



Name :

Roll No. :

Invigilator's Signature :

CS/M.Phil (MGMT)/SEM-1/FIN-002/2010

2010

RISK MANAGEMENT

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* questions. $5 \times 14 = 70$

1. a) If two portfolios have same expected returns, can they differ in their risk ? If so, explain. How risk is defined in Finance ? What are the drivers of unexpected outcomes and how do they arise ?

- b) A financial institution owns a portfolio of options on the US dollar-sterling exchange rate. The delta of the portfolio is 56.0. The current exchange rate is 1.5000. Derive an approximate linear relationship between the change in the portfolio value and the percentage change in the exchange rate. If the daily volatility of the exchange rate is 0.7% estimate the 10 days 99% VaR.

4 + 10



2. a) In the risk assessment why and when does one need to go for applying Extreme Value Theory ? Discuss the procedure to estimate the VaR EVT.
- b) Suppose that you have a cumulative distribution function where the threshold is 2.8. On the basis of this, there are 19 observations beyond the threshold. The estimated shape and scale parameters are 0.2086 and 0.6509 respectively. The total number of observations is 432. Find out the 5 day VaR EVT at 99% confidence level. 5 + 9
3. a) Discuss contingent Value Rights in the context of decision of Firm A to acquire Firm B.
- b) How are the option contracts used here and what benefit does it impart on the target firm B ? Discuss this in the context of the following data. Company A acquires Company B at \$ 5 million when Company A's stock was traded at \$ 40 per share. Company A offers 1,25,000 shares to Company B. In the event of a possibility of a price decline from \$ 40 later Company A offers insurance of \$ 5 per share to the stockholders of Company B. What sort of creative financing would you propose and how will the payoffs look like ? 4+ 10
4. a) Distinguish between risk and exposure with examples. Would you consider excessive returns in a loan portfolio risky ? Explain.
- b) How is operational risk different from other types of risks ? Why is it difficult to recognize operational risk from other risk categories ? Discuss the three approaches of determining the operational risk regulatory capital.

5 + 9



5. It is said that the equityholders of a levered firm can be thought of as holding a call option on the firm's assets. Explain what is meant by this statement. Can they be considered as holders of put options as well? If so, how then the traditional put-call parity needs to be modified? How is the decision to exercise these types of options made with respect to a given exercise price & what impact does it have on the bondholders?

14

6. a) What assumptions are being made when VaR is calculated using historical simulation approach and say 500 days of data? What is the procedure of historical simulation method of VaR estimation. How is this modified when you incorporate volatility into the estimation?

- b) Suppose that the daily change in the value of a portfolio is, to a good approximation, linearly dependent on two factors, calculated from a principal component analysis. The delta of a portfolio with respect to the first factor is 6 and the delta with respect to the second factor is -4. The standard deviations of the factor are 20 and 8 respectively. What is the 5 days 99% VaR.

7 + 7

7. a) What is the basic intuition behind the Black-Scholes formulation? What parameters are required in Black-Scholes estimation? Why is this formulation considered a most important contribution in Finance?

- b) Ken is interested in buying A European Call Option written on Northwestern Airlines, Inc., a non-dividend paying common stock, with a strike price of \$ 110 and one year until expiration. Currently, Northwestern's stock sells of \$ 100 per share. In one year, Ken knows that Northwestern's stock will be either \$ 120 or \$ 80 per share. Ken is able to borrow and lend at the risk free interest rate of 2.5 per cent per annum. How much should Ken expect to pay for his desired call option today?

7 + 7



8. a) How are the following factors related to the American option (both call and put) values ?

- i) Value of the underlying asset (Stock Price)
- ii) Exercise Price
- iii) Stock Volatility
- iv) Interest rate
- v) Time to exercise date.

b) Nick Leeson, an employee of Barings Bank in the Singapore Office in 1995, had a mandate to look for arbitrage opportunities between Nikkei 225 futures prices on the Singapore exchange and the Osaka exchange. Overtime Leeson moved from being an arbitrager to being a speculator without anyone's knowledge in the London Head Office. He began to make losses and was able to hide and began to make bigger speculative positions to recover the losses. In the end, total loss was close to \$ 1 billion and the bank was wiped out.

What sort of risks was associated with this episode and what lessons are learnt from it from the risk management perspective ?

7 + 7

