INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

4th November 2008

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) a) "Compared to life insurance, there is more opportunity for fraud in health insurance." Discuss the validity of this statement and mention the areas in which the staff of a health and care insurer, need to have expertise for effective risk control. (4)

b) Explain and discuss the concepts of moratorium underwriting and exclusions as applied to PMI business (6)

c) Explain the concept of ADL in the context of LTCI plan. (3)

[13]

Q 2) a) Explain the terms indemnity policy and deductible under health insurance contracts. (2)

b) Explain the relevance of deductible in health insurance contracts and how deductibles could be set in lump sum hospital cash products. (3)

c) You are a product actuary in a life company. In one of the product development meetings, the marketing head says that there are no indemnity products covering critical illness. Assuming that her statement is true, list the pros and cons for a life company in developing an indemnity based critical illness product. (5)

[10]

Q 3) As the marketing actuary to a health and care insurer, what are the considerations in keeping an eye on your competitors' products, processes and performance? **[6]**

Q 4) a) The holder of a non linked CI policy, which was sold 15 years ago for a term of 20 years with level regular premiums on guaranteed terms, has not paid the latest due premium, thereby lapsing the policy. There is no surrender value payable. Discuss the effect of such lapsed policies on the profitability of the health and care insurer. (4)

b) "Short term products such as PMI do not normally make a profit until the policy has been with the same insurer for perhaps two, three or more years." Discuss this statement and its implications for pricing assumptions and experience analysis. (4)

c) List the different ways in which an insurer would encourage renewal of PMI policies which are generally written for term of one year (i.e. by incentives and otherwise). (2)

d) While carrying out analysis of past experience on non renewals in a portfolio of PMI policies, mention the factors which would not be taken into account but would be relevant for such rates in the future. (2)

[12]

Q 5) a) List the reasons why an employer might offer health benefits to his employees and their dependants. (3)

b) List down the factors that you would consider while setting up a new health insurance scheme for an employer employee group. The health insurance scheme is expected to provide PMI, CI and Major Medical expense benefits (3)

c) The employee's staff union which also acts as a lender of personal, vehicle and housing loans for its members is keen on negotiating with the employer to provide income protection insurance scheme to its members. List the objectives of such a scheme and the additional factors that you would consider while setting up such a scheme (assuming the existence of an employer sponsored health insurance scheme mentioned above) (3)

d) The health insurance company in which you are an actuary offers both group and individual health insurance products. The marketing manager in your office states that the underwriting criteria under group health schemes are less stringent as compared to those applied on individual contracts. Comment on the statement made by the marketing manager. (3)

[12]

Q 6) a) Explain the following concepts and discuss the key modeling and assumption issues in relation to pricing and reserving calculations, in the context of PMI business

i. Distribution of indemnity claim payments
ii. Distribution of claim frequency
iii. Family covers where individuals on risk may not be known
iv. Group arrangements of employees of employers, where individual employees can only be estimated. (10)

b) What does funding for care mean in a LTCI policy and how will it affect modeling and making assumptions about distribution of claim amounts? (4)

[14]

Q 7) a)

i) Explain the product specific risks for Critical Illness (CI) policies (6)
ii) List the product specific risks associated with Long Term Care Insurance Policies (3)

b) You are a product associate actuary in a life office which is planning to launch its first health product (which would provide critical illness, hospital cash and surgical benefits).

The CEO of your company citing a recent press article which had elaborated on the large scale mis-selling in such living benefit products seeks a report from the chief product actuary on the sources of mis-selling and how the company could avoid this. You are entrusted with producing this report

Identify two key sources of mis-selling which could arise from product design and contract terms. Also list the steps that need to be take to avoid mis-selling. (6)

[15]

Q 8) a) Write down a simple formula for calculating incidence rate for a typical age x for a hospital cash product for a term of one year, providing a lump sum cash for each day of stay at a hospital. (2)

b) The following table is an extract of your hospital cash portfolio which pays a lump sum benefit for each day of hospitalisation. Calculate the incidence rate for a one-year contract from the data given below.

Age	35 years
Insured lives	1000

Hospital cash per day benefit	No. insured	Claims rate	Average days in hospital
500	100	10.00%	5.00
750	200	8.00%	5.00
1000	400	6.00%	5.00
1250	200	6.00%	5.00
1500	100	6.00%	5.00

(3)

c) Given that a reinsurer loads the incidence rate in such a way to get 10% of the gross reinsurance premium as a charge for expenses and cost of capital, using the incidence rate calculated above, calculate the reinsurance premium for Rs 100 per day hospital cash benefit for age 35 years. Ignore timing of claims arising, interest and the effect of reserving and solvency margins in your calculation (1)

d) Given that an insurer loads the reinsurance rate in such a way to get 30% of the gross premiums as a charge for expenses and cost of capital, using the reinsurance rate calculated above, calculate the gross insurance premium for Rs 100 per day hospital cash benefit for age 35 years. Ignore timing of claims arising, interest and the effect of reserving and solvency margins in your calculation (1)

e) Assuming a risk premium quota share arrangement wherein 50% of the hospital cash risk is shared between the insurer and the reinsurer, and assuming that the experience from the portfolio for which you have priced matches the claim experience given in question (b) above, using the reinsurance and the gross insurance premiums calculated above, calculate the following:

- Benefits retained and benefits reinsured
- Premiums earned by the insurer and reinsurance premiums ceded
- Claims retained and reinsurance claims

Technical profits for the insurer and the reinsurer (technical profits defined as earned premiums less claims) (7)

f) One of your senior actuarial colleagues looks at the experience and the reinsurance arrangement and comments as follows: "This portfolio seems to be providing us better than expected results – our expected load for expenses and costs of capital was 30% of gross premiums whereas we get 3.5% more than our targeted load as the technical profit. It seems that we could therefore retain more risk from this portfolio. Given our focus on low income individuals who typically opt for the minimum hospital daily benefit (which is Rs 500), having a surplus arrangement with a retention of Rs 500 will help us retain more and hence improve our overall profitability."

Comment on the profitability of the portfolio under the current arrangement, the expected profitability under the proposed arrangement and briefly suggest an approach to maintain or enhance profitability under the proposed arrangement. No detailed calculation of the exact share of risk, premiums, claims and hence the technical profits under the proposed arrangement is required. (4)

[18]

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