

# Actuarial Society of India

## EXAMINATIONS

24<sup>th</sup> November 2005

Subject CA11 – Assets

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)** ABC Investment Company is considering the launch of a new unit linked fund investing in domestic smaller companies. The fund will aim to track an appropriate index of such companies with a tracking error of no more than 0.25%. The Company will need to invest Rs.10 crores in the fund in order to begin tracking the index from the launch date. The fund will have a management charge of 0.25% per annum. You are the investment adviser and you have been asked to investigate the viability of this project by the Company's directors. Describe briefly the issues that you would cover in your report to the directors.

[6]

**Q.2)** You are investment adviser to a large scale life insurance company which has invested a portion of its money in Japanese equities. You are concerned with the poor relative returns from Japan over the last three years. One of the directors has suggested switching the Japanese investment to emerging markets. Discuss the major issues in this proposal.

[7]

**Q.3)** You are an investment adviser in Mumbai. You have been asked to construct an index to be used by your company as a benchmark for assessing the performance of property portfolios. List the factors you would consider in constructing such an index.

[5]

**Q.4)** You are an actuary for XYZ life insurance Company which calculates the value of assets by reference to a notional portfolio. From the information set out below, calculate the value that should be placed on the assets, ignoring tax and stating any other assumptions made.

Market value of Rs.100 crore

Notional portfolio is 75% in equities, 25% in a benchmark GOI bonds

Valuation assumptions are 8% per annum effective interest and 4% per annum effective dividend growth

Yield on the Mumbai All Share Index is 3.9%

The benchmark GOI bond has a 12% coupon (payable twice yearly), a 20 year term and a quoted market price of Rs 153.39

[7]

**Q.5)**

(a) Ram is a tax exempted investor. He is considering the purchase of a rupee denominated, corporate bond, maturing 2013-17, with a gross redemption yield of 7.1% per annum. Gopal, his investment advisor, informed him that it may not fetch 7.1% even if it is held to redemption. Outline the reasons for this.

(4)

(b) ABC consultants have suggested to "Honey land" Government that it is better to issue index linked securities rather than fixed interest securities. Explain the reasons for this recommendation.

(6)

**Total [10]**

**Q.6)** Sriram Ltd., is considering a capital project, which is the construction of a highway between Mumbai and Pune. The initial set up cost is Rs.100 crore and will generate revenues of Rs.50 crores per annum for three years, if very successful or Rs.40 crores, if less successful. The probability of the project being very successful is about 50%. All cash flows other than the initial

set up cost are assumed to occur at the end of the year in consideration. All cash flows and rates of return are assumed to be expressed in real terms. The beta of the project is assumed to be 1.4.

- (a) If a risk free rate of 3% and an expected return on its existing portfolio is 8%, calculate the risk discount rate that should be used to calculate the expected NPV of this project. (2)
- (b) Use this risk discount rate to calculate the expected NPV of the project. (3)
- (c) Calculate the mean internal rate of return of the project. (3)
- (d) The company is considering insuring the project so as to cover the risk that the project is not successful. If insurance premium is Rs.5 crore and the cover provides payment equal to 35% of the shortfall in income below Rs. 50 crore in any year. Calculate the expected NPV if insurance is taken and explain your answer. (4)

**Total [12]**

**Q.7)**

- (a) List various methods of valuing investment instruments. Explain which two are most commonly used. (3)
- (b) Explain why selling an asset may not fetch the “market value” of the asset. (2)

**Total [5]**

**Q.8)**

- (a) You have been asked to produce a stochastic asset model for equity prices. Describe various attributes of a good model you would like to have. (3)
- (b) In the context of (a) briefly state why ARCH models are preferred by many. (2)
- (c) Describe various approaches that may be used to facilitate testing and parameterization of an asset model at the implementation stage of its development. (5)

**Total [10]**

**Q.9)** Sunshine Property Developers in Hyderabad is considering the construction of a small “shopping mall”. The total cost is estimated at Rs.40 lakhs and the initial level of rent estimated is Rs.4 lacs. The expected time for completion is 18 months.

You are investment adviser to a large bank. You have suggested to the developer two alternative financing arrangements:

- (i) A variable rate mortgage for 40 lakhs repayable over 25 years at 3% over short term interest rate. The developer plans to fund the interest payments from the rent receivable.
- (ii) The bank takes an equity stake. It provides the finance necessary, which is bundled up at a notional interest rate of 4% per annum. Rent would be split as follows:
  - 6% of gross cost (including notional interest) to the investor
  - 2% of gross cost (including notional interest) to the developer
  - remaining rent split at 50/50

The debt would be cancelled on completion and the developer would have the option of converting his share of rentals into a capital sum using a factor to be agreed in advance.

- (a) Explain why arrangement (ii) is likely to be more suitable in this case. (5)  
 (b) Suggest any modifications to financing arrangement (ii) that you would seek. (5)  
 (c) Discuss further information you would require and other factors to take into account before agreeing to finance the project. (6)

**Total [16]**

**Q.10)** Explain the impact of each of the following on the slope of the yield curve for government bonds and substantiate your answer.

- (a) Tight monetary policy  
 (b) Lots of life offices [] want to buy government bonds  
 (c) Investors being risk – aware with respect to future reinvestment rates.  
 (d) Fixing the exchange rate above its free market level to an exchange rate mechanism with a reputation for low inflation.  
 (e) An upward sloping yield curve for overseas government bonds.

**[10]**

**Q.11)** You are given the values of the following variables.

- Dividend yield on All Share Index
- Yield on 3% undated government bonds
- Index – linked government bond yield
- Prime yield on offices
- Expected inflation
- Equity risk premium
- Marketability of premium on property
- Inflationary risk premium
- Property risk premium
- Real dividend growth
- Real rental growth

Using the above, construct equations to explain the theoretical relationship that you would expect to see between the dividend yield on the All Share Index and

- (a) The yield on 3% undated government bonds  
 (b) The real yield on a long dated index linked government bonds  
 (c) The yield on prime offices

**[12]**

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