

# Actuarial Society of India

## EXAMINATIONS

23<sup>rd</sup> November 2005

**Subject ST5 – Finance and Investment A**

**Time allowed: Three Hours (10.15\* - 1.30 pm)**

### *INSTRUCTIONS TO THE CANDIDATE*

- 1. You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only but notes may be made. You then have three hours to complete the paper.*
- 2. You must not start writing your answers until instructed to do so by the supervisor.*
- 3. The answers are not expected to be any country or jurisdiction specific. However, if examples/illustrations are required for any answer, the country or jurisdiction from which they are drawn should be mentioned.*
- 4. Mark allocations are shown in brackets.*
- 5. Attempt all questions, beginning your answer to each question on a separate sheet.*
- 6. Fasten your answer sheets together in numerical order of questions. This, you may complete immediately after expiry of the examination time.*

### **Professional Conduct:**

*“It is brought to your notice that in accordance with provisions contained in the Professional Conduct Standards, If any candidate is found copying or involved in any other form of malpractice, during or in connection with the examination, Disciplinary action will be taken against the candidate which may include expulsion or suspension from the membership of ASI.”*

**Candidates are advised that a reasonable standard of handwriting legibility is expected by the examiners and that candidates may be penalized if undue effort is required by the examiners to interpret scripts.**

***AT THE END OF THE EXAMINATION***  
***Hand in BOTH your answer script and this question paper to the supervisor.***

- Q.1)** Explain what is meant by securitization. Give examples of the range of assets on which securitization may be collateralized. [6]
- Q.2)**
- (i) Describe the three major types of hedge funds. (6)
  - (ii) Indicate the likely relative levels of risk of these hedge funds. (3)
- Total [9]**
- Q.3)**
- (i) Explain what is meant by the expected default loss on a corporate bond. (2)
  - (ii) Consider a bond issued by a company that pays 5% annual coupons, and has an outstanding term to maturity of 3 years (it is currently exactly one year to the next coupon date). Suppose also that the zero curve for government bonds is flat over the first 3 years at a yield of 6% p.a. compounded annually, but that the corresponding zero rates for the company are 7% p.a.
- Calculate the expected default loss during the third year from now on this company's bonds (as a percentage of the total value of the corresponding government bond). (5)
- (iii) Why might you expect your answer in (ii) above to be an overestimate of the actual default losses? (3)
- Total [10]**
- Q.4)**
- (i) Discuss the merits of incentivising managers through share option packages (3)
  - (ii) Outline the primary responsibilities of company directors. (6)
- Total [9]**
- Q.5)** Given that the 1-year and 4-year continuously-compounded spot rates are currently 5.11% and 5.62% and that a 1-year European put bond option with a strike price of 85.00% is available on a 4-year zero coupon bond.
- a) calculate the modified duration of the 4-year zero-coupon bond (2)
  - b) An option dealer quotes forward yield volatility for the bond option of 16%. Calculate the forward price volatility of the zero-coupon bond and hence the price of the put option of the bond (8)
- Total [10]**
- Q.6)** An investor decides to go long in a call option on a short-term interest rate future, whilst at the same time going short in another call option (with a lower strike price) on the same short-term interest rate future. Describe fully how this strategy affects the rate at which the investor is able to lend money and hence why the investor might wish to undertake this strategy. [6]

- Q.7)** Companies A and B have been offered the following rates per annum on a Rs. 500 million five-year loan.

	Fixed Rate	Floating Rate
Company A	12.0%	LIBOR + 0.1%
Company B	13.4%	LIBOR + 0.6%

Company A requires a floating rate loan; Company B requires a fixed rate loan. Design a swap that will net a bank, acting as an intermediary, 0.1% per annum and that will appear equally attractive to both companies. Comment on any risks that the bank could face. **[6]**

- Q.8)** A large pension fund invests in bonds, equities and property. The equities portfolio is managed by two different investment managers. The trustees are keen on maximizing the returns on investments within their overall risk tolerance limits. They are also keen that performance should be periodically compared against appropriate benchmarks.

- (a) Explain the problems in constructing suitable property indices and suggest how the performance can be benchmarked. **(6)**
- (b) A significant part of the assets is invested in equities. It is being suggested that the performance of the two investment managers should be assessed at quarterly intervals by carrying out risk return analysis. Discuss the advantages and disadvantages of this suggestion. **(6)**
- (c) Over the past three years, the market's equity index has given an average return of 25%, which is 13% above the risk free rate of return, and had a standard deviation of 30%. The performance of the two investment managers during this period is as below

	Manager 1	Manager 2
Average return	22%	30%
Standard deviation	20%	40%
Correlation coefficient with the index	0.9	0.7

- i. Calculate the risk adjusted performance measures for the managers using the Treynor and Jensen measures. **(4)**
- ii. Assess the performance of the managers on the basis of (i) above explaining any limitations. **(4)**

**Total [20]**

- Q.9)** Companies X and Y write unit linked life insurance products. A section of Company X's sales force is not happy with its investment performance over past 12 months vis-à-vis that of company Y. The investment manager of X claims that his approach is "top-down" and investing in "value stocks" with "passive management". He believes that company Y is more focused on growth stocks backed with active management.

- a) Explain what is meant by company X’s approach to investment. (7)
- b) Company X had equity fund of Rs. 20 billion on 01 January 2005, which it split equally between two fund managers, P and Q. The company wanted to monitor their performance against the All Stock Index. P and Q had freedom to deviate from the benchmark.

P’s investment strategy was to keep a mix of 77% in S&P CNX Nifty stocks and 23% in CNX Midcap stocks. New contribution of Rs. 1 billion received on 01 March 2005 was invested in S&P CNX Nifty stocks. On 01 May 2005 the fund value was Rs. 10.02 billion.

Q’s investment strategy was to keep a mix of 60% in S&P CNX Nifty stocks and 40% in CNX Midcap stocks. New contribution of Rs. 1.50 billion received on 01 April 2005 was invested in CNX Midcap stocks. On 01 May 2005 the fund value was Rs. 10.50 billion.

The following additional information is available.

	Index weight as % of All Stock	Index values on different dates			
		01 January 2005	01 March 2005	01 April 2005	01 May 2005
S&P CNX Nifty	75%	2115	2084	2068	1902
CNX Midcap	25%	3046	2982	2993	2847

- (i) Construct appropriate fund values and allocate the difference between that attributable to deviation from benchmark in terms of index selection and in terms of stock selection. (6)
- (ii) Comment on your results. (4)

**Total [17]**

**Q.10)**

- (a) Explain what is meant by value at risk and its uses. (3)
- (b) Consider a portfolio consisting of a position worth Rs. 100 million in stocks on Infosys Technologies. Assuming a volatility of 2% per day, the investment manager wants to be 99% certain that she will not lose more than Rs. X in the next ten days. Calculate X. State all assumptions.

(4)

**Total [7]**

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