Actuarial Society of India

EXAMINATION

15th May 2006

Subject ST1 — Health and Care Insurance
Specialist Technical

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

4. *Mark allocations are shown in brackets.*

5. *Attempt all 8 questions, beginning your answer to each question on a separate sheet.*

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

7. *Fasten your answer sheets together in numerical order of questions. This, you may complete immediately after expiry of the examination time.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer sheets firmly attached, and this question paper to the supervisor.

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

Q1) Define the following terms commonly used in healthcare insurance:

(i) open enrolment
(ii) moratorium period
(iii) claims pre-authorisation
(iv) claim notification period
(v) benefit limitation **[5]**

Q2)

(i) Describe briefly the following categories of reserve, which an insurer of short-term health lines of business may hold:
(a) Unexpired premium reserve
(b) Unexpired risk reserve
(c) Outstanding claims reserve
(d) Incurred but not reported reserve
(e) Incurred but not enough reported reserve (5)

(ii) For each type of reserve stated in part (i) above, describe briefly how an appropriate reserve amount may be determined. (5)

[10]

Q3) An established life and health insurer has decided to add two new Private Medical Insurance products to its product range. The first provides a fixed, daily amount of hospitalisation benefit; the second provides for reimbursement of actual medical expenses incurred as an inpatient in hospital, within the benefit limits of the policy. The insurer has decided to focus on distribution of the new products and will outsource policy administration and claims assessment to a third party administrator (TPA). A reinsurer will provide product design and pricing guidance in return for an 80% quota share reinsurance of all the PMI business. The reinsurer will pay a reinsurance commission to the insurer and the insurer will pay a percentage of all Private Medical Insurance premiums to the TPA for its services.

(i) Discuss the advantages of this arrangement for the insurer and for the reinsurer (4)

(ii) Discuss the risks inherent in this arrangement for the insurer and for the reinsurer. (6)

[10]

Q4) A healthcare insurer writes both individual and group Income Protection business.

(i) Describe the features of Income Protection product design that the insurer may incorporate to ensure that the risk characteristics of the insured portfolio are consistent with its morbidity risk pricing assumptions (5)

(ii) Describe the risk selection techniques that the insurer may use to assess the risk characteristics of applicants for individual Income Protection insurance. (3)

(iii) Explain why the approach to risk selection is likely to differ for group Income Protection insurance (3)

[11]

Q5) As the actuary of a healthcare insurer, you have been asked to review the historic claims experience of two large, group Income Protection funds. Each fund is managed by its trustees; the membership is drawn from many participating employers within a particular industry sector. Brief details of the two funds are as follows:

Fund 1

Membership: Nurses and other related healthcare workers

Benefits: 70% of basic salary after deferred period of 26 weeks, increasing at 5% per annum throughout the period of a claim

Disability definition: 'Own occupation' definition for first 12 months; 'own or suited occupation' definition thereafter

Contributions: Benefits are funded by participating employers

Fund 2

Membership: Computer software developers

Benefits: Basic, fixed monetary income benefit, equivalent to 25% of the average of members' current salaries. 20% of the members have opted for additional, voluntary benefits, which are capped at 80% of basic salary in the previous 24 months. The deferred period for Income Protection benefits is 4 weeks.

Disability definition: Based on inability to perform certain, specified 'Activities of Daily Work'

Contributions: Basic benefits are funded by participating employers; additional benefits funded by individual members.

(i) Discuss the factors relevant to these particular funds that could explain observed differences in the claim inception and termination rates. (5)

(ii) Suggest with reasons which fund you would expect to exhibit the higher average cost of claims (2)

(iii) Explain why the trustees of the funds have a stakeholder interest in the design of the Income Protection benefits (4)

[11]

Q6) As the actuary of a healthcare insurer, you have been asked to review the claims experience of a particular group scheme that was acquired some years' ago, which is insured for death benefits and Critical Illness benefits. The group policy provides a death sum assured of INR 10,00,000 per life; in addition, an amount equal to 100% of the death benefit is paid on diagnosis of any one of the medical conditions specified in the policy, provided the member survives for at least 30 days following the insured medical event.

The group scheme insured 250 lives in the policy year starting 1 January 2005. The Critical Illness premium for the group scheme in respect of the 2005 renewal was INR 4.40 per INR 1,000 sum assured, of which 80% represents the expected claims cost. This premium included the allowance for the 30-day minimum survival period.

You are given the following claims information:

Ref.	*Claim amount [INR]*	*Date of critical illness event*	*Date of death*	*Date of claim notification*	*Date of settlement*
1	10,00,000	22 August 2004		14 January 2005	12 February 2005
2	10,00,000	2 January 2005	6 January 2005	17 January 2005	1 March 2005
3	10,00,000		7 February 2005	5 March 2005	14 April 2005
4	10,00,000	15 December 2004	12 May 2005	22 May 2005	5 June 2005
5	10,00,000	19 November 2005		20 March 2006	Ongoing
6	10,00,000	4 January 2006	19 January 2006	22 January 2006	27 January 2006

(i) Calculate the actual Critical Illness claims cost for the policy year commencing 1 January 2005, explaining how you arrive at your answer. (2)

(ii) Calculate the actual to expected claim ratio for the Critical Illness cover on an amounts basis for the 2005 policy year. (2)

(iii) Explain why the result calculated above may give an incomplete view of the claim ratio. (2)

(iv) It now transpires that the group scheme was renewed in 2005 in error, providing instead a group life and *accelerated* Critical Illness benefit of INR 10,000,000 sum assured, for which the expected claims cost of the combined benefit is INR 4.90 per INR 1,000 sum assured. Calculate the revised actual to expected claim ratio for the scheme on an amounts basis for the 2005 policy year explaining how you arrive at your answer. (4)

(v) Explain the purpose of the 30-day minimum survival period following the Critical Illness event (2)

[12]

Q7) A healthcare insurer writes individual Income Protection, Critical Illness and Long-Term Care insurance business.

(i) Explain why the insurer may offer these products with premium rates that are guaranteed for the full term of the policy. (4)

(ii) Describe the risks to the insurer of offering these products with fully guaranteed premium rates and how the insurer can manage these risks. (8)

(iii) Describe the risks to the insurer of guaranteeing the definition of the insured Critical Illness events for the full term of the policy. (3)

(iv) The Long Term Care product written by the insurer is pre-funded by a single premium and provides an indemnity benefit that meets the costs of formal care received, provided the insured fails at least 3 of the 6 Activities of Daily Living specified in the policy. (5)

Describe the risks to the insurer of this particular product design and suggest modifications to the product design that would tend to mitigate these risks.

[20]

Q8) A newly-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) State the parameter types for which demographic assumptions are required to determine the best estimate of claims costs for each of these products. (4)

(ii) Describe the possible sources of data to develop the demographic assumptions and the advantages and disadvantages of each. (8)

(iii) Describe the additional assumptions required to price the Private Medical Insurance products and indicate which assumptions are likely to assume greater importance in determining the final office premium rates. (6)

(iv) State with reasons the pricing technique that you would expect the insurer to use to price each new type of contract. (3)

[21]

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