**JAIPURIA INSTITUTE OF MANAGEMENT, INDORE**

**PGDM**

**FIFTH TRIMESTER (Batch 2019-21)**

**END TERM EXAMINATION, JAN-2021**

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| Course Name | **Financial Derivatives & Risk Management** | Course Code |  |
| Max. Time | **2 hours** | Max. Marks | **40** |

**INSTRUCTIONS:**

All the questions are compulsory.

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**Question.1 (10 Marks)**

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.

**Question.2 (10 Marks)**

Mr. Raman formulates his investment strategies using only European call options on NSE Nifty index. Raman 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. Raman 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?

**Question.3 (10 Marks)**

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.

**Question.4 (10 Marks)**

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.