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Fourth Semester MBA Degree Examination, Dec.2013/Jan.2014
Risk Management

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 is meant by index arbitrage? **(03 Marks)**
   b. An index consist of 5 stocks,

Stock	Price	Market cap
A	48	80
B	52	25
C	66	31
D	71	26
E	95	95

Spot value of the index Rs.3000/-, CCrf 10%, Maturity period 90 days.
Adjustment:
i) It is expected that stock B will give a dividend of Rs.15 per share 30 days hence.
ii) It is expected that stock 'E' will give a dividend of Rs.5 per share 45 days hence,
Calculate the value of there future contract assuming lot size of 50 units. **(07 Marks)**

   c. What is the significance of risk management in the context of an organization? Explain the process of risk management? **(10 Marks)**

2 a. What is currency swaps? **(03 Marks)**
   b. Suppose the spot (zero) rates with continuous compounding are as follows:

Maturity (year)	1	2	3	4	5
Rate (% PA)	12.00	13.00	13.70	14.20	14.50

Calculate forward interest rate for the second, third, fourth and fifth year. **(07 Marks)**

   c. Consider a call option on a stock with following parameters strike price Rs.70, R_f = 6%, Time to expiration 90 days, standard on return σ 0.4, spot price Rs.60/-. Compute price of the call option, delta, gamma, Rho, Vega. **(10 Marks)**

3 a. What do you mean by VAR? **(03 Marks)**
   b. Determine the profits from the butterfly spread based on the following data & interpret the result:
   i) First purchase of call option @ Rs.320 at a premium of Rs.40.
   ii) Second purchase of call option @ Rs.400 at a premium of Rs.20.
   iii) Sell both the call option @ Rs.360 at a premium of Rs.30
   iv) The price on the due date is 270, 300, 360, 400, 450, 500. **(07 Marks)**

   c. The current price of a share is Rs.50 and it is believed that at end of one month the price will be either Rs.50 or Rs.45, what will be European call option with the exercise price of Rs.53 on this share be valued @ if the risk free rate of interest is 15% PA? Also calculate the hedge ratio, applying binominal formulation. **(10 Marks)**

4 a. Explain covered call and naked call. **(03 Marks)**
   b. Two companies are offered the following interest rates on a 5 year loan of Rs. 2 million, company A is interested in floating rate and B wants fixed rate. Design an interest rate swap netting 0.5% to be intermediary is equally attractive to both A and B. Explain the cash flow. **(07 Marks)**

Company	Fixed	Floating
A	15%	MIBOR + 1%
B	18%	MIBOR + 2%

4 c. For the following data value the call option under black and scholes model:
- ➤ Stock price : Rs.50
- ➤ Months to expiration : 3 months
- ➤ Risk free rate of interest : 10 % PA
- ➤ Standard deviation of stock : 40%
- ➤ Exercise price : Rs.55
- ➤ Option type : European call **(10 Marks)**

5 a. What is commodity future? **(03 Marks)**
b. Explain the types of credit derivatives. **(07 Marks)**
c. The following table gives the prices of bonds:

Bond principal	Time to maturity (years)	Annual coupon ($)	Bond price ($)
100	0.50	0.0	98
100	1.00	0.0	95
100	1.50	6.2	101
100	2.00	8.0	104

(Held the stated coupon is assumed to be paid every 6 month)
i) Calculate zero rate for maturities of 6 months, 18 months and 24 months.
ii) What are the forward rate for the periods, 6 months to 12 months, 12 months to 18 months, 18 months to 24 months?
iii) What are the 6 month, 12 month, 18 month and 24 month per yields for bonds that provide semiannual coupon payment?
iv) Estimate the price and yield of a two year bond providing a semi annual coupon of 7% per annum. **(10 Marks)**

6 a. Explain the different between futures and forwards. **(03 Marks)**
b. Create a straddle top and a straddle bottom with the pay off with price are as follows: **(07 Marks)**

Prices	250	260	270	280	290	300	310	320	330	340	350
Exercise price →		300		Call premium – 15				Put premium – 18			

c. A portfolio consists of Rs.400000 invested in shares of company A and Rs.600000 invested in shares of company B. The daily volatilities measured by SD for these two stock are 1% and 2% respectively. The stock returns are normally distributed. The correlation co-efficient between the returns of these stocks is 0.40. Compute the 10 day 99% 'VAR' of the portfolio by what amount has the diversification reduced VaR? (Use model building approach). **(10 Marks)**

7 a. What is recovery rates? **(03 Marks)**
b. An investor takes a long position on Reliance futures following information is available number of shares 100, closing price Rs.2500, Initial margin 15% on the value of the contract maintains margin 40% of Im. **(07 Marks)**

Date	1	2	3	4	5	6	7	8	9	10
Price	2540	2580	2460	2400	2350	2200	2100	2000	2150	2250

c. An investor holds shares of three companies AB, MN and PQ shares of AB are traded at Rs.180/-. The company is not expected to pay any dividend during the next six months. MN is traded at Rs.560/- per share. MN is expected to pay a dividend of Rs.25/- per share three months from now. PQ is traded at Rs.780/- per share. Two dividends of Rs.10/- and Rs.30/- per share are expected from PQ two months and four months from now respectively. Compute the price at which the investor can sell six-month futures contract on each of these shares. The risk free rate of return continuously compounded is 8% per annum, and it is expected to remain unchanged throughout the next six months. **(10 Marks)**

8 Case Study:

Mr. Ram purchased a 3 month call option on the equity share of Birla engineering company. It is a present market value per share of Rs.112. Exercise price of Rs.120. At the end of 3 months, the investor expects the price of share to be in the following range of Rs.90 and Rs.170 with the following probabilities:

Expected price	100	110	125	150	170
Probability	0.10	0.25	0.30	0.25	0.10

You are required to answer the following:

a. What is the expected value of share price 3 months from now? What is the value of call option at expiry if the expected value of the share prevails at the end of 3 months? **(05 Marks)**

b. Determine the gain or lose to the call option holder and seller if the share price at expiry is Rs.129.50. Show the pay off diagrams. **(05 Marks)**

c. Determine the price per share or expiry at which call option buyer and seller will be at break even point. **(05 Marks)**

d. Determine the maximum gain to the call option buyer and seller and what is its probability. **(05 Marks)**

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