INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

05th November, 2014

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 you are required 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 is 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) Interest rates and inflation are currently high in India. You are the investment advisor to the Actuarial Function Holder (AFH) of the ABC Insurance Company limited. The company has a decent offering of protection and investment products (both unit-linked and with-profits) but wants to push its pension products to increase its market share. A joint meeting it held along with the AFH, the Actuarial Pricing Head and the Marketing Director. It is suggested that the company can offer options on its pension products to make them attractive. The Pricing Head has studied the offerings in the developed nations and has suggested to offer Guaranteed Annuity Options (GAOs) with the company's standard pension products. The product will have an accumulation phase wherein the premium paid will accumulate and thereafter the policyholder will have the annuity phase wherein a guaranteed annuity is offered. He suggests the guarantee to be in the range of 6% pa to be able to gain a competitive edge and also retain a profit margin. The AFH asks you and the Pricing Head to analyse the feasibility of providing these options.

In the context of the above, please answer the following questions.

i) What is a GAO? And explain the three main risks in providing such options? (4)

ii) Highlight some of the challenges in the Indian pension system. (6)

iii) Briefly explain three methods of dealing with the type of risks associated with writing financial guarantees. (3)

iv) The guaranteed annuity option is similar to a put option on a coupon bond with the annuity payments and survival probabilities incorporated in the notional coupons. Explain the payoff of the put option. Specify any assumptions and notations used. (7)

v) What are swaptions, their benefits and how can you use swaptions to hedge the interest rate risk associated with GAO? (7)

vi) Briefly describe the steps in the stochastic asset liability modelling of the pension fund. (5)

vii) How would the GAO differ if it were offered on with-profit contract rather than on a unit linked contract? (2)

viii) Under the no arbitrage pricing model, the price of the derivative must be equal to the current price of the replicating portfolio. However, in real world, the assumptions of the model are never exactly fulfilled which leads to *hedging error*. Why? (3)

ix) In what other areas can derivatives be used by insurance companies? (3)

x) What are the concerns in using derivatives for such guarantees in the Indian market? Highlight some of the recent regulatory changes in use of derivatives by insurers. (6)

xi) Which exchange-traded instruments are available in the Indian market? Briefly describe the trading mechanism of derivatives on NSE? (6)

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Q. 2) ABC Asset Management PLC is considering making a direct foreign investment in either INDIA or BRAZIL (both are developing countries). It has carried out its due diligence and feasibility studies that have produced various IRR and NPV calculations.

i) Explain the potential risks that ABC should consider before making any direct foreign investment in a developing country. (6)

ii) Discuss whether ABC should rely more on the NPV rather than the IRR in its feasibility study. (5)

iii) You have been asked to analyze the Indian market as a probable investment destination. Briefly explain who can invest in India, what are the entry routes and what instruments are available to a foreign investor in India? (6)

iv) ABC decided to invest in INDIA. The portfolio manager of the company is keen to hedge the currency risk. Discuss the relative advantages and disadvantages of the use of a money market hedge compared with using exchange traded derivatives for hedging the foreign exchange exposure. Discuss the extent to which currency hedging can reduce a firm's cost of capital. (6)

v) After a year of doing business in India the planning department of the company has provided the following information to the Chief Financial Officer (all amounts in INR crores):

Item	USD denominated	INR denominated
Operating income	1000	200
Operating expenses	200	700

a) Calculate the sensitivity of the operating margin to 10% movement in INR-USD exchange rate in either direction and hence describe how the operating margin of the company could fluctuate due to movement in exchange rate. (5)

b) The company proposes to enter into a 6 month INR-USD forward contract for the company's net USD exposure to reduce the sensitivity of operating margin to exchange rate.

Describe the risks and limitations of using such a derivative contract to hedge the currency mismatch risk. (5)

vi) The company has created a self managed Gratuity Plan that provides a lump-sum payment at retirement, death, incapacitation or termination of employment, of an amount based on respective employee's salary and the tenure of employment with the company.

a) Outline the financial risks inherent in the Gratuity Plan's liabilities. (4)

b) The company uses the following securities issued by the Central Government of India to invest the gratuity fund assets. Describe briefly the nature of these assets

1. Cash Management Bills
2. Treasury Bills
3. Dated Government Securities (3)

c) Describe in detail how a portfolio of securities issued by the Central Government could be constructed to hedge the interest rate risk of the Gratuity Plan's liabilities. Include in your description the residual risks and additional risks due to such a portfolio. (8)

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