CA FINAL

STRATEGIC FINANCIAL MANAGEMENT

SUPER 100

CLASS 6 TO 10

-Sanjay Saraf Sir

Powered by -

ULURN
KNOWLEDGE IN DEPTH

SSEI QFORUM

~~Value of swap to Cavin Cally = 25 – 26.3543 = -$1.3543million~~
~~This amount is to be paid by the company to the bank.~~

~~**b.** The company should pay to the bank every six month = 25x0.06/2 = $0.75 million~~

18. A fund manager in the USA is holding 50 US Treasury bonds of 18 years and 9 months to maturity. Current quotes in the market are as follows:

Price of T- bond	131-02
Coupon rate	12%
Conversion factor	1.3782

The fund manager is concerned about a potential rise in interest rate and has decided to fully hedge the portfolio through Treasury bond futures. He has decided to protect the portfolio for 3 months and identified the following T – bond futures for hedging:

T – bond futures price	94-22
Short term financing rate	8% p.a.

You are required to

a. Suggest the fund manager whether to buy or sell the futures, and how many futures contract to be used?

b. Calculate the annualized return earned on the portfolio if the T- bond price and futures price after 3- month closes at

i. 130-05, 94-03

ii. 131-31, 94-45.

(Source :- FOD)

ANSWER:-

a. As the fund manager is expecting a rise in interest rate that will reduce the value of the portfolio. So to hedge the interest rate risk the fund manager should sell the T-bond futures, as rise in interest rate will reduce

the futures price, and hence he can make gain by selling futures now, which will reduce the loss in portfolio's value.

The number futures contract required =

$$\frac{\text{Face value of T-bonds}}{\text{Face value of futures contract}} \times \text{Conversion factor}$$

$$\frac{\$5,000,000}{\$100,000} \times 1.3782 = 68.91 \simeq 69 \text{ contracts}$$

b. Value of the holding at the time of entering into hedge =

$$\$5,000,000\left(131\frac{2}{32}\Big/100\right)$$

$$= \$5,000,000(1.310625)$$

$$= \$6,553,125$$

(i) Portfolio value $= \$5,000,000\left(130\frac{5}{32}\Big/100\right)$

$$= \$5,000,000(1.3015625)$$

$$= \$6,507,812.50$$

Change in basis points in futures = 19 bp

Gain in futures = 19 × \$31.25 × 69 = \$40,968.75

Accrued interest for three months $= \$50,00,000 \times 0.12 \times \frac{3}{12} = \$150,000$

Annualized return

$$= \frac{(6,507,812.5 + 40,968.75 + 150,000) - 6,553,125}{65,53,125} \times \frac{12}{3}$$

$$= \frac{145,656.25}{65,53,125} \times \frac{12}{3} = 8.891\%$$

(ii) Portfolio value $= \$5,000,000\left(131\frac{31}{32}\Big/100\right)$

$$= \$5,000,000(1.3196875)$$
$$= \$6,598,437.50$$

Change in basis points in futures = 23 bp

Loss in futures = 23× \$31.25 × 69 = \$49,593.75

Accrued interest for three months = $\$50,00,000 \times 0.12 \times \frac{3}{12} = \$150,000$

Annualized return = $\frac{(6,598,437.50\text{-}49,593.75\text{-}150,000)\text{-}6,553,125}{6,553,125} \times \frac{12}{3}$

$$= \frac{145,718.75}{6,553,125} \times \frac{12}{3} = 8.895\%$$

19. An American investor is holding 25 US T-bonds of remaining maturity 18 years. Underlying interest on the bond is 5.5% and the bond is currently quoted in the market at 90-12.

The interest rates in the American economy are set to rise in near future, so the investor wants to hedge its holding of bonds through T-bond futures. The investor has decided to protect his holding for 6-months and identified the following T-bond futures for hedging:

T-bond futures price	94-24
Underlying coupon rate	6% p.a.

You are **required** to

a. Advise the investor how to hedge the holding through T-bond futures, and how many futures contract required for perfect hedge?

b. Calculate the annualized return earned on the holding for the protection period, if T-bond price and futures price after 6-months closes at

i. 92-26, 97-08

ii. 88-06, 92-22

(Source :- FOD)

~~(ii)~~

		~~4.50%- Allow to Lapse~~	~~5.50%-Exercise~~
~~Interest~~	~~₹ 100 crores X 4.50%~~ ~~₹ 100 crores X 5.04%~~	~~₹ 4.50 crores~~ -	- ~~₹ 5.04 crores~~
~~Premium (Cost of Option)~~	~~₹ 100 crores X 0.1%~~	~~₹ 0.10 crores~~	~~₹ 0.10 crores~~
		~~4.60 crores~~	~~5.14 crores~~

12. NoBank offers a variety of services to both individuals as well as corporate customers. NoBank generates funds for lending by accepting deposits from customers who are paid interest at PLR which keeps on changing.

NoBank is also in the business of acting as intermediary for interest rate swaps. Since it is difficult to identify matching client, NoBank acts counterparty to any party of swap.

Sleepless approaches NoBank who have already have ₹ 50 crore outstanding and paying interest @PLR+80bp p.a. The duration of loan left is 4 years. Since Sleepless is expecting increase in PLR in coming year, he asked NoBank for arrangement of interest of interest rate swap that will give a fixed rate of interest.

As per the terms of agreement of swap NoBank will borrow ₹50 crore from Sleepless at PLR+80bp per annuam and will lend ₹ 50 crore to Sleepless at fixed rate of 10% p.a. The settlement shall be made at the net amount due from each other. For this services NoBank will charge commission @0.2% p.a. if the loan amount. The present PLR is 8.2%.

You as a financial consultant of NoBank have been asked to carry out scenario analysis of this arrangement.

Three possible scenarios of interest rates expected to remain in coming 4 years are as follows:

	Year 1	Year 2	Year 3	Year 4
Scenario 1	10.25	10.50	10.75	11.00
Scenario 2	8.75	8.85	8.85	8.85
Scenario 3	7.20	7.40	7.60	7.70

Assuming that cost of capital is 10%, whether this arrangement should be accepted or not.

(Source :- ICAI, RTP)

ANSWER:-

Interest and Commission due from Sleepless = ₹ 50 crore (0.10+0.002) = ₹ 5.10 crore

Net Sum Due to Sleepless in each of Scenarios

Scenario 1

Year	PLR	Sum due to Sleepless	Net Sum Due (₹ Crore)		(₹ Crore)
1	10.25	50 (10.25 + 0.8)% = 5.525	5.10 –5.525 = - 0.425	0.909	-0.38633
2	10.5	50 (10.50 + 0.8)% = 5.650	5.10 –5.650 = - 0.550	0.826	-0.4543
3	10.75	50 (10.75 + 0.8)% = 5.775	5.10–5.775 = - 0.675	0.751	-0.50693
4	11	50 (11.00 + 0.8)% = 5.900	5.10 –5.900 = - 0.800	0.683	-0.5464
					-1.89395

Scenario 2

Year	PLR	Sum due to Sleepless	Net Sum Due (₹ Crore)		(₹ Crore)
1	8.75	50 (8.75 + 0.8)% = 4.775	5.10 –4.775 = 0.325	0.909	0.295425
2	8.85	50 (8.85 + 0.8)% = 4.825	5.10 – 4.825 = 0.275	0.826	0.22715
3	8.85	50 (8.85 + 0.8)% = 4.825	5.10 –4.825 = 0.275	0.751	0.206525
4	8.85	50 (8.85 + 0.8)% = 4.825	5.10 –4.825 = 0.275	0.683	0.187825
					0.916925

Scenario 3

Year	PLR	Sum due to Sleepless	Net Sum Due (₹ Crore)		(₹ Crore)
1	7.20	50 (7.20 + 0.8)% = 4.00	5.10–4.00 = 1.10	0.909	0.9999
2	7.40	50 (7.40 + 0.8)% = 4.10	5.10 –4.10 = 1.00	0.826	0.826
3	7.60	50 (7.60 + 0.8)% = 4.20	5.10 –4.20 = 0.90	0.751	0.6759
4	7.70	50 (7.70 + 0.8)% = 4.25	5.10 –4.25 = 0.85	0.683	0.58055
					3.08235

Decision: Since the NPV of the proposal is positive in Scenario 2 (Best Case) and Scenario 3 (Most likely Case) the proposal of swap can be accepted. However, if management of NoBank is of strong opinion that PLR are likely to be more than 10% in the years to come then it can reconsider its decision.

(iii) ₹90.77per £.

(iv) ₹85.77per £.

33. In March, 2009, the Multinational Industries make the following assessment of dollar rates per British pound to prevail as on 1.9.2009:

$/Pound	Probability
1.60	0.15
1.70	0.20
1.80	0.25
1.90	0.20
2.00	0.20

(i) What is the expected spot rate for 1.9.2009?

(ii) If, as of March, 2009, the 6-month forward rate is $ 1.80, should the firm sell forward its pound receivables due in September, 2009?

34. Diva jewellery Exporters, Chennai received orders to export diamond jewellery to USA at the rate of one consignment every month in January, February and March, 2007. Amounts will be received at the end of each month. The company has the option to invoice the exports either in US $ or Euro. The value of the shipments in US$ and Euro is as under :

Particulars	US $	Euro	To be received at the end of
First consignment	63950	50000	January 07
Second consignment	96100	75000	February 07
Third consignment	128150	100000	March 07

You, as the Finance Manager of the Company have the following forecast for the exchange rates at the end of the following months :

Currency	January	February	March
$/Euro	1.2786/88	1.2806/08	1.2811/13
₹/$	45.98/46.00	46.05/07	46.07/09

The current forward rates in the market are as under :

Currency	January	February	March
$/Euro	1.2803/05	1.2822/24	1.2828/30
₹/$	46.04/06	46.11/13	46.13/15

You are required to find out the rupee inflows and suggest the currency of invoicing for each consignment :

i. If the exposure is hedged.

ii. If the exposure is left uncovered.

• *TRIANGULAR ARBITRAGE*

28. Followings are the spot exchange rates quoted at three different forex markets:

USD/INR 64.74 in Mumbai

€/INR 73.52 in France

€/USD 1.6231 in New York

The arbitrageur has USD1,00,00,000. Assuming that there are no transaction costs, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

29. Followings are the spot exchange rates quoted at three different forex markets:

USD/INR 59.25/ 59.35 in Mumbai

GBP/INR 102.50/103.00 in London

GBP/USD 1.70/ 1.72 in New York

The arbitrageur has USD1,00,00,000. Assuming that bank wishes to retain an exchange margin of 0.125%, explain whether there is any arbitrage gain possible from the quoted spot exchange rates.

30. On the same date when the DM spot rate was quoted at $0.40 in New York, the price of the Pound Sterling was quoted at $1.80.

i. What would you expect the price of the Pound to be in Germany?

ii. If Pound was quoted in Frankfurt at DM 4.40/Pound, what procedure (action/steps/sequence) you will follow to do to profit from the situation?

31. Consider the following exchange rate quotations :

Bank A = ₹/$ 57.50

Bank B = ₹/£ 93.20

Bank C = $/£ 1.3650

Show the process of arbitrage using $ 10,00,000.

• *FORWARD COVER*

32. ABG Shipyard is considering hedging its foreign exchange risk. It has made a purchase on 1st April, 2016 for which it has to make a payment of £ 30,500 on September 30, 2016. The present exchange rate is 1 £ = ₹83.77. It can purchase forward 1 £ = ₹84.77. The company will have to make an upfront premium @ 1% of the forward amount purchased. The cost of funds to the company is 8% per annum.

In the following situations, compute the profit/loss the company will make if it hedges its foreign exchange risk with the exchange rate on September 30, 2016 as :

(i) ₹86.77per £.

(ii) ₹82.77per £.

(iii) ₹90.77per £.

(iv) ₹85.77per £.

33. In March, 2009, the Multinational Industries make the following assessment of dollar rates per British pound to prevail as on 1.9.2009:

$/Pound	Probability
1.60	0.15
1.70	0.20
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Currency	January	February	March
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₹/$	46.04/06	46.11/13	46.13/15

You are required to find out the rupee inflows and suggest the currency of invoicing for each consignment :

i. If the exposure is hedged.

ii. If the exposure is left uncovered.

~~Additional information :~~

~~**i.** Interest on outlay of funds is at 12% p.a. and interest on inflow of funds is at 8% p.a~~

~~**ii.** Exchange margin required is 0.05%.~~

~~You are required to compute :~~

~~**a.** Forward rate quoted by the bank as on 01.11.2006.~~

~~**b.** Amount to be collected from/paid to the customer due to early delivery. Also explain how the contract would be settled by the bank.~~

• *FX SWAP*

73. Komal Finance Ltd. An Indian finance company has planned to invest rupee fund equivalent to $50 million for one-year in USA. The return on investment over the period of investment will be 20%. The current rupee-dollar exchange rates are as follows:

Spot	Rs./$	46.90
1 year forward		49.25

A European bank is offering to supply $50 million at a rate of Rs.46.50/$ and swap the same amount at Rs.48.75/$ after one-year. The rupee cost of funds for the company is 16%.

You are required to calculate the actual return earned under forward cover or swap deal and suggest the company whether it should go for the simple forward cover or accept the European bank's offer.

(You can consider that there is no restriction on accessing and repatriation of funds in both dollar and rupees.)

74. A Finance company in Mumbai proposes to invest rupee funds equivalent to €10 million for one year in London market. The return on investment over the period of investment will be 8%. The current exchange rates are as follows :

₹/€	**Spot**	**53.15/53.20**
	1-year forward	53.25/53.30

A foreign bank has agreed to offer €10 million at a rate of ₹ 53.10/€and swap the same amount at ₹ 53.20/€ after one year. The rupee cost of the funds to the company is 7%.

You are required to calculated the actual returns earned under forward cover and swap deal and suggest the company whether it should go for the simple forward cover or accept the foreign bank's offer.

~~**b.** Forward rate (90 days) of 1 FFr = ₹ 6.50~~

~~**c.** Interest rate in India is 9% and in France is 12%.~~

~~Mr. E entered in forward contract with banker for 90 days to sell FFr at above mentioned rate.~~

~~When the matter come for consideration before Mr. A, Accounts Manager of company, he approaches you.~~

~~You as a Forex consultant is required to comment on:~~

~~**(i)** Whether there is an arbitrage opportunity exists or not.~~

~~**(ii)** Whether the action taken by Mr. E is correct and if bank agrees for negotiation of rate, then at what forward rate company should sell FFr to bank.~~

92. Columbus Surgicals Inc. is based in US, has recently imported surgical raw materials from the UK and has been invoiced for £ 480,000, payable in 3 months. It has also exported surgical goods to India and France.

The Indian customer has been invoiced for £ 138,000, payable in 3 months, and the French customer has been invoiced for € 590,000, payable in 4 months.

Current spot and forward rates are as follows:

£ / US$

Spot:	0.9830 – 0.9850
Three months forward:	0.9520 – 0.9545

US$ / €

Spot:	1.8890 – 1.8920
Four months forward:	1.9510 – 1.9540

Current money market rates are as follows:

UK:	10.0% – 12.0% p.a.
France:	14.0% – 16.0% p.a.
USA:	11.5% – 13.0% p.a.

You as Treasury Manager are required to show how the company can hedge its foreign exchange exposure using Forward markets and Money markets hedge and suggest which the best hedging technique is.

~~**93.** An importer in UK has a payable of Euro 500,000 after 3 month. He has collected the following information from his banker.~~

~~Euro/£ spot : 1.4200/1.4210~~

~~3 month forward : 1.4245/1.4256~~

~~3 month interest rates (p.a.)~~

~~Euro : 2.60% - 2.80%~~

~~£ : 3.00% - 3.20%~~

~~Which of the following would you recommend for covering the exposure through?~~

~~**A.** Forward market~~

~~**B.** Money market.~~

• EARLY DELIVERY AND CANCELLATION AFTER DUE DATE

71. On 10th July, an importer entered into a forward contract with bank for US $ 50,000 due on 10th September at an exchange rate of ₹ 66.8400. The bank covered its position in the interbank market at ₹ 66.6800.

How the bank would react if the customer requests on 20th September:

(I) to cancel the contract?

(II) to execute the contract?

(III) to extend the contract with due date to fall on 10th November?

The exchange rates for US$ in the interbank market were as below:

	10th September	**20th September**
Spot US$1 =	66.1500/1700	65.9600/9900
Spot/September	66.2800/3200	66.1200/1800
Spot/October	66.4100/4300	66.2500/3300
Spot/November	66.5600/6100	66.4000/4900

Exchange margin was 0.1% on buying and selling.

Interest on outlay of funds was 12% p.a.

You are required to show the calculations to:

(i) cancel the Contract,

(ii) execute the Contract, and

(iii) extend the Contract as above.

72. On November 1, 2006. State Bank of Mysore entered in to a three-month forward contract for sale of €2 million with M/s Nandi Exports &Imports, Bangalore with a fixed delivery date as 0.1.02.2007 at the ongoing market rates as on 01.11.2006

Spot	**₹/€**	**58.51/58.53**
Forward	1 month	17/18
	2 month	27/28
	3 month	44/45

The overseas supplier made an early shipment of the goods on 22.12.2006 and sent the documents to the banker on collection basis. Since M/s. Nandi Exports &Imports needs consignment urgently it approached the bank on 01.01.2007 for delivery of Euro under the forward contract.

The following rates prevailed on 01.01.2007 :

Spot	**₹/€**	**58.46/58.48**
Forward	1 month	18/20
	2 month	27/29
	3 month	36/38

Additional information :

i. Interest on outlay of funds is at 12% p.a. and interest on inflow of funds is at 8% p.a

ii. Exchange margin required is 0.05%.

You are required to compute :

a. Forward rate quoted by the bank as on 01.11.2006.

b. Amount to be collected from/paid to the customer due to early delivery. Also explain how the contract would be settled by the bank.

• *FX SWAP*

73. Komal Finance Ltd. An Indian finance company has planned to invest rupee fund equivalent to $50 million for one-year in USA. The return on investment over the period of investment will be 20%. The current rupee-dollar exchange rates are as follows:

Spot Rs./$ 46.90

1 year forward 49.25

A European bank is offering to supply $50 million at a rate of Rs.46.50/$ and swap the same amount at Rs.48.75/$ after one-year. The rupee cost of funds for the company is 16%.

You are required to calculate the actual return earned under forward cover or swap deal and suggest the company whether it should go for the simple forward cover or accept the European bank's offer.

(You can consider that there is no restriction on accessing and repatriation of funds in both dollar and rupees.)

74. A Finance company in Mumbai proposes to invest rupee funds equivalent to €10 million for one year in London market. The return on investment over the period of investment will be 8%. The current exchange rates are as follows :

₹/€	**Spot**	**53.15/53.20**
	1-year forward	53.25/53.30

A foreign bank has agreed to offer €10 million at a rate of ₹ 53.10/€and swap the same amount at ₹ 53.20/€ after one year. The rupee cost of the funds to the company is 7%.

You are required to calculated the actual returns earned under forward cover and swap deal and suggest the company whether it should go for the simple forward cover or accept the foreign bank's offer.

94. An exporter in UK is expecting to receive Euro 1 million after 3 months. He has collected the following information from his banker.

Euro/£	Spot	1.5778/80
	3 months forward	1.5770/72

3 months interest rates (P.a.)

Euro	4.5%-5%
£	6%-6.5%

Which of the following would you recommend for covering the exposure?

(i) Forward market

(ii) Money market.

95. Techinfo Ltd. Has imported specialty computer equipments worth US$ 250,000 from a company in US. The amount due for the imports is payable after 3 months. Mr. Garg, the treasury manager of Techinfo has collected the following market quotes:

Exchange rates:

Sport	Rs./$	47.15/47.30
Forward	3 month	55/60

Interest rates(p.a.):

Dollar(3 months)	6.00%/6.50%
Rupee(3 months)	10.00%/11.00%

The supplier of the equipments has offered a discount of $5000 if the payable is settled at the current date. Mr.Garg is reviewing the following alternatives to settle the payable:

(i) Cover through forward market.

(ii) Cover through money market.

(iii) Avail the cash discount of $5000 by taking a bridge loan at 9% p.a. from a lending institution.

You are required to suggest Mr. Garg the best alternative to settle the payable.

96. Wenden Co is a Dutch-based company which has the following expected transactions

One month : Expected receipt of	**£2,40,000**
One month : Expected payment of	£1,40,000
Three months : Expected receipts of	£3,00,000

The finance manager has collected the following information :

Spot rate (£ per €) :	**1.7820 ± 0.0002**
One month forward rate (£ per €) :	1.7829 ± 0.0003
Three months forward rate (£ per €) :	1.7846 ± 0.0004

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

(i) The US deposit rate is 8% per annum

(ii) The sterling deposit rate is 10% per annum

(iii) The spot exchange rate is $1.80/pound

(iv) The three month forward rate is $1.78/pound.

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

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

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

(d) With the originally stated spot and forward rates and the same dollar deposit rate, what is the equilibrium sterling deposit rate?

90. Given the following information :

Exchange rate - AUD 0.734 per Euro (Spot)

AUD 0.751 per Euro (3 months)

Interest rate -

Euro 8% p.a.

AUD 10% p.a.

What operations would be carried out to earn the possible arbitrage gains ?

• *FC vs MMC*

91. True Blue Cosmetics Ltd. is an old line producer of cosmetics products made up of herbals. Their products are popular in India and all over the world but are more popular in Europe.

The company invoice in Indian Rupee when it exports to guard itself against the fluctuation in exchange rate. As the company is enjoying monopoly position, the buyer normally never objected to such invoices. However, recently, an order has been received from a whole-saler of France for FFr 80,00,000. The other conditions of the order are as follows:

a. The delivery shall be made within 3 months.

b. The invoice should be FFr.

Since, company is not interested in losing this contract only because of practice of invoicing in Indian Rupee. The Export Manger Mr. E approached the banker of Company seeking their guidance and further course of action.

The banker provided following information to Mr. E.

a. Spot rate 1 FFr = ₹ 6.60

b. Forward rate (90 days) of 1 FFr = ₹ 6.50

c. Interest rate in India is 9% and in France is 12%.

Mr. E entered in forward contract with banker for 90 days to sell FFr at above mentioned rate.

When the matter come for consideration before Mr. A, Accounts Manager of company, he approaches you.

You as a Forex consultant is required to comment on:

(i) Whether there is an arbitrage opportunity exists or not.

(ii) Whether the action taken by Mr. E is correct and if bank agrees for negotiation of rate, then at what forward rate company should sell FFr to bank.

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Current spot and forward rates are as follows:

£ / US$

Spot: 0.9830 – 0.9850

Three months forward: 0.9520 – 0.9545

US$ / €

Spot: 1.8890 – 1.8920

Four months forward: 1.9510 – 1.9540

Current money market rates are as follows:

UK: 10.0% – 12.0% p.a.

France: 14.0% – 16.0% p.a.

USA: 11.5% – 13.0% p.a.

You as Treasury Manager are required to show how the company can hedge its foreign exchange exposure using Forward markets and Money markets hedge and suggest which the best hedging technique is.

93. An importer in UK has a payable of Euro 500,000 after 3 month. He has collected the following information from his banker.

Euro/£ spot : 1.4200/1.4210

3 month forward : 1.4245/1.4256

3 month interest rates (p.a.)

Euro : 2.60% - 2.80%

£ : 3.00% - 3.20%

Which of the following would you recommend for covering the exposure through?

A. Forward market

B. Money market.

- ***CURRENCY OF INVESTMENT***

115. The price of a bond just before a year of maturity is $ 3,250. Its redemption value is $ 3,665 at the end of the said period. Interest is $148 p.a. The Dollar appreciates by 3.66% during the said period. Calculate the rate of return.

116. Your bank's London office has surplus funds to the extent of USD 5,00,000/- for a period of 3 months. The cost of the funds to the bank is 4% p.a. It proposes to invest these funds in London, New York or Frankfurt and obtain the best yield, without any exchange risk to the bank. The following rates of interest are available at the three centers for investment of domestic funds there at for a period of 3 months.

London 5 % p.a.
New York 8% p.a.
Frankfurt 3% p.a.

The market rates in London for US dollars and Euro are as under:

London on New York

Spot 1.5350/90
1 month 15/18
2 month 30/35
3 months 80/85

London on Frankfurt

Spot 1.8260/90
1 month 60/55
2 month 95/90
3 month 145/140

At which centre, will be investment be made & what will be the net gain (to the nearest pound) to the bank on the invested funds?

117. A foreign institutional investor invested in unit is of a mutual fund in India for a period of one year. The following information is available regarding the investment and other economic variables :

Value of investment	**₹ 1000 million**
NAV at the time of investment	₹ 10.00
NAV at the end of investment horizon	₹ 11.00
Dividend received per unit after 6 months	₹ 1.20
₹/ $ rate at the time of investment	44.50 / 44.60
₹/ $ rate at the end of investment horizon	46.70 / 46.85
Reinvestment rate during the period	10%

You are required to

a. Calculate the nominal return to FII.

b. Calculate the real return to FII.

c. Calculate the real return to an Indian investor who invested in the same fund for the same period.

118. A US Institutional Investor decided to invest in a Indian security of b = 1.40 and standard deviation 20%. The return on the market portfolio is 18% and risk-free rate is 7% in India. Indian rupee in expected to depreciate by 5% in the next one year. Standard Deviation of ₹/$ exchange rate is 9%. The correlation coefficient between the Indian security and exchange rate is 0.25.
You are required to calculate expected return and risk in dollar terms if the FII holds the investment for one year.

119. A UK Institutional Investor decided to invest in a Indian security of b = 2.40 and standard deviation 30%. The return on the market portfolio is 20% and risk-free rate is 8% in India. Indian rupee in expected to depreciate by 6% in the next one year. Standard Deviation of ₹/$ exchange rate is 10%. The correlation coefficient between the Indian security and exchange rate is 0.45.
You are required to calculate expected return and risk in pound terms if the FII holds the investment for one year.

120. An American investor is considering to invest in an Indian security with a beta of 1.20 and standard deviation of returns 8%. The holding period of investment will be one year. The current rupee-dollar exchange rate is ₹ 46/$. The expected depreciation of rupee against dollar is 6% with a standard deviation of 10%. The expected return from the market portfolio in India is 15% and the correlation between the return on security and the exchange rate is 0.10. The risk free rate of return in India is 8%.

121. A multinational company in Germany has surplus funds of Euro 2 million for three months. The treasury manager wants to toy with the idea of investing funds in currencies other than that of the home currency. He has collected the following information on the exchange rates and interest rates:

$/Euro	spot	1.1410/1.2
	3 months forward	20/19
£/$	spot	0.6217/19
	3 months forward	13/14

3 months interest rates (P.a.)

$: 2.6%/2.8%

£ : 3.00%/3.6%

Euro : 3.2%/3.4%

You are required to determine, in which Market the MNC should invest to have more returns without exposing the investment to exchange risk.

122. A company based in US has surplus funds to the tune of $5,00,000 for 3 months. The company has obtained the following quotes/information from its bank:

$/Euro	Spot	: 09079/0.9083
3 month forward		: 35/33
$/£	Spot	: 1.4554/1.4558
3 month forward		: 54/51
3 month interest rate:	$	: 3.00% p.a.
	£	: 4.00% p.a.
	Euro	: 2.50% p.a.

You are required to advise the company as to the currency, in which it should invest to have more inflow of dollars.

~~**123.** A Foreign Institutional Investor (FII) invested in Indian capital market on December 01,2000. When the Mumbai stock exchange sensex was quoting at 3800. The rupee-dollar spot exchange rate at that time was Rs./$46.30/33. The FII sold the investment on November 30, 2001. When the Mumbai stock exchange sensex was quoting at 3250, to take back the amount in dollars. The spot exchange rate quoted on November 30, 2001 was Rs./$48.02/05. Inflation rate in India was 6%, and in US was 2.5% during the same period.~~

~~You are required to:~~

~~**a)** Compute nominal rate of return to FII~~

~~**b)** Compute real rate of return to FII.~~

~~**c)** Compute the real return to an Indian investor who invested Rs. 100,000 in the capital market for the same period.~~

~~(You can assume return earned should be in line with the return from sensex.)~~

~~**124.** Nifty presently trade at 6000 and in one year time it is expected o go up by 20%. Exchange rate now is ₹50/$. Forecasted inflation.~~

~~India :5% &USA : 2%~~

~~An USA investor bought in $500 million and invested in NYFTY.~~

~~**(i)** Find out the normal and real return for the US investor~~

~~**(ii)** Find out normal and real return for the Indian investor~~

125. An MNC company in USA has surplus funds to the tune of $ 10 million for six months. The Finance Director of the company is interested in investing in DM for higher returns. There is a Double Tax Avoidance Agreement (DTAA) in force between USA and Germany. The company received the following information from London :

DM/$ Spot

0.4040/41
6 months forward 67/65
Rate of interest for 6 months (p.a.) 5.95% - 6.15%
Withholding tax applicable for interest income 22%
Tax as per DTAA
10%
If the company invests in DM what is the gain for the company?
HINTS
Annualized Return = 8.66%, Inflow after 6 months = $ 10.433

• *INTERNATIONAL PROJECT APPRISAL*

126. If the Euro is quoted $ 0.90 today and the inflation rates are 4% in Euro zone and 3% in U.S.A What should be the $Euro quote after 3 months?

a. $ 0.9022/Euro **b.** $ 0.8978/Euro
c. $ 0.8966 /Euro **d.** $ 0.8855/Euro
e. $ 0.8777/Euro

127. Consider K ltd a supplier of jute goods to retailers in the UK and other Western European countries. The company is considering entering into a joint venture with a manufacturer in SWEDEN.

The two companies will each own 50 per cent of the limited liability company JV and will share profits equally. £ 600,000 of the initial capital is being provided by K ltd. and the equivalent in SWEDENian real (SKR) is being provided by the foreign partner. The managers of the joint venture expect the following net operating cash flows, which are in nominal terms:

	SKR '000	**Forward Rates of exchange to the £ Sterling**
Year 1	6,250	7
Year 2	5,500	14
Year 3	11,000	22

For tax reasons JV the company to be formed specifically for the joint venture, will be registered in SWEDEN. Assuming you are financial adviser retained by K Limited to advise on the proposed joint venture.

(i) Calculate the NPV of the project under the two assumptions explained below. Use a discount rate of 20per cent for both assumptions.

Assumption 1 : SWEDEN has exchange controls which prohibit the payment of dividends above 30 per cent of the annual cash flows for the first three years of the project. The accumulated balance can be repatriated at the end of the third year.

~~**(i)** Calculate the cash balance at the end of 30 days period in ₹ for each company under each of the following scenarios ignoring transaction costs and taxes:~~

~~**a.** Each company invests/finances its own cash balances/deficits in local currency independently.~~

~~**b.** Cash balances are pooled immediately in India and the net balances are invested/borrowed for the 30 days period.~~

~~**(ii)** Which method do you think is preferable from the parent company's point of view?~~

138. Following are the covered after-tax lending and borrowing rates for three units of a Multinational Corporation located in the Japan, Malaysia and India.

	Lending (%)	Borrowing (%)
Japan	6.0	8.0
Malaysia	6.5	7.0
India	7.6	8.4

Currently, the Malaysia and India units owe ¥140 million and ¥90 million, respectively to their Japanese parent. The Malaysia unit also has ¥45 million in receivables from its India affiliate. The timing of these payments can be changed by up to 180 days in either direction. If Japanese Parent is in deficit of funds, while both the Malaysia and India subsidiaries have surplus cash available, you are required to :

(a) Determine the MNC's optimal leading and lagging strategies.

(b) Calculate the net profit impact of these adjustments.

139. A multinational company has surplus fund of £ 300,000 in UK for 90 days. The company is planning to invest the fund for 90 days. The company is considering to invest the fund in 90-day deposit in banks or invest in CDs for 90 days. The interest rate offered by a British bank on 90-day deposit is 6.5%. The interest rate on CD is 10%, but the minimum size of investment in CD is £ 500,000 and in multiples of £ 500,000. The overdraft charges applicable to the company is 14%. You are required to

a. Find out the break-even size of investment in CD and suggest the bank whether to invest in CD or not.

b. Compare the gain/loss if the company have decided to invest in a CD against the investment in bank deposits.

140. A multinational company based in Germany has its subsidiaries in UK, Singapore, Hongkong and Japan. The cash position of these subsidiaries for the month of February 2003 is as follows:

UK.	Cash surplus of £1 million
Singapore	Cash deficit of S$1 million
Hongkong	Cash deficit of HK$2 million
Japan	Cash surplus of JPY 50 million

The current exchange rates are given below:

Euro/£	1.5025
S$/Euro	1.8910
Euro/HK$	0.1190
JPY/Euro	130

You are required to determine the cash requirement of the MNC adopts:

(i) Centralized cash management.

Decentralized cash management.

141. A multinational white goods company based in US has its subsidiaries in UK, France, Japan and Australia. The following are the cash flows occurred during December 2001 among the subsidiaries and the parent company:

The current exchange rates are given below:

$/Euro	0.8815
Yen/$	123.42
$/£	1.4226
AUD/$	1.9153

If the centralized cash management is followed by the company, then you are required to arrive at the net cash flows of the subsidiaries and US Parent in US $ terms.

142. A multinational white goods company based in US has its subsidiary in UK France, Japan and Australia. The following are the cash flows occurred during December 2001 among the subsidiaries and the parent company.

Form	To	Amount
UK subsidiary	France subsidiary	£ 500,000
France subsidiary	Australia subsidiary	Euro 600,000
Japan subsidiary	France subsidiary	Yen 50 million
Australia subsidiary	US	AUD 750,000
Australia subsidiary	Japan subsidiary	AUD 400,000
Japan subsidiary	UK subsidiary	Yen 10 million
Japan subsidiary	US Parent	Yen 80 million
UK subsidiary	UK Parent	£650,000
France subsidiary	US Parent	Euro 500,000

The current exchange rates are given below :

$ / Euro	**0.8815**
Yen / $	123.42
$/£	1.4226
AUD / $	1.9153

143. True view Ltd. a group of companies controlled from the United Kingdom includes subsidiaries in India, Malaysia and the United States. As per the CFO's forecast that , at the end of the June 2010 the position of inter-company is as follows:

i. The Indian subsidiary will be owned or will receive `1,44,38,100 by the Malaysian subsidiary and will to owe or will pay the US subsidiary US$ 1,06,007.

ii. The Malaysian subsidiary will be owed or will receive MYR 14,43,800 by the US subsidiary and will owe it or will pay US$ 80,000

Suppose you are head of central department of the group and you are required to net off inter-company balances as far as possible and to issue instructions for settlement of the net balance. For this purpose, the relevant exchange rates may be assumed in term of £1 are US$ 1.415; MYR 10.215; ₹68.10. What are the net payments to be made in respect of the above balances?

• *GLOBAL FINANCING*

144. Rolls Royce Holdings plc is a British multinational public limited company, wants to increase in extent, size, volume, and scope for which it requires funds of £ 600 crores net of issue expenses. It proposed to raise the required funds through a GDR issue. It considers the following factors in pricing the issue :

a. The expected market price of the company's equity share in the domestic market is ₹ 1800 (Face value ₹ 100 each)

b. 5 share should consists each GDR

c. The GDR are priced at a discount of 9.5% to the market price.

d. The expected exchange rate is ₹ 83.79 per £ Dividend expected to be paid on the equity share is 20% with a growth of 8% p.a. forever.

e. The issue cost amount to 2% of the issue size.

Compute the number of GDRs that have to be issued and also the cost of GDR to the company.

145. Zenith Exports Ltd. has proposed to expand its operations for which it requires funds of $5 million, net of issue expenses, which amounts to 2% of the issue size. It proposes to raise the funds through a GDR issue. It considers the following factors in pricing the issue:

- The expected domestic price of the share is Rs.225, while the face value is Rs.10
- 3 shares underlie each GDR
- Underlying shares are priced at 10% discount to the market price
- Expected exchange rate is Rs.48/$

You are required to compute

a. The number of GDRs to be issued

b. Cost of GDR to the company if the dividend expected to be paid in the current year is 25% with a growth rate of 25%

c. Gain/loss to a holder of 200 GDRs, if the company proposes a rights issue after the GDR issue in the ratio of 1:4 at a subscription price of Rs.150 per share. Assume the GDR holder exercises

- ***COMPLICATED SUMS ON COMPUTATION OF $E(R_P)$ AND σ_P***

4. Mr. Anup Singhal has identified the shares of two companies that have good investment potential. The following is the share price data relating to them:

Year	XYZ Co.(Rs./share)	ABC Co. (Rs./share)
1995	19.60	8.70
1996	18.75	12.80
1997	33.42	16.20
1998	42.64	18.25
1999	43.25	15.60
2000	44.60	13.25
2001	34.75	18.60

You are required to

a. Calculate the return and risk from investing in XYZ Co. and ABC Co.

b. Calculate the return and risk from investing in a portfolio of the two stocks, if he invests 60% in ABC and 40% in XYZ.

c. State whether it is better for him to invest in the combination mentioned in (b) above than in any one of the companies? Give reasons.

5. Consider the following information about four stocks:

Stock	Expected Return (%)	Standard Deviation (%)
HCL	5	20
Satyam	10	10
Reliance	20	15
Infosys	15	30

The coefficient of correlation between the returns on the four stocks is given in the matrix below:

Stock	**HCL**	**Satyam**	**Reliance**	**Infosys**
HCL	1.00	-0.2	0.3	0.5
Satyam	-0.2	1.00	0.2	-0.5
Reliance	0.3	0.2	1.00	0.6
Infosys	0.5	-0.5	0.6	1.00

A portfolio is constructed by buying Rs10,000 worth of HCL, Rs15,000 worth of Satyam, Rs30,000 worth of Reliance and Rs25,000 worth of Infosys. The investor provided Rs30,000 and leveraged the portfolio for the remaining amount by borrowing at a risk free rate of 5.6% p.a.

You are required to

a. Compute the expected return of the portfolio

b. Compute the standard deviation of the portfolio.

18. Consider the following securities ?

	A	B	C	D	E	F
E (R)	20%	15%	15%	25%	26%	22%
S.D	8%	5%	7%	10%	10%	7%

Identify the efficient securities and draw the efficient portfolio.

• EXPECTED RETURN AND RISK OF A SINGLE STOCK

19. The current price of stock A and stock B are Rs. 80 and Rs. 60 respectively. At the end of the year, the price of stocks A and B and their associated probabilities are given below.

Stock A (Rs.)	**Stock B (Rs.)**	**Probability**
74	55	0.30
80	60	0.40
58	66	0.30

Given this data, which stock should an investor choose?

20. Mr. Raghu, Chief Analyst of a reputed research division forecasts the four economic scenarios, which he believes are likely to occur with the given probabilities. Based on these scenarios he makes the following forecasts of the returns for the stocks A and B.

Economic Scenario	**Probability**	**Returns**	
		A	B
Optimistic	0.3	20	35
Most likely	0.5	10	0
Pessimistic	0.2	15	-25

Calculate

a. Expected return and risk of security A.
b. Expected return and risk of security B.
c. Expected return and risk of portfolio consisting of both A and B in equal proportion.

21. A conservative investor is analyzing the shares of PSEL which is currently trading at Rs. 1,180. For the year 1999 - 2000, the earnings per share (EPS) was Rs. 40. The investor has generated the following scenarios for the next year with the corresponding probabilities:

P/E ratio EPS	**20**	**30**
50	0.20	0.35
60	0.30	0.15

You are required to calculate the expected risk and return for the share of PSPEL

• *EQUALLY WEIGHTED PORTFOLIO OF IDENTICAL STOCKS*

15. Expected return on each stock = 25%
SD of each stock = 15%
Pair wise correlation = 0.4
Risk free rate of return = 5%

1. Derive an expression for the variance of an equally weighted portfolio of N stocks
2. Expected return SD & Sharpe ratio for an equally weighted portfolio of
   - **a.** N = 2 stocks
   - **b.** N = 5 stocks
   - **c.** N = 10 stocks
   - **d.** N = infinite stocks
3. State your conclusions from the above calculations.
4. What is the smallest number of stocks necessary to generate an efficient portfolio with a standard deviation equal to or smaller than 43%. SIDDANTH - PRB - 10 PG - 56

• *EFFICIENT AND OPTIMAL PORTFOLIO*

16. Following is the data regarding six securities:

	U	V	W	X	Y	Z
Return (%)	10	10	15	5	11	10
Risk (%) (Standard deviation)	5	6	13	5	6	7

(i) Which of three securities will be selected?
(ii) Assuming perfect correlation, analyse whether it is preferable to invest 80% in security U and 20% in security W or to invest 100% in Y.

17. The data given below relates to companies "Alpha and Beta".

	Alpha (Rs.)	Beta (Rs.)
Expected Dividend	5	9
Current Market price	30	120
Expected market price after one year under two scenarios		
Optimistic scenario	100	175
Pessimistic scenario	50	100

If an investor's holding period is one year, which stock he should buy?

32. The rates of return on the security of Company X and market portfolio for 10 periods are given below:

Period	Return of Security X (%)	Return on Market Portfolio (%)
1	20	22
2	22	20
3	25	18
4	21	16
5	18	20
6	-5	8
7	17	-6
8	19	5
9	-7	6
10	20	11

(i) What is the beta of Security X?

(ii) What is the characteristic line for Security X?

- ***CAPM***

33. For the data given below, prepare price weighted, equally weighted and value weighted indices.

	Price per share on 30th June Year 1 (Rs.)	Price per share on 30th June Year 2 (Rs.)	Number of Shares outstanding on 30th June Year 2
Stock A	54	60	1,00,000
Stock B	60	64	1,50,000
Stock C	65	72	2,00,000

Consider 30th June, Year 1 as the base period date.

34. The stock research division of M/s Kothari Investment services has developed ex-ante probability distribution for the likely economic scenarios over the next one year and estimates the corresponding one period rates of return on stocks A, B and market index as follows:

Economic Scenarios	Probability	One period rate of return %		
		Stock A	Stock B	Market
Recession	0.15	-15	-3	-10
Low growth	0.25	10	7	13
Medium growth	0.45	25	15	18
High growth	0.15	40	25	32

The expected risk-free real rate of return and the premium for inflation are 3.0% and 6.5% p.a. respectively.

As an analyst in a research division you are required to :

a. Calculate the following for stock A and B

i. Expected return

ii. Covariance of returns with the market returns

iii. Beta

b. Recommend for fresh investment in any of these two stocks. Show all the necessary calculations.

35. Consider the following information relating to the returns from two stocks and the market index in different economic scenarios:

Scenario	Probability of scenario	Stock A (%)	Stock B (%)	Return from market index (%)
Boom	0.25	-15	-8	-7
Slow growth	0.10	19	-5	12
Stagnation	0.45	35	25	20
Recession	0.20	15	18	25

From the above information, you are required to :

a. Calculate the ex-ante beta for the two stocks

b. Assuming that SML holds good, determine the Alpha of the two stocks and comment on the same.

Also assume a risk free rate of interest of 7%.

36. Given below are the expected returns on the stocks of Hindalco and Indal along with the indicative returns on the Natex 100 for different macroeconomic scenarios:

Scenario	Probability	Rate of Return (%)		
		Indal	Hindalco	Natex
Recess & high int.	0.20	-13%	-4%	-9%
Recess & low int.	0.15	16%	2%	8%
Boom & high interest	0.40	32%	21%	16%
Boom & low interest	0.25	12%	20%	20%

Based on the above information for different scenarios you are required to

a. Calculate the ex ante Beta for Indal and Hindalco.

b. Assuming that the SML holds good in this case; calculate the Alpha for Indal and Hindalco and interpret these values assuming a risk - free rate of 4%.

~~Risk-free rate of return~~	~~14.0%~~
~~Expected return on market portfolio~~	~~15.0%~~
~~Correlation coefficient of portfolio with market~~	~~0.7~~

~~**b.** What will be the expected return on the portfolio if portfolio beta is 0.7 and the risk-free return is 15%~~

• *QUANTIFICATION OF TR, SR AND UR*

51. Consider the stock of Bharti Chemicals has the following regression line

$$r_{it}(\%) = a_i + \beta_{i\,rmt} + e_{it}$$

Where the notations are in their standard use. The regression line explains only 80% of the variation in the return on Bharti's stock. The variance in market return is 95(%2). The covariance of stock return with that of market is 110 (%²).

You are required to find

a. Systematic and unsystematic risk for Bharti stock

b. Whether the stock of Bharti is defensive or aggressive?

~~**52.** The following are risk and return estimates for two stocks:~~

~~Stock~~	~~Expected return~~	~~Beta~~	~~Firm specific standard deviation of the expected return~~
~~**A**~~	~~12%~~	~~0.75~~	~~30%~~
~~**B**~~	~~16%~~	~~1.10~~	~~45%~~

~~The market index has a standard deviation of 22% and risk free rate (on T-bills) is 5%.~~

~~**Required:**~~

~~**a.** Calculate the standard deviation of expected returns on stocks A & B.~~

~~**b.** Suppose a portfolio is to be constructed with the following proportions:~~

~~**Stock A**~~	~~**0.25**~~
~~**Stock B**~~	~~**0.40**~~
~~**T-bills**~~	~~**0.35**~~

~~Calculate the expected return, standard deviation of expected return and non-systematic risk (standard deviation) of the portfolio.~~

53. Suppose the assumptions of CAPM are valid and unlimited borrowing and lending at risk-less rate of interest is possible. You are **required** to determine the unknown quantities in the following table.

Stock	Expected Return (%)	Standard Deviation (%)	Beta	Unsystematic Risk (%)²
Super Cements	12	?	1.52	15
Cresent Pharma	?	8	0.96	9
DFL Plastics	9	?	0.80	25

FINANCIAL SWAP

Problem 6 :

Cavin Cally Ltd., a large export house from India entered into a five-year interest rate swap with the ICICI Bank, under which it has contracted to pay 8% and receive six-month LIBOR semi-annually, on a notional principal amount of US $ 25 million. This deal was set-up on April 01, 2003. On April 01, 2005, after the swap payments were settled, the Treasurer of Cavin Cally suggested that the swap be cancelled as the rates in the market have dropped considerably. He approached the bank, which agreed to cancel the deal at 6%, which is also the current rate for the 3 years swap deal for fixed vs LIBOR.

You are required to find out the following :

a. If the deal was to be cancelled on April 1, 2005, what amount of money would be required to be paid? By whom?

b. Instead of canceling the existing deal, if a new deal was made and allowed to run for 3 years (till the maturity of the original deal), what would be the cash flow on the fixed leg of the new deal? (Assume that each period is exactly 6 months).

Problem 7 :

9 year Government of India Security is being quoting at 10.5%. The 364 T Bill (Treasury Bill) is being quoted at 11.25. Last year Indian National Bank had issued a fixed rate bond under statutory requirement at 15% coupon for a period of 10 years. Now when remaining 9 years are yet to expire the bank wants to convert their fixed rate obligation to floating rate due to anticipation of decline in interest rates. Market quotation for fixed to floating rate swap is T Bill rate Vs. 75/85 bp over 9 year Government of India Security. If T Bill decline 20 bp over the current year and raises by 5 bp every year thereafter what is the effective cost of funds to Indian National Bank. To hedge interest rate Indian National Bank undertakes swap transaction every year.

Problem 8 :

TMC Corporation entered into € 3.5 million notional principal interest rate swap agreement. As per the agreement TMC is to pay a fixed rate and to receive a floating rate of LIBOR.

The Payment will be made at the interval of 90 days for one year and it will be based on the adjustment factor 90/360. The term structure of LIBOR on the date of agreement is as follows :

Days	Rate (%)
90	7.00
180	7.25
270	7.45
36	7.55

You are required to calculate fixed rate on the swap and first net payment on the swap.

Problem 56 :

Sumana wanted to buy shares of EIL which has a range of ₹ 411 to ₹ 592 a month later. The present price per share is ₹ 421. Her broker informs her that the price of this share can sore up to ₹ 522 within a month or so, so that she should buy a one month CALL of EIL. In order to be prudent in buying the call, the share price should be more than or at least ₹ 522 the assurance of which could not be given by her broker.

Though she understands the uncertainty of the market, she wants to know the probability of attaining the share price ₹ 592 so that buying of a one month CALL of EIL at the execution price of ₹ 522 is justified. Advice her. Take the risk free interest to be 3.60% and e0.036 = 1.037

Problem 57 :

The current rupee-dollar exchange rate is ₹46.00/$. The annual volatility of the rupee-dollar exchange rate is 5%. The risk free interest rate in India is 5% p.a. and risk-free interest rate in US is 1.5% p.a.

You are required to :

Calculate the value of a 6-month call option on dollar for the strike price of ₹ 46.50.

Problem 58 :

Find out the value of a 3 month call and put option on a stock at strike price = 980. The stock presently trades at 1000. In 3 months time it can go up to 1150 or come down to 920. Rf = 7% p.a. effective.

Problem 59 :

The stock of X Ltd. is currently quoted in the market at ₹ 195. The company has declared a dividend of ₹ 8 per share recently, which will be distributed to the shareholders after two months. The volatility of X's stock price is 15% annually. The risk free interest rate prevailing in the economy is 6% p.a. Using Black-Scholes option valuation model.

You are required to :

Calculate the price of a 6 month put option on the company's stock at an exercise price of ₹ 225.