# Actuarial Society of India

## EXAMINATION

## 15th May 2007

# Subject ST1 — Health and Care Insurance

Time allowed: Three hours (14.15* pm – 17.30 pm)

**INSTRUCTIONS TO THE CANDIDATE**

1. *Enter all the candidate and examination details as requested on the front of your answer sheet.*

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. *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. *You must not start writing your answers in the answer sheet until instructed to do so by the supervisor.*

5. *Mark allocations are shown in brackets.*

6. *Attempt all questions, beginning your answer to each question on a separate sheet.*

7. *Candidates should show calculations where this is appropriate.*

8. *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**

Please return your answersheets and this question paper to the supervisor seperately.

**In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.**

**Q.1** Explain the following terms in the context of health and care insurance business:

i ) Deferred period (2)
ii ) Antiselection (2)
iii ) Individual rating (2)
iv ) Community rating (2)
v ) Replacement ratio (2)

**[10]**

**Q.2**

(a) Health care provided by the State can be more comprehensive than cover provided by insurance companies – Discuss this statement. (4)

(b) Explain how product design of health and care policies can overcome some of the problems faced by policyholders due to the effects of inflation. (3)

**[7]**

**Q.3**

(a) Discuss the difficulties caused by the two main practices followed by insurance companies in payment of commission to intermediaries, i.e. i) level commission in all years and ii) higher first year commission followed by lower and level commission in all the subsequent years, from the angle of sales of health and care cover and also mention other implications for the business. (5)

(b) Describe briefly the four specific customer needs generally met by the design of health and care insurance products. (4)

**[9]**

**Q.4** List the demographic, economic and other assumptions, which will be used in the cash flow method of pricing of non-linked income protection policies. You can assume that the terms are guaranteed and that the sales will be through insurance intermediaries. Also, state which of those items will not be used in a formula based pricing approach. **[7]**

**Q.5**

(a) You are the product development actuary of a life insurance company which is planning to introduce a stand alone critical illness product on unit linked basis, in a market where critical illness products have started appearing only in the last three years. Discuss sources of data and associated issues, for estimating the demographic assumptions in the pricing of the product. (5)

(b) Explain how future developments in medicine and medical practices may be expected to affect claim costs under the following health and care insurance contracts.

i ) Critical Illness contract (2)
ii ) Income Protection Contract (2)
iii ) Private Medical Insurance Contract (2)

**[11]**

**Q.6** ABC Ltd. is a large life insurance company, which sells a wide range of health and care insurance policies charging the same premium rates for both males and females of same age. In the last 5 years the sales to female population has increased significantly and also the claims. The company is concerned about the significant increase in claims and asked you to conduct a suitable investigation and suggest possible actions.

(a) Briefly discuss the possible reasons for this development and implications for the company. (4)

(b) Give a brief account of how you would conduct the investigations. (6)

(c) Suggest possible actions that the company may consider in arresting the significant increase in claims for the future. (4)

**[14]**

**Q.7**

(a) As the health insurance actuary to a reinsurance company, describe the factors you will take into account in quoting suitable terms for risk premium reinsurance treaty covering a new stand alone critical illness product of a direct insurer. (8)

(b) List the circumstances in which a direct insurer may decide not to use reinsurance. (4)

**[12]**

**Q.8** "Happy health" is a large health and care insurance company, which sells long term care policies to both men and women. The benefit consists of 4 levels of which one is to be selected by the purchaser at the time of signing the contract. While the lowest level provides for a fixed sum of rupees monthly to take care of minimum amount of health care and the highest level provides for a fixed sum of rupees monthly to take care of round the clock residential care.

This is a regular premium contract and both the premium and monthly benefits are indexed to the wholesale price index.

Discuss the risks for the insurance company through this business. **[10]**

**Q.9** A proprietary health and care insurance company is reviewing its premium rates on its flagship product, which provides comprehensive health cover.

(a) As chief actuary of this company, list the issues you would like to concentrate in this task. (3)

(b) In particular, how do you address the conflict that could arise between pricing and return on capital on the one hand and between supervisory reserves and each of return on capital, profitability and capital management? (5)

(c) Do you envisage a situation where the level of underwriting and reinsurance could be counter-productive to the aims of the company? Give a brief account of this. (2)

**[10]**

**Q.10** Manshuklal and Company is a leading automobile industry in India and employees about 15,000 people. They are planning to purchase single premium accelerated critical illness insurance policy from “Subka Suvidha”, a leading health and long term care company.

The sum assured is Rs. 1, 00,000 payable at the end of the year of claim. This is a three-year policy contract. The policy carries an option that may be selected at the outset of the 3-year policy in return for the payment of additional single premium. This option provides a guarantee to the policyholder that an additional sum assured of Rs. 1, 00,000 may be purchased at a subsequent policy anniversary, on normal premium rates and without further evidence of health. A policyholder who has paid the additional single premium at the outset can subsequently decide whether or not to take up the option. However, the option can be exercised only once. The Company uses the North American experience method for pricing the option.

The proportion of policyholders who decide to increase the sum assured is 20 per cent at each of first and second policy anniversaries. Use an interest rate of 5.5 per cent and the claim incidence rate is five times the AM92 select mortality rate, except in the case of policyholders who decide to exercise their option to increase the sum assured. For these policyholders the incidence rate from the option exercise date is 750 per cent of the AM92 ultimate mortality rates.

Calculate the additional single premium payable at the outset for a policyholder, who is aged exactly 40 and who decides to choose to buy the option. You may ignore expenses. **[10]**

**********************************