**Set A**

Q1. A fund manager has a portfolio worth Rs. 50 million with a beta of 0.87. The manager is concerned about the performance of the market over the next 2 months and plans to use 3 month future contract on the NSE to hedge the risk. The current level of the index is 4200, one contract is 200 times the index, the risk free rate is 6 % per annum and the dividend yield on the index is 4% per annum. The current 3 month future price is Rs.4270.

1. What position should the fund manager take to eliminate all exposure to the market over the next 2 years?
2. Calculate the effect of your strategy on the fund manager’s return if the level of market in 2 months is Rs. 4000, Rs. 4100 and Rs. 4300. Assume that the 1-month futures is 0.25 % higher than the index level at this time.

Q2. Mr. Raman formulates his investment strategies using only European call options on NSE Nifty index. Ashok strongly believes that value of NSE Nifty index in the next two months will be around 6000. The current value of NSE Nifty is 5800. European call options on NSE Nifty are available with strike prices 5800, 5900, 6000 and 6100 and expiration dates in two months. Their prices are Rs. 165, Rs. 115, Rs. 76 and Rs. 47 respectively. Raman desires that his maximum loss as a percentage of the current Nifty value must not be more than 1% under any situation concerning the future Nifty values. Ashok considers the following three investment strategies:

1. Strategy A is to create a bull spread using strike prices 5900 and 6000 and expiration dates in two months.
2. Strategy B is to create a bull spread using strike prices 5800 and 6000 and expiration dates in two months.
3. Strategy C is to create a butterfly spread using strike prices 5900, 6000 and 6100 and expiration dates in two months.

Evaluate each of these investment strategies with respect to Raman’s conviction about the Nifty value’s future movement and his investment goals. What are the advantages and disadvantages of each? Which would you recommend? Why?

Q3. Company P wants a loan of Rs.10 million. Its bankers have told the company that a fixed interest loan can be sanctioned at 10% interest, while a floating interest rate can be sanctioned at the LIBOR + 1 %. Another company Q is also looking for a Rs.10 million loan. Its bankers have given it a quote of 11 % for a fixed interest loan and LIBOR + 3 % for a floating interest loan. Explain how the swap can be arranged through financial intermediary which charges 20 basis points.

Q4. The market price of a security can be modelled by assuming that it will either increase by 12% or decrease by 15% each month, independently of the price movement in other months. No dividends are payable during the next two months. The continuously-compounded risk-free rate of interest is 8% per annum. The current market price of the security is Rs. 254.

1. Use the binomial model to calculate the value of a two-month European put option on the security with a strike price of Rs. 250.
2. Calculate the value of a two-month American put option on the same security with the same strike price.
3. Calculate the value of a two-month European call option on the same security with the same strike price.
4. Calculate the value of a two-month American call option on the same security with the same strike price.
5. Verify numerically that the put-call parity relationship holds in case of European options.
6. Verify numerically that the put-call parity relationship holds in case of American options.

Set B

Q1. Deepak, advisor ,has a client who believes the common stock price of KEI Industries could move substantially in either direction in reaction to an expected court decision involving the company. The current market price is Rs.58 per share. The client currently owns no KEI shares but asks Deepak for advice about implementing a strangle strategy to capitalize on the possible stock price movement. Deepak gathers the KEI option pricing data shown in the following table: KEI Industries Option Pricing Data

|  |  |  |
| --- | --- | --- |
| Particulars | Call Option | Put Option |
| Option Price | Rs.5 | Rs.4 |
| Strike Price | Rs.60 | Rs.55 |
| Time to Expiration | 3 months | 3 months |

1. Recommend whether Deepak should choose a long strangle strategy or a short strangle strategy to achieve the client’s objective. Justify your recommendation with one reason.
2. Indicate, at expiration for the appropriate strangle strategy in Part a, the

(i). Maximum possible loss

(ii). Maximum possible gain

(iii). Break-even Price

1. The delta of the call option is 0.625 and KEI share does not pay any dividends. Calculate the appropriate change in option price of the call if KEI share price immediately increase to Rs.59.

Q2. Calculate the value of an eight month European put option on US dollar with a strike price of 1$ = Rs. 50. The current exchange rate is 1$ = Rs. 52, the volatility of the exchange rate is 15%, the risk-free rate in India is 8% per annum and the risk-free rate in US is 6% per annum.

Q3. Connect Catering, British Company wishes to borrow US Dollars at a fixed rate of interest. Questcor Pharmacy, a US Multinational, wishes to borrow sterling at a fixed rate of interest. They have been quoted the following rates per annum

|  |  |  |
| --- | --- | --- |
| Particulars | Sterling | US Dollars |
| Connect Catering | 8 % | 4 % |
| Questcor Pharmacy | 7.6 % | 3.2 % |

Design a swap that will net a bank, acting as intermediary, 10 basis points per annum. (6 Marks)

Q4 (a) On January 2 of a particular year, an American Firm decided to close out its account at a Canadian bank on February 28. The firm is expected to have 5 million Canadian dollars in the account at the time of withdrawal. It would convert the funds to U.S.Dollars and transfer them to a New York bank. The relevant forward exchange rate was $0.7564. The March Canadian dollar futures contract priced at $0.7541. Determine the outcome of a future hedge if on February 28 the spot rate was $0.7207 and the future rate was).7220. All prices are in US Dollars per Canadian dollar. The Canadian dollar futures contract covers CD 1, 00,000.

Q4 (b) R is an independent observer of the market. His funds position does not allow him to take risks so he has been avoiding trading in securities. However, R keeps a close watch for an arbitrage opportunity that is present. R has funds under his control worth Rs.1 million which can currently earn a risk free rate of 7 %. He finds that L ltd. is presenting quoting at Rs.520 in the stock market. The two month future is quoting at Rs.546. Is there a arbitrage opportunity? Is so, give the chronological steps involved?