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Fourth Semester MBA Degree Examination, Feb./Mar. 2022 Financial Derivatives

Time: 3 hrs.

Max. Marks: 100

**Note: 1. Answer any FOUR full questions from Q.No.1 to Q.No.7.
2. Question No. 8 is compulsory.**

- 1
 - a. What are the benefits of financial derivatives? (03 Marks)
 - b. What is OTC trading? Explain the functions of derivatives market. (07 Marks)
 - c. What is Financial Derivatives? Briefly explain the different players in the derivatives market. (10 Marks)

- 2
 - a. What is meant by marking to market? (03 Marks)
 - b. An investor trades grade 1 rice in the market for Rs.1600 per quintal. A 6 months future contract on this rice is traded at Rs.1675. The size of one future contract is 1 quintal. An amount of Rs.50 has to be paid for storing 1 quintal rice for 6 months. Calculate the price of future contracts. What position investor has to take in futures market? (07 Marks)
 - c. Mr. Gupta took long position in five futures contracts on rice at an exercise price of Rs.50 per kg. The initial margin on this contract is 10% and maintenance margin is 85% of the initial margin. The size of each future contract is 1000 kg. The futures prices for the first 10 days of the contract are given below:

Day	1	2	3	4	5	6	7	8	9	10
Settlement Price (Rs./kg)	52.50	51.25	51.00	51.80	51.40	51.10	49.75	50.30	50.50	50.25

Prepare a margin account assuming that all margin calls are honoured immediately and money in excess of the initial margin is withdrawn immediately. (10 Marks)

- 3
 - a. What is lot size and tick size? (03 Marks)
 - b. Find out the theoretical price of a stock maturing in six months from now, which is currently trading at Rs.540. The annual risk free rate of return continuously compounded is 9%.
 - (i) What would an arbitrageur do if the six months future contract on this stock is trading at Rs.600?
 - (ii) Does it make any difference if the six months future contract on this stock is trading at Rs.500?
 - (iii) What are the risks involved in the arbitrage transactions in futures contracts? (07 Marks)
 - c. Consider the following data about July 2020 NIFTY option (opening values of the day are taken):

Exercise Price	Call Premium	Put Premium
9860	NA	8.70
9880	NA	9.70
9900	45.25	10.60
9920	23.40	13.25
9940	15.50	15.40
9960	12.20	24.50
9980	9.60	NA
10000	8.35	NA
10020	7.80	NA

The July NIFTY opened at 3rd July 2017. Classify each of the above options and find out intrinsic and time values of the options [NA = options are not available]. (10 Marks)



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- 4 a. What is covered and naked call? (03 Marks)
b. Discuss the factors that determine the option value. (07 Marks)
c. Consider a put option contract on a certain share, XYZ, suppose two investors X and Y enter into a contract and take short and long positions respectively. Other details are given below: Exercise price of Rs.110 and it expires on March 2020, size of contract is 100 shares and date of entering into contract is January 6, 2020. Price of option on the date of contract = 7.50. Calculate profit/loss profile for both the investor. Stock prices are: 80, 90, 100, 110, 120, 130, 140 and 150. (10 Marks)

- 5 a. What is butterfly spread? (03 Marks)
b. Explain commodity exchanges in India and its role atleast 3 exchanges. (07 Marks)
c. The following information is available on put option with 2 months expiration dates on a stock. Explain how the option can be used to create a butterfly spread. Find the pay-off for the investor at various ranges of stock price as Rs.85, Rs.90, Rs.95, Rs.100, Rs.105, Rs.110.

Strike price (Rs.)	95	100	105
Premium (Rs.)	5	7	10

(10 Marks)

- 6 a. Differentiate between coupon swap and basis swap. (03 Marks)
b. Create a long straddle from given information:
Call strike price Rs.400; call premium Rs.15; put strike price Rs.400; put premium Rs.18. Closing price are as following (in Rs): 300, 325, 350, 375, 400, 425, 450, 475, 500, 525. (07 Marks)
c. Companies X and Z have been offered the following rates per annum on a \$5 million; 10 year investment.

	Fixed Rate	Floating Rate
Company X	8.0%	LIBOR
Company Y	8.8%	LIBOR

Company X requires a fixed rate investment. Company Y requires a floating rate investment. Design a swap that will net a bank, acting as intermediary, 0.2% per annum and will appear equally attractive to X and Y. (10 Marks)

- 7 a. What is VaR? (03 Marks)
b. Differentiate between stress testing and back testing. (07 Marks)
c. Assume that the current spot rate of NTPC is Rs.165 and which is expected to rise to Rs.170 or fall to Rs.160 after six months. The annual continuously compounded risk-free interest rate is 8%. What is the value of six month European call option on the stock with strike price of Rs.162? (10 Marks)



8 Case Study:

An investor Mr. Kairav has constructed a portfolio on 1st May 2020 consisting shares of ten companies; the details of which are given below:

Sl.No.	Stock	Market Price P.S (Rs.)	No. of Shares	Beta Value (Rs.)
1.	Apollo Tyres Ltd.	250	1000	0.93
2.	Arvind Ltd.	370	950	0.69
3.	Bata India Ltd.	580	750	0.75
4.	Ajanta Pharma Ltd.	1460	400	0.55
5.	Biocon Ltd.	400	650	0.45
6.	Exide Industries Ltd.	217	900	1.07
7.	Federal Bank Ltd.	117	1500	1.28
8.	IDFC Ltd.	58	3000	0.81
9.	Voltas Ltd.	500	500	1.52
10.	SRF Ltd.	1511	300	1.99

The continuous compounding, annual cost of capital for the investor is 15%. The investor fears that the market will fall in the near future due to occurrence of war between China and India and hence wants to hedge the portfolio without selling the shares in the portfolio. Since the investor is not aware of the hedging strategies available, you, being the financial analyst, are requested to explain the investor various options available to hedge the portfolio and choose the best one. You are also required to:

- Calculate the theoretical value of the futures contracts expiring in July and August 2020 if the Nifty is currently quoted at 9500.
- Find whether or not the futures market and spot market price are consistent so as not to offer an arbitrage profit if July and August futures are currently trading at 9700 and 10,000 with lot size of 75.
- Find out the numbers of Nifty futures contracts required to be shorted to hedge the entire portfolio of the investor until July and August 2020.
- Find out the number of Nifty futures contracts required to be shorted to hedge to the extent of 90% and 125% of the portfolio until August 2020.
- Find out the numbers of Nifty futures contracts required to be traded if the investor desires to reduce beta of his portfolio to 0.80. **(20 Marks)**
