

# INSTITUTE AND FACULTY OF ACTUARIES



## EXAMINATION

6 October 2016 (am)

### Subject ST1 – Health and Care Specialist Technical

*Time allowed: Three hours*

#### ***INSTRUCTIONS TO THE CANDIDATE***

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
3. *You have 15 minutes of planning and reading time before the start of this examination. You may make separate notes or write on the exam paper but not in your answer booklet. Calculators are not to be used during the reading time. You will then have three hours to complete the paper.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all six questions, beginning your answer to each question on a new page.*
6. *Candidates should show calculations where this is appropriate.*

#### ***AT THE END OF THE EXAMINATION***

*Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.*

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

- 1** A health insurer calculates an unearned premium reserve (UPR) for its private medical insurance (PMI) business.
- (i) Explain why there might be a need for the insurer to hold an unexpired risk reserve (URR) in addition to the UPR. [2]
  - (ii) Describe how the insurer could make use of a cashflow approach to calculate the additional URR. [9]
- [Total 11]
- 2** A small health insurer with an established portfolio of critical illness insurance business has recently also started writing income protection insurance business.
- The insurer is currently going through a phase of significant growth and its solvency ratio is below the market average for health insurers.
- The insurer has purchased reinsurance for both types of health insurance product.
- Explain the possible reasons for this insurer's use of reinsurance. [12]
- 3** A large health insurer calculates its embedded value on an annual basis.
- (i) Outline the calculation of embedded value and its components, including how it may vary for different types of insurance business. [6]
- One of the conditions covered by the insurer's products is lung cancer. Survival rates for lung cancer fall with delays in diagnosis. For example, 75% may be expected to survive for at least one year after diagnosis if the diagnosis is made at the earliest stage of disease development. However, only 10% may be expected to survive for at least one year after diagnosis if the diagnosis is made at later stages.
- A medically tested cure for lung cancer has now been found and approved, and will be available from all hospitals in six months' time. The cure is 100% successful for early diagnoses but is more expensive than existing treatments. The success rate decreases for later diagnoses.
- (ii) Assess the likely impacts of the information regarding the lung cancer cure on the insurer's embedded value, in respect of each of the following products:
    - (a) private medical insurance
    - (b) critical illness insurance, both stand alone and accelerated
    - (c) income protection insurance
- [18]
- [Total 24]

- 4** (i) Describe the possible methods by which the State may provide healthcare support. [5]

A small, developed country attracts many expatriates (i.e. individuals who have citizenship in another country) to live and work there. These expatriates are typically aged between 20 and 40 and work in office jobs. Most return to their country of origin well before their retirement. The number of expatriates in the country is stable over time and represents 20% of the total population of the country.

The State runs an efficient healthcare service. There are also private healthcare providers in the country which offer additional facilities and services that are not provided by the State.

- (ii) Outline the likely health and care needs of this expatriate population, including possible insurance products. [5]
- (iii) Contrast the healthcare needs of the expatriate population with those of the domestic population. [3]

A large insurer in the country is designing private medical insurance (PMI) products to be marketed to the expatriate population.

- (iv) Describe the benefits, services and policy conditions that the insurer could offer under such products that would particularly meet the needs of the expatriates. [5]
- [Total 18]

- 5** A young family with two small children is reviewing its life and health insurance products. The parents are both employed and have recently taken out a mortgage on a house.

At present, the only insurance product held is life insurance cover on the husband's life only, provided through his employer. It covers 75% of their outstanding mortgage repayment amount, with annually reviewable premiums and cover levels.

- (i) Identify the family's immediate health and care protection needs. [6]
- (ii) Suggest, with reasons, three key products that could address those needs [6]
- [Total 12]

- 6** (i) Define the term total and permanent disability (TPD) in the context of a critical illness insurance benefit. [2]

A health insurance company has only ever sold stand-alone critical illness (SACI) insurance policies through brokers. It has now decided to add TPD to all of the SACI policies that it sells from now on.

- (ii) Discuss the risks to the insurer of making this change. [21]  
[Total 23]

**END OF PAPER**