Fourth Semester MBA Degree Examination, June/July 2016
Financial Derivatives

Time: 3 hrs.   Max. Marks: 100

SECTION – A

Note : 1. Answer any FOUR questions from Q.No.1 to Q.No.7.
2. Use of natural logs, e^x, e^{-x}, area under normal curve (z),
interest factor tables permitted.

1   Define 'Derivatives' with an example.   (03 Marks)

2   What is 'Put-Call' parity?   (03 Marks)

3   What is 'Hedging' using futures?   (03 Marks)

4   What is 'Forward Rate Agreement' (FRA)?   (03 Marks)

5   What do you understand by 'Convenience yield' in commodities market? (03 Marks)

6   Define 'Credit Default Swap'   (03 Marks)

7   Describe 'Value at Risk (VaR).   (03 Marks)

SECTION – B

Note : Answer any FOUR questions from Q.No.1 to Q.No.7.

1   Describe the factors which affect option prices and how they affect call option price and put option price.   (07 Marks)

2   The market price of shares of a company is Rs.40 per share currently. The company is expected to pay a dividend of Rs.2.50 per share, three months from now. If the continuously compounded risk free rate of internet is 12% pa. Calculate the theoretical price (IV) of a 6 month futures on 100 shares.   (07 Marks)

3   Differentiate between futures and forward.   (07 Marks)

4   A trader buys two July contracts on orange juice at 160 cents/lb. Each contract is for delivery of 15000 lbs. Initial margin is $5000 per contract and maintenance margin is $4000 per contract.
    i)   What is the price below which a margin call is required?
    ii) At what price, an excess margin on $2000 may be withdrawn from the margin account.
    [Hint : 1$ = 100 cents].   (07 Marks)

5   What are 'Option Greeks' (optional derivatives)? What is indicated (measured) by each of the option Greeks?   (07 Marks)

6   Determine the forward rates using the following information on zero rates.   (07 Marks)

Time period (yrs)	1	2	3	4	5	6	7	8
Zero rate (% pa)	10	10.5	10.8	11	11.1	11.2	11.4	11.5

7   What is 'Moneyness' of options? Determine the moneyness, intrinsic value and time value of following options: (07 Marks)

No.	Option type	S (Rs)	E (Rs)	Option Price (Rs)
1	Put	36	32	5.30
2	Call	48	50	4.10
3	Call	107.50	105	8.40
4	Put	41	45	9.70

SECTION – C

Note : Answer any FOUR questions from Q.No.1 to Q.No.7.

1   What are the assumptions of Black and Scholes model?   (10 Marks)

2   Consider an investment of Rs.5 million in ABC Ltd. The yearly volatility of ABC Ltd. return is 16% pa.
   i)   Determine daily volatility of returns (Hint: 252 days of working in a year).
   ii) Determine 1 day VaR @ 99% confidence load.
   iii) Calculate 1 day VaR @ 95% confidence level.
   iv) Calculate 10 days VaR @ 90% confidence level.
   v)   Calculate 25 day VaR @ 92% confidence level.   (10 Marks)

3   From the following data calculate the value of call option and put option using Black and Scholes model:

   Current price of share   = Rs.486
   Exercise price   = Rs.500
   Time to expiration   = 65 days
   Stand deviation (σ)   = 0.54
   Continuously compounded rate of interest = 9% pa
   Dividend expected   = Nil

   (10 Marks)

4   What are the characteristics and uses of credit default swap and total return swap?   (10 Marks)

5   An investor takes a 'short' position in 10 futures contracts of a commodity at Rs.28.75/kg. The size of the contract is 1000kg. The initial margin is 20% of contract value and maintenance margin is 85% if the initial margin. Assuming the excess amount from margin account is not withdrawn; prepare the margin account statement showing MTM calculation for the following data on closing prices: (10 Marks)

Day	1	2	3	4	5	6	7	8	9
Closing price (Rs/kg)	28.90	29.75	29.10	28.85	29.65	30.15	31.25	31.50	30.25

6 Company ABC wishes to borrow US Dollar at a fixed interest rate. Company XYZ wishes to borrow Japanese Yen at a fixed rate of interest. The amounts required by the two companies are same at current exchange rate. Companies are quoted the following rates on interest.

Company	US Dollar	Japanese Yen
ABC	8.6%	4.0%
XYZ	9.0%	5.5%

Design a swap that is equally attractive to both the companies and that will net a bank acting as an intermediary 50 basis points per annum. The foreign exchange risk is assumed by the bank. Also show the swap diagram.

(10 Marks)

7 Considering the following data about call option on BHEL, for which one contract involves 1100 share, create a butterfly spread and determine the pay off structure at various ranges of stock price. Also calculate the net profit/loss where stock price takes the value Rs.176 and Rs.185.

(10 Marks)

Strike price (Exercise price) (Rs.)	Call premium
Rs.170	Rs.21.10
Rs.180	Rs.14.00
Rs.190	Rs.8.00

SECTION – D
(Compulsory)

8 On Jan 1st, 2015 an investor has a portfolio of 5 shares as given below:

Security	Price	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% per annum:

a. Calculate the beta of the portfolio.

b. Assuming current nifty value as 8000, calculate theoretical value of Nifty futures for February 2015 and March 2015. (Contract multiplier for Nifty futures is 200).

c. Determine the number of Nifty futures contract required to hedge the total portfolio until February, assuming futures are traded at their fair value.

d. Calculate the number of futures contracts required to be used if the investor desires to reduce the portfolio beta to 0.60.

(20 Marks)

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