Paper – 14 – Strategic Financial Management

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

Answer Question No. 1 which is compulsory and carries 20 marks and any five from Questions No. 2 to 8.

Section A [20 marks]

Answer the following questions:

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

(i) You are a forex dealer in India. Rates of rupee and Euro in the international market are US $ 0.01962905 and US $ 1.335603 respectively. What will be your direct quote of € (euro) to your customer?
(A) ₹ 69.5900
(B) ₹ 68.0420
(C) ₹ 65.1010
(D) ₹ 70.905

(ii) Marison Ltd. is planning to invest in USA. The rates of inflation are 8 % in India and 3 % in USA. If spot rate is currently ₹46.50/$, what spot rate can the company expect after 5 years?
(A) ₹57.93/$
(B) ₹58.94/$
(C) ₹59.00/$
(D) ₹59/.13/$

(iii) The Beta co-efficient of equity stock of ECOBOARD LTD. Is 1.6. The risk free rate of return is 12% and the required rate of return is 18% on the market portfolio. If dividend expected during coming year is ₹2.50 and the growth rate of dividend and earnings is 8%, at what price the stock of ECOBOARD ltd. Can be sold (based on CAPM)?
(A) ₹18.38
(B) ₹15.60
(C) ₹12.50
(D) None of the above

(iv)The spot USD/Yen=190 Yen and one year forward rate of USD/Yen =210Yen The prime rate in US is 15%. What should be Japanese prime rate be?
(A) 20.11%
(B) 25.22%
(C) 27.11%
(D) 29.55%

(v) Which of the following investment avenues has the least risk associated with it?

(A) Corporate fixed deposits
(B) Deposits in commercial banks
(C) Public Provident Fund
(D) Non convertible zero coupon bond.

(vi) Consider the following data:

Rate of inflation=5.1%
Beta=0.85
Real rate of return=4.2%
Market return=12.6%
The risk premium for the above security will be:

(A) 2.5%
(B) 2.65%
(C) 2.805%
(D) 2.95%

(vii) Covariance between a stock and a market index and variance of market index are 33.56 and 19.15 respectively. The Beta of stock is:

(A) 1.55
(B) 1.75
(C) 1.85
(D) 1.95

(viii) The face value of a 364 day T-Bill is ₹100. If purchase price is ₹86, then the yield on such a bill is

(A) 12.5%
(B) 13.36%
(C) 16.32%
(D) 16.56%

(ix) A company has obtained quotes from two different manufacturers for an equipment. The details are as follows:

Product	Cost (Million)	Estimated life (years)
Make X	4.50	10
Make Y	6.00	15

Ignoring operation and maintenance cost, which one would be cheaper? The company's cost of capital is 10%.
[Given: PVIFA (10%, 10 years) = 6.1446 and PVIFA (10%, 15 years) = 7.6061]

(A) Make X will be cheaper
(B) Make Y will be cheaper
(C) Cost will be the same
(D) None of the above

(x) The stock of ABC Ltd sells for ₹ 240. The present value of exercise price and value of call option are ₹217.40 and ₹ 39.60 respectively. What is the value of put option?

(A) ₹ 16.50
(B) ₹ 22.00
(C) ₹17.00
(D) ₹18.00

Answer: 1

(i) (B) — ₹ 68.0420:

₹ /US $ = 1/0.01962905 = ₹ 50.9449

Now, US $ /€ = 1.335603

Therefore, The direct quote of €in India will be —

₹/€=₹/$* $/€=₹ 50.9449 × 1.335603 = ₹ 68.0420

(ii) (B) ₹58.94/$

E(₹/$)=46.50*[(1.08)^5/(1.03)^5

=46.5(1.08/1.03)^5 =46.50*1.267455=₹58.94

Hence expected rate =₹58.94/$

(iii) (A) ₹18.38

Expected return(By CAPM)

Re=Rf+β(Rm-Rf)

=12%+1.6(18%-12%)

=12%+9.6%

=21.6%

Price of stock(Dividend growth formula)

Re=D1/P_0+g

0.216=2.50/P_0+0.08

.216-.08=2.50/P_0

.136=2.50/P_0

P_0= 2.50/0.136 = ₹18.38

(iv) (C) 27.11%

From Interest Rate parity

(¥210/$)/(¥190/$)=(1+i¥)/1.15

Or, i¥=27.11%

(v) (C) Public Provident Fund

PPF Account can be opened in a Head Post Office or branch of SBI or subsidiaries. The rate of interest on these accounts is determined by Central Government.

(vi) (C) 2.805%

Risk free return= Real rate of return + Rate of inflation

= 5.1+4.2=9.3

Risk Premium= β(R_m-R_f)= 0.85(12.6-9.3)=2.805

(vii) (B) 1.75

B= Cov_{sm}/Variance $_m$ =33.56/19.15=1.75

(viii) (C)16.32%

[₹(100-86)/₹86]*365/364*100=16.32%

(ix) (A) Make X will be cheaper

Make X

Purchase cost = ₹ 4.50 million

Equivalent annual cost = 4.50/6.1446 = ₹ 0.73235 million

Make Y

Purchase cost = ₹ 6.00 million

Equivalent annual cost = 6.00/7.6061 = ₹0.78884 million

Therefore, equivalent annual cost of make X is lower than make Y, make X is suggested to purchase.

(x) (C) ₹17.00.

Value of put option = Value of Call option + PV of exercise price – Stock price

= ₹(39.60+217.40-240) = ₹ 17.

Section B [80 marks]

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

2(a) DS Inc. is considering a new plan in Netherlands. The Plan will cost 26 million Guilders. Incremental cash flows are expected to be 3 million Guilders per year for the first 3 years. 4 million Guilders for the next 3, 5 million Guilders in years 7 to 9, and 6 million Guilders in years 10 through 19, after which the project will terminate with no residual value.
The present exchange rate is 1.90 Guilders per dollar. The required rate of return on repatriated dollar is 16%.
Required:
(i) If the exchange rate stays at 1.90, what is the project NPV?
(ii) If the Guilder appreciates to 1.84 for years 1-3, to 1.78 for years 4-6, 1.72 for years 7-9, and to 1.65 for years 10-19, what happens to NPV?

Year	0	1-3	4-6	7-9	10-19
Discount factors at 16%	1	2.246	1.439	0.922	1.270

2(b) From the following project details calculate the sensitivity of the
(i)Project cost
(ii)Annual cash flow, and
(iii)Cost of capital.
Which variable is the most sensitive?

Project cost	₹12,000	Annual Cash flow	₹4,500
Life of the project	4 Years	Cost of capital	14%

The annuity factor at 14% for 4 years is 2.9137 and at 18% for 4 years is 2.6667. [8+8 marks]

Answer:

2(a) NPV under Fixed exchange rate ($ 1 = Guilders 1.90):

(Amount in million)

Particulars	Years				
	0	**1 - 3**	**4 - 6**	**7 - 9**	**10 - 19**
1. Cash flow in Guilders	(26.00)	3.00 p.a	4.00 p.a	5.00 p.a	6.00 p.a
2. Exchange rate (Guilders / $)	1.90	1.90	1.90	1.90	1.90
3. Cash flow in $	(13.6842)	1.5789	2.1053	2.6316	3.1579
4. Discount factor @ 16%	1	2.246	1.439	0.922	1.270
5. Discounted cash flow	(13.6842)	3.5462	3.030	2.4263	4.0105

Net Present Value = **US $ (0.6712) million.**
Recommendation: **Since NPV is negative, the Project should not be accepted.**

NPV under variable exchange rates:

(Amount in million)

Particulars	**0**	**1-3**	**4-6**	**7-9**	**10 -19**
Cash flow in Guilders	(26.00)	3.00 p.a	4.00 p.a	5.00 p.a	6.00 p.a
Exchange rate (Guilders / $)	1.90	1.84	1.78	1.72	1.65
Cash flow in $	(13.6842)	1.6304	2.2472	2.9070	3.6364
Discount factor @ 16%	1	2.246	1.439	0.922	1.270
Discounted cash flow	(13.6842)	3.6619	3.2337	2.6803	4.6182

NPV = **US $ 0.5099 Million.**
Recommendation: **Since the NPV is positive, the project may be accepted.**

2(b)

Annual cash inflow (₹) (4,500 × 2.9137)	13,112
Less: Project Cost (₹)	12,000
Net present value (₹)	**1,112**

(i) Sensitivity for Project Cost

If the project cost is increased by ₹1,112, the NPV of the project will become zero. Therefore, the sensitivity for project cost is:

$$\frac{1,112}{12,000} \times 100 = 9.27\%$$

(ii) Sensitivity for Annual Cash Inflow

If the present value of annual cash inflow is lower by ₹1,112, the NPV of the project will become zero. Therefore, the sensitivity for annual cash flow is:

$$\frac{1,112}{13,112} \times 100 = 8.48\%$$

(iii) Sensitivity for Cost of Capital

Let 'p' be the annuity factor which gives a zero NPV
Therefore we can say – 12,000 + 4,500p =0
[Where p = PVIFA (x, 4), where x is that rate when NPV = 0 i.e. x is the IRR]
4,500p = 12,000
p=12,000 ÷ 4,500 = 2.667
Therefore PVIFA (x, 4) = 2.667. now looking across year 4 in the PVIFA table, we get x = 18 %. Therefore the sensitivity for cost of capital is:

$$\text{Sensitivity \%} = \frac{18\% - 14\%}{14\%} = 28.57\%$$

Analysis – The cash inflow is more sensitive, since only 8.5% change in cash inflow will make the NPV of the project zero.

3 (a) Following information is available regarding four Mutual Funds:

Mutual Fund	Return (%)	Standard Diviation (σ)	Beta (β)
A	12	15	0.80
B	16	22	0.76
C	21	37	1.15
D	13	24	1.32

Risk free rate of return is 10% and face value is ₹ 100 each.
Evaluate the performance of these Mutual Funds using Sharpe Ratio and Treynor's Ratio.
Comment on the evaluation after ranking the Funds.

3 (b) An investor purchased 300 units of a mutual fund at ₹12.25 per unit on 31st December, 2016. As on 31st December, 2017 he has received ₹1.25 as dividend and ₹1.00 as capital gains distribution per unit,

Required:

(i) The return on investment if the NAV as on 31st December, 2017 is ₹13.00.
(ii)The return on investment as on 31st December, 2017 if all dividends and capital gains distributions are reinvested into additional units of the fund at ₹12.50 per unit.
(II) Moonlight mutual fund is an open-end fund with 50 Lakh units outstanding. You buy 2,100 units today. The dividend paid and the closing NAV for 2 years are as follows:

Year	Dividend ₹	NAV ₹
Today	-	19
1	0.20	21
2	0.25	23

Calculate Money Weighted rate of Return (MWROR), if you reinvest dividends

[6+(6+4) marks]

Answer:

3 (a) Sharpe Ratio = $(R_p - R_f)/\sigma_p$; and Treynor's Ratio = $(R_p - R_f)/\beta_P$.

Where R_P = return on Portfolio
R_f = Risk-free return
σ_p = Standard deviation of portfolio
β_P = Beta of portfolio

Mutual Fund	Under Sharpe's method	Ranking	Under Treynor's method	Ranking
A	(12 - 10) / 15 = 0.133	3	(12 -10) / 0.80 = 2.5	3
B	(16-10)/22 = 0.27	2	(16 -10) / 0.76 = 7.89	2
C	(21 -10)/ 37 = 0.30	1	(21 -10) / 1.15 = 9.57	1
D	(13 -10)/24 = 0.125	4	(13 -10) / 1.32 = 2.27	4

Rank in both methods is same. This indicates that all the Mutual Funds seem to be reasonably well diversified.

3(b)(I) Return for the year (all charges on a per year basis)

Particulars	₹/Unit
Changes in price [13.00 -12.25]	0.75
Dividend received	1.25
Capital gain distribution	1.00
Total return	3.00

Return on investment = [3.00 / 12.25] × 100 = 24.49 %

If all dividends and capital gains are reinvested into additional units at ₹ 12.50 per unit, the position would be:

Total amount reinvested = ₹ 2.25 × 300	= ₹675
Additional units added = ₹ 675 / 12.50	= 54 units
Value of 354 units as on 31.12. 2013	= ₹4,602
Price paid for 300 units on 31.12. 2012 = 300 × ₹12.25	= ₹3,675
Return = [4,602 - 3,675] / 3,675 =927/3,675	= 25.22%

(II) MWROR with reinvestment:

When you reinvest 20 p, dividend at time 1, the no. of units you buy = [0.2 × 2100] / 21 = 20

Therefore. Total units at the beginning of the 2nd. Year = 2100 +20 = 2120.

The cash flow for computing the rupee-weighted return are then:

Time	Return
0	-2100 × 19 = (-) 39,900
1	
2	2120 × [0.25 + 23] = 49.290

The rupee-weighted return is just the IRR, defined by:

(-) 39,900 + 49,290/(1 + IRR)^2 = 0; OR, IRR = [49,290/39,900]$^{0.5}$ – 1 = 11.1458%

4 (a) An investor is interested to construct a portfolio of securities ALFA and GAMA. He has collected the following information about the proposed investment:

	ALFA	**GAMA**
Expected return	**20%**	**25%**
σ	**12%**	**16%**

Co-efficient of Correlation (r) between ALFA and GAMA is 0.16.

He wants to constitute only 5 portfolios of ALFA and GAMA as follows:

(1) All funds invested in ALFA.
(2) 50% of funds in ALFA and 50% in GAMA.
(3) 75% of funds in ALFA and 25% in GAMA.
(4) 25% of funds in ALFA and 75% in GAMA.
(5) All funds invested in GAMA.

You are required to calculate:

(A) Expected return under different portfolios.
(B) Risk factor associated with these portfolios.
(C) Which portfolio is best from the view-point of risk?
(D) Which portfolio is best from the view-point of return?

4(b) A portfolio manager has the following four stocks in his portfolio:

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

Compute the following:

(i) Portfolio Beta (β).

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

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

[8+8 marks]

Answer: 4(a)

(A) Expected return under different portfolios-

Portfolio (1): 1 x 0.20 + 0 x 0.25 = 20%
Portfolio (2): 0.5 x 0.20 + 0.5 x 0.25 = 22.50%
Portfolio (3): 0.75 x 0.20 + 0.25 x 0.25 = 21.25%
Portfolio (4): 0.25 x 0.20 + 0.75 x 0.25 = 23.75%
Portfolio (5): 0 x 0.20 + 1 x 0.25 = 25%.

(B) Risk factor associated with different Portfolios –

Portfolio (i) = $[(\sigma a^2 \times W_a{}^2) + (\sigma c^2 \times W_c{}^2) + 2 (\sigma a \times W_a \times \sigma c \times W_c \times ac)]^{1/2}$,
where a= ALFA and c = GAMA.

ρ $= [(12^2 \times 1^2) + (16^2 \times 0^2) + 2 \times 12 \times 1 \times 16 \times 0 \times 0.16]^{1/2} = (144)^{1/2} = 12\%$.

Similarly, Portfolio (ii) = $(115.36)^{1/2} = 10.74\%$.
Portfolio (iii) = $(108.52)^{1/2} = 10.42\%$
Portfolio (iv) = $(164.52)^{1/2} = 12.83\%$
Portfolio (v) = $(256)^{1/2} = 16\%$.

(C) The best portfolio from the viewpoint of Risk is one which has least risk factor; i.e., 10.42%, i.e., Portfolio (iii) = **75% fund in ALFA and 25% fund in GAMA.**

(D) The best portfolio from the view-point of Return is one which has best return, i.e., 25%, i.e., Portfolio (v) = **100% fund in GAMA.**

4(b)

Security	No. of shares	Market price per share	(1) x (2)	% of total	Beta	Weighted Beta
	(1)	(2)		(W)		
VSL	10,000	50	5,00,000	0.4167	0.9	0.375
CSL	5,000	20	1,00,000	0.0833	1.0	0.083
SML	8,000	25	2,00,000	0.1667	1.5	0.250
APL	2,000	200	4,00,000	0.3333	1.2	0.400
			12,00,000	1.0000		1.108

Hence, Portfolio beta [i] 1.108
[ii] Required beta 0.8
It should become [0.8 / 1.108] 72.2% of the present portfolio
If ₹ 12,00,000 is 72.2%, total portfolio should be ₹ 12,00,000 x 100 / 72.20 = ₹ 16,62,050
Additional investment in ZERO risk should be (₹16,62,050 - ₹ 12,00,000) = ₹ 4,62,050.

(ii) Revised Portfolio will be

Security	No. of shares	Market price per share	(1) x (2)	% to total	Beta	Weighted Beta
	(1)	(2)				
VSL	10,000	50	5,00,000	0.3008	0.9	0.271
CSL	5,000	20	1,00,000	0.0602	1.0	0.060
SML	8,000	25	2,00,000	0.1203	1.5	0.180
APL	2,000	200	4,00,000	0.2407	1.2	0.289
Risk-free Asset	46,205	10	4,62,050	0.2780	0	0
			16,62,050	1		0.800

(iii) To increase Beta to 1.2
Required beta 1.2
It should become 1.2 / 1.108 108.30% of present data
If ₹ 12,00,000 is 108.30%, total portfolio should be 12,00,000 x 100 / 108. 30 = 11,08,030
Additional investment should be (-) 91,967 i.e., Divest ₹ 91,970 of Risk free asset.

Revised portfolio will be -

Security	No. of shares	Market price per share	(1) x (2)	% to total	Beta	Weighted Beta
	(1)	(2)				
VSL	10,000	50	5,00,000	0.4513	0.9	0.406
CSL	5,000	20	1,00,000	0.0903	1.0	0.090
SML	8,000	25	2,00,000	0.1805	1.5	0.271
APL	2,000	200	4,00,000	0.3610	1.2	0.433
Risk-free Asset	(-) 9,197	10	(-) 91,970	(-) 0.0830	0	0
			11,08,030	1		1.20
Portfolio Beta						1.20

5 (a) The following table shows interest rates and exchange rates for the US Dollar and French Franc. The spot exchange rate is 7.05 Francs per Dollar. Complete the missing entries:

	3 months	6 months	1 year
Euro-dollar interest rate (Annual)	**11.5%**	**12.25%**	**?**
Euro-franc interest rate (Annual)	**19.5%**	**?**	**20%**
Forward Francs per dollar	**?**	**?**	**7.52**
Forward discount on Franc (% per year)	**?**	**(6.3%)**	**?**

5 (b) Suppose a dealer Rupam quotes 'All-in-cost' for a generic swap at 8% against six month LIBOR flat. If the notional principal amount of swap is ₹ 5,00,000,

(i) Calculate Semi-Annual fixed payment.

(ii) Find the first floating rate payment for (i) above if the six month period from the effective date of swap to the settlement date comprises 183 days and that the corresponding LIBOR was 6% on the effective date of swap.

(iii) In (ii) above, if settlement is on 'Net' basis, how much the fixed rate payer would pay to the floating rate payer?

Generic swap is based on 30/360 days basis. [10+6 marks]

Answer: 5(a)

Particulars	3 Months	6 Months	1 Year
Euro Dollar interest rate [Annual]	11.5%	12.25%	**12.50%**
Euro Franc interest rate [Annual]	19.5%	**18.94%**	20.00%
Forward Francs per Dollar	**7.1871**	**7.2721**	7.52
Forward Discount on Franc [per cent per year]	**(7.78%)**	(6.3%)	**(6.67%)**

Working notes:

1. Spot rate 1$ =7.05 Francs;
2. 3 Months forward: (for $ 1)
   = Spot rate x [(1 + Francs interest rate for 3 months) / (1 + Euro dollar interest rate for 3 months)]
   = 7.05 Francs x [(1 + 19.5% / 4) / (1 + 11.5% / 4)] = **Fr. 7.1871. [Interest rate parity method]**

3. Forward Discount rate [3 months]
   = [(Forward rate - Spot rate) / Spot rate] x 100 x 12 / (no. of months forward rate)
   = [(7.1871 - 7.05) / 7.05] x 100 x (12 / 3) = **7.78%.** [Annualised]

4. 6 months Forward rate:
   = Spot rate x [1 + (Discount rate x No. of months forward /12)]
   = Fr.7.05 x [1 + (6.3% x 6/12)] = **Fr. 7.2721.**

5. Franc interest rate [6 months] = Assuming Franc interest rate = X, applying the same in Interest rate Parity Formula for determining Forward Rate -
   Forward Rate
   = Franc Spot rate x [(1 + Francs interest rate for 6 months) / (1 + Euro Dollar interest rate for 6 months)]
   Fr. 7.2721 = Fr. 7.05 x (1 + X/2) / (1 + 12.25% / 2);
   or, Fr. 7.2721 = Fr. 7.05 x (1 + X/2) / (1 + 6.125%); or, X = **18.94%.**

6. Euro Interest Rate [1 year] = Assuming Euro interest rate = X, applying the same in interest rate parity formula for determining Forward Rate —
   Forward Rate
   = Franc Spot rate x [(1 + Francs Interest Rate for 1 year) / (1 + Euro Dollar interest rate for 1 year)]
   Fr. 7.52 = Fr. 7.05 x [(1 + 20%) / (1 + X); Or, X = **12.50%.**

7. Forward Discount Rate
   = [Forward rate - Spot rate] / [Spot rate x 100 x 12 / (no. of months forward)]
   = [(7.52 - 7.05) / 7.05] x 100 x [12 / 12 months] = 0.0667 = **6.67%.**

5(b) Computation of Factors

Factor	Notation	Value
Notional Principal	P	5,00,000
Time	N	180 days
All in Cost Rate	R	0.08

(i) Computation of Semi Annual Fixed Rate Payment

Semi-Annual Fixed Rate Payment = P X (N ÷ 360) X R
= 5,00,000 x (180 ÷ 360) x 0.08
= 5,00,000 x 0.5 x 0.08 = ₹20,000/-

(ii) Computation of Floating Rate Payment

Floating Rate Payment = P x (N ÷ 360) x LIBOR

Where N = Period from the effective date of SWAP to the date of Settlement

= 5,00,000 x (183 ÷ 360) x 0.06

= 5,00,000 x (0.5083) x 0.06 = ₹15,250.

(iii) Computation of Net Amount

Net Amount to be paid by the Person Requiring Fixed Rate Payment = Fixed Rate Payment Less Floating Rating Payment = ₹20,000 - ₹15,250 = ₹4,750.

6(a) The following two-way quotes appear in the Foreign Exchange Market:

	Spot	2 months forward
₹ / US $	**₹ 46.00 / 46.25**	**₹ 47.00 / 47.50**

Required:

(i) How many US Dollars should a firm sell to get ₹ 25 lakhs after 2 months?

(ii) How many Rupees is the firm required to pay so as to obtain US $ 2,00,000 in the spot market?

(iii) Assume that the firm has US $ 69,000 in current account earning interest. ROI on Rupee investment is 10% per annum. Should the firm en-cash the US $ now or 2 months later?

6(b) Bharat's subsidiary in India, Emami, procures most of its soaps from a Japanese company. Because of the shortage of working capital in India, payment terms for the Indian importers are typically 180 days or more. Emami wishes to hedge an 8.5 million Japanese Yen payable. Although options are not available on the Indian Rupee (₹), forward rates are available against the Yen. Additionally, a common practice in India is, for companies' like Emami, to work with a currency agent who will, in this case, lock in the current spot exchange for a 4.85% fee. Using the following data, recommend a hedging strategy.

Spot rate, USD/JPY	**yen 120.60/$**	
Spot rate, USD/INR	**₹47.75/$**	
180-day forward rate, JPY/INR	**₹0.4166/yen**	
Expected spot exchange rate in 180 days	**₹0.3846/yen**	
180-day yen investment rate	**1.5%**	
180-day rupee investment rate	**8.0%**	
Cost of capital	**12.0%**	**[6+10 marks]**

Answer: 6(a)

(i) US $ required to get ₹ 25 Lakhs after 2 months at the rate of ₹ 47.00 per $.
Hence, ₹ 25,00,000 / ₹ 47.00 = US $ 53191.489.

(ii) ₹ required to get US $ 2,00,000 now at the rate of ₹ 46.25 per $.
Hence, US $ 2,00,000 x ₹ 46.25 = ₹ 92,50,000.

(iii) En-cashing US $ 69,000 Now Vs. 2 months later
Proceeds if we can en-cash in open market $ 69,000 x ₹ 46.00 = ₹ 31,74,000.
Opportunity gain = 31,74, 000 x (10 /100) x (2 /12) = ₹52,900.
Likely sum at end of 2 months = ₹ 32,26,900. Proceeds if we can en-cash by Forward rate: $ 69,000 x ₹ 47.00= ₹ 32,43,000.
It is better to en-cash the proceeds after 2 months and get opportunity gain.

ALTERNATIVE SOLUTION: Part(iii) only.

Evaluation of investment in Rupee:

Forward Premium (for Bid rates)

= [(Forward rate ₹ 47 - Spot rate ₹ 46)/ Spot rate ₹ 46] x (12 months / 2 months) x 100.

= 13.04%.

Observation and conclusion: Annualised forward premium for Bid rates (13.04%) is greater than the Annual return on investment in Rupees (10%). Therefore, the firm should not en-cash its US $ balance now. It should sell the US $ in the forward market and en-cash them two months later.

6(b)

180 – day account payable, Japanese Yen	8500000
Spot rate, Yen/$	120.60
Spot rate, Rupee/$	47.75
Implied (calculated) spot rate Yen/ Rupee (120.60/47.75)	2.5257
180 – day Forward rate: Yen/ Rupee	2.4000
Expected spot rate in 180 – days Yen/Rupee	2.6000
180 – day Indian Rupee investing rate	8.00%
180 – day Japanese yen investing rate	1.50%
Currency Agent's exchange rate fee	4.80%
Emami's cost of capital	12.00%

HEDGING ALTERNATIVES:

1. REMAIN UNCOVERED	**Rate Yen per Rupee**	**Amount (₹)**
Settling Account	2.5257	
Payable in 180 – days at spot rate.		
*If spot rate in 180- days is same as current spot	(8500000/2.5257)	3365464.34 Risky
*If spot rate in 180 – days is same as Forward rate [8500000/2.4000]	2.4000	3541666.67 Risky
* if spot rate in 180 – days is expected Spot rate [8500000/2.6000]	2.600	3269230.77 Risky
2. BUY JAPANESE YEN FORWARD 180 DAYS		
Settlement amount at forward rate. [8500000/2.400]	2.400	3541666.67 Certain
3. MONEY MARKET HEDGE:		
Principle Account Payable:	Yen 8500000	
Discount factor for year		
Investing Rate for 180 days (1/1.0075)	0.99256	
Principle needed to meet	Yen 8436760.00	
Account payable in 180 – days: (8500000 x 0.99256)		
Current spot rate	Yen per rupee 2.5257	
Indian Rupee Current amount: [8436760/2.5257]	₹3340365.05	

Emami WACC carry – forward Factor for 180 days: 1.0600

FUTURE VALUE OF MONEY MARKET HEDGE: ₹ 3540786.95 certain

4. INDIAN CURRENCY AGENT HEDGE:	
Principle Account Payable	Yen 8500000
Current spot rate Yen per rupee	2.5257
Current account payable (8500000/2.5257)	₹3365403.65 (A)
Plus: Agent's Fees (4.85%)	₹163222.08
Emami's WACC	
Carry – forward factor for 180 days on fee (163222.08 x 1.06)	₹173015.40 (B)
Total	₹3538419.05 Certain.

EVALUATION ALTER NATIVES:

Hedging through currency agents is the best alternative hedging strategy if risk avoidance is the objective.

7 (a) Nava Ratna Ltd. has just installed MACHINE R at a cost of ₹ 2,00,000. This machine has 5 years life with no residual value. The annual volume of production is estimated at 1,50,000 units, which can be sold at ₹ 6 per unit. Annual operating costs are estimated at ₹ 2,00,000 (excluding depreciation) at this output level. Fixed costs are estimated at ₹ 3 per unit for the same level of production.

The company has just come across another model called MACHINE S, capable of giving the same output at an annual operating costs of ₹1,80,000 (excluding depreciation). There will be no change in fixed costs. Capital cost of this machine is ₹ 2,50,000 and the estimated life is 5 years with no residual value.

The company has an offer for sale of MACHINE R at ₹ 1,00,000. But the cost of dismantling and removal will amount to ₹ 30,000. As the company has not yet commenced operation, it wants to sell MACHINE R and purchase MACHINE S.

Nava Ratna Ltd. will be a zero-tax company for 7 years in view of several incentives and allowances available. The cost of capital may be assumed as 14%.

Required:
(i) Advise the company whether it should opt for replacement.
(ii) What would be your advice, if MACHINE R has not been installed but the company is in the process of selecting one or the other machine?
[Given: PVIF for 1-5 years = 0.877, 0.769, 0.675, 0.592, 0.519]

7 (b) A stock costing ₹120 pays no dividends. The possible prices that the Stock might sell for at the end of the year with the respective probabilities are given below. Compute the Expected Return and its standard Deviation.

Price	115	120	125	130	135	140
Probability	0.1	0.1	0.2	0.3	0.2	0.1

[10+6 marks]

Answer:

7 (a) Replacement of Machine R:

Incremental cash outflow:	
Cash outflow of Machine S	₹ 2,50,000
Less: Sale value of Machine R (₹1,00,000 - 30,000)	₹ 70,000
Net outflow	₹1,80,000

Incremental cash flow from Machine S:

Annual cash flow from Machine S:

[(1,50,000 x 6) – 1,80,000 - (1,50,000 x 3)] ₹ 2,70,000

Annual cash flow from Machine R:

[(1,50,000 x 6) - 2.00.000 - (1,50,000 x 3)] ₹ 2,50,000

Net inflow ₹ 20,000

Present value of Incremental cash inflow:

= 20,000 x (0.877 + 0.769 + 0.675 + 0.592 + 0.519) = ₹ 68,640

NPV of Machine S = 68,640 - 1,80,000 = ₹ (-) 1,11,360.

[₹ 2,00,000 spent on Machine R is a sunk cost and hence it is not relevant for deciding the replacement]

Decision: NPV of Machine S is NEGATIVE. Replacement is not advised. If it selects one of the two, independent NPV is to be calculated for this decision.

Independent evaluation of Machine R & Machine S:

[All in ₹]

Particulars	Machine R	Machine S
Units produced	1,50,000	1,50,000
Selling Price @ ₹ 6	9,00,000	9,00,000
Less: Operating cost (Exclusive of depreciation)	2,00,000	1,80,000
Contribution	7,00,000	7,20,000
Less: Fixed cost	4,50,000	4,50,000
Annual cash flow	2,50,000	2,70,000
PV of cash flows for 5 years, i.e.,[Sum of PVIF for 14%, 5]		
3.432 x 2,50,000	8,58,000	
3.432 x 2,70,000		9,26,640
Cash out flow	2,00,000	2,50,000
NPV	6,58,000	6,76,640

Decision: Choose Machine S as NPV of S is higher than that of R.

7(b)

Price	Return (R) = ₹ 120 - P	Probability (P)	Expected Return (P x R)	D = R - $\bar{R}$	D^2	P x D^2
115	(5)	0.1	(0.5)	(13.5)	182.25	18.225
120	0	0.1	0.0	(8.5)	72.25	7.225
125	5	0.2	1.0	(3.5)	12.25	2.450
130	10	0.3	3.0	1.5	2.25	0.675
135	15	0.2	3.0	6.5	42.25	8.450
140	20	0.1	2.0	11.5	132.25	13.225
Total			$\bar{R}$ **= 8.5**			**50.250**

Expected Return on Security = ₹8.5

Risk of Security = $\sigma = \sqrt{\text{Variance}} = \sqrt{50.25}$ = ₹ 7.09

8. Answer any 4 questions out of 5 **(4x 4=16)**

(a) What are the advantages of OCDs (Optionally Convertible Debentures) to investor?

(b) Discuss clearing mechanism

(c) Write short note on prepayment risk.

(d) Discuss the regulatory role of RBI

(e) Put-Call Parity Theory.

Answer:

8 (a) Advantages of OCD to Investor:

Assured Interest: Investor gets assured interest during gestation periods of the project, and starts receiving dividends once the project is functional and they choose to convert their debentures. thereby, it brings down the effective gestation period at the investor's end to zero.

Secured Investment: The investment is secured against the assets of the company, as against company deposits which are unsecured.

Capital Gains: There is a possibility of capital gains associated with conversion, which compensates for the lower interest rate on debentures.

(b) Only clearing members including professional clearing members (PCMs) are entitled to clear and settle contracts through the clearing house. The clearing mechanism essentially involves working out open positions and obligations of clearing members. This position is considered for exposure and daily margin purposes. The open positions of PCMs are arrived at by aggregating the open positions of all the TCMs clearing through him, in contracts in which they have traded. A TCM's open position is arrived at by the summation of his clients' open positions, in the contracts in which they have traded. Client positions are netted at the level of individual client and grossed across all clients, at the member level without any set-offs between clients. Proprietary positions are netted at member level without any set-offs between client and proprietary positions.

(c) Prepayment is the event that a borrower prepays the loan prior to the scheduled repayment date. Prepayment takes place when the borrowers can benefit from it, for example, when the borrowers can refinance the loan at a lower interest rate from another lender. Prepayments result in loss of future interest collections because the loan is paid back pre-maturely and can be harmful to the loan-backed securities, especially for long term securities. A second, and maybe more important consequence of prepayments, is the impudence of un-scheduled prepayment of principal that will be distributed among the securities according to the priority of payments, reducing the outstanding principal amount, and thereby affecting their weighted average life. If an investor is concerned about a shortening of the term we speak about contraction risk and the opposite would be the extension risk, the risk that the weighted average life of the security is extended. In some circumstances, it will be borrowers with good credit quality that prepay and the credit quality pool backing securities will deteriorate as a result. Other circumstances will lead to the opposite situation. Prepayment is the event that a borrower prepays the loan prior to the scheduled repayment date. Prepayment takes place when the borrowers can benefit from it, for example, when the borrowers can refinance the loan at a lower interest rate from another lender. Prepayments result in loss of future interest collections because the loan is paid back pre-maturely and can be harmful to the loan-backed securities, especially for long term securities. A second, and maybe more important consequence of prepayments, is the impudence of un-scheduled prepayment of principal that will be distributed among the securities according to the priority of payments, reducing the outstanding principal amount, and thereby affecting their weighted average life. If an investor is concerned about a shortening of the term we speak about contraction risk and the opposite would be the extension risk, the risk that

the weighted average life of the security is extended. In some circumstances, it will be borrowers with good credit quality that prepay and the credit quality pool backing securities will deteriorate as a result. Other circumstances will lead to the opposite situation.

(d) The RBI's Regulatory Role

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

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

(e) Put-Call Parity is the relationship between the price of an European Call Option and the price of the European Put Option, when they have the same strike price and maturity date, namely that a portfolio of long a call option and short a put option is equivalent to (and hence has the same value as) a single forward contract at this strike price and expiry. This is because if the price at expiry is above the strike price, the call will be exercised, while if it is below, the put will be exercised, and thus in either case one unit of the asset will be purchased for the strike price, exactly as in a forward contract. The validity of this relationship requires that certain assumptions be satisfied; these are specified and the relationship derived below. In practice transaction costs and financing costs (leverage) mean this relationship will not exactly hold, but in liquid markets the relationship is close to exact.

theory:

C + PV of EP = SP + P

Where, C = Price of a Call Option, i.e. Call Option Premium

EP = Exercise Price

SP = Current Stock Price

P = Price of a Put Option, i.e. Put Option Premium

Significance and Application: When options are priced such that the Put-Call Parity does not hold good, then there is scope for arbitrage, by investing in risk free investments or borrowing at risk free rate.