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## Fourth Semester MBA Degree Examination, June / July 2013

### Risk Management

Time: 3 hrs.

Max. Marks:100

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

**2. Q.No. 8 is compulsory.**

**3. Use of Natural Logarithms ex, e-x and normal distribution tables permitted.**

- 1
- What is pure risk? Give two examples for the same. (03 Marks)
  - The current value of a stock index is 900. The stock index provides a dividend yield of 3% p.a. If the continuously compounded risk free rate of interest is 8%, calculate the price of a three month futures contract of the stock index. (07 Marks)
  - From the following figures, calculate the hedge ratio using individual stock Betas – value of the NIFTY 50 index is Rs 500000/-. (10 Marks)

Stock	Share price	Shares O/s	Beta	Proportion of portfolio
Bank of Baroda	115	1000	0.95	40%
ACC	160	2000	1.20	40%
Bata	40	4000	1.40	10%
Ballapur Industries	50	6000	1.30	10%

- 2
- What is a Derivative? (03 Marks)
  - Company XYZ, a British manufacturer wishes to borrow US Dollar at fixed rate of interest. Company ABC a US, MNC wishes to borrow sterling pounds at a fixed rate of interest. The rates are as follows : (07 Marks)

	Sterling	USD
Company XYZ	11%	7.5%
Company ABC	10.6%	6.2%

Design a swap that will have a bank acting as intermediary 10 basis points per annum and which will produce a gain of 15 bps pa for each of the two companies.

- c. On Dec 15<sup>th</sup>, ABC Ltd establishes a long position in 200 shares of TISCO on Jan 1 at a futures price of Rs 600/- per share. Initial margin for contract is 30,000/- and maintenance margin is Rs 20,000/-. Draw a table showing margin and marking to market for ABC on 1<sup>st</sup> January with the following information. Assume that ABC Ltd withdraws all gains and deposits all losses to maintain initial margin. (10 Marks)

Date	Dec 15	16	17	18	19	21	22	23	24	25	27	31	Jan 1
Futures Price	600	550	650	600	605	590	580	600	620	630	640	660	690

- 3
- What are the characteristic features of an arbitrage transaction? (03 Marks)
  - Differentiate between a futures and a forward contract. (07 Marks)
  - From the following data, calculate the values of call and put options using Black and Scholes model : Current price of share – Rs 486 / - ; Exercise price – Rs 500/- ; Time to expiration – 65 days ; Standard Deviation – 54% ; Continuously compounded rate of int. – 9% ; Dividend expected - Nil. (10 Marks)

- 4 a. What do you understand by the term market maker? (03 Marks)  
 b. Explain the time value and intrinsic value of options. Calculate the time value and intrinsic value of the following options. (07 Marks)

Option	Stock price	Exercise price	Option price
Call	72-50	70	7.75
Put	83-50	80	2.50
Call	72-50	75	2.50
Put	83-50	85	6.75

- c. Explain credit default and total return swaps. What are their uses? (10 Marks)
- 5 a. What is a FRA? (03 Marks)  
 b. Call options on shares are available with strike prices of Rs 100/-, Rs 120/- and Rs 125/- and expiry dates is 6 months. Their call prices are Rs 20/-, Rs 12/- and Rs 5/- respectively. Explain how the options can be used to create a butterfly spread. Construct a table showing how profit varies with the stock price for the butterfly spread. (07 Marks)  
 c. Explain straddle, strip, straps and strangles. (10 Marks)
- 6 a. Explain VAR. (03 Marks)  
 b. Calculate the delta of an 6 month option at the money on a non dividend paying stock when the risk free rate of interest is 5% and the stock volatility is 12-5% p.a. (07 Marks)  
 c. The price of one year futures contract on gold is \$ 450. If the continuously compounded risk free rate of interest is 7% p.a and if the carrying cost of gold is \$ 2 per year, calculate the futures price of one gold futures contract. (10 Marks)
- 7 a. What do you understand by put call parity? (03 Marks)  
 b. What are the factors that determine the option value? Explain. (07 Marks)  
 c. A call option with a exercise price of Rs 50/- , costs Rs 2/-. A put option with a strike price of Rs 45/- , costs Rs 3/-. Discuss how a strangle can be created from these two options and show profit profile of strangle. Suppose that stock price on expiration date is Rs 60/-. (10 Marks)

8 CASE STUDY : (Compulsory)

The following table gives the prices of bonds.

Bond Principal	Time to Maturity (Years)	Annual Coupon	Bond Price
100	0.5	0	98
100	1.0	0	95
100	1.5	6-2	101
100	2.0	8	104

(Coupon is assumed to be paid every 6 months)

- a. Calculate zero rates for maturities of 6 months, 12 months, 18 months and 24 months. (10 Marks)  
 b. What are the forward rates for the period 6 mths to 12 months, 12 months to 18 months and 18 months to 24 months? (05 Marks)  
 c. Estimate the price and yield of a two year bond providing a semi annual coupon of 7% p.a. (05 Marks)