

# INSTITUTE AND FACULTY OF ACTUARIES



## EXAMINATION

28 September 2017 (pm)

### **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 seven 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** (i) List the four main objectives that a government should consider in respect of its provision of health and care protection. [2]

The recently elected government of Country A is in the process of implementing universal healthcare provisions in Country A for the first time – one of the promises it had made during its election campaign.

Under the existing system, healthcare services are entirely provided by privately owned healthcare organisations. Medical costs are either funded by each citizen's private medical insurance or individual savings at the point of treatment.

Under the proposed system healthcare services will be provided entirely by government run healthcare organisations, funded by an increase in general taxation. It will be designed to ensure that every citizen of Country A will receive healthcare irrespective of their social status, income, age, gender, race, pre-existing condition or wealth.

- (ii) Discuss the advantages and disadvantages of the proposed healthcare system relative to the current healthcare system in Country A. [10]  
[Total 12]

- 2** A health and care insurer has been using the inception / disabled life annuity approach for modelling and pricing its income protection business since it was launched many years ago.

- (i) Describe the inception / disabled life annuity approach. [3]

In the health insurer's most recent board meeting, one of the board members questioned the ongoing appropriateness of the current modelling approach arguing that it is too simplistic. He believes that given the maturity of the income protection business, the multi-state modelling approach should enable more granular and accurate analyses to be produced.

- (ii) Describe the main differences between the multi-state modelling approach and the inception / disabled life annuity approach. [5]

The board has instructed the Chief Actuary to carry out a feasibility investigation into adopting a multi-state modelling approach for the pricing of its income protection business.

- (iii) Discuss the factors that the Chief Actuary would consider under this feasibility investigation. [10]  
[Total 18]

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The board has instructed the Chief Actuary to carry out a feasibility investigation into adopting a multi-state modelling approach for the pricing of its income protection business.

- (iii) Discuss the factors that the Chief Actuary would consider under this feasibility investigation. [10]  
[Total 18]

- 3** A country has a well established critical illness market. The main product sold in the country is accelerated critical illness insurance on guaranteed terms. A new health and care insurer is launching an accelerated critical illness product with guaranteed premium rates into the country's existing insurance market. The Sales Director has suggested that the company should follow a pricing strategy that sets the new product's premium rates for each age and policy term equal to the average of the lowest three premiums offered by competitors at the corresponding age and policy term.
- (i) Explain why this pricing strategy presents additional risks for the company. [13]
  - (ii) Suggest potential advantages to the company of the proposed pricing strategy. [2]  
[Total 15]
- 4** A health and care insurer writes long term care business.
- (i) List six main product specific risks that the insurer faces. [3]
  - (ii) Explain what investigations should be carried out to manage each of the risks identified in part (i). (You are not required to provide details of how any investigation would be carried out.) [12]  
[Total 15]
- 5** A health and care insurer writes both unit-linked critical illness business and immediate needs long term care business. The insurer invests in government bonds and equities to back the critical illness liabilities, and government bonds and corporate bonds to back the long term care liabilities.
- The insurer currently follows a passive valuation approach but is considering moving to an active valuation approach.
- (i) Discuss the differences between an active and passive valuation approach. [5]
- The insurer currently reports profits on a passive embedded value basis. Currently, the future investment return assumptions are the insurer's expected long term returns and the risk discount rate is used to reflect the risks inherent in the business. The insurer is moving to a Market Consistent embedded value basis.
- (ii) Suggest how the change in profit reporting basis could affect the insurer's embedded value earnings, considering the effects on the elements of the embedded value basis. [8]  
[Total 13]

- 6** A health and care insurer has written critical illness and private medical insurance policies for a number of years. A prominent celebrity has started to promote the benefits of simple AIDS tests.

Discuss the impact this could have on the insurer's reserves. [5]

- 7** A health insurer has a large portfolio of individual private medical insurance (PMI) policies. The Chief Financial Officer would like to understand the reasons why this portfolio has been very unprofitable over the past year and has asked an actuary to investigate.

- (i) Outline the analyses the actuary would carry out to investigate the reasons why the business has been unprofitable. [8]

The actuary's analysis has identified that the main area of unprofitability has been the larger than expected outgoings (negative cashflows).

- (ii) Suggest reasons why the key cashflows have been more negative than expected over the past year. [8]

The actuary's investigation has identified that business sold through the insurer's broker distribution channel in a particular region is highly loss-making.

- (iii) Suggest actions the insurer should consider to reduce its losses in relation to:
- (a) the broker distribution channel; and
  - (b) other aspects of the business.

[6]  
[Total 22]

**END OF PAPER**

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