INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

19th May 2009

Subject ST1 - Health and Care Insurance

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

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 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 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.*

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

6. *Mark allocations are shown in brackets.*

AT THE END OF THE EXAMINATION

Please return your answer book and this question paper to the supervisor separately.

Q 1) An insurance company has launched an Income Protection plan, which is sold to healthy lives and offers a policy term of 5 years. At any policy anniversary if the life assured (LA) is disabled he or she receives Rs 100,000. However if the LA dies during the policy term his or her nominee receives a lump sum income benefit of Rs 150,000 every year for the remaining policy term payable on each policy anniversary starting from the policy anniversary following the death of the LA.

A level premium is payable every year in advance during the policy term as long as the LA is alive and is not disabled.

The transition probabilities are as follows, and are independent of age:

P (disability at time t+1/ healthy at time t) = 0.02
P (death at time t+1/ healthy at time t) = 0.03
P (death at time t+1/ disabled at time t) = 0.04
P (healthy at time t+1/ disabled at time t) = 0.20

(i) Calculate the probability of the LA being in a healthy, disabled or dead state at the end of each policy year during the term of the policy. (3)

(ii) Calculate the annual premium for a policy issued for a healthy life aged 30 years assuming an interest rate of 5% pa and the following expenses:

Initial Expense – Rs 500
Renewal Expense (incurred at beginning of each year from 2nd year)
– Rs 150 pa (if LA is healthy)
– Rs 250 pa (if LA is disabled).
Expenses are assumed not to increase in future years. (5)

(iii) Describe how you would profit test the premium rate which you have calculated (detailed formula not required), explaining all profit measures you would consider. (6)

[14]

Q 2) A health insurance company sells Critical Illness (CI) cover policies with policy terms of 10 years or more, with the right in the policy contract to review the CI premium rate every 5 years.

(i) Explain the problems for the insurance company arising from the inclusion of such review options.

The company is proposing to include a review of the definitions of CI and the type of CIs which are to be covered under a policy every 5 years. (3)

(ii) Discuss how the policyholder might view this proposal and how the company might ensure that such a proposal is viewed favourably by the policyholders. (3)

[6]

Q 3) **(i)**

a) Explain how a large health insurance company, selling long term products, is exposed to credit risk with regard to reinsurance.

b) Discuss ways in which such credit exposure can be managed. (5)

(ii) Describe the factors you would consider in determining the reinsurance retention limit for an income protection health insurance policy. (5)
[10]

Q 4) Discuss the likely effect on the Embedded Value of a proprietary long term health insurance company after one year for each of the following events:

(i) An unanticipated increase in discontinuance rate of the policy. (5)

(ii) A fall in bond yields, which are likely to stay low in the near future. (5)

(iii) An increase in claim incidence rates due to the invention of a new diagnostic technique. (3)

(iv) Low sales of new business against those planned for due to the unattractiveness of a new product launched during the year. (1)
[14]

Q 5) **(i)** Explain why the profit of a health insurance company, selling short term products, is relatively insensitive to the investment return assumptions used to calculate the health insurance premium. (2)

(ii) Describe how a company's investment strategy can be developed using a cashflow model. (3)
[5]

Q 6) A health insurance company sells both CI business and PMI business.

Describe how reserves for the following would be set, and the factors which would be considered in doing so:

(i) option to extend the term without further medical evidence under standalone CI business (7)

(ii) unexpired risks for annual premium PMI business (5)
[12]

Q 7) Describe the following terms:

(i) Accelerated critical illness benefit (2)

(ii) Hospital cash plan (2)

You are a product actuary in a life company and have proposed premium rates for a critical illness product. In the product development meeting, the marketing head says that the proposed premium rates are low as compared to the market.

(iii) Describe possible reasons why the proposed premium rates are appropriate which could be put to the marketing head. (6)

[10]

Q 8) Discuss the factors the regulator would consider in assessing and approving a new health insurance product. **[7]**

Q 9) Discuss the relative importance of each of the assumptions which are required when setting pricing bases for the following products:

(i) without profits CI product (5)

(ii) without profits immediate needs long term care annuity (5)

[10]

Q 10) XYZ, a stand alone health insurer, is exploring whether to establish operations in a country where the health insurance market is dominated by non-life insurance companies primarily selling PMI products.

Discuss the factors XYZ should consider when making a decision on whether this market presents potential for starting a new stand alone health insurance company.

[12]

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