

# EXAMINATION

9 October 2009 (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 have 15 minutes before 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 booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all seven questions, beginning your answer to each question on a separate sheet.*
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 and care insurer sells a range of products, including critical illness. The marketing manager has proposed adding to the critical illness contracts an option to increase the sum assured without further evidence of good health.

One of the approaches that the company could take to reduce the risks involved in such an option is to limit the exercise of this option to the occurrence of special events.

- (i) List eight such special events that could be included in the contract terms. [2]
- (ii) Outline other steps that the company could take for the purpose of reducing the risks involved in offering the increase option. [4]

[Total 6]

- 2** In Actuarial medical treatment is free. However all Actuarial's residents currently pay for all drugs prescribed by the Actuarial medical profession. There is a preset refund from the medical scheme for each drug. The refund is based on an average countrywide price and is a fixed amount, which varies by drug.

A very recent development in Actuarial has been that people are now able to buy some of the prescribed drugs on the internet at a cheaper price and still claim the refund under the medical scheme. It is possible to use the internet for drug purchase as Actuarial's local currency is freely convertible. The internet drug suppliers do not require sight of the prescription.

- (i) Discuss the advantages and disadvantages of this new internet development, from the perspective of individuals requiring drugs. [5]

The duties of the social insurance regulator of Actuarial include setting the refund amounts and forecasting the total cost of Actuarial's State medical scheme. The developing internet drug market has just been brought to the regulator's attention, and he is concerned about the implications for the State medical scheme and for public health.

- (ii) Discuss how the regulator could manage the situation. [4]

A leading supermarket group has now started to import a selection of the more common prescription drugs for sale to the public.

- (iii) Discuss the advantages and disadvantages of being able to buy the drugs direct over the counter at a supermarket, from the perspective of individuals requiring drugs. [2]

[Total 11]

- 3** (i) State six reasons for calculating the technical reserves of a health and care insurer. [3]

For a particular block of business, the reserving team is considering whether to use the same assumptions for calculating its reserves as the pricing team used to price the business.

- (ii) Describe the factors that would influence whether or not this is appropriate. [4]

One of the products written by the insurer is group private medical insurance business, written on a short term indemnity basis. The reserving team is also responsible for setting any additional reserves (i.e. in excess of the normal amount of reserves that would be held for each scheme member) used to cost the group renewal.

- (iii) Explain what additional reserves should be held for the three scheme members whose details are set out below.

- (a) Mr A is a clerical worker who in the past scheme year has had an operation for appendicitis and has now fully recovered.
- (b) Mrs B contracted breast cancer some years ago. In the last scheme year, specialised drugs for cancer treatment have been prescribed for Mrs B. The drugs cost £10,000 in the last scheme year. The government subsidised health service would not fund the treatment, and the cost was fully paid under the group scheme. The current expectation of life forecast by the oncologist for Mrs B is described as reasonable, and the drug treatment remains ongoing.
- (c) The insurer has agreed that a hip replacement will be performed in a private hospital on Miss C. She is not yet immobile but the operation has been fixed for just after the renewal date.

[6]

[Total 13]

- 4** (i) Discuss the relative merits of using a formula approach and a cash flow approach for pricing health and care products. [6]

- (ii) List typical cashflow components in a profit testing model for unit-linked health and care products. [5]

[Total 11]

- 5** XYZ plc currently insures its group private medical insurance policy with company Q, a health insurance company. Company Q has been asked to provide a quotation on the renewal of this policy for the 2009 policy year.

The following data relating to the XYZ plc policy has been provided:

<i>Year</i>	<i>Data months</i>	<i>Claims</i>
2006	12	£20,000
2007	12	£25,000
2008	9	£28,000

#### **Employee data and Inflation**

<i>Year</i>	<i>Members</i>	<i>Spouses</i>	<i>Children</i>	<i>Inflation</i>
2006	70	30	20	
2007	60	30	25	6%
2008	70	50	30	10%
2009	60	35	25	12%

#### **Benefits insured**

Up to the end of the 2008 policy year, members, spouses and children had full cover. With effect from the 2009 renewal, spouses and children will be on budget cover.

#### **Company Q's Quotation Basis**

- 1 Spouses experience 120% of member cost per head
- 2 Children experience 25% of member cost per head
- 3 Budget cost is 50% lower than full cover
- 4 2009 Expenses: £50 per member
  - 5% administration on the risk cost
  - 5% commission on the premium

All expenses are incurred at the start of the policy. The inflation rate given for year X represents inflation from the middle of year X-1 to the middle of year X. Taxation can be ignored.

- (i) Calculate the premium ignoring any profit, contingency or cost of capital loadings. You should show your workings and state any additional assumptions that you make. [15]

Company R is a competitor in this market, and has quoted XYZ plc a premium of £30,000.

- (ii) Discuss the factors that Company Q should take into account when producing its final quotation for XYZ plc. [3]  
[Total 18]

- 6** The pricing team in a health and care insurance company is reviewing its approach to allowing for the non-financial risks of the products that it is writing. Financial risks are defined as movements in the stock market and in interest rates, and other macro-economic risks involved in the business. Non-financial risks are all the other risks undertaken.

It intends to implement a change to the approach for its next pricing exercise, which will be for its accelerated critical illness product line.

- (i) Describe eight non-financial risks to be taken into account for the accelerated critical illness product. [4]

Three options are being considered for the allowance for non-financial risks:

Option A: the risk discount rate used will be increased to allow for the level of non-financial risk in the product, with the same adjustment to the discount rate being used for each product.

Option B: the risk discount rate used will be increased to allow for the level of non-financial risk in the product, with a different adjustment being used for each product.

Option C: a margin will be included in each assumption to allow for the risk of adverse deviation.

- (ii) Discuss the relative merits of each proposal. [11]  
[Total 15]

- 7** A proprietary health and care insurer has written a pre-funded long term care product for several years. The product has a conventional design (i.e. it is not unit-linked). The benefit payable on claim is an income throughout the policyholder's lifetime, subject to ongoing disability. There are two benefit options available: a fixed monetary income and an indemnity option. The benefit required is chosen at outset, as it affects the premium payable.

The regulator is concerned about the security of these plans as they have a potential term of several decades. There are therefore strict regulations constraining the mismatching of the assets backing the reserves on these contracts.

- (i) Explain how restrictions on mismatching may be implemented by a regulator. [2]
- (ii) Describe how the company might invest its assets in order to match its pre-funded long term care liabilities as closely as possible. [10]

Following extensive lobbying by insurers, the regulator is planning to remove the restrictions on mismatching for pre-funded long term care business.

- (iii) State the controls that the regulator may introduce in relation to investment, other than restrictions on mismatching. [3]
  - (iv) Describe how you would determine the optimal investment strategy for the assets backing this book of business following this change. [11]
- [Total 26]

**END OF PAPER**