

# CBCS SCHEME

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16MBAFM405

## Fourth Semester MBA Degree Examination, June/July 2018 Financial Derivatives

Time: 3 hrs.

Max. Marks:80

- Note: 1. Answer any Four questions from Q.No. 1 to Q.No. 7.  
2. Question No. 8 is compulsory.  
3. Use of interest factor tables and 'Z' tables is permitted.**

- 1 a. What is 'Put – Call Parity'? (02 Marks)  
b. Determine all relevant forward rates using the following information on zero rates : (06 Marks)

Time period (years)	1	2	3	4	5	6	7
Zero rate (% p.a.)	10.0	10.50	10.80	11.0	11.10	11.20	11.40

- c. Differentiate between Forwards and Futures. (08 Marks)
- 2 a. Define 'Credit Default Swap'. (02 Marks)  
b. A company has \$20 million worth portfolio with a portfolio beta of 1.5. The company intends to use index futures to hedge risk. The index futures are currently traded at 1080 with each contract for a delivery of \$ 250 times the index. (06 Marks)  
i) Determine the 'hedge' that minimizes risk.  
ii) Calculate the number of index futures to be used for reducing portfolio beta to 0.6.  
c. State the assumptions of Black and Scholes model of option pricing. (08 Marks)
- 3 a. What is 'Value at Risk'? (02 Marks)  
b. Describe the factors affecting option price. (06 Marks)  
c. Two Indian companies Indo – plas and Indo – car want to raise finance of Rs 500 crores each. They have been offered the following rates by a bank. (08 Marks)

	Fixed rate	Floating rate
Indo – plas	12 %	MIBOR + 70 bps
Indo - car	11 %	MIBOR + 30 bps

- Indo – plas wants to raise fixed rate and Indo – car desires floating rate. A bank is willing to arrange for swap for a fee of 10 bsp (5 bps from each firm). Design an appropriate swap showing the effect and benefit of swap to the two firms and bank. [Assume swap benefits to be shared equally by firms].
- 4 a. What is 'FRA'? (02 Marks)  
b. A trader buys two futures on orange juice at 160 cents/lb. Each contract is for a delivery of 15000 lbs. Initial margin is \$ 6000 per contract and maintenance margin is \$ 4500 per contract i) What changes in futures price would lead to a margin call?  
ii) Determine the future price at which \$ 2000 can be withdrawn from margin account. [\$ 1 = 100 cents]. (06 Marks)  
c. Compute and interpret the value of option delta of At – The – Money call option and put option (both European) with a volatility of  $\sigma = 0.35$  and interest rate at 7% p.a. (Continuously compounded) with 90 days to expire. (Consider 365 days in a year). (08 Marks)
- 5 a. What is 'Hedging', using futures? (02 Marks)  
b. Consider an investment of Rs 5 million in ABC Ltd. The yearly volatility of ABC Ltd returns is 16% p.a. Determine i) 1 day VaR @ 99% confidence level ii) 10 days VaR @ 90% confidence level iii) 25 days VaR @ 92% confidence level. (06 Marks)  
[Hint : 252 days of working in a year].

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

c. From the following data calculate the call option price using Black and Scholes Model.  
 Current share price = Rs 486 ; Exercise price = Rs 500 ; Time to expiration = 65 days  
 Volatility ( $\sigma$ ) = 0.54 ; Continuously compounded rate of interest = 9 % p.a ;  
 Dividend expected = Nil. (08 Marks)

- 6 a. What is a 'Straddle'? (02 Marks)  
 b. An investor has purchased shares of ABC Ltd at Rs 440 per share. He has also gone long on a put option at an exercise price of Rs 425 per share by paying a premium of Rs 45 per share. Determine the net pay off of his position if the stock price at maturity (expiration) takes the following values : Rs 150 , Rs 210 , Rs 350 , Rs 440 , Rs 500 and Rs 560. (06 Marks)  
 c. An investor takes a 'Short' position in 10 futures contract on a commodity at a price of Rs 28.75 per kg. The contract size is 1000 kg. Initial margin is 20% of contract value and maintenance margin is 85% of initial margin. Assume that excess margin amount is not withdrawn. Prepare the margin account statement , showing MTM calculation for the following data on closing price for the days. (08 Marks)

Day	1	2	3	4	5	6	7	8
Closing price Rs/kg	28.90	29.75	29.10	28.85	29.65	30.15	31.25	31.50

- 7 a. Define 'Derivative'. (02 Marks)  
 b. The current price of a commodity is Rs 30,000 per Q. The risk free rate of interest is 10% pa (cc). Calculate the value of a nine month futures on the commodity if the contract size is 10 Q, Convenience yield associated with commodity is 2% pa (cc) , storage cost is Rs 500 per Q payable at the end of contract period. (06 Marks)  
 c. Consider the following data about call option on BHEL stocks, One contract involves 1100 shares.  
 i) Create a butterfly spread and determine pay – off structure.  
 ii) Calculate net profit/loss when the stock price takes the values Rs 176 per share and Rs 185 per share. (08 Marks)

Exercise price	Rs 170	Rs 180	Rs 190
Call premium	Rs 21.10	Rs 14.00	Rs 8.00

8 **Compulsory Question :**

An investor has a portfolio of five shares as given below (as on 1.1.2018)  
 (Amount in Rs)

Security	Price per share	No. of shares	Beta
A	59.50	5000	1.05
B	81.85	8000	0.35
C	101.10	10000	0.80
D	125.15	15000	0.85
E	140.50	1500	0.75

The cost of capital to the investor is 12% pa.

- a. Calculate the beta of the portfolio.  
 b. Assuming current index value as 2500, calculate theoretical value of index futures for February 2018 and March 2018, if the contact multiplier is 200.  
 c. Determine number of index futures contracts required to hedge the entire portfolio until February 2018, assuming futures are traded at their fair value.  
 d. Calculate the number of futures required to be used if the investor desires to reduce the portfolio beta to 0.60. (16 Marks)

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