

# Actuarial Society of India

## EXAMINATIONS

14<sup>th</sup> November 2005

Subject ST1 – Health and Care 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.”*

**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)**

An insurer of life and healthcare insurance products employs cashflow modelling techniques for pricing work and to assess product profitability.

- (i) Explain what is meant by the term “risk discount rate”. (2)
- (ii) Explain why the insurer may use a different risk discount rate for the pricing of life insurance and healthcare insurance business. (2)

**Total [4]**

**Q.2)**

Define the following terms commonly used in Income Protection insurance:

- (i) deferred period
- (ii) linked claims
- (iii) net replacement ratio
- (iv) proportionate benefit
- (v) activities of daily work

**[5]**

**Q.3)**

A healthcare insurer is reviewing the pricing basis for its regular premium, pre-funded Long-Term Care insurance product. Describe briefly an approach to determine suitable lapse assumptions for this product from the company’s own experience and its limitations. (5)

**Q.4)**

A healthcare insurer writes both Income Protection and Long-Term Care insurance business.

- (i) Describe the claims triggers commonly used in long-term care insurance to measure the level of dependency and eligibility for the insured benefits. (4)
- (ii) Explain why it would NOT be appropriate for the insurer to use the same claims definitions for both types of contract. (3)

**Total [7]**

**Q.5)**

A recently-established healthcare insurer is proposing to launch a range of new products, which will include the following types of contract:

- Income Protection
- Critical Illness
- Private Medical Insurance

- (i) Explain why the insurer might well choose to reinsure some of the risks assumed under these contracts. (5)
- (ii) State with reasons the main types of reinsurance arrangement that would be appropriate for each of these contract types. (6)

**Total [11]**

**Q.6)**

In a particular country, the State Medical Insurance scheme provides reimbursement of 80% of all in-patient and out-patient medical expenses to all individuals in full-time, regular employment and their dependent families. The amount of medical expenses reimbursed is also subject to:

- a deductible amount of X in respect of each claim
- treatment in an approved hospital with a maximum rate of reimbursement of Y per day in respect of the daily room rate charged as an inpatient
- an annual limit of Z for each claimant
- exclusions for certain elective and cosmetic surgical procedures

- (i) Explain why the government of this country may have decided to establish its State Medical Insurance scheme in this way. (4)

A healthcare insurer wishes to market group Private Medical Insurance to employers based in this country.

- (ii) Describe briefly the types of group Private Medical Insurance product that the insurer could offer to complement the cover provided by the State. (4)

- (iii) Explain why the availability of Private Medical Insurance in the market may affect the claims experience of the State Medical Insurance scheme. (3)

**Total [11]**

**Q.7)**

A life insurer is considering the design and scope of benefits for a new Critical Illness product that it intends to launch into an established market for Critical Illness insurance.

- (i) Explain the main differences between accelerated and stand-alone Critical Illness cover and the factors that the insurer should consider when deciding which form of Critical Illness cover to offer. (3)

- (ii) In addition to a group of six 'core' conditions, the insurer wishes to offer policyholders the option of selecting a more comprehensive cover for a further twenty Critical Illness conditions. Describe the factors that the insurer should take into account when deciding which additional medical conditions or surgical procedures to include in the more comprehensive version of the product. (4)

- (iii) State suitable formulae to calculate

- (a) the expected cost of claims under a stand-alone Critical Illness policy; and  
 (b) the additional cost of claims for acceleration of the death benefit on the event of a Critical Illness.

Define all terms used. (3)

- (iv) Describe the practical difficulties faced by the pricing actuary using these formulae to price Critical Illness contracts and how these difficulties can be managed. (5)

**Total [15]**

**Q.8)**

- (i) Explain why healthcare insurers may choose to provide long-term guarantees to policyholders for the cost of healthcare insurance benefits. (4)
- (ii) Describe the risks to the insurer of providing such guarantees and how these risks can be managed by the insurer. (8)
- (iii) State with reasons the potential impact on future claims costs for an insurer writing Critical Illness, Long-Term Care and Private Medical Insurance of the following types of advance in medical science:
  - a) the introduction of a screening test to detect a serious disease in its early stages for all men and women over the age of 50.
  - b) the licencing of a new drug, which has been found to improve survival of patients suffering from a particular chronic, degenerative medical condition. (6)

**Total [18]****Q.9)**

A healthcare insurer writes both individual and group Income Protection insurance.

- (i) State the demographic assumptions required by the insurer to price these products and the typical risk factors used to construct discrete risk cells for product pricing. (3)
- (ii) Describe briefly the sources of statistical data that the insurer may be able to use to set the elements of the pricing basis relating to the demographic assumptions. (5)
- (iii) Discuss the ways in which the insurer can control the insurance risks accepted for Income Protection cover under individual and group contracts. (5)
- (iv) Describe briefly the advantages and disadvantages of pricing the individual Income Protection product using a claim inception and disability annuity approach rather than:
  - a) a formula method
  - b) a multiple state model approach (5)
- (v) Describe briefly how the historic claims experience of a large insured group can be used to set an appropriate Income Protection premium rate for the group and give reasons why the historic experience may be a poor guide to future claims costs. (6)

**Total [24]**

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