

**PAPER 14 - STRATEGIC FINANCIAL  
MANAGEMENT**

# **Answer to MTP\_Final\_Syllabus 2016\_Dec2023\_Set1**

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## **PAPER 14 - STRATEGIC FINANCIAL MANAGEMENT**

**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**

**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?
- ₹ 69.5900
  - ₹ 68.0420
  - ₹ 65.1010
  - ₹ 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?
- ₹57.93/\$
  - ₹58.94/\$
  - ₹59.00/\$
  - ₹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)?
- ₹18.38
  - ₹15.60
  - ₹12.50
  - 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?
- 20.11%
  - 25.22%
  - 27.11%
  - 29.55%

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- (v) Which of the following investment avenues has the least risk associated with it?
- Corporate fixed deposits
  - Deposits in commercial banks
  - Public Provident Fund
  - 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:
- 2.5%
  - 2.65%
  - 2.805%
  - 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:
- 1.55
  - 1.75
  - 1.85
  - 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
- 12.5%
  - 13.36%
  - 16.32%
  - 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]
- Make X will be cheaper

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- 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:**

- (i) — (B).  
 $₹68.0420: ₹/US \$ = 1/0.01962905 = ₹50.9449$   
Now,  $US \$ /€ = 1.335603$   
Therefore, the direct quote of € in India will be —  
 $₹/€ = ₹/\$ \times \$/€ = ₹50.9449 \times 1.335603 = ₹68.0420$
- (ii) — (B).  
 $₹58.94/\$ E(₹/\$) = 46.50 \times [(1.08)^5/(1.03)^5]$   
 $= 46.5(1.08/1.03)^5$   
 $= 46.50 \times 1.267455$   
 $= ₹58.94$   
Hence, expected rate is ₹58.94/\$
- (iii) — (A).  
Expected return (By CAPM)  $R_e = R_f + \beta(R_m - R_f)$   
 $= 12\% + 1.6(18\% - 12\%)$   
 $= 12\% + 9.6\%$   
 $= 21.6\%$   
Price of stock (Dividend growth formula)  $R_e$   
 $= D_1/P_0 + g$   
 $= 0.216 = 2.50/P_0 + 0.08$   
 $= 0.216 - 0.08 = 2.50/P_0$   
 $= 0.136 = 2.50/P_0$   
 $P_0 = 2.50/0.136 = ₹18.38$
- (iv) — (C).

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From Interest Rate parity -  $(\text{¥}210/\text{\$})/(\text{¥}190/\text{\$})=(1+i_{\text{¥}})/1.15$

Or,  $i_{\text{¥}}=27.11\%$

(v) — (C).

Public Provident Fund (PPF).

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).

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

$$= 5.1+4.2$$

$$= 9.3$$

Risk Premium =  $\beta(R_m-R_f)$

$$= 0.85(12.6-9.3)$$

$$= 2.805$$

(vii) — (B).

$$B = \text{Covs } m/\text{Variance } m = 33.56/19.15=1.75$$

(viii) — (C).

$$[\text{₹}(100-86)/\text{₹}86] \times 365/364 \times 100 = 16.32\%$$

(ix) — (A).

Make X Purchase cost = ₹4.50 million

Equivalent annual cost =  $4.50/6.1446 = \text{₹}0.73235$  million

Make Y Purchase cost = ₹6.00 million

Equivalent annual cost =  $6.00/7.6061 = \text{₹}0.78884$  million

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

(x) — (C).

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

$$= \text{₹} (39.60+217.40-240) = \text{₹}17.$$

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## Section - B

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

2. (a) X Ltd. an existing profit making company, is planning to introduce a new product with a projected life of 8 years' initial equipment cost will be ₹120 lakhs and additional equipment costing ₹10 lakhs will be needed at the beginning of third year. At the end of the 8 years, the original equipment will have resale value equivalent to the cost of removal, but the additional equipment would be sold for ₹ 1 lakhs. Working Capital of ₹15 lakhs will be needed. The 100% capacity of the plant is of 4,00,000 units per annum, but the production and sales volume expected are as under:

Year	Capacity in percentage
1	20
2	30
3-5	75
6-8	50

A sale price at of ₹100 per unit with a profit volume ratio of 60% is likely to be obtained. Fixed Operating Cash Cost are likely to be ₹16 lakhs per annum. In addition to this the advertisement expenditure will have to be incurred as under:

Year	1	2	3-5	6-8
Expenditure in ₹ in Lakhs each year	30	15	10	4

The company is subject to 40% tax. Assuming straight-line method of depreciation is permitted under tax laws and taking 15% as appropriate after tax Cost of Capital, should the project be accepted? [10]

- (b) Determine the risk adjusted net present value of the following projects:

	A	B	C
Net cash outlays (₹)	1,00,000	1,20,000	2,10,000
Project life	5 years	5 years	5 years
Annual cash inflow (₹)	30,000	42,000	70,000
Coefficient of variation	0.4	0.8	1.2

The company selects the risk-adjusted rate of discount on the basis of the coefficient of variation:

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Coefficient of variation	Risk adjusted rate of discount	Present value factor 1 to 5 years at risk adjusted rate of discount
<b>0.0</b>	<b>10%</b>	<b>3.791</b>
<b>0.4</b>	<b>12%</b>	<b>3.605</b>
<b>0.8</b>	<b>14%</b>	<b>3.433</b>
<b>1.2</b>	<b>16%</b>	<b>3.274</b>
<b>1.6</b>	<b>18%</b>	<b>3.127</b>
<b>2.0</b>	<b>22%</b>	<b>2.864</b>
<b>More than 2.0</b>	<b>25%</b>	<b>2.689</b>

[6]

Answer :

### 2. (a) Computation of initial cash outlay

(₹ in lakhs)

Equipment Cost (0)	120
Working Capital (0)	<u>15</u>
	135

Calculation of Cash Inflows:

Year	1	2	3-5	6-8
Sales in units	80,000	1,20,000	3,00,000	2,00,000
Contribution @ ₹60 p.u.	48,00,000	72,00,000	1,80,00,000	1,20,00,000
Fixed cost	16,00,000	16,00,000	16,00,000	16,00,000
Advertisement	30,00,000	15,00,000	10,00,000	4,00,000
Depreciation	15,00,000	15,00,000	16,50,000	16,50,000
Profit/(loss)	(13,00,000)	26,00,000	1,37,50,000	83,50,000
Tax @ 40%	Nil	10,40,000	55,00,000	33,40,000
Profit/(loss) after tax	(13,00,000)	15,60,000	82,50,000	50,10,000
Add: Depreciation	15,00,000	15,00,000	16,50,000	16,50,000
Cash Inflow	2,00,000	30,60,000	99,00,000	66,60,000

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## Computation of PV of CIF

Year	CIF	PV Factor @ 15%	
	₹		₹
1	2,00,000	0.8696	1,73,920
2	30,60,000	0.7561	23,13,666
3	99,00,000	0.6575	65,09,250
4	99,00,000	0.5718	56,60,820
5	99,00,000	0.4972	49,22,280
6	66,60,000	0.4323	28,79,118
7	66,60,000	0.3759	25,03,494
8	66,60,000	0.3269	21,77,154
WC	15,00,000	0.3269	4,90,350
SV	(1,00,000)	0.3269	(32,690)
			2,75,97,362
PV of COF0			1,35,00,000
Additional Investment = ₹ 10,00,000 × 0.7561			7,56,100
NPV			1,33,41,262

Recommendation: Accept the project in view of positive NPV.

## 2. (b)

Statement showing the determination of the risk adjusted net present value

Projects	Net cash outlays	Coefficient of variation	Risk adjusted discount rate	Annual cash inflow	PV factor 1-5 years at risk adjusted rate of discount	Discounted cash inflow	Net present value
	₹			₹	₹	₹	₹
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii) = (v) x (vi)	(viii) = (vii) - (ii)
A	1,00,000	0.4	12%	30,000	3,605	1,08,150	8,150
B	1,20,000	0.8	14%	42,000	3,433	1,44,186	24,186
C	2,10,000	1.20	16%	70,000	3,274	2,29,180	19,180



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3. (a) A mutual fund made an issue of 800000 units of ₹10 each on 01.04.2022. No entry load was charged. It made the following investments after meeting its issue expenses.

Particulars	₹
40,000 Equity Shares of ₹100 @ ₹160	64,00,000
At par:	
8% Government Securities	6,40,000
9% Debentures (unlisted)	4,00,000
10% Debentures (listed)	4,00,000
	78,40,000

During the year, dividend of ₹9,60,000 was received on equity shares. Interest on all types of debt securities was received as and when due. At the end of the year on 31.03.2023, equity shares and 10% debentures were quoted at 175% and 90% of the respective par value. Other investments were at par. The operating expenses during the year amounted to ₹4,00,000.

- (i) Find out the Net Assets Value (NAV) per unit at the end of the year.  
(ii) 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) Following information is available regarding four Mutual Funds:

Mutual Fund	Return (%)	Standard Diviation ( $\sigma$ )	Beta ( $\beta$ )
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. [8]

**Answer:**

3. (a) Computation of closing net asset value

Given the total initial investment ₹ 78,40,000 out of issue proceeds of ₹80,00,000 therefore balance of ₹1,60,000 is considered as issue expenses.

Particulars	Opening value of investment ₹	Capital Appreciation ₹	Closing value of investment ₹	Income ₹
40000 Equity of ₹100 each at ₹160	64,00,000	6,00,000	70,00,000	9,60,000
8% Government securities	6,40,000	Nil	6,40,000	51,200
9% Debentures (Unlisted)	4,00,000	Nil	4,00,000	36,000

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10% Debentures (Listed)	4,00,000	- 40,000	3,60,000	40,000
<b>Total</b>	<b>78,40,000</b>	<b>5,60,000</b>	<b>84,00,000</b>	<b>10,87,200</b>

Total Income	=	₹ 10,87,200
Less: Opening Expenses during the period	=	₹ 4,00,000
Net Income		<u>₹ 6,87,200</u>
Net Fund Balance ₹84,00,000 + ₹6,87,200	=	₹ 90,87,200
Less: Dividend = ₹7,20,000 (8,00,000 × 0.90)	=	<u>₹ 7,20,000</u>
Net Fund balance (after dividend)	=	₹ 83,67,200
Net Asset Value (before considering dividend)	=	₹ 90,87,200
Net Asset Value(before considering dividend) [₹90,87,200 ÷ 800000]=		₹ 11.36
Net Asset Value (After dividend) [₹83,67,200 ÷ 800000]	=	₹ 10.46

**Note:** Closing market price of the investment have been quoted at a percentage of the face value (Assumption)

3. (b) 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

$\sigma_p$  = Standard deviation of portfolio

$\beta_p$  = 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.

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
<b>Expected return</b>	<b>20%</b>	<b>25%</b>
<b><math>\sigma</math></b>	<b>12%</b>	<b>16%</b>

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.

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(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? [8]

(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]

**Answer:**

4. (a) (A) Expected return under different portfolios

Portfolio (1):  $1 \times 0.20 + 0 \times 0.25 = 20\%$

Portfolio (2):  $0.5 \times 0.20 + 0.5 \times 0.25 = 22.50\%$

Portfolio (3):  $0.75 \times 0.20 + 0.25 \times 0.25 = 21.25\%$

Portfolio (4):  $0.25 \times 0.20 + 0.75 \times 0.25 = 23.75\%$

Portfolio (5):  $0 \times 0.20 + 1 \times 0.25 = 25\%$ .

(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.

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

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.

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(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) (i) Computation of Portfolio Beta

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

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

### (ii) Reduce Beta to 0.8

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

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

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

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

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

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

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

- Therefore, existing Risky Investments will not be disturbed. Therefore, investments in Risky Securities will be ₹12, 00,000 (constituting 72.2%)
- Amount of new Risk Free Investments =  $1272.2,00,000\% \times 27.8\% = ₹4, 62,050$ .

### (i) Increase Portfolio Beta to 1.2

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

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

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

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

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

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
<b>Euro-dollar interest rate (Annual)</b>	<b>11.5%</b>	<b>12.25%</b>	<b>?</b>
<b>Euro-franc interest rate (Annual)</b>	<b>19.5%</b>	<b>?</b>	<b>20%</b>
<b>Forward Francs per dollar</b>	<b>?</b>	<b>?</b>	<b>7.52</b>
<b>Forward discount on Franc (% per year)</b>	<b>?</b>	<b>(6.3%)</b>	<b>?</b>

[10]

- (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.

[6]

**Answer:**

5.(a)

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

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)]

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= 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

### (1) 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

### (2) 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.

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### (3) 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 encash 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%	[10]

#### 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) Encashing US \$ 69,000 Now Vs. 2 months later  
Proceeds if we can encash in open market \$ 69,000 x ₹ 46.00 = ₹ 31,74,000. Opportunity gain = 31,74, 000 x (10 /100) x (2 /12) = ₹52,900.

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Likely sum at end of 2 months = ₹ 32,26,900.

Proceeds if we can encash by Forward rate: \$ 69,000 x ₹ 47.00  
= ₹ 32,43,000.

It is better to encash 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 encash its US \$ balance now. It should sell the US \$ in the forward market and encash 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 exchanges rate fee	4.80%
Emami's cost 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



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<b>2. BUY JAPANESE YEN FORWARD 180 DAYS</b>		
Settlement amount at forward rate. [8500000/2.400]	2.400	3541666.67 Certain
<b>3. MONEY MARKET HEDGE:</b>		
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

<b>4. INDIAN CURRENCY AGENT HEDGE:</b>	
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

## Answer to MTP\_Final\_Syllabus 2016\_Dec2023\_Set1

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] [10]

- (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.

<b>Price</b>	<b>115</b>	<b>120</b>	<b>125</b>	<b>130</b>	<b>135</b>	<b>140</b>
<b>Probability</b>	<b>0.1</b>	<b>0.1</b>	<b>0.2</b>	<b>0.3</b>	<b>0.2</b>	<b>0.1</b>

[6]

**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)] Annual cash flow from Machine R:	₹2,70,000
[(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:

$$= 20,000 \times (0.877 + 0.769 + 0.675 + 0.592 + 0.519)$$

$$= ₹ 68,640$$

$$\text{NPV of Machine S} = 68,640 - 1,80,000 = ₹ (-) 1,11,360.$$

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

## Answer to MTP\_Final\_Syllabus 2016\_Dec2023\_Set1

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 - R	D <sup>2</sup>	P x D <sup>2</sup>
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
<b>Total</b>			<b>R = 8.5</b>			<b>50.250</b>

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 questions.

[4x4=16]

- (a) The advantages of OCDs (Optionally Convertible Debentures) to investor
- (b) Characteristics of Commodity Exchange in India
- (c) Types of Credit risk.
- (d) Discuss the regulatory role of RBI
- (e) Put-Call Parity Theory.

# Answer to MTP\_Final\_Syllabus 2016\_Dec2023\_Set1

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**Answer :**

**8.(a)** The advantages of OCDs (Optionally Convertible Debentures) to investor:

Optionally Convertible Debentures (OCDs) are the debentures that include the option to get converted into equity. The investor has the option to either convert these debentures into shares at price decided by the issuer/agreed upon at the time of issue.

Advantages of OCD are:

(a) From Issuer

- (i) **Quasi-Equity:** Dependence of Financial Institutions is reduced because of the inherent option for conversion (i.e. since these are converted into equity, they need not be repaid in the near future.)
- (ii) **High Equity Line:** It is possible to maintain Equity Price at a high level, by issuing odd-lot shares consequent to conversion of the debentures, and hence lower floating stocks.
- (iii) **Dispensing Ownership:** Optionally Convertible Debentures enable to achieve wide dispersal of equity ownership in small lots pursuant to conversion.
- (iv) **Marketability:** The marketability of the issue will become significantly easier, and issue expenses can be expected to come down with the amounts raised becoming more.

(b) Investor

- (i) **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.
- (ii) **Secured Investment:** The investment is secured against the assets of the Company, as against Company deposits which are unsecured.
- (iii) **Capital Gains:** There is a possibility of Capital Gains associated with conversion, which compensates for the lower interest rate on debentures.

(c) Government

- (i) Debentures helped in mobilizing significant resources from the public and help in spreading the Equity Investors, thereby reducing the pressure on Financial Institutions (which are managed by Government) for their resources.
- (ii) By making suitable tax amendments, benefits are extended to promote these instruments, to safeguard the funds of Financial Institutions and encouraging more equity participation, which will also require a higher compliance under Corporate Laws, whereby organisations can be monitored more effectively.

**8. (b) Characteristics of Commodity Exchange in India:** The basic characteristics of commodity exchange in India are:

- (i) The units are inter-changeable and no value adding processes are performed on them. This allows the units to be traded on exchanges without prior inspection.
- (ii) Every commodity has a unique supply factor and as they are produced —naturally.

- (iii) Commodities are subject to cycles in demand from both intermediate players and end users. High prices usually lead to a boost in resource investments causing excess supply in the future which eventually pushes down commodity prices.
- (iv) The commodities from different groups may be negatively correlated at a point of time. For example, the prices of wheat and aluminium can move in the opposite direction as they are affected by a different set of factors.
- (v) There is a positive correlation between commodity prices and growth measures, although there may be a significant lag between a pickup in industrial production and commodity prices.
- (vi) A positive correlation is often seen between commodities and inflation indicators. In particular, commodities tend to react to an early stage of inflation as raw material price appreciation generally tends to precede, and quite often exceed consumer price inflation growth. While true over the very long term, the relationship between inflation and commodity prices has been considerably weaker over the last 10 years, which has been characterized by disinflation/low inflation.

The above characteristics may not be true for all commodities taken individually; however, they are true for diversified indices of industrial commodities and agricultural commodities.

**8. (c) Types of Credit risk:** Credit risk can be classified in the following way:

- (i) **Credit default risk:** The risk of loss arising from a debtor being unlikely to pay its loan obligations in full or the debtor is more than 90 days past due on any material credit obligation; default risk may impact all credit sensitive transactions, including loans, securities and derivatives.
- (ii) **Counterparty risk:** The risk of loss arising from non-performance of counterparty in trading activities such as buying and selling of commodities, securities, derivatives and foreign exchange transactions. If inability to perform contractual obligations in such trading activities is communicated before the settlement date of the transaction, then counterparty risk is in the form of pre-settlement risk, while if one of the counterparty defaults on its obligations on the settlement date, the counterparty risk is in the form of settlement risk.
- (iii) **Concentration risk:** The risk associated with any single exposure or group of exposures with the potential to produce large enough losses to threaten a lender's core operations. It may arise in the form of single name concentration or industry concentration.
- (iv) **Country risk:** The risk of loss arising from sovereign state freezing foreign currency payments (transfer/ conversion risk) or when it defaults on its obligations (sovereign risk).

**8. (d) The regulatory role of RBI:** As the nation's financial regulator, the reserve bank of India handles a range of activities, including:

1. Licencing
2. Prescribing capital requirements
3. Monitoring Governance
4. Setting prudential regulations to ensure solvency and liquidity of the banks
5. Prescribing lending to certain priority sectors of the economy
6. Setting appropriate regulatory norms related to income regulation, asset classification, provisioning investment valuation, exposure limits and the like
7. Initiating new regulation

**8. (e) Put-Call Parity Theory:** Put-call parity states that the simultaneous purchase and sale of a European call and put option of the same class (same underlying asset, strike price, and expiration date) is identical to buying the underlying asset right now. The inverse of this relationship would also be true.

The term "put-call" parity refers to a principle that defines the relationship between the price of European put and call options of the same class. Put simply, this concept highlights the consistencies of these same classes. Put and call options must have the same underlying asset, strike price, and expiration date in order to be in the same class. The put-call parity, which only applies to European options, can be determined by a set equation.

Put-call parity shows the relationship that has to exist between European put and call options that have the same underlying asset, expiration, and strike prices.

This concept says the price of a call option implies a certain fair price for the corresponding put option with the same strike price and expiration and vice versa.

Put-call parity doesn't apply to American options because you can exercise them before the expiry date.

If the put-call parity is violated, then arbitrage opportunities arise.

You can determine the put-call parity by using the formula  $C + PV(x) = P + S$ .

As noted above, the put-call parity is a concept that applies to European options. These options are of the same class, meaning they have the underlying asset, strike price, and expiration date. As such, the principle doesn't apply to American options, which can be exercised at any time before the expiration date.

Put-call parity states that simultaneously holding a short European put and long European call of the same class will deliver the same return as holding one forward contract on the same underlying asset, with the same expiration, and a forward price equal to the option's strike price.

If the prices of the put and call options diverge so that this relationship does not hold, an arbitrage opportunity exists. This means that sophisticated traders can theoretically earn a risk-free profit. Such opportunities are uncommon and short-lived in liquid markets.