INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

SP1 - Health and Care

May 2025

Time allowed: 3 Hours 15 Minutes (09.30 – 12.45 Hours)

Total Marks: 100

Q. 1) A health insurer has been writing only a Private Medical Insurance (PMI) product since the year 2017. The product has one-year pre-existing illnesses exclusion and a fixed term of three years.

i) Outline the reasons why the PMI product's actual claims experience may vary from that assumed in the premium basis. [4]

You are provided with the following data. All claims reported as of 31.12.2023 have been included in the data.

Calendar Year	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3
No. of Insured Lives (as at End of the quarter)	21,345	38,559	37,272	45,098	50,345	48,974	60,904
No. of Claims incurred during the quarter	547	925	1,087	1,987	1,345	1,296	1,234
Total amount Claimed during the quarter ('000)	13,254	21,974	33,673	67,073	34,253	34,703	40,053

The company has used an incidence rate of 2.5% per annum and average claim size of 27,000 in its pricing assumption.

ii) Calculate the Actual to Expected claims (A/E) ratio for the calendar year 2022 and the expected A/E ratio for the full calendar year 2023. State any assumptions that you make. [6]

The insurer has decided to re-price the product.

iii) Describe how you would go about setting the assumptions required to arrive at the expected claim cost per life per annum. [6]

iv) Explain how you would calculate the embedded value of the insurer. You should list all the relevant assumptions that are required to do the calculation. (without referring to the data in question) [5]

[21 Marks]

Q. 2) A Health and Care Insurer writes accelerated and standalone Critical Illness, Income Protection and Private Mediclaim Insurance products.

Describe how the reserves for the relevant products would be affected by following trends:

1. Improvements in recovery rates from Cancer
2. A sudden, unexpected, decrease in the supply of hospital operating theatre nurses
3. Increase in the take-up rate of a diagnostic test for a serious cancer, following a high-profile celebrity case

[12 Marks]

Q. 3)

i) What are the objectives of Health care benefits provided by government of a country. What are the methods government use to provide the health care to its citizens. [6]

ii) Discuss the ways in which state healthcare provision may offer more comprehensive coverage than private health and care Insurance, and the implications of this for insurers. [4]

iii) A State, which provides free healthcare, has a large private medical insurance (PMI) market.
The directors of one of the country's largest providers of PMI products have decided to lobby the

government to change the taxation system so that those over age 60 who buy an individual PMI policy can deduct the premiums they pay from their income before it is taxed.

Explain the advantages and disadvantages to the State of this system of subsidizing premiums. [6]

iv) Health Insurance in the country is regulated. Regulator has recently put a restriction on the increase in premium for those aged 60 and above.
Outline the possible restrictions that can be imposed by the insurance regulator of the country. What potential impact could the recent regulatory changes have on the insurers' pricing strategies and their ability to reprice existing products? [6]

[22 Marks]

Q. 4) A large health insurance company predominantly writing private medical insurance products to individuals and groups is planning to launch a conventional income protection (IP) product to individuals aged 55 years or below for a ten-year term. The product provides a fixed benefit of X per year, where X does not exceed 50% of gross annual income of the individual, during all periods of sickness except the first year of sickness. Benefit ceases at the end of policy term or earlier death. A level monthly premium is payable at the start of each month, ceasing after 10 years or on earlier death. Premiums are waived during periods of sickness.

i) Discuss the drawbacks of using a formula approach to calculate premium rates for the IP product. [4]

ii) Discuss all the assumptions, in terms of their importance and consistency, that are required to be set for pricing the IP product. [9]

The sales director of the company has expressed concern over poor sales of the product and suggested the following changes:

a) The policy term should extend to age 65 instead of the fixed 10 years for all entry ages
b) The benefit should be increased to 100% of the gross annual income
c) The benefit should commence from day one of sickness

iii) Comment on the pros and cons of each of the above suggestions. [9]

iv) Discuss why the company may choose not to reinsure this product and outline the risks to the company of not reinsuring. [5]

[27 Marks]

Q. 5) The government of a developed country is about to impose new legislation whereby it will be illegal to discriminate on the grounds of gender or age for the purposes of selling health insurance.

i) Outline, with examples, the impact that this legislation may have on insurance companies writing short-term individual health insurance business. [7]

ii) Suggest actions that these companies may take to mitigate the adverse effects of the legislation. [5]

[**12 Marks]**

Q. 6) Outline data risks that a health and care insurer faces. **[6 Marks]**

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