INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

19th November, 2013

Subject SA6 – Investment

Time allowed: Three hours (14.45* - 18.00 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 expected to be India Specific application for the syllabus and corresponding core reading. However, substantially the core reading material is still taken from material supplied by Actuarial Education Company which are meant for UK Fellowship examination. The core reading also contains some material which is India Specific, mostly the IRDA regulation. In view of this, it should be noted that focal point of answers is expected to be India Specific application. However if application specific to any other country is quoted in the answer the Candidate should answer the question with reference to Indian environment.*
5. *Attempt all questions, beginning your answer to each question on a separate sheet.*
6. *Mark allocations are shown in brackets.*
7. *Please check if you have received complete Question Paper and no page is missing. If so, kindly get new set of Question Paper from the Invigilator.*

AT THE END OF THE EXAMINATION
Please return your answer book and this question paper to the supervisor separately.

Q. 1) You are an Actuarial Consultant to the Trustees of ABC Pensions Fund. During the last year, the surplus in the fund has vanished due to extreme fluctuations in interest rates and inflation where the assets were affected much more than the liabilities. The market on the whole performed very poorly though the fund managed to achieve higher returns than most of its competitors and benchmarks. You are being approached to review the investment strategy for the fund to protect it from such volatilities in the future. In your response, you are preparing a case for implementing liability driven investment (LDI) strategy.

i) In the above context, please answer the following.

a) What is LDI? (1)

b) "There is no use of complex techniques like LDI in pension schemes. A pension is a series of cash flows and a bond is a series of cash flows. So bonds are the lowest risk investment for pension funds. No other assets are required." Comment on this statement. (1)

c) The Indian market is currently experiencing a downward sloping yield curve. Explain how does an inverted yield curve imply economic problems? (2)

d) Why derivatives (and specifically swaps) are being used in LDI? How can a fund use 'swaption collar' to implement a 'stop-loss' hedging strategy which limits downside risk of falling interest rates? (6)

(10)

ii) **a)** Optionality in pension affects the hedging strategy as it can make liabilities difficult to predict. List some of the common options that pension schemes offer. (2)

b) What other factors (not specific to pensions) affect the hedging strategy? (2)

c) How would you construct a Liability Benchmark? Please explain how would you subsequently implement LDI? (8)

d) What factors will the trustees have to consider in formulating an LDI strategy? (3)

(15)

iii) You explained to trustees that "Contingent assets" have additional value to the pension fund, and its beneficiaries, since they provide an additional cushion in case of the insolvency of the sponsoring employer. A contingent asset could be either held outside of the pension scheme, but available to the beneficiaries of the pension scheme on the insolvency of the sponsoring employer (thereby making the pension fund a secured creditor of the sponsor) OR held within the fund but have an enhanced value in the event of insolvency.

a) How can such contingent asset affect the investment strategy of a pension fund? (3)

b) What are the possible disadvantages of setting up such a contingency fund? (2)

c) In India, many of the insurers hold Fund beyond Solvency which is in the nature of the contingent assets held as part of shareholders fund. What are the advantages of holding Fund beyond Solvency? (2)

(7)

iv) **a)** Compare LDI in pensions with LDI for an insurance company offering bulk purchase annuity ("BPA") buyouts to pension funds. (8)

b) The need of LDI has arisen to reduce balance sheet volatility as regulations are pushing for more transparency in pension schemes. However LDI is not without its shortcomings. State some of the limitations of LDI. (2)

c) You are considering implementing one of the 3 LDI strategies:

i) Duration Matching

ii) Maturity Bucket Matching

iii) Cashflow Matching

Compare the hedge effectiveness of the above 3 strategies. Which one would you recommend and why? (4)

(14)

v) As stated before, the fund had managed to achieve higher returns than most of its competitors and benchmarks. The comparisons were made based on Risk-Adjusted Performance Measures (RAPM) such as Sharpe ratio, ROC, etc. Since most of the beneficiaries of the fund are active members, you feel that Sharpe ratio may not be the most suitable tool to access risks for such a 'young' fund. As a result, some of the investments which were rejected by Sharpe ratio could have been acceptable under other RAPM tools like the Sortino ratio.

a) What do you understand by RAPM? (1)

b) What are the limitations of Sharpe ratio? (3)

c) Define Sortino Ratio. Why it can be a better alternative to Sharpe Ratio? (2)

d) What are the challenges in implementing RAPMs and what can be done to overcome them? (2)

e) Apart from performance measurement and financial communication, where else can RAPMs be used in the company? (1)

(9)
[55]

Q. 2) **i)** You are an actuary to a life insurance company, in India, whose assets are invested in domestic equities and bonds.

a) The Director of the company has asked you to explain to him the following three methods of valuation of assets. Describe briefly the main points you would like to consider in the explanation.

i) market values

ii) discounted cash-flows on the portfolio of present assets

iii) a notional portfolio method

(3)

b) Please use a discounted cash-flow approach or a dividend discount model to value the shares of a firm in which you want to invest. You have been given the following information.

- The firm has a return on equity of 13% and is expected to maintain the same in perpetuity.
- The expected market return is 12%.
- The firm had Rs 2 as earning per share and gave a dividend of Rs 1.4 per share thus having a dividend payout ratio of 70%.
- The risk free rate of interest is 7%.
- The beta of the firm is 0.9.
- The risk premium is 5%.

(3)

(6)

ii) **a)** You hold an unsecured ten-year bond with put/call option at the end of five years and it has a gross redemption yield of 10.5% per annum. Discuss the reasons why you may not realize a return of 10.5% per annum even if you hold the bond to redemption. (2)

b) Explain the problems associated with using a single yield curve based on gross redemption yields. (2)

c) Briefly explain how volatility varies with an increase in

i) coupon

ii) term and

iii) redemption yield (3)

d) Explain how economic factors influence bond yields. (5)

(12)

iii) You have a mandate to invest INR 100 cr. You have been offered an instrument where there is a guarantee that in 6 months you will receive a return greater of i) zero and ii) 40% of the return provided by a market index.

Evaluate whether this is a good deal?

Given:-

Risk free rate of return 8% per annum

Dividend Yield on the index 3% per annum

Volatility of the index 25% per annum **(6)**

iv) Your CEO has forwarded a circular from the regulator which permits Insurance companies lending through Securities Lending and Borrowing ('SLB') scheme. However lending through SLB shall be in equities only.

a) Explain SLB (1)

b) Give the single biggest advantage that this will provide to insurance companies? (1)

c) Outline the important considerations to be made by the investment team at the insurer before participating in the Securities lending scheme (2)

(4)

v) Recently IRDA permitted insurance companies to invest in category I & II AIFs.

a) What is category 1 and category 2 AIF and what are the advantages of this relaxation? (4)

b) What is meant by private equity and what are the various forms of private equity? (3)

c) For a life Insurance company which has been in business for 20 years, what are the risks involved while making investments in a private equity fund. (5)

d) Your friend is an entrepreneur and has an idea on developing an application on mobiles. He has a small set up and some trials are already completed. He needs capital for expansion. You suggest him to go for angel funding rather than venture capitalist approach. Explain the key differences between angel funding and venture capital funding. (5)

(17)

[45]

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