FINAL EXAMINATION
GROUP - III
(SYLLABUS 2016)

SUGGESTED ANSWERS TO QUESTIONS
JUNE - 2017

Paper-14 : STRATEGIC FINANCIAL MANAGEMENT

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

The figures in the margin on the right side indicate full marks.
Working Notes should form part of your answers.
Wherever necessary candidates may make appropriate assumptions and clearly state them.
No present value factor table or other statistical table will be given in addition to this question paper.
This paper contains two sections, A and B. Section A is compulsory and contains question 1 for 20 marks. Section B contains question 2 to 8, each carrying 16 marks.
Answer any five questions from Section B.

Section – A
Answer all the questions. Each question carries two marks.

1. Choose the Correct Option from amongst the four alternatives given (1 mark is for the correct choice and 1 mark for justification/workings) 2×10=20

(i) Annual Cost Saving ₹ 4,00,000
Useful life 4 years
Cost of the Project ₹ 11,42,000
The Pay back period would be
(A) 2 years 8 months
(B) 2 years 11 months
(C) 3 years
(D) 1 year 10 months

(ii) There are 4 investments

	X	Y	Z	U
The standard deviation is	37,947	44,497	42,163	41,997
Expected net present value (₹)	90,000	1,06,000	1,00,000	90,000

Which investment has the highest risk?
(A) X
(B) Y
(C) X
(D) U

(iii) The spot rate of the US dollar is ₹ 65.00/USD and the four month forward rate is 65.90/USD. The annualized premium is
(A) 4.2%
(B) 5.1%
(C) 6.0%
(D) 6.4%

(iv) A stock is currently sells at ₹ 350. The put option to sell the stock sells at ₹ 380 with a premium of ₹ 20. The time value of option will be
(A) ₹ 10
(B) ₹ -10
(C) ₹ 20
(D) ₹ 0

(v) An investor owns a stock portfolio equally invested in a risk free asset and two stocks. If one of the stocks has a beta of 0.75 and the portfolio is as risky as the market, the beta of the stock in portfolio is
- **(A) 2.12**
- **(B) 2.25**
- **(C) 2.56**
- **(D) 2.89**

(vi) You are given the following information: required rate of return on risk free security 7%; required rate of return on market portfolio of investment 12%; beta of the firm 1.7. The cost of equity capital as per CAPM approach is
- **(A) 16.3%**
- **(B) 18.0%**
- **(C) 18.60%**
- **(D) 19%**

(vii) The following statement is true in the context of rupee-dollar exchange rate with r_i denoting interest rate in India and r_u denoting interest rate in the US.
- **(A) Rupee will be at forward discount if $r_i > r_u$**
- **(B) Rupee will be at forward premium if $r_u > r_i$**
- **(C) Rupee will be forward premium if $r_i > r_u$**
- **(D) Rupee will be at par with dollar if $r_i = r_u$.**

(viii) The following is not a systematic risk.
- **(A) Market Risk**
- **(B) Interest Rate Risk**
- **(C) Business Risk**
- **(D) Purchasing Power Risk**

(ix) The following statement is true:
(If 'r' denotes the correlation coefficient)
- **(A) r = +1 implies full diversification of securities in a portfolio**
- **(B) r = -1 implies full diversification of securities in a portfolio**
- **(C) r = 0 implies an ideal situation of zero risk**
- **(D) 'r' is independent of diversification. Nothing can be inferred based on r.**

(x) The following is not a feature of Capital Market Line:
- **(A) There is no unsystematic risk.**
- **(B) The individual portfolio exactly replicates market portfolio in terms of risk and reward.**
- **(C) Estimates portfolio return based on market return.**
- **(D) Diversification can minimize the individual portfolio risk.**

Answer:

1. (i) (B)

Justification: Pay-back Period = Cost of Project/Annual Cost Saving
= ₹ 11,42,000/4,00,000 = 2.855
= 2 years 11 months.

(ii) (D)

Justification: Coefficient of variation = Standard deviation/Expected NPV
Coefficient of variation of X=37947/90000=0.422
Coefficient of variation of Y=44497/106000=0.420
Coefficient of variation of Z= 42163/100000=0.422
Coefficient of variation of U= 41997/90000=0.467
U has highest risk as it has highest coefficient of variation.

(iii) (A)

Justification: The annualized premium = [(Forward rate-Spot Rate)/Spot Rate]*[12/ Forward Contract length in months]
= 65.90-65/65*12/4 = 4.2%.

(iv) (D)

Justification: Time value of option is =(Option premium- Intrinsic Value of option)
= ₹[20-(380-350)]= ₹(20-30) = ₹ -10
= 0 (Cannot be negative)

(v) (B)

Justification: Beta of the stock of the portfolio is [(1/3*0.75)+(1/3*x)+(1/3*0)] = 1
So, x = 2.25

(vi) (A)

Justification: Cost of equity capital as per CAPM approach= 0.07+1.7(0.12-0.07)=16.3

(vii) (B)

Justification: Interest Parity = $\frac{F}{S} = (\frac{1+r_i}{1+r_U})$

Rupee premium is when spot is more than forward rupee/dollar
Forward value is less if $r_i < r_U$ i.e $r_U > r_i$.

(viii) (C)

Justification: Business Risk arise from known and controllable factors unique to particular security or industry. Business Risks can be eliminated by diversification of portfolio.

(ix) (B)

Justification: Investments offset each other as they move in opposite direction.

(x) (D)

Justification: Individual securities does not lie on Capital Market Line. A well diversified portfolio does not become risk free and would be subject to considerable variability. The real risk of a security is the market risk which cannot be eliminated.

Section – B

Answer any five questions from question No. 2 to 8. Each question carries 16 marks.

2. (a) A Ltd. is considering replacement of an existing machine or to spend money on overhauling it. A Ltd currently pays no taxes. The replacement machine costs ₹ 50,000 now and requires maintenance of ₹ 5,000 at the end of every year for 5 years. At the end of 5 years, it would have a salvage value of ₹ 10,000 and would be sold. The existing machine requires increasing amounts of maintenance each year and its salvage value falls each year as follows:

Year	Maintenance (₹)	Salvage (₹)
Present	0	20,000
1	5,000	12,500
2	10,000	7,500
3	15,000	0

The cost of capital of A Ltd is 15%.

End of year	1	2	3	4	5	6
Present value factor @ 15%	0.8696	0.7561	0.6575	0.5718	0.4972	0.4323

When should the company replace the machine? **8**

(b) The following information pertaining to two securities is given:

	Securities	
	A Ltd.	B Ltd.
Spot Price (₹)	4,550	360
Dividend expected (₹)	50	20
Divided receivable in (months)	2	3
Recommended Action:	Sell Spot, Buy Futures	Buy Spot Sell Futures

Risk free interest rate may be taken as 9% p.a.

(i) Determine the 6 months' theoretical forward prices of securities of A Ltd. and B Ltd. For what values of futures contract rates will the above recommended action be appropriate?

(ii) What would your answer to (i) above be if there is no dividend expected for A and B? 8

Answer:

2. (a) Equivalent cost of (EAC) of new machine:

	₹
Cost of new machine now	50,000
Add: P.V. of annual repairs @ 5,000 p.a. for 5 years = 5,000 × 3.3522	(+)16,761
Less: P.V. of salvage value at end of 5 years = 10,000 × 0.4972	(-) 4,972
	61,789
Equivalent annual cost = 61,789/3.3522	18,432

EAC of keeping the old machine:

Present Value	Year 1(₹)	Year 2(₹)	Year 3 (₹)
Value present	20,000	12,500	7,500
Add PV of Annual Maintenance			
=Annual Maintenance/1.15	4347.826	8695.652	13043.48
Total	24347.826	21195.652	20543.48
Less: PV of salvage value at end of year (PV/1.15)	10869.565	6521.739	0
	13478.261	14673.913	20543.48
	1.15	1.15	1.15
Equivalent Annual Cost	15500	16875	23625

Advice: The company should replace the old machine after year 2 as EAC of new machine at ₹ 18,432 is lower than the cost of using existing machine in year 3.

(b) (i)

Securities of	A Ltd.	B Ltd.
Spot Price [S_X] (₹)	4,550	360
Dividend Expected [D_F] (₹)	50	20
Dividend Receivable in [t]	2 months or 1/6 year or 0.1667	3 months or ¼ year or 0.25
Risk Free Interest Rate [r]	9% or 0.09	9% or 0.09
Present Value of Dividend [Dp]	DF ÷ e^{rt} = ₹ 50 ÷ $e^{0.09 \times 0.1667}$ = ₹ 50 ÷ $e^{0.015}$ = ₹ 50 ÷ 1.01511 = ₹ 49.256	DF ÷ e^{rt} = ₹ 20 ÷ $e^{0.09 \times 0.25}$ = ₹ 20 ÷ $e^{0.0225}$ = ₹ 20 ÷ 1.022755 = ₹ 19.555
Adjusted Spot Price [S_{adj}] S_X - D_P (₹)	4,550 - 49.256 = 4,500.744	360 – 19.555 = 340.445
Theoretical Forward Price = [TFP_X] (₹)	= 4500.744 × $e^{0.09 \times 0.50}$ = 4,500.744 × $e^{0,045}$ = 4,500.744 × 1.04603 = 4,707.91	= 340.445 × $e^{0.09 \times 0.50}$ = 340.445 × $e^{0,045}$ = 340.445 × 1.04603 = 356.126
6 months Futures Contract Rate [AFP_X] (₹)	Less than 4707	More than 356
Valuation in Futures Market	Undervalued	Overvalued
Recommended Action	Sell Spot. Buy Future.	Buy Spot. Sell Future.

(ii)

Adjusted spot price	4550	360
Theoretical Forward Price	= 4550 × $e^{0.045}$ = 4550 × 1.04603	= 360 × $e^{0.045}$ = 360 × 1.04603

	= 4759.4	= 376.57
6 months future rate for appropriateness of action	Less than 4759	More than 376

3. (a) A Mutual Fund made an issue of 10,00,000 units of ₹ 10 each on 01.01.2016. No entry load was charged. It made the following investments after incurring initial expenses of ₹ 2 lacs.

Particulars	₹
50,000 Equity Shares of ₹ 100 each @ ₹ 160	80,00,000
7% Government Securities	8,00,000
9% Debentures (unlisted) of ₹ 100 each	5,00,000
10% Debentures (Listed) of ₹ 100 each	5,00,000
Total	98,00,000

During the year, dividends of ₹ 12,00,000 were received on equity shares, interest on all types of debt securities was received as and when due. At the end of the year, equity shares and 10% debentures are quoted at 175% and 90% of their respective face values. Other investments are quoted at par.

(i) Find out the Net Asset Value (NAV) per unit given that the operating expenses during the year amounted to ₹ 5,00,000.

(ii) Also find out the NAV, if the Mutual Fund had distributed a dividend of ₹ 0.90 per unit during the year to the unit holders. 8

(b) H L Manufacturing Ltd. desires to acquire a diesel generating machine set costing ₹ 40 lakh which has an economic life of 10 years at the end of which the asset is not expected to have any residual value. The company is considering two alternatives:
(a) taking the machine on lease
(b) purchasing the asset outright by raising a loan.
Lease payments are equal annual amounts and have to be made in advance and the lessor requires the asset to be completely amortized over its useful period. The loan carries an interest 16% p.a. The loan has to be paid in 10 equal annual installment becoming due at the beginning of the first year. Average rate of income tax is 50%. It is expected that the operating costs would remain the same under either method. The company allows straight line method of depreciation and the same is accepted for tax purposes.

Assume tax benefits at the end of the respective years and for end of year zero, tax benefit may be considered at the end of the first year. Use 8% discount rate for p.v. factors. Present a statement showing discounted values of annual cash flows to the nearest rupee under alternative (b), only for end of years 0 to 2 and year 10. What should be the maximum annual lease rental for which the lease option may be preferred if you are given that the present value under the loan option is ₹ 26,57,029?
The present value of an annuity of one Rupee

Year	8%
1 to 9	6.247
1 to 10	6.71

Present value of Rupee one at 8%

Year	0	1	2	3	4	5	6	7	8	9	10
PV	1.00	0.926	0.857	0.794	0.735	0.681	0.630	0.583	0.540	0.500	0.463

8

Answer:

3. (a) Given the total initial investments is ₹ 98,00,000, out of the issue proceeds of ₹ 1,00,00,000. Therefore the balance of ₹ 2,00,000 is considered as Issue Expenses.

Computation of Closing Net Asset Value

Particulars	Opening value of Investments	Capital Appreciation (₹)	Closing value of Investments	Income (₹)
Equity Shares	80,00,000	7,50,000	87,50,000	12,00,000
7% Govt. Securities	8,00,000	NIL	8,00,000	56,000
9% Debentures (Unlisted)	5,00,000	NIL	5,00,000	45,000
10% Debentures(Listed)	5,00,000	(-)50,000	4,50,000	50,000
Total	98,00,000	7,00,000	1,05,00,000	13,51,000
Less: operating expenses during the period				(5,00,000)
Net Income				8,51,000
Net Fund Balance = ₹ (1,05,00,000+8,51,000)				1,13,51,000
Less: Dividend = (10,00,000 × 0.90)				(9,00,000)
Net Fund Balance (after Dividend)				1,04,51,000
NAV(Before considering Dividends) ₹1,13,51,000 ÷ 10,00,000				11.35
NAV(After Dividends) ₹ 1,04,51,000 ÷ 10,00,000				10.45

(b) **Schedule of Debt Payment**

Year end	Loan Instalment	Loan at the beginning of the year	Interest on loan (Col. 3 × 0.16)	Principal Repayment (Col.2 – Col.4)	Principal Outstanding at the end of the year (Col.3 – Col.5)
1	2	3	4	5	6
0	713,394	40,00,000	0	713,394	32,86,606
1	713,394	32,86,606	525,857	187,537	30,99,069
2	713,394	30,99,069	495,851	217,543	28,81,526

Annual instalment of Loan = ₹40,00,000 / 5.607 (PV factor making payment in 0 year=Factor for cash flow at time 0+Annuity factor for 9 years at 16%=1+4.607)
= ₹713,394

PV of Cash Outflows under Buying Alternative

Depreciation = 40,00,000 / 10 = 4,00,000

Year End	Loan Instalment	Tax Advantage		Net Cash Outflows	PV factor at after tax cost	Total PV
		On Interest (0.5)	On Depreciation (0.5)			
1	2	3	4	5	6	7
0	713,394	0	-	713,394	1.000	713,394
1	713,394	262,928	200,000	250,465	0.926	231,931
2	713,394	247,926	200,000	265,468	0.857	227,506
10	0	0	2,00,000	(2,00,000)	0.463	(92,600)

Let x be the equal annual lease rental (L.R).

P.V. of L.R. = PV for year 0 + PV for yrs 1-9 +PV for year 10
= (x)x1+ (x-0.5x)x 6.247-(0.5x)x0.463 = 1x + 3.1235x-0.2315x = 3.892x
Lease will be preferred if 3.892x < 26,57,029, i.e., x < 6,82,690

4. (a) A firm has an investment proposal, requiring an outlay of ₹ 40,000. The investment proposal is expected to have 2 years' economic life with no salvage value. In year 1, there is a 0.4 probability that cash inflow after tax will be ₹ 25,000 and 0.6 probability that cash inflow after tax will be ₹ 30,000. The probabilities assigned to cash inflows after tax for the year 2 are as follows:

The Cash inflow year 1	₹ 25,000		₹ 30,000	
The Cash inflow year 2		Probability		Probability
	₹ 12,000	0.2	₹ 20,000	0.4
	₹ 16,000	0.3	₹ 25,000	0.5
	₹ 25,000	0.5	₹ 30,000	0.1

The Firm uses a 12% discount rate for this type of investment.

(i) Tabulate the NPVs for each path of the decision free (diagram not essential)

(ii) What net present value will the project yield if the worst outcome is realized? What is the probability of occurrence of this NPV.

(iii) What will be the best outcome and the probability of that occurrence?

(12% Discount factor 1 year 0.8929
2 year 0.7972) 8

(b) The following details are given about stocks X and Y. An analyst prepared ex-ante probability distribution for the possible economic scenarios and the conditional returns for the two stocks and the market index as shown below:

Economic Scenario	Probability	X	Y	Market
Growth	0.4	25	20	18
Stagnation	0.3	10	15	13
Recession	0.3	-5	-8	-3

The risk free rate during the next year is expected to be around 9%. The following additional information is known:

	X	Y	Market
Standard Deviation %	12.46	12.03	8.89
Covariance with the market	106.20	106.69	

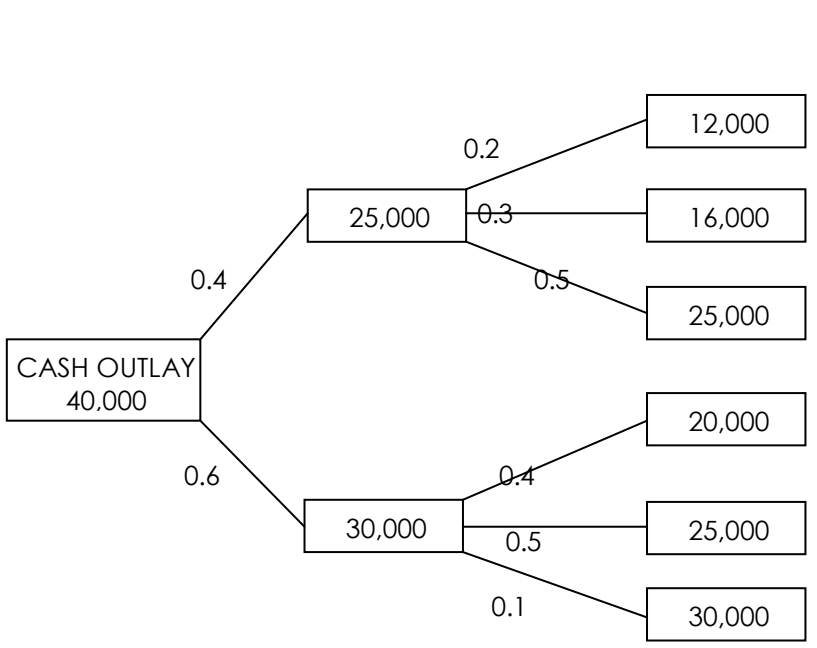
(i) Find the expected returns of X, Y and the market using the probability distribution.

(ii) Find the Beta of X and Y.

(iii) Find the expected returns of X and Y under CAPM and recommend whether to buy or hold stocks X and Y. 8

Answer:

4. (a) (i) The decision tree given below shows that there are six possible outcomes each represented by a path.



PATH NO.	Jt. Probability year 1 × year 2
1	0.08
2	0.12
3	0.20
4	0.24
5	0.30
6	0.06
	1.00

The net present value of each path at 12% discount rate is given below:

Path	Cash inflow year 1*discount factor year 1	cash inflow year 2*discount factor year 2	Total inflow	cash outflow	NPV
1	₹ 25000*.8929=22323	12000*.7972=9566	31889	40000	-8111
2	₹ 25000*.8929=22323	16000*.7972=12755	35078	40000	-4922
3	₹ 25000*.8929=22323	25000*.7972=19930	42253	40000	2253
4	₹30000*.8929=26787	20000*.7972=15944	42731	40000	2731
5	₹30000*.8929=26787	25000*.7972=19930	46717	40000	6717
6	₹30000*.8929=26787	30000*.7972=23916	50703	40000	10703

Statement showing Expected Net present Value

Path	NPV @12%	Joint probability	Expected NPV
1	-8111	0.08	-648.88
2	-4922	0.12	-590.64
3	2253	0.2	450.60
4	2731	0.24	655.44
5	6717	0.3	2015.1
6	10703	0.06	642.18
			2523.8

(ii) If the worst outcome is realized, the Net Present Value which the project will yield is Rs 8111(negative). The probability of occurrence of this NPV is 8%

(iii) The best outcome will be path 6 when NPV is higher i.e. ₹10703(positive). The probability of occurrence of this NPV is 6%

(b) (i) Computation of Expected Returns:

Scenario	Prob. P	Return x R_x	Mean P x R_x	Return Y R_y	Mean P x R_y	Market Return R_M	Mean Px R_M

Growth	0.4	25	10.00	20	8.0	18	7.2
Stagnation	0.3	10	3.00	15	4.5	13	3.9
Recession	0.3	-5	-1.50	-8	-2.4	-3	-0.9
Estimated Returns			11.5		10.1		10.2

(ii) Computation of Standard Deviation of R_M

R_M	DM=R_M-10.2	D_M2	P	P × D_M2
18	7.8	60.84	0.4	24.34
13	2.8	7.84	0.3	2.35
-3	-13.2	174.24	0.3	52.27
				78.96

Standard Deviation of the Market = √78.96 = 8.89%
Beta =Covariance/Variance of the market

1. Beta of Security X = 106.20/78.96= 1.34
2. Beta of Security Y = 106.69/78.96 = 1.35

(iii) Under CAPM, the equilibrium Return = $R_f + \beta(R_m - R_f)$
Expected Return of Security X = 9% + 1.34 (10.2 – 9) = 10.61%
Expected Return of Security Y = 9% + 1.35 (10.2 – 9) = 10.62%

Conclusion and Recommendations

Particulars	Security X	Security Y
Estimated Returns	11.50	10.10
Expected Return under CAPM	10.61	10.62
Estimated Return Vs. Expected Return	Expected Return is lower. Stock X is under priced.	Expected Return is higher Stock Y is overpriced
Recommendation	Buy/Hold	Sell

5. (a) An investor has invested ₹ 10,00,000 in four securities A, B, C and D the details of which are as follows:

Security	Amount Invested (₹)	Beta
A	2,50,000	0.500
B	3,00,000	1.400
C	1,60,000	0.900
D	2,90,000	1.300
Total	10,00,000	

Reserve Bank of India (RBI) bonds carry an interest rate of 9% and NIFTY yields 15%. You are required to find out the expected return on portfolio. If investment in security C is replaced by RBI Bonds, what is the corresponding change in portfolio beta and expected return? 10

(b) ABC Ltd. has a capital budget of ₹ 2 crore for the year. From the following information relating to six independent proposals, select the projects if (i) the projects are divisible and (ii) projects are indivisible in order to maximise the NPV.

Proposal	Investment (₹)	NPV (₹)
I	8,500,000.00	5,000,000.00
II	3,500,000.00	2,600,000.00
III	6,000,000.00	2,000,000.00
IV	4,000,000.00	2,500,000.00

V	**6,000,000.00**	**5,000,000.00**
VI	**8,000,000.00**	**(2,500,000.00)**

6

Answer:

5. (a) Computation of Weighted Beta (Beta of the Portfolio)

Security	Amount Invested	Proportion to Total Investment	Beta of Investment	Weighted Beta
A	250000	0.250	0.500	0.125
B	300000	0.300	1.400	0.420
C	160000	0.160	0.900	0.144
D	290000	0.290	1.300	0.377
Total	1000000	1.000		1.066

Computation of Expected Return on Portfolio

Expected Return $[E(R_p)] = R_f + \beta_p \times (R_m - R_f)$

Risk Free Rate	9%
Nifty Yields	15%
Beta	1.066
Expected Return	9% + 1.066 × (15 – 9) = 0.1539

Computation of Weighted Beta (Beta of the Portfolio)

Security	Amount Invested	Proportion to Total Investment	Beta of Investment	Weighted Beta
A	250000	0.250	0.500	0.125
B	300000	0.300	1.400	0.420
RBI	160000	0.160	0.000	0.000
D	290000j	0.290	1,300	0.377
Total	1000000	1.000		0.922

Computation of Expected Return on Portfolio

Expected Return $[E(R_p)] = R_f + \beta_p \times (R_m - R_f)$

Risk Free Rate	9%
Nifty Yields	15%
Beta	0.922
Expected Return	9% + 0.922 (15 – 9) = 0.1453

(b) (i) If the projects are divisible
Projects are ranked according to PI and arranged in descending order.

Proposal	Investment	NPV	PV of Inflows	PI	Rank
I	85,00,000	50,00,000	135,00,000	1.59	4
II	35,00,000	26,00,000	61,00,000	1.74	2
III	60,00,000	20,00,000	80,00,000	1.33	5
IV	40,00,000	25,00,000	65,00,000	1.63	3
V	60,00,000	50,00,000	110,00,000	1.83	1

Proposal	Investment	Cum Investment
V	60,00,000	60,00,000
II	35,00,000	95,00,000
IV	40,00,000	135,00,000
I	85,00,000	220,00,000
III	60,00,000	280,00,000

Only 65,00,000 can be invested in project I.NPV of the project=65/85x50,00,000=38,23,529
So the selected projects are V, II, IV and part of I.

(ii) If the projects are indivisible (by trial and error method)

Feasible Sets	Investments	NPV
V, II, I	180,00,000	126,00,000
V, IV, I	185,00,000	125,00,000
V, II, IV, III	195,00,000	121,00,000
I, II, IV	160,00,000	101,00,000
V, IV, III	160,00,000	95,00,000

Project V, II and I provides the maximum NPV may be undertaken.

6. (a) Company A has outstanding debt on which, it currently pays fixed rate of interest at 9.5%. The company intends to refinance the debt with a floating rate interest. The best floating rate it can obtain is LIBOR + 2%. However, it does not want to pay more than LIBOR.
Another company B is looking for a loan at a fixed rate of interest to finance its exports. The best rate it can obtain is 13.5% but it cannot afford to pay more than 12%. However, one bank has agreed to offer finance at a floating rate of LIBOR + 2% and is in the process of arranging rate swap between these two companies.
(i) Enumerate the steps in the swap deal.
(ii) What are the interest savings by each company?
(iii) How much would the bank's benefit be? 10

(b) JB ltd. an American Company will need £ 3,00,000 in 180 days. In this connection, the following information is available:
Spot rate £1= $2.00
180 days forward rate of £ as of today = $ 1.96
Interest rates are as follows:

	U.K	US
180 days deposit rate %	4.50	5.00
180 days borrowing rate %	5.00	5.50

The Company has forecast the spot rates 180 days hence as follows:

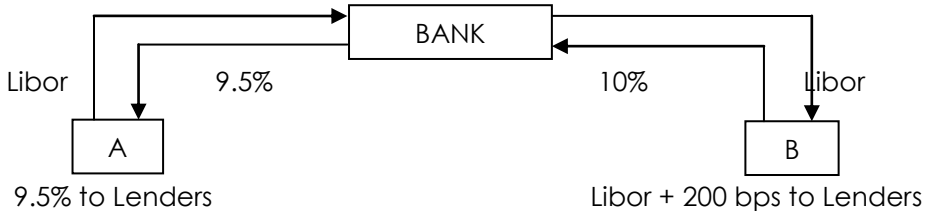
Rate	Probability
$ 1.91	25%
$ 1.95	60%
$ 2.05	15%

Compare the benefits of money market hedge Vs. Nod hedge and advise JB Ltd. on the choice of the better strategy. 6

Answer:

6. (a) (i)First let us tabulate the details to find the quality spread differential:

		Cost of funds to company A and B	
	Objective	Fixed Rate	Floating Rate
Company A	Floating	9.50% p.a.	Libor + 200 bps
Company B	Fixed	13.5% p.a.	Libor + 200 bps
Differential		400 bps	0 bps



The differential between the two markets = 400 bps - 0 = 400 bps.
A total of 400 bps needs to be shared between A, B and bank.
Since A cannot afford to pay more than LIBOR, it needs 200bps benefits out of the total 400 bps (Libor +2% -Libor).

Similarly, B cannot pay more than 12% as against the existing available fixed rate funding of 13.5%. It requires 150 bps benefits, out of 400 bps.
The balance 50 bps would be shared/charged by the bank.

The swap can therefore be structured as follows:

Firm	Paid to Bank	Received from Bank	Paid to market	Net Cost	Savings
A	LIBOR	9.5%	9.5%	LIBOR	(LIBOR+2%)-(LIBOR)=200bps
B	10%	LIBOR	LIBOR+200bps	12%	(13.5-12.0)=150bps

(ii)Company A gets floating rate funds at LIBOR as against (LIBOR+2%), thereby getting an advantage of 200 bps.

Company B gets fixed rate funds at 12% as against 13.5%, thereby getting an advantage of 150 bps.
(iii) Bank gets 50 bps as commission.

(b) Money market hedge: Borrow $, convert to £, invest £, repay $ loan in 180 days
Amount in £ to be invested = 3,00,000/(1+i) = 3,00,000/1.045 = £ 2,87,081
Amount of $ needed to convert into £ = 2,87,081 × 2 = $ 5,74,162

Interest and principal on $ loan after 180 days = $ 5,74,162 × (1 + 5.5 %) = $ 5,74,162 × 1.055 = $ 6,05,741

No hedge option:

Expected future spot rate	Dollar needed	Probability	
(1)	£ 3,00,000 × (1) =(2)	(3)	(2) × (3) =(4)
1.91	5,73,000	0.25	1,43,250
1.95	5,85,000	0.60	3,51,000
2.05	6,15,000	0.15	92,250
			5,86,500

Probability distribution of outcomes for no hedge strategy appears to be more preferable because less no. of dollars are needed under this option to arrange £3,00,000.

7. (a) 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 if
(i) The strike price in both cases is ₹ 220 and
(ii) The share price on the exercise days is ₹ 200, 210 220, 230 and 240. 8
[on the expiry day for what threshold values of share price will each option holder be in the money?]

(b) Stock P has a beta of 1.50 and a market expectation of 15% return. For stock Q, it is 0.80 and 12.50% respectively. If the risk free rate is 6% and the market risk premium is 7%, evaluate whether these two stocks are priced correctly. Hence recommend the appropriate action to be taken for each stock. For what value of β of stock P would you reverse your decision above for stock P? 8

Answer:

7. (a) Net pay off [call option]

Spot price on Expiry Date (SPE)	Exercise Price (EP)	Value of call [Maximum of (SPE-EP),0]	Action	Option premium	Net Pay off [call holder]
1	2	3	4	5	6=3-5
200	220	200-220=-20----------0	Lapse	6	0-6=-6
210	220	210-220= -10----------0	Lapse	6	0-6=-6
220	220	220-220=0----------0	Lapse	6	0-6=-6
230	220	230-220=10----------10	Exercise	6	10-6=4
240	220	240-220=20----------20	Exercise	6	20-6=14

Net pay off [put option]

Spot price on Expiry Date(SPE)	Exercise price (EP)	Value of call [Maximum of (EP-SPE),0]	Action	Option premium	Net Pay off [call holder]
1	2	3	4	5	6=3-5
200	220	220-200=20	Exercise	5	15
210	220	220-210=10	Exercise	5	5
220	220	220-220=0	Lapse	5	-5
230	220	220-230= -10----------0	Lapse	5	-5
240	220	220-240= -20----------0	Lapse	5	-5

Option is gainfully exercised by(or in the money)

(i) For call option holder share price is more than ₹ 226

(ii) For put option holder share price is less than ₹ 215

(b) Expected return under CAPM:

Stock P = $R_F + \beta \times [R_M - R_F] = 6\% + 1.50 \times 7\% = 16.50\%$

Stock Q = $6\% + 0.80 \times 7\% = 11.60\%$

Market price evaluation

Particulars	Stock P	Stock Q
Expected return (market) [A]	15%	12.50 %
Expected return under CAPM [B]	16.50%	11.60 %
[A] vs. [B]	B is higher	B is lower
Inference	Stock P gives lesser return than what it should give	Stock Q gives higher return than what it should give.
Conclusion:	Overvalued	Undervalued
Recommendation	Sell	Buy

For holding or buying P,

CAPM return ≤ Market Return

$6\% + \beta \times 7\% \leq 15\%$

$\therefore \beta \leq \frac{9\%}{7\%} = 1.29$

β should be less than or equal to 1.29 to reverse the decision.

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

(a) What are the tools and techniques used by RBI to maintain financial stability? 4

(b) Distinguish between commodity futures and financial futures with respect to the following aspects:

(i) Valuation

(ii) Delivery and settlement

(iii) Contract features and life

(iv) Supply and consumption pattern 4

(c) List the steps involved in raising equity through American Depositary Receipts (ADR). 4

(d) Write a short note on price based auction in securities market. 4

(e) What are the constituents of an interest rate cap? 4

Answer:

8. (a) Tools and Techniques

The Reserve Bank makes use of a variety of tools and techniques to assess the build-up of systemic risks in the economy and to provide critical inputs in this respect to its policy making departments. The tools include:

- A **Financial Stress Indicator** - a contemporaneous indicator of conditions in financial markets and in the banking sector;
- **Systemic Liquidity Indicator** for assessing stresses in availability of systemic liquidity;
- **A Fiscal Stress Indicator** for assessing build up of risks from the fiscal;
- A **Network Model** of the bilateral exposures in the financial system - for assessing the inter-connectedness in the system;
- A **Banking Stability Indicator** for assessing risk factors having a bearing on the stability of the banking sector; and
- A series of **Banking Stability Measures** for assessing the systemic importance of individual banks.

(b) Difference between Financial futures and commodity futures on the following basis:

(i) Valuation

Financial futures are easier to understand as the cost of carry model for its valuation applies. The argument of arbitrage also holds because of the absence of convenience yield in financial futures. Financial futures involve financial instruments which do not have consumption value. The consumption value makes valuation of futures contracts on commodities difficult.

(ii) Delivery and Settlement

The provisions of delivery are applicable equally to commodities and financial futures. In case of financial futures delivery of underlying assets is prompt and hassle free, and so is its settlement.

Further, there are no costs of transportation, storage, or insurance, etc. involved in financial futures. For futures on financial assets the price adjustment on account of discrepancy in quality of what was contracted and what is being delivered, is not required. Quality of underlying asset is immaterial in case of financial products, whereas there is ample scope of controversy over quality in case of commodity futures. In case of futures on indices or intangibles the underlying is non-deliverable and futures contracts on them are necessarily cash settled.

(iii) Contract Features and Life

Commodity futures are governed by seasons and perishable nature of the underlying asset. The delivery is linked to the availability, and therefore contracts specifications have to consider physical characteristics of the underlying assets. Futures contracts on commodities normally do not exceed 90 days, while there is no such limitation on the financial futures. Financial futures can have much longer life, though generally maturity of many financial futures is kept at 90 days.

(iv) Supply and Consumption Patterns

In case of financial products, such as stocks, indices, and foreign exchange, the supply can be considered as unlimited and independent of weather and seasons. The supply in case of financial products does not suffer from vagaries of nature. The supply of commodities depends upon factors on which we do not have any control. The total supply is dependent upon whether, storage capacity, shelf life, etc. further, the supply of most commodities (agricultural products) is

confined to the harvesting period, while the consumption is uniform throughout the year. Deterioration in value of commodities with time is another phenomenon that does not affect futures on financial products.

(c) Process for Raising Equity through ADR:

(i) **Issue Intermediaries**: ADRs are issued by Overseas Depository Bank (ODB), who have a Domestic Custodian Bank (DCB) in India.
(ii) **Deposit of Securities**: Company willing to raise equity through ADRs should deposit the securities with the DCB in India.
(iii) **Authorization for Issue of ADRs:** The Indian Company authorizes the ODB to issue ADR against the security of Company's Equity Shares.
(iv) **Issue of ADR:** ODB issues ADRs to investors at a predetermined ratio to the Company's securities.
(v) **Redemption of ADR:** When an investor redeems his ADRs, the appropriate number of underlying equity shares or bonds is released.
(vi) **Dividend/Interest:** The Indian Company pays interest to the ODB, which in turn distributes dividends to the ADR holders based on the prevailing exchange rate.

(d) Price Based Auction in securities market:

In this type of auction, RBI announces the issue size or notified amount and the tenor of the paper to be auctioned, as well as the coupon rate. The bidders submit bids in terms of the price. This method of auction is normally used in case of reissue of existing Government Securities. Bids at price lower than the cut off price are rejected and bids higher than the cut off price are accepted. Price Based auction leads to a better price discovery then the Yield based auction.

(e) Constituents of an interest rate cap :

(i) Notional Principal amount
(ii) Interest Rate Index : specified maturity of LIBOR
(iii) A cap rate, which is equivalent to strike or exercise price on an option
(iv) Period of agreement, including payment dates and interest rate reset dates.

Candidates may use relevant values from the following:
$e^{0.015} = 1.01511$
$e^{0.225} = 1.022755$
$e^{0.045} = 1.04603$
$e^{0.03} = 1.030455$
PV factor $(\frac{1}{1+x})^n$

End of Year n	1	2	3	4	5
x% 12	0.8929	0.7972	0.7118	0.6355	0.5674