

# INSTITUTE OF ACTUARIES OF INDIA

## EXAMINATIONS

28<sup>th</sup> May 2009

**Subject ST5 — Finance and Investment A**

**Time allowed: Three hours (9.45\* – 13.00 Hrs)**

**Total Marks: 100**

### INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions on the front page of answer booklet and instructions to examinees sent along with hall ticket carefully and follow without exception*
2. *\* 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.*
3. *You must not start writing your answers in the answer sheet until instructed to do so by the supervisor*
4. *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.*
5. *Attempt all questions, beginning your answer to each question on a separate sheet.*
6. *Mark allocations are shown in brackets.*

**AT THE END OF THE EXAMINATION**

**Please return your answer book and this question paper to the supervisor separately.**

- Q 1)** A financial director of a major multinational company has said in a financial press conference that “we can see many mergers in the near future to come out the current economic crisis”. Outline the points you would make in a report covering the following:
- a)** types of mergers
  - b)** reasons for merger within the context explained above [6]
- Q 2)**
- (i)** Explain what a swap rate is and the relationship between swap rates and par yields. (2)
  - (ii)** You are given the following information related to a plain-vanilla interest swap.
    - X is a BBB rated company and Y is a AAA rated company.
    - X is paying fixed and receiving floating rate in the interest rate swap arrangement.

Assuming that companies are most likely to default when interest rates are high explain with an example whether it increases or decreases the risk of the bank’s swap portfolio, where the bank has acted as the intermediary for the swap deal. State other assumptions, if any. (4)
  - (iii)** Suppose that the term structure of interest rates is flat in US and Australia. The USD interest rate is 7% per annum and the AUD is 9% per annum. The current value of the AUD is 0.62 USD. Under the terms of a swap agreement, a financial institution pays 8% per annum in AUD and receives 4% per annum in USD. The principals in the two currencies are 12 million USD and 20 million AUD. Payments are exchanged every year, with one exchange having just taken place. The swap will last 2 more years. Determine the value of the swap to the financial institution. Assume all interest rates are continuously compounded. State any assumptions. (5)
- [11]
- Q 3)** Explain why it is necessary to regulate the financial services sector And why the need is greater for this sector compared to non-financial sectors of the economy. [5]
- Q 4)** A fund has its assets split between two internal fund managers. One is responsible for the equity portfolio and the other for the bond portfolio. As part of the review of investment performance of the two managers you are asked to compare the performance with appropriate benchmarks over a one year period.
- The bench mark for the equity portfolio is All-Equity Index and for the bond portfolio it is All-Bond index of suitable term. You are given the following information:

	1 <sup>st</sup> January	31 <sup>st</sup> December
All-Share Index	12,365	9,626
Gross Dividend yield	6.66%	8.65%
All-Bond Index	2,345	2,019
Ex-dividend adjustment	0	105.4

The value of the equity portfolio was Rs. 8400m on 1 January and was Rs. 7800m on 31 December. During the year, net new money of Rs.480m was invested in the equity portfolio. The value of the fixed interest portfolio was Rs.1600m on 1 January and was Rs.1650m on 31 December. During the year, net new money of Rs.250m was invested in the fixed interest portfolio. Investment income from each portfolio was reinvested in the portfolio from which it originated.

- (i) Calculate, stating any assumptions that you make, the money-weighted return achieved by each of the fund managers
- (ii) Comment on the performance of each manager compared to the appropriate benchmark. [7]

**Q 5)** A life insurance company is keen to launch a unit linked guaranteed products. The marketing team has proposed a close –ended Single Premium Bond with a term of 10 years providing a compounded guaranteed return of 6% on the premium invested in this product on maturity. You may assume that this guarantee will not be provided if the policyholder surrenders before the expiry of the term. The death benefit is fixed at 1.25 times the premium.

- (i) Discuss the investment risks inherent in this product. (7)

The assets backing these liabilities will be fixed income securities. No investment in other asset classes is contemplated. The Investment Manager has proposed a passive investment strategy for managing this portfolio of fixed income securities comprising coupon bearing Government Securities and Corporate Bonds with a minimum credit rating of AA by benchmarking the portfolio to a bond index widely followed in the market. The market does not have any zero coupon bonds.

- (ii) Distinguish between active and passive investment strategies. (4)
- (iii) Discuss two active bond portfolio strategies to enhance the yield outlining the risks associated with these strategies. (6)

As the company is unable to hedge the risks fully in this case the Chief Actuary has asked you to calculate the Asset Liability mismatching reserve for this product.

- (iv) Discuss what is meant by Asset Liability mismatching reserve and explain how an asset liability mismatch reserve can be calculated using for the given product using stochastic modeling techniques. (6)

[23]

- Q 6)** The world economy has been in recession. In order to enhance the economic activity, the Indian central bank has reduced the bank rates and the Cash Reserve Ratios (CRR) which the banks have to maintain with the central bank. However, the economic activity has not increased at the expected level.
- (i) List the key functions of the central bank of any country (3)
  - (ii) Explain how the reduction in interest rates and the CRR will impact the economy (6)
  - (iii) Explain the possible reasons why the reduction in interest rates could not have the desired affect of enhancing the economy activity (5)
  - (iv) Briefly explain how the reduced interest rates will impact the fixed income bond markets and equity markets. (7)
- [21]**

- Q 7)** You are the fund manager of a large pension fund. The trustees have set the investment policy of the fund with significant component of the fund being invested in equity markets. The trustees have specified the bench mark as the Nifty-50 Index operated by National Stock Exchange of India. The fund manager while accepting the benchmark has suggested that she would construct the portfolio that tracks the benchmark without necessarily investing in all the 50 stocks in the same proportion as they comprise in the index. The trustees have asked the fund manager to prepare a report for their consideration consisting of the following :
- (i) The advantages and disadvantages of constructing such portfolio that does not necessarily consist of each of the 50 stocks with the same weights as they have in the index. (6)
  - (ii) The investigations that could be made to ensure that the portfolio effectively tracks the index. (4)

Explain the points which you would make in the report.

One of the trustees who has read an article in a financial magazine about modern portfolio theory has asked you to explain this theory.

- (iii) Briefly state the modern portfolio theory and the key assumptions underlying the theory (5)
- (iv) (a) State the key actuarial risk this theory ignores.
- (b) Explain how the theory can be modified to take care of this actuarial risk for this pension fund Using appropriate formulae and defining all terms used. (4)

**[19]**

**Q 8)** You are working for a large life insurance company that has a significant amount of traditional (non-linked) business. Its investment policy states that all the assets pertaining to the liabilities of the traditional business are invested in fixed income securities. In recent times the bond markets have witnessed volatility due to fast changing economic conditions. Recently the insurance regulator has mandated that all the life insurance companies must value their assets at the market value or book value whichever is lower to assess the excess assets over the liabilities for measuring the solvency of the company.

Discuss the appropriateness of this measure given the long term nature of the liabilities and its likely impact on the company. Suggest and discuss the other alternative asset valuation approaches that could be used to reduce the volatility.

**[8]**

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