Actuarial Society of India

EXAMINATIONS

15th June 2005

Subject ST2 – Life Insurance

Time allowed: Three Hours (2.15* - 5.30 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."

AT THE END OF THE EXAMINATION

Hand in BOTH your answer script and this question paper to the supervisor.

Q.1 **a)** Define Profit Test and Return on Capital in the context of pricing an insurance contract for a proprietary company. **[3]**

b) Describe how the objective of profitability may conflict with the marketability of an insurance product . **[2]**

c) The marketing manager of your company has suggested launching a deferred annuity contract where the annuity benefit payable is linked to a published investment index. The annuity contract is paid for by a single premium. The company will take its margins for expenses and mortality during deferment in the rate it offers for conversion from the premiums to the initial level of annuity. On death during the deferment period the benefit will be the indexed value of the premium. Penalties may be imposed on withdrawals during the deferment period.

Outline the principal risks to the company on this contract. **[5]**

Total [10]

Q.2 **a)** Define how the asset share of a with- profit insurance contract may be determined. **[6]**

b) Explain how the asset share helps determination of reversionary and terminal bonus rates to policyholders under the additions to benefit method. **[5]**

Total [11]

Q.3 **a)** Identify the principal types of data collected as part of the actuarial management of a life office and the purposes for which they are used. **[7]**

b) An insurance company proposes to add the following options to its term assurance contract:

i) An option to convert to a whole life or endowment contract any time during the term of the policy

ii) An option to renew the contract of assurance for a further period of years.

In each case no further medical evidence is obtained.

Comment on the additional risks for the insurance company in offering either of these options and how they might be managed. **[7]**

c) Describe and explain option cost in the context of mortality options. **[2]**

d) Identify and describe two methods of pricing mortality options generally. Mention any advantages and disadvantages with each. **[3]**

Total [19]

Q.4 **a)** Describe the basic methodology of actuarial modeling to project business performance and management of the supervisory solvency position of a proprietary insurer. **[8]**

b) You have been asked to investigate the consequences of a proposed investment strategy on the company's long term solvency position.

i) State with reasons whether you would use a deterministic or stochastic approach **[5]**

ii) Describe how the results could be presented to the Directors, who are non-actuaries, in a way that they could understand. **[3]**

Total [16]

Q.5 **a)** Describe the principal methods used by life insurance companies to recoup initial expenses under unit- linked contracts and the key risks to the company from each. **[3]**

b) Explain what is meant by capital or initial units and how the method of actuarial funding might be used in conjunction with these units to reduce the new business strain under unit linked life insurance contracts. **[6]**

Total [9]

Q.6 You are the actuary of an established insurer that writes mainly medium sized endowment policies in middle income markets. Your mortality experience is stable and broadly in line with best estimate assumptions. You have recently reviewed your reinsurance arrangements and are satisfied with the relatively high retention levels in place .

Your marketing director is now planning to target affluent sectors in urban areas and increase the emphasis on providing life insurance protection. He asserts that policies will be significantly larger and there will be shift in business towards whole of life.

He further asserts that the more affluent lives will be in a better state of health generally and this fact, combined with the larger average premium per policy, means that existing underwriting practices can be simplified by reducing the number of questions on the application forms and increasing non medical limits.

a) Draft a short email response to the marketing director, indicating whether or not you, as the actuary, support his proposal generally and setting out your rationale. **[6]**

(including 2 marks for drafting)

b) Explain the changes that might need to be made to your reinsurance arrangements. **[2]**

c) Describe how you would judge whether reinsurance arrangements were optimal. **[3]**

d) Describe how these proposals might affect the experience investigations in your Control Cycle. **[3]**

Total [14]

Q.7 You have been seconded to a life insurer operating in a country where the Regulations simply say that an actuary must conduct an investigation of a life insurer's assets and liabilities each year and confirm to the Ministry of Finance that the company is solvent by an appropriate margin. The company transacts both non participating and participating business.

The Ministry has said that it expects generally accepted statutory valuation and solvency margin principles comparable to international standards to be used and has asked you to explain what this means in practice.

a) Identify the most important principles you would mention. **[7]**

b) Explain the interdependency between reserving and solvency margin requirements. **[2]**

c) Explain how the statutory valuation and solvency margins requirements might affect the company's ability to offer attractive products. **[3]**

Total [12]

Q.8 **a)** State the general principles to be followed in the investment of a life insurer's funds. **[2]**

b) A Director of a proprietary company writing with profits business has suggested that it is not in the Company's interest for sizeable free assets to be retained within the participating fund. As Appointed Actuary you have been asked to respond.

i) What does the Director probably mean by 'free assets' **[1]**

ii) Why might he or she have this point of view? **[3]**

iii) What points would you make in your reply? **[3]**

Total [9]

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