Fourth Semester MBA Degree Examination, Dec.2023/Jan.2024
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.*
3. *Use of Normal distribution table is permitted.*

1 a. What is Basis? **(03 Marks)**
  b. Differentiate between Forward and Future contract. **(07 Marks)**
  c. Consider a 6 – month forward contract 100 shares with a price of Rs 120 each.
   i) The continuously compounded risk free rate is 10% p.a. The share yields dividend of Rs .50 in 4 months. Find the value of forward contract.
   ii) Assume that dividend income worth Rs 300 is expected after 3 months and also after 6 months then what is the value of the contract? **(10 Marks)**

2 a. How does a pepper powder manufacturer hedge pepper futures expecting rise in prices? **(03 Marks)**
  b. Explain the role of different type of players in the derivatives market. **(07 Marks)**
  c. The following details pertaining to an investor who has taken short position in SIB futures contract. Prepare the margin account of the investor assuming that if a margin call is made at any time, the investor would deposit the amount called for :
  Contract size : 500 units   ;   Unit price : Rs 22   ;
  No. of contracts : 8   ;
  Initial margin : 12%   ;   Maintenance margin : ¾ᵗʰ of initial margin.   ;
  Date of contract   : June 3.
  Closing prices :

Date	June 4	June 5	June 6	June 7	June 10	June 11	June 12	June 13
Price (Rs)	22.30	23.10	22.90	23.00	23.15	22.85	22.95	23.00

(10 Marks)

3 a. What is a Put – Call parity? **(03 Marks)**
  b. Explain the various factors affecting option prices. **(07 Marks)**
  c. From the following data, calculate the values of call and put options using Block and Scholes model :
  Current price of the share   :   Rs 486
  Exercise price :   Rs 500
  Time to expiration :   65 days
  Standard deviation = 0.54
  Continuously compounded rate of interest :   9% p.a.
  Dividend expected :   Nil. **(10 Marks)**

4 a. Define Commodity Swap. **(03 Marks)**
  b. Explain the mechanics of interest rate swap. **(07 Marks)**

c. Company ABC and XYZ have offered the following rates per annum on a Rs 200 million loan :

	Fixed rate (%)	Floating rate (%)
ABC	12.0%	MIBOR + 0.1%
XYZ	13.4%	MIBOR + 0.6%

ABC requires floating rate loan and XYZ requires fixed rate loan. Design a swap that will net a bank acting as intermediary 0.1% per annum and equally attractive to both the parties. Show the diagram. **(10 Marks)**

5 a. How does a petrol bunk owner hedge his stock using commodity derivatives? **(03 Marks)**

b. Explain the trading and settlement mechanism in commodity exchanges in India. **(07 Marks)**

c. A call option with an exercise price of Rs 100 is available on a share which is currently sold at Rs 100. The price of the share is likely to be up by 15% or down by 10% at the end of 3 months. The risk free rate is 20%. Determine the hedge ratio and the value of the call option using the binomial model. **(10 Marks)**

6 a. What is Value at Risk? **(03 Marks)**

b. Elucidate the use of credit default and total return swaps. **(07 Marks)**

c. Suppose that the spot (zero) rates with continuous compounding are as follows :

Maturity (years)	1	2	3	4	5
Rate (% pa)	12.00	13.00	13.70	14.20	14.50

Calculate forward interest rates for the second, third, fourth and fifth year. **(10 Marks)**

7 a. What is Theta in option Greek? **(03 Marks)**

b. What is Butterfly spread? When do the investors prefer this strategy? **(07 Marks)**

c. Consider a position consisting of Rs 3,00,000 investment in gold and Rs 5,00,000 investment in silver. Suppose that the daily volatilities of these investments are 1.8% in gold and 1.2% in silver and the coefficient of correlation between their returns is 0.6. What is the 10 – day 97.5% value at risk for the portfolio? By how much does diversification reduce the VAR? **(10 Marks)**

8 **CASE STUDY (Compulsory) :**

On January 1, 2022 an investor has a portfolio of 5 shares as given here :

Security	Price	No. of shares	Beta
A	59.50	5,000	1.05
B	81.85	8,000	0.35
C	101.10	10,000	0.80
D	125.15	15,000	0.85
E	140.50	1,500	0.75

The cost of capital to the investor is 12.5% per annum. You are required to

a. Calculate the beta of his portfolio. **(05 Marks)**

b. Calculate the theoretical value of the Nifty futures for February. **(05 Marks)**

c. If the current value of Nifty is 17,000 and Nifty futures have a minimum trade lot requirement of 75 units, obtain the number of contracts of Nifty he needs to sell in order to get a full hedge until February for his portfolio. Assume that the futures are trading at their fair value. **(05 Marks)**

d. Calculate the number of future contracts the investor should trade if he desires to reduce the Beta of his portfolio to 0.7. **(05 Marks)**

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