21.50
Actual Return (C)=(A)÷(B)×100	14.57%	13.24%	13.67%
Beta (D)	1.40	1.10	1.35
Expected Return under CAPM [E=(R_P)][E]=$R_F \times B_P \times (R_M - R_F)$]	14.14% [6.64+1.40×(12-6.64)]	12.54% [6.64+1.10×(12-6.64)]	13.88% [(6.64+1.35×(12-6.64)]
Jensen's Alpha (σ_p)(C)-(E)	0.43% (14.57-14.14)	0.70% (13.24-12.54)	=(0.21%) (13.67-13.88)
Ranking	II	I	III

Schemes A and B have outperformed the market portfolio (Nifty) whereas scheme C has underperformed in comparison with the NIFTY.

7) A mutual fund has an NAV of ₹ 12.50 per unit at the beginning of the year. At the end of the year the NAV increases to ₹ 13.40. In the meanwhile the Fund distributes ₹ 0.85 as dividend and ₹ 0.70 as capital gains.

(i) Calculate the fund's rate of return during the year.

(ii) Assuming that the investor had 240 units and that the distributions have been reinvested at an average NAV of ₹ 12.80, find out the rate of return.

Ans:

(i) Return for the year (all changes on a per unit basis)

Change in price (13.40 - 12.50)	₹ 0.90
Dividend received	₹ 0.85
Capital Gain	₹ 0.70
Total Return	₹ 2.45

Holding Period Return $\frac{₹\,2.45}{₹\,12.50} \times 100 = 19.6\%$

(ii) When all dividends and capital gains distributions are reinvested into additional units of the fund (12.80).

Dividend and Capital gain per unit 0.85+0.70 =	₹ 1.55
Total receipt from 240 units =1.55 × 240 =	₹ 372
Additional unit acquired ₹ 372 / ₹ 12.80 =	₹ 29.06 Units
Value of 269.06 units held at end of year = 269.06×13.40 =	₹ 3605.40
Price paid for 240 units at beginning of year = 240 units ×12.50=	₹ 3000
Holding period return would be = (3605.40 - 3000) / 3000 =	20.18%

8. The following particulars relates to Gilt Fund Scheme:

	Particulars	
1.	**Investment in Shares (at cost)**	
	IT and ITES Companies	**₹ 20 Crores**
	Infrastructure Companies	**₹ 22 Crores**
	FMCG	**₹ 15 Crores**

	Automotive	**₹ 20 Crores**
	Banking/Financial Services	**₹ 8 Crores**
2.	**Cash and other Assets in Hand (even throughout the fund period)**	**₹ 4 Crores**
3.	**Investment in Fixed Income Bearing Bonds**	
	Listed Bonds [10,000 10% Bonds of ₹ 10,000 each]	**₹ 10 Crores**
	Unlisted Bonds	**₹ 10 Crores**
4.	**Expenses payable as on closure date**	**₹ 2 Crores**
5.	**Market Expectation on Listed Bonds**	**9%**
6.	**No. of Units Outstanding**	**₹ 4 Crores**

The particulars relating to sectoral index are as follows:

Sector	Index on the date of purchase	Index on the valuation date
IT and ITES	**1800**	**2800**
Infrastructure	**1400**	**2500**
FMCG	**1600**	**2500**
Automotive	**2000**	**3000**
Banking/Financial Services	**1500**	**2200**

The Fund has incurred the following expenses:

Management Advisory Fees	**₹ 260 Lakh**
Administration Expenses	**₹ 300 Lakh**
Publicity and Documentation	**₹ 100 Lakh**
Total	**₹ 660 Lakh**

The period under consideration is 2 years. The Fund has distributed ₹ 1.5 per unit as annual cash dividend. Compute the annualized net return (%) and the expense ratio of the Fund.

Ans:

(i) Net Asset Value of the Fund

Particulars	₹ in Crore
1. Market Value of Shares in -	
(a) IT and ITES [Cost ₹ 20 × Closing Sector Index 2800 ÷ Opening Sector Index 1800]	31.11
(b) Infrastructure [Cost ₹ 22 × Closing Sector Index 2500 ÷ Opening Sector Index 1400]	39.29
(c) FMCG [Cost ₹ 15 × Closing Sector Index 2500 ÷ Opening Sector Index 1600]	23.44
(d) Automotive [Cost ₹ 20 × Closing Sector Index 3000 ÷ Opening Sector Index 2000]	30.00
(e) Banking [Cost ₹ 8 × Closing Sector Index 2200 ÷ Opening Sector Index 1500]	11.73
2. Market Value of Investment in Listed Bonds [Face Value ₹ 10 Crores × Interest on Face Value 10% ÷ Market Expectation 9%]	11.11
3. Cost of Investment in Unlisted Bonds	10.00
4. Cash and Other Assets	4.00
Total Assets of the Fund	160.68
Less: Outstanding Expenses	2.00
Net Asset Value of the Fund	158.68

Note: It is assumed that Cash and other Assets existed from the beginning of the period at the same values.

(ii) Net Asset Value per Unit
NAV per Unit = Net Asset Value of the Fund ÷ No. of the Outstanding
= ₹ 158.68 Crores ÷ 4 Crore Units
= ₹ 39.67

(iii) Annualized Return on Fund
(a) Computation of Opening NAV

	Particulars	₹ in Crore
1.	Investment in Shares (at Cost)	
	• IT and ITES companies	20.00
	• Infrastructure Companies	22.00
	• Aviation, Transport and Logistics	15.00
	• Automotive	20.00
	• Banking / Financial Services	8.00
2.	Investment in Fixed Income Bearing Bonds	
	• Listed Bonds [10,000 10% Bonds of ₹ 10,000 each]	10.00
	• Unlisted Bonds	10.00
	Net Asset Value	105.00

Note: Cash and Other Assets are not included because they arise out of investments made in the beginning.

(b) Computation of Opening NAV per Unit
NAV per Unit = Net Asset Value of the Fund ÷ No. of Units Outstanding
= ₹ 105.00 Crores ÷ 4.00 Crore Units
= ₹ 26.25

(c) Computation of Returns per Unit
- Capital Appreciation = Closing NAV per Unit – Opening NAV per Unit
= ₹ 39.67 – ₹ 26.25 = ₹ 13.42
- Cash Dividend = ₹ 1.5 × 2 Years – ₹ 3
- Returns = [Cash Dividend + Capital Appreciation] ÷ Opening NAV
= [₹ 3.00 + ₹ 13.42] ÷ ₹ 26.25 = ₹ 16.42 ÷ ₹ 26.25 = 62.55%
- Return p.a. = Total Return/ Period = 62.55% ÷ 2 Years = 31.28%

(iv) Expense Ratio
(a) Total Expense = Management Advisory Fee ₹ 2.60 Cr. + Administration Exp. ₹ 3.00 Cr. + Publicity and Documentation ₹ 1.00 Cr. = ₹ 6.6 Crores

(b) Average Value of Portfolio = (Opening Net Asset Value + Closing Net Asset Value)÷2
= (₹105 Crores + ₹158.68 Creores) ÷ 2 = ₹263.68 Crores ÷ 2
= ₹ 131.84 Crores

(c) Expense Ratio = Total Expenses ÷ Average Value of Portfolio
= (₹ 6.6 Crores ÷ ₹ 131.84 Creores) × 100
= 5.01%

(d) Expense Per Unit = Total Expenses ÷ No. of Units = ₹ 6.6 Crores ÷ 4.00 Crores = ₹ 1.65

9. PS Fund invests exclusively in Public sector undertakings, yielded ₹ 4.85 per unit for the year. The opening NAV was ₹ 26.85. The Fund has a risk factor of 3.50%. Ascertain the Sharpe Ratio and compare the fund performance with market performance if
(i) Risk Free Return is 6%, if return on sensex is 16% with a standard deviation of 3.75%.
(ii) Risk Free Return is 5%, return on sensex is 18% with a standard deviation of 4%.

Ans:

Sharpe Ratio = $(R_P - R_f) / \sigma_P$
Where R_P = Return on portfolio
R_f = Risk free Return
σ_P = Standard Deviation of portfolio

Particulars	Case I	Case II
Risk free return R_f	6%	5%
Market Return (R_M)	16%	18%
Standard Deviation of market return (σ_m)	3.75%	4.00%
Sharpe Ratio for N Fund $\{(R_P - R_F) \div \sigma_P\}$(A)	18.06% - 6% ÷ 3.50 =3.45	18.06% - 5% ÷ 3.50%=3.73
Sharpe Ratio for Market Return $\{(R_m - R_F) \div \sigma_m\}$(B)	16% - 6% ÷ 3.75% = 2.67	18% - 5% ÷ 4% = 3.25
Sharpe Ratio is higher for	PS Fund	PS Fund
Inference / Evaluation	PS Fund has outperformed market's performance	PS Fund has outperformed

Return on PS Fund = yield ₹ 4.85 ÷ Opening NAV ₹ 26.85 = 18.06%

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

10. The returns on Stock PQ and market portfolio for a period of 4 years are as follows:

Year	Return on PQ (%)	Return on Market portfolio (%)
1	**12**	**8**
2	**15**	**12**
3	**11**	**11**
4	**2**	**(-)4**

You may opt to use the following additional information:

Particulars	PQ	Market
Mean Return (%)	**10**	**6.75**
Standard Deviation (%)	**4.84**	**6.38**
Covariance of stock with market = 29.75		

You are required the determine the Characteristic Line for Stock PQ. Find the expected return on PQ when market return improves to 5% in year 5 or decreases to - 8% in the 5th year.

Ans:

Characteristics line
$y = \alpha + \beta x$
y= Mean return (stock PQ), x= mean return (market)
10=α+0.73 (6.75)
α =5.0725
y=5.0725+0.73x

If x=5
y=5.0725+3.65
y=8.7225
or, y=8.72%

If x=(-)8
y=5.0725+0.73(-8)
y=5.0725-5.84
y=(-)0.767%
y=(-)0.77%

11. A holds the following portfolio:

Share/Bond	Beta	Initial Price	Dividend	Market price at the end of year
A Ltd.	**0.9**	**30**	**3**	**60**
B Ltd.	**0.8**	**40**	**3**	**70**
C Ltd.	**0.6**	**50**	**2**	**150**
G Bonds	**0.01**	**1000**	**140**	**1010**

Risk Free return is 14%
Calculate:
(i) The expected rate of return on his portfolio using Capital Asset Pricing (CAPM)
(ii) The average return of his portfolio

Ans:

(i) Expected Rate of return

	Total Investment	Dividend	Capital Gain
A Ltd.	30	3	30
B Ltd.	40	3	30
C Ltd.	50	2	100
GOI Bonds	1000	140	10
	1120	148	170

Expected Return on Market Portfolio = $\frac{148+170}{1120} = 28.39\%$

CAPM E (R_P) = $R_F + \beta$ [E (R_M) – R_F]

A Ltd.	14+0.9(28.39-14)	= 14+12.95	=26.95%
B Ltd.	14+0.8(28.39-14)	= 14+11.51	=25.51%
C Ltd.	14+0.6(28.39-14)	= 14+8.63	=22.63%
GOI Bonds	14+0.01(28.39-14)	=14+0.14	=14.14%

(ii) Average Return of Portfolio = $\frac{26.95+25.51+22.63+14.14}{4} = \frac{89.23}{4} = 22.31\%$

Alternatively, $\frac{0.9+0.8+0.6+0.01}{4} = \frac{2.31}{4} = 0.5775$

0.5775 (28.39 – 14) = 14 + 8.31 = 22.31%.

12. The returns on Stock A and Market Portfolio for a period of 6 years are as follows:

Year	Return on A (%) (R_A)	Return on Market Portfolio (%) (R_M)
1	**10**	**8**
2	**17**	**10**
3	**13**	**13**
4	**2**	**-4**
5	**10**	**11**
6	**-10**	**-2**

You are required to determine:
Characteristic line for Stock A

Ans:

Characteristic Line for security A = Y = a + βx

CALCULATION OF BETA OF SECURITY

Period	Return of		Deviation from Mean		Variance		Co-Variance of DM × DA
	Market Portfolio (R_m)	Security A (R_A)	Market (D_m) ($R_m - R_m$)	A (D_A)	Market DM^2	DA^2	
1	8	10	2	3	4	9	6
2	10	17	4	10	16	100	40
3	13	13	7	6	49	36	42
4	-4	2	-10	-5	100	25	50
5	11	10	5	3	25	9	15
6	-2	-10	-8	-17	64	289	136
	Σ=36	Σ=42	Σ=0	Σ=0	ΣDM^2=258	ΣD^2A=468	ΣDM×DA=289

Mean	Market Portfolio	Share Company
$\left(\frac{\Sigma RM}{N} \text{ Or } \frac{\Sigma RA}{N}\right)$	$= \frac{36}{6} = 6$	$\frac{42}{6} = 7$
Variance (σ^2)	$\frac{258}{6} = 43$	$\frac{468}{6} = 78$
($\sigma^2_m = \Sigma DM^2 \div n$))		
Standard Deviation	√43	√78
(σ)	= 6.56	= 8.83
Covariance (MA)	= Σ(DM × DA) ÷ n	
	289 ÷ 6 = 48.167	

$\beta = CovMA \div \sigma^2_m = 48.167 \div 43 = 1.12$

$$\text{Correlation} = \frac{COVMA}{\sigma_M \times \sigma_A} = \frac{48.167}{6.56 \times 8.83} = 0.8316$$

Characteristic line for stock: A
$7 = a + 1.12 \times 6$
$a = 7 - 6.72$ or $a = 0.28$

$y = 0.28 + 1.12x$

FINANCIAL RISK MANAGEMENT

13. Build-Con Ltd. is a real-estate company. Market value of their debt is ₹ 400 Lakh. The company has 8,00,000 equity shares of ₹ 10 each, market price of which is presently ₹ 40/-. Equity beta is 1.10. Market risk premium is 5%. RBI Bonds are quoted at 7%. Find the following:
(A) Required return on equity share
(B) Beta of Assets
(C) Cost of Capital
(D) Appropriate discount rate that the company should use for an expansion proposal.
(E) The company is diversifying into Steel manufacturing. Average ungeared company in that industry carries a beta of 1.20. What should be expected return on this new venture?

Ans:

(A) Required return = Rf + β(Rm) = 7 + 1.1(5) = 12.5%
(B) Market value of shares = 8,00,000 × 40 = ₹ 320 Lakh
Debt Equity mix therefore = 400 : 320 (5 : 4)
Debt is assumed to be risk free
Beta of assets = (0) + 1.1 (4/9) = 0.489
(C) Cost of Capital is = 7 + 0.489 (5) = 9.445%
(D) Appropriate discount rate to be used for expansion is 9.445%
(E) Required return for the new venture: 7 + 1.2(5) = 13%.

14. The following data relates to DCB Ltd.'s share prices:

Current Price Per Share	**₹ 180**
Price per share in the futures	**₹ 200**
Market - 6 months	

It is possible to borrow money in the market for securities transaction at the rate of 12% p.a.
(i) Calculate the theoretical minimum price of 6 months-Futures contract.
(ii) Explain if any arbitraging opportunities exist.

Ans:

(i) Theoretical Future Price

Particulars	Value
6 months future price	200
Current Stock Price (S_x)	180
Borrowing Rate (r)	12% or 0.12
Time (in years)	6/12 = 0.5 year

Theoretical Future Price (F_x) $= S_x \times e^{rt}$
₹ 180 × $e^{0.12 \times 0.5}$
₹ 180 × $e^{0.06}$
180 × 1.06184 = ₹191.13

Since the Theoretical Future Price is less than the Expected Future Price, the recommended action would be to sell in the future market.

(ii) Cash flows to gain from Arbitrage opportunity:
Activity Flow: Enter into a future contract to sell shares at the rate of ₹ 200 on expiry date, sell the shares at the 6 months future rate of ₹ 200 ,pay the amount of borrowing together with interest.
₹ 180 × $e^{0.12 \times 0.5}$ =191.13
Net gain = 200 – 191.13=₹ 8.87

15. An investment management company wants to hedge its portfolios of shares worth ₹15 crore using NSE-NIFTY index futures. The contract size is 100. The index is currently quoted at 9120. The beta of the portfolio is 0.8. The beta of the index may be taken as 1. How many contacts to be traded by the investor?

Ans:

Beta of the portfolio =0.8
Beta of the index =1.0
Value per futures contract =V_F=9120×l00=₹912000
Value of the portfolio = V_F =15 crore
Hedge ratio= Beta of the port folio/Beta of the index =0.8/1=0.8
Number of future contacts to be traded
= Portfolio Value × (Hedge Ratio/Value of a Futures Contract)
=15 crore × [0.8/912000]
=131.5789474
=132 contracts

16. Given the following information:

BSE Index	**25,000**
Value of Portfolio	**₹ 50,50,000**
Risk Free Interest rate	**9% p.a.**
Dividend Yield on Index	**6% p.a.**
Beta of Portfolio	**2.00**

Assuming that a futures contract on the BSE Index @ 50 units per contract with 4 months maturity is used to hedge the value of the portfolio over the next 3 months. Based on the information calculate the price of a future contract and the gain per contract on short futures position if Index turns out to be 22,500 in 3 months.

Ans:

Tenor / time period (t) in years = 4 months or 0.3333 years.

(i) Risk free interest rate ® = 9% or 0.09
Price of future contract
$(TFP_x) = S_x \times e(r - y) \times t$
$= ₹ 25000 \times e^{(0.09 - 0.06) \times 0.3333}$
$= ₹ 25000 \times e^{0.03 \times 0.3333}$
$= ₹ 25000 \times e^{0.01} = ₹ 25000 \times 1.010$
= ₹ 25250
Therefore, price of futures contract is ₹ 25,250.

Gain on short Future Position

No. of contracts to be entered into Portfolio Value ₹ 5050000
4 month's future price per unit of BSE index ₹ 25250
No. of units per BSE Index future contract 50
Value per BSE Index future contract (50 units × ₹25250 Per Unit) =₹ 12,62,500
No. of contract to be entered (5050000 × 2.00 ÷ 1262500 = 8 Contracts

Contract sale price per unit	₹ 25,250
Less: Index Position in 3 months	₹ 22,500
Gain per unit of BSE Index Future	₹ 2,750

No. of unit per contract 50
Gain per contract ₹ 2,750 × 50 units = ₹ 1,37,500

FINANCIAL RISK MANAGEMENT – OPTIONS, SWAPS

17. The equity share of VCC Ltd. Is quoted at ₹210. A 3-month call option is available at a premium of ₹6 per share and a 3-month put option is available at a premium of ₹5 per share. Ascertain the net pay offs to the option holder of a call option and a put option.
(i) The strike price in both cases is ₹220, and
(ii) The share price on the exercise day is ₹ 200, 210, 220, 230, and 240.

Also indicate the price range at which the call and the put options may be gainfully exercised.

Ans:

Net pay-off for the holder of the call option					(₹)
Strike price on exercise day	200	210	220	230	240
Option exercise	No	No	No	Yes	Yes
Outflow (Strike price)	Nil	Nil	Nil	220	220
Outflow (premium)	6	6	6	6	6
Total outflow	6	6	6	226	226
Less: Inflow (sales proceeds)	--	--	--	230	240
Net pay off	- 6	- 6	- 6	4	14

Net pay-off for the holder of the put option					(₹)
Strike price on exercise day	200	210	220	230	240
Option exercise	Yes	Yes	No	No	No
Inflow (Strike price)	220	220	Nil	Nil	Nil
Less: Outflow (purchase price)	200	210	--	--	--
Less: Outflow (premium)	5	5	5	5	5
Net pay off	15	5	- 5	- 5	- 5

Analysis – The loss of the option holder is restricted to the amount of premium paid. The profit (positive pay off) depends on the difference between the strike price and the share price on the exercise day.

18. P Ltd. exports electronic instruments to importers of USA, and Japan on 180 days credit terms. You are given the following information of the company:

Cost and sales information

Particulars	**Japan**	**USA**
Variable cost per unit	**₹ 600**	**₹ 1560**
Export sale price per unit	**Yen 1200**	**USD 30.50**
Receipts from sale due in 180 days	**Yen 120,00,000**	**USD 3,05,000**

Foreign Exchange Rate information

Particulars	**Yen/₹**	**USD/₹**
Spot Market	**1.693 - 1.714**	**0.01610 - 0.01670**
6-Months Forward	**1.701 - 1.712**	**0.01652 - 0.01662**
6-Months Spot	**1.719 - 1.733**	**0.01658 - 0.01661**

You are asked to advise P Ltd. whether it should hedge its foreign currency risk or not. Present relevant figures in support of your advice.

Ans:

	Japan		USA	
Particulars	Bid Rate	Ask rate	Bid rate	Ask Rate
Spot Market	1.714	1.693	0.01670	0.01610
	0.583	0.591	59.880	62.112
6 months forward	1.712	1.701	0.01662	0.01652
	0.584	0.588	60.168	60.533
6 months spot	1.733	1.719	0.01661	0.01658
	0.577	0.582	60.205	60.314

	Japan		USA	
	Spot	Forward	Spot	Forward
Variable Cost per unit(a)	600	600	1560	1560
Export Sale(b)	1200	1200	30.5	30.5
Relevant bid rate(c)	0.577	0.584	60.205	60.168
Export sale per unit(d)	692.4	700.8	1836.253	1835.124
Contribution per unit(e)=(d-a)	92.4	100.8	276.253	275.124
Contribution ratio(f)=e/d	13.34	14.38	15.04	14.99
Advice	Hedging using forward contract.		Do not hedge	

Advice: The Company should hedge its foreign currency risks/exposure in Japanese Yen as it stands to gain a higher contribution to sales ratio and therefore higher profit margin. However for sale to USA, company need not hedge its risk.

Alternative Answer:

1. Both exports result in positive contribution. Hence export is worthwhile.
2. Variable cost is in ₹ Hence irrelevant for computation.
3. Selling price / sale value is receivable in foreign currency.

Hence, it is sufficient to use sale value for evaluation of hedging proposal.

Yen: Relevant rate when exporter encashes Yen is 1.733 (spot) and 1.712 for Forward rate. Yen value is higher in spot, and Yen/Rupees decreases in forward → exporter will get more Rupees in forward.
Or, ₹/Yen Spot = 1 ÷ 1.733 = 0.577
Forward = 1 ÷ 1.712 = 0.584
He will gain more Rupees in forward.
Gain = (0.584 – 0.577) * 120,00,000 Yen = (0.007) * 120,00,000 = 84,000
Advice : Hedge exposure in Yen.

US $ - Rupees relevant rate
Forward : Spot = 0.01662
60.168 ₹/$ * 3,05,000 = 183,51,240
No hedge : 60.205 * 3,05,000, or, 3,05,000 / 0.01661 = 183,62,432
Hedge loss avoided = 11,192/-
Forward yields lower gain. Hence no hedge is recommended.

19. IB and BT face the following interest rates:

Particulars	IB	BT
US Dollars (Floating Rate)	**LIBOR +1.5%**	**LIBOR + 2.0%**
Great Britain Pound (GBP) (Fixed Rate)	**6.0%**	**7.5%**

IB wants to borrow US Dollars at a floating rate of interest and BT wants to borrow GBP at a fixed rate of interest. A bank is willing to act as intermediary with 50 basis point as its remuneration. If the swap is attractive to IB and BT at 60 : 40 ratio, calculate the rates of that IB and BT will end up paying.

Ans:

(a)

Particulars	Value
1. Difference in Floating Rates [LIBOR+2%]-[LIBOR+1.5%]	0.5%
2. Difference in Fixed Rates[7.5%-6.0%]	1.5%
3. Net Difference [1-2] in absolute terms	1%
4. Amount paid for arrangement in swap option	(0.5%)
5. Net gain (3-4)	**0.5%**
6. IB's share in gain[0.5*60%]	0.3%
7. BT's share in gain [0.5*40%]	0.2%

Effective rate of Interest for IB and BT.

	IB		BT
1.	IB will borrow at Fixed rate	1.	BT will borrow at Floating rate
2.	Pay interest to bankers at Fixed rate, i.e. 6%	2.	Pay to bankers at floating rate, i.e. [LIBOR+2%]
3.	IB will collect from BT interest amount differential i.e. Interest computed at Fixed rate(6%) less Interest computed at Floating rate of (LIBOR+1.5%)=4.5%-LIBOR	3.	BT will pay amount differential to IB i.e. Interest computed at Fixed rate(6%) less Interest computed at Floating rate of (LIBOR+1.5%)=4.5%-LIBOR
4.	Receive its share of Gain from BT=0.3%	4.	Pay to IB its share of Gain=0.2%
5.	Effective interest rate=2-3-4=Fixed rate paid by IB-Interest differential received from BT-Share of Gain =(6%)-(4.5%-LIBOR)-(0.3%) LIBOR+1.2%	5.	Pay commission charges to bank for arranging swap contract=0.5%
		6.	Effective interest rate=2+3+4+5 =(LIBOR+2%)+(4.5%-LIBOR)+(0.2%)+(0.5%) =**7.2%**

INTERNATIONAL OPERATIONS

20. The following two-way quotes appear in the foreign exchange market -

	Spot Rate	1 month forward
₹/US$	**₹ 56/₹ 56.25**	**₹ 57 / ₹ 75.50**

Required:

(i) How many US Dollars should a firm sell to get ₹ 30 Lakhs after two months?

(ii) How many Rupees is the firm required to pay to obtain US $ 2,40,000 in the Spot market?

(iii) Assume the firm has US $ 69,000 Current Account's earning interest. ROI on Rupee investment is 10% p.a. should the firm encash the US $ now 2 months later?

Ans:

I) Action = Sell foreign currency in forward market
Relevant Rate = Spot Ask Rate = ₹ 56.25
US$ required to get ₹ 30,00,000 = ₹ 30,00,000 ÷ ₹ 57.00 = 52,631.58

(II) ₹ required to obtain US$ 2,40,000 in the spot market
Action = Buy foreign currency in spot market.
Relevant Rate = Spot Ask Rate = ₹ 56.25
Rupees required to obtain $ 2,40,000 = US$ 2,40,000 × 56.25 = ₹ 1,35,00,000

(III) Evaluation of investment in rupees

Forward premium (or Bid Rates) = $\frac{\text{Forward Rate ₹ 57 - Spot Rate ₹ 56}}{\text{Spot Rate ₹ 56}} \times \frac{12\text{ months}}{2\text{ months}} \times 100 = 10.71\%$

Annualized Forward Premium for Bid Rates (10.71%) is greater than the Annual Return on investment in Rupees (10%). Therefore, the firm should not encash its US$ balance now. It should sell the US$ in the forward market and encash them two months later.

21. The following two way quotes appear in the Foreign Exchange Market

	Spot	Three Months' Forward
₹/US $	₹ 66/66.25	₹ 67/67.50

(i) By what % has the Dollar currency changed? Indicate the nature of change. (Answer with reference to the ask rate).
(ii) By what % has the Rupee changed? Indicate the nature of change. (Answer with reference to the bid rate).
(iii) How many US Dollars should a firm sell to get ₹ 45 lakhs after three months?
(iv) How many rupees is the firm required to pay so as to obtain US $ 2,20,000 in the spot market?
(v) Assume that the firm has US $ 90,000 in current account earning interest. Return on rupee investment is 10% per annum. Should the firm encash the US $ now or 3 months later?

Ans:

(i) Ask rate:
Computation of annualized appreciation/depreciation
=(Forward rate-spot rate)/spot rateX100X12/3
=(67.50-66.25)/66.25 X 100X12/3
=7.55%
Result is positive, so appreciation.

(ii) Bid rate:
Computation of annualized appreciation/depreciation
Spot =66 ₹/$ =0.01515 $/₹
3 months forward= 67 ₹/$ =0.01493 $/₹
Difference =(0.00022) =.00022/.01515X100X12/3 =5.81%

Result is negative, so depreciation.

iii) Action= Sell US $ in forward market
Relevant rate= Forward bid rate=₹67.
US $ required= ₹4500000/₹67=US $ 67164.18

iv) Action= Buy US $ in spot market
Relevant rate= Spot ask rate=₹66.25
Rupees required to obtain US $220000=US $220000X ₹66.25 =₹14575000

v) Evaluation of Investment in Rupee

Particulars	Encash Now	Encash after 3 months
Relevant rate	Spot bid rate=₹66	Forward bid rate=₹67
₹ available for US $90000	₹5940000	₹6030000
Add: Interest for 3 months (if converted now)	5940000X10%X3/12 =148500	Not applicable
Amount available after 3 months	₹6088500	₹6030000

Conclusion: Encashing now yields higher return. So it is better to encash now.

22. A USA based company is planning to set up a software development unit in India. Software development at the India unit will be bought back by the US parent at a transfer price of US $ 10 million. The unit will remain in existence in India for one year; the software is expected to get developed within this time frame.

The US based company will be subject to corporate tax of 30per cent and a with-holding tax of 10% in India and will not be eligible for tax credit in the US. The software developed will be sold in the US market for US $ 12.0 million. Other estimates are as follows:

Rent for fully furnished unit with necessary hard ware in India	**₹15,00,000**
Man power cost (80 software professional will be working for 10 hours each day)	**₹400 per man hour**
Administrative and other costs	**₹12,00,000**

Advise the US Company on financial viability of the project. The rupee-dollar rate is ₹48/$.

Ans:

1. Cost of Operating the Indian Unit for 1 Year

Particulars	**Value**
Rental Cost [assumed to be annual]	₹ 15.00 Lakhs
Man Power Cost [80 Professionals × 365 Days x 10 Hours per Day x ₹ 400 per Hour)	₹ 1,168.00 Lakhs
Administrative and Other Costs [assumed to be annual]	₹ 12.00 Lakhs
Total Annual Cost of Operation	₹1,195.00 Lakhs
Exchange Rate per USD	₹ 48.00
Total Annual Cost of Operation in USD [₹ 1195 Lakhs ÷ ₹ 48.00]	USD 24.90 Lakhs

2. Computation of Indian Withholding Tax

Particulars	**Value**
Transfer Price for the Software	USD 100.00 Lakhs
Withholding Tax Rate in India	10%
Tax withheld in India [USD 100.00 Lakhs x 10%]	USD 10.00 Lakhs

3. Computation of Gain to Indian Business Unit

Particulars	**Value**
Transfer Price for the Software	USD 100.00 Lakhs
Cost of Operation for One Year	USD 24.90 Lakhs
Gain of Indian Business Unit [Transferred to US Parent]	USD 75.10 Lakhs

4. Computation of Tax Liability for US Parent Company (in US)

Particulars	Value
Sale Price of the Software in US Market	USD 120.00 Lakhs
Less: Price at which transferred from India to US	USD 100.00 Lakhs
Profit on Sale (taxable at 30% in the US Market)	USD 20.00 Lakhs
Add: Share of Gain of Indian Business Unit	USD 75.10 Lakhs
Total Taxable Income of the US Parent Company	USD 95.10 Lakhs
Tax Liability at 30%	USD 28.53 Lakhs

5. Cost Benefit Analysis

Particulars		Value
Inflow on Sale of Software in US Market	[A]	USD 120.00 Lakhs
Summary of Outflows:		
Annual Operation Cost of Indian Software Development Unit		USD 24.90 Lakhs
Tax Withheld in India for which credit is not available		USD 10.00 Lakhs
Tax Liability in US for Total Profits of the US Company		USD 28.53 Lakhs
Total Cash Outflow to the Company	[B]	USD 63.43 Lakhs
Net Benefit / Cash Inflow	[A-B]	USD 56.57 Lakhs

Recommendation: The project yields a net surplus of USD 56.57 Lakhs or USD 5.657 Millions (approximately). Therefore, the project is financially viable and the US Company may go ahead with the project.

23. The current price (in Dec 2017) of sugar is ₹40 per kg. Sugar Mill SM expects to produce 200 MT of sugar in February 2018. February futures contract due on 20th February is trading at ₹ 45 per kg. SM wants to hedge itself against a price decline to below ₹45 kg in February. 100% cover is required and each contract is for 10 MT.

(i) Explain SM's appropriate hedging measure showing cash flows for full value if the price falls to ₹42 per kg in February 2018.

(ii) What is the position of SM in the futures and in the spot market? (1 MT = 1000 kg.)

Ans:

Quantity to be hedged=200MT/10=20 futures.

Hedging Strategy:

Sell 20 futures in Dec 15 : 20×10×45×1000	₹90,00,000
Buy futures in Feb 16 : 20×10×42×1000	₹84,00,000
Gain in Future Market (A)	₹6,00,000
Price in Spot Market : 20×10×42×1000 (B)	₹84,00,000
Effective price realized [A+B]	₹90,00,000

SM's position in futures market is short and since SM holds the underlying asset, it is long in the spot market.

24. N, a foreign exchange dealer, is actively engaged in simultaneously buying and selling same foreign currencies to make guaranteed profit.

The rates prevailing in the market are as follows:

Spot rate	**:**	**₹65.80/$**
3 months forward rate	**:**	**₹66.40/$**
3 months interest rates	**:**	**₹ : 7% p. a.**
		$: 11% p. a.

Discuss the possibility of a net gain in arbitrage if N's borrowing potential is limited to ₹100 million.

Ans:

3 month forward rate of dollar is higher (at ₹ 66.40) than the spot rate (₹ 65.80). It implies that the dollar is at premium.

Premium (%) = $\frac{₹66.40 - ₹65.80}{65.80} \times \frac{12}{3} \times 100 = 3.647$ or 3.65% P.a.

Interest rate differential = 11% – 7% = 4% pa.

Since the interest rate differential (4%) and premium (3.65%) do not match, there are arbitrage gain possibilities. An arbitrageur (Nihar) can take the following steps in this regard:

(i) N (arbitrageur) borrows, say ₹ 100 million at 7% for 3 months (as ₹ carries lower interest rate)
(ii) He then converts ₹ 100 mollion in US $ at the spot rate of ₹ 65.80 in the spot market. He gets an amount of US $ 1519757 (i.e. 100,000,000/65.80 = 1519756.839 or 1519757)
(iii) He invests US $ 1519757 in the US money market at 11% interest p.a. for 3 months and he obtains interest of US $ 41793($1519757*3/7*11/100)
(iv) Total sum available with arbitrageur, 3 months from now is (US $1519757 + $41793) = US $1561550.
(v) Since he would get US $1561550 after 3 months, he sells forward US $ 1561550 at the rate of ₹ 66.40.
(vi) As a result of forward deal, at the end of 3 months from now, he would get ₹ 103686920, i.e. ($ 1561550 x 66.40)
(vii) He refunds ₹ 100 million borrowed, along with interest due on it. The refunded sum is ₹100, 000000+₹1750000 i.e (₹100,000,000*3/12*7/100)=₹101750000
(viii) Net gain is ₹ 103686920 – 101750000 = ₹ 1936920

25. Considering the following quotes
Spot (Euro/Pound) = 1.6543/1.6557
Spot (Pound/NZ$) =0.27860/0.2800
i) Calculate the % spread on the Euro/Pound Rate
ii) Calculate the % spread on the Pound/NZ$ Rate
iii) The maximum possible % spread on the cross rate between the Euro and the NZ$.

Ans:

(i) The % spread on Euro/Pound = $\frac{1.6557 - 1.6543}{1.6543} \times 100 = 0.085\%$

(ii) % Spread on the pound/NZ $ = $\frac{0.2800 - 0.2786}{0.2786} \times 100 = 0.50\%$

(iii) The maximum possible % spread on the cross rate between € & NZ $
To find out cross rate first
Given Spot (EURO/Pound) = 1.6543/1.6557
Spot (Pound / NZ$) = 0.2786/0.2800
Spot (Euro/NZ$) = 0.2786 x 1.6543 / 0.2800 x 1.6557 = 0.4609/0.4636
The maximum % spread on Euro/NZ$ = $\frac{0.4636 - 0.4609}{0.4609} \times 100$ = 0.59%

26. The following market data is available:

Spot USD/JPY 116

Deposit rates p.a.	USD	JPY
3 months	4.50%	0.25%
6 months	5.00%	0.25%

Forward Rate Agreement (FRA) FOR Yen is Nil.

1. The 6&12 months LIBORS are 5% & 6.5% respectively. A bank is quoting 6/12 USD FRA at 6.50-6.75%. Is any arbitrage opportunity available?

Calculate profit in such case.

Ans:

6 Months Interest rate is 5% p.a. & 12 Months interest rate is 6.5% p.a.
Future value 12 month from now is a product of Future value 6 months from now and 6 Months Future value from after 6 Months.
$(1+0.065) = (1+0.05*6/12) \times (1+i_{6.6} *6/12)$
$i_{6.6} = [(1+0.065/1.025) - 1] *12/6$

6 Months forward 6 month rate is 7.80% p.a.
The Bank is quoting 6/12 USD FRA at 6.50 – 6.75%
Therefore there is an arbitrage Opportunity of earning interest @ 7.80% p.a. & Paying @ 6.75%
Borrow for 6 months, buy an FRA & invest for 12 months
To get $ 1.065 at the end of 12 months for $ 1 invested today
To pay $ 1.060# at the end of 12 months for every $ 1 Borrowed today
Net gain $ 0.005 i.e. risk less profit for every $ borrowed
(1+0.05/2) (1+.0675/2) = (1.05959) say 1.060

27. An extract from exchange rate list of a Kolkata based bank is given below:

₹/¥: 0.3992: 0.4002

(i) How many Yen will it cost for a Japanese tourist visiting India to purchase ₹ 2,500 worth of jackfruit?

(ii) How much will Mr. B in Kolkata have to spend in rupees, to purchase a Sony Camcorder worth Yen 1, 25,000?

Ans:

The Japanese will have to pay (₹2500/0.3992 or) = ¥ 6263 for the jackfruit
Mr. B will have to pay (¥125000 × 0.4002) or ₹50025 rounded off ₹50000 for the Camcorder.

LEASING

28. A contract has been made between M & T Construction Company Ltd. and a foreign embassy to build a block of ten flats to be used by the foreign embassy as guest houses. As per the terms of the contract the foreign embassy would provide the plans and the land costing ₹ 50 lakh to M & T Construction Company Ltd. The Company would build their flats at their own cost and lease them to the foreign embassy for 15 years. As per the contract the flats will be transferred to the foreign embassy after 15 years at a nominal value of ₹ 16 lakh.

The company estimates the cost of construction as follows:

Area per flat	**1500 sq. feet**
Construction cost	**₹ 1200 per sq. feet**
Registration and other costs	**5% of cost of construction**

The company will also incur ₹ 8 lakh each in years 14 and 15 towards repairs of flats. M & T Construction Company Ltd. proposes to charge the lease rentals as follows:

Years	Rentals
1-5	Normal
6-10	130% of the normal
11-15	150% of normal

The company's present tax rate averages at 35% which is likely to be the same in future. The full construction and registration costs will be written off over 15 years at a uniform rate and will be allowed for tax purposes.

Additional information: (a) Minimum desired rate of return 10% (b) Rentals and Repairs will arise on the last day of the year and (c) construction, registration and other costs will be incurred at the beginning of the project (t=0).

Calculate the normal lease rent per annum per flat.

Ans:

(a)

Calculation of present value of Cash Out Flow	₹	₹
Cost of construction 1500 × 1200 × 10		180,00,000
Registration and other costs @ 5%		9,00,000
Cost of repairs	8,00,000	
Less : Tax Savings (35%)	2,80,000	
	5,20,000	
Present value of cost of repairs for year 14 = 5,20,000 × 0.2633	1,36,916	
Present value of cost of repairs for year 15 = 5,20,000 × 0.2393	1,24,488	2,61,404
		191,61,404
Rounded off		191,61,400

Let 'X' be the normal lease rent per 10 flats per annum, P/V of recurring cash inflow for 15 years

Particulars	1-5 years	6-10 years	11-15 years
Lease rent annum	X	1.3 X	1.5 X

Depreciation [189,00,000/15]	12,60,000	12,60,000	12,60,000
PBT	X-12,60,000	1.3X-12,60,000	1.5X-12,60,000

PAT (65%)	0.65X-8,19,000	0.845X-8,19,000	0.975X-8,19,000

CIAT = PAT + Depreciation	0.65X+4,41,000	0.845X+4,41,000	0.975X+4,41,000

PVCF	3.7907	2.3538	1.4615
PV	2.464X+16,71,699	1.989X+10,38,026	1.425X+6,44,522

Total = 5.878x + 33,54,247

P/V of terminal cash inflows :

	₹
Nominal value of flats after 15 years	16,00,000
Less : Tax on profit (35%×16,00,000)	5,60,000
Value	10,40,000
P/V = 10,40,000 × 0.2394	2,48,976

At 10% rate of return : P/V of cash inflows = P/V of cash outflows
5.878X + 33,54,247 + 2,48,976 = 191,61,400
5.878X = 155,58,177
X = 26,46,849

Lease rent per flat = ₹26,46,849 / 10 = ₹2,64,685

29. A company wish to acquire an asset costing ₹1,00,000. The company has an offer from a bank to lend @ 18%. The principal amount is repayable in 5 years end installments. A leasing Company has also submitted a proposal to the Company to acquire the asset on lease at yearly rentals of ₹ 280 per ₹ 1,000 of the assets value for 5 years payable at year end. The rate of depreciation of the asset allowable for tax purposes is 20% on W.D.V with no extra shift allowance. The salvage value of the asset at the end of 5 years period is estimated to be ₹1,000. Whether the Company should accept the proposal of Bank or leasing company, if the effective tax rate of the company is 50%? The Company discounts all its cash flows at 18%.

Ans:

(I) Borrowing Option:

(Amount in ₹)

Year	Principal	Interest @ 18% p.a.	Depreciation @ 20% on W.D.V.	Tax shield (3)+(4)×50%	Net cash flow (2)+(3)–(5)	P. V. Factor @18%	Discounted Cash Flows (6)x(7)
1	2	3	4	5	6	7	8
1	20,000	18,000	20,000	19,000	19,000	0.847	16,093
2	20,000	14,400	16,000	15,200	19,200	0.718	13,786
3	20,000	10,800	12,800	11,800	19,000	0.609	11,571
4	20,000	7,200	10,240	8,720	18,480	0.516	9,536
5	20,000	3,600	8,192	5,896	17,704	0.437	7,736
5	(1,000)	---	31,768*	15,884	(16,884)	0.437	(7,378)
Present value of Total Cash out flow							**51,350**

*WDV at the end of 5 years shall be ₹32,768. Deducting there from the salvage value of ₹ 1,000 the capital loss claim will be ₹ 31,768.

(II) Leasing Option:

(Amount in ₹)

Year	Lease Rentals	Tax shield	Net Cash Flows	P.V. Factor @ 18%	Discounted Cash Flows
1	28,000	14,000	14,000	0.847	11,858
2	28,000	14,000	14,000	0.718	10,052
3	28,000	14,000	14,000	0.609	8,526
4	28,000	14,000	14,000	0.516	7,224
5	28,000	14,000	14,000	0.437	6,118
Discounted after tax cost					**43,778**

Advise: By making analysis of both the alternatives, it is observed that the Present value of the Cash Outflow is lower in alternative II by ₹ 7,572 (i.e. 51,350 – 43,778). Hence it is suggested to acquire the asset on lease basis.

PART – III : SHORT NOTES

30. Write short notes on:

a) Decision Tree Analysis
b) Objectives of Cross Border leasing
c) Difference between Banks and NBFCs
d) Commercial Bills.
e) Derivatives
f) State the objectives of Portfolio Management.
g) What are the components of risk?
h) Repo and Reverse Repo
i) Role of hedging as foreign exchange risk management.

Ans:

a) Decision Tree Analysis is a useful tool for analysis of investment proposals incorporating project flexibility. The decision-tree method analyzes investment opportunities involving a sequence of decisions over time. Various decision points are defined in relation to subsequent chance events. The Expected NPV for each decision point is computed based on the series of NPVs and their probabilities that branch out or follow the decision point in question. In other words, once the range of possible decisions and chance events are laid out in tree diagram form, the NPVs associated with each decision are computed by working backwards on the diagram from the expected cash flows defined for each path on the diagram. The optimal decision path is chosen by selecting the highest expected NPV for the first decision point.

b) Objectives of Cross Border l easing:

(i) **Overall Cost of Financing**: A major objective of cross-border leases is to reduce the overall cost of financing through utilization by the lessor of tax depreciation allowances to reduce its taxable income. The tax savings are passed through to the lessee as a lower cost of finance. The basic prerequisites are relatively high tax rates in the lessor's country, liberal depreciation rules and either very flexible or very formalistic rules governing tax ownership.

(ii) **Security:** The lessor is often able to utilize non-recourse debt to finance a substantial portion of the equipment cost. The debt is secured by among other things, a mortgage on the equipment and by an assignment of the right to receive payments under the lease.

(iii) **Accounting Treatment**: Also, depending on the structure, in some countries the lessor can utilize very favourable "Leveraged Lease" Financial Accounting treatment for the overall transaction.

(iv) **Repossession:** In some countries, it is easier for a lessor to repossess the leased equipment following a Lessee default because the lessor is an owner and not a mere secured lender.

c) Difference between banks & NBFCs

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.

d) Commercial bill is a short term, negotiable, and self-liquidating instrument with low risk. It enhances the liability to make payment in a fixed date when goods are bought on credit. The bill of exchange is a written unconditional order signed by the drawer requiring the party to whom it is addressed to pay on demand or at a future time, a definite sum of money to the payee. It is negotiable and self-liquidating money market instrument which evidences the liquidity to make a payment on a fixed date when goods are bought on credit. It is an asset with a high degree of liquidity and a low degree of risk. Such bills of exchange are discounted by the commercial banks to lend credit to the bill holder or to borrow from the Central bank. The bank pays an amount equal to face value of the bill minus collection charges and interest on the amount for the remaining maturity period. The writer of the bill (debtor) is drawer, who accept the bill is drawee and who gets the amount of bill is payee.

e) A derivative is a financial instrument, whose value depends on the values of basic underlying variable. In the sense, derivatives is a financial instrument that offers return based on the return of some other underlying asset, i.e., the return is derived from another instrument. Derivatives are a mechanism to hedge market, interest rate, and exchange rate risks. Derivatives market is divided into two types- Financial market and Commodity market. Types of Financial Derivatives include: Forwards, Futures, Options, Warrants, Swaps, Swaptions. There are three types of traders in the derivatives market: Hedger, Speculator and arbitrageur.

f) The objectives of Portfolio management are —

(i) **Reduce Risk:** To reduce the risk of loss of capital / income, by investing in various types of securities and over a wide range of industries, i.e. diversification.
(ii) **Safety of Principal:** To keep the capital / principal amount intact, in terms of value and in terms of purchasing power. The capital or the principal amount invested should not erode, either in value or in terms of purchasing power. By earning return, principal amount will not erode in nominal terms, by earning returns at a rate not lesser than the inflation rate; principal amount will be intact in present value terms.
(iii) **Stability of Income:** To facilitate a more accurate and systematic re-investment of income, to ensure growth and stability in returns.
(iv) **Capital Growth:** To enable attainment of capital growth by reinvesting in growth securities or through purchase of growth securities.
(v) **Marketability:** To have an easily marketable investment portfolio, so that the investor is able to take advantage of attractive opportunities in the market.
(vi) **Liquidity:** Some investors prefer that the portfolio should be such that whenever they need their money, they may get the same.
(vii) **Maintaining the Purchasing Power**: Inflation eats the value of money, i.e., purchasing power. Hence, one object of the portfolio is that it must ensure maintaining the purchasing power of the investor intact besides providing the return.
(viii) **Tax Savings:** To effectively plan for and reduce the tax burden on income, so that the investor gets maximum from his investment.

g) Components of Risk
Total Risk = Systematic Risk + Unsystematic Risk

- Systematic Risk: It represents that portion of Total Risk which is attributable to factors that affect the market as a whole. Beta is a measure of Systematic Risk.
- Unsystematic Risk: It is the residual risk or balancing figure, i.e., Total Risk Less Systematic Risk.

h) Repo or ready forward contact is an instrument for borrowing funds by selling securities with an agreement to repurchase the said securities on a mutually agreed future date at an agreed price which includes interest for the funds borrowed. Repo rate is the return earned on a repo transaction expressed as an annual interest rate.

The reverse of the repo transaction is called 'reverse repo' which is lending of funds against buying of securities with an agreement to resell the said securities on a mutually agreed future date at an agreed price which includes interest for the funds lent.
It can be seen from the definition above that there are two legs to the same transaction in a repo/ reverse repo. The duration between the two legs is called the 'repo period'. Predominantly, repos are undertaken on overnight basis, i.e., for one day period. Settlement of repo transactions happens along with the outright trades in government securities.

The consideration amount in the first leg of the repo transactions is the amount borrowed by the seller of the security. On this, interest at the agreed 'repo rate' is calculated and paid along with the consideration amount of the second leg of the transaction when the borrower buys back the security. The overall effect of the repo transaction would be borrowing of funds backed by the collateral of Government securities.

The money market is regulated by the Reserve Bank of India. All the above mentioned money market transactions should be reported on the electronic platform called the Negotiated Dealing System (NDS).

i) In International finance, hedging means a transaction undertaken to offset some exposure arising from a firm's usual operation. In order to reduce or eliminate currency exposer, internal strategies such as currency invoicing, netting and offsetting, leading and lagging, indexation clause in contract, switching the base of manufacture are resorted to.

A money market hedge involves taking a money market position to cover future foreign currency payable and receivables position.

Hedging is a risk management technique, primarily done to protect the foreign exchange exposures against the volatility of exchange rates, by using derivatives like Currency Options, Currency Futures, Forward Contracts, Currency Swaps, and Money Markets etc. by taking off-setting positions against the underlying asset. Hedging refers to process, whereby one can protect the price of financial instrument at a date in the future by taking an opposite position in the present by using derivatives like Currency Options, Currency Futures, Forward Contracts, Currency Swaps, Money Markets, etc. It refers to technique of protecting the financial exposures in the underlying asset or liability due to volatility in the exchange rates by taking offsetting positions through derivatives to offset the losses in the cash market by a corresponding gain in the derivatives market.

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.