

# INSTITUTE AND FACULTY OF ACTUARIES



## EXAMINATION

22 April 2015 (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 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 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** It has been suggested that someone wanting to protect their income should buy a stand-alone critical illness insurance policy instead of an income protection insurance policy.

Discuss this suggestion. [8]

- 2** A health insurer calculates its statutory reserves for individual income protection insurance policies using the “inception/annuity” approach.

These reserves and their calculation processes are currently being reviewed by the external auditors.

Outline the likely components of this review. [11]

- 3** Five years ago, a large established health insurer started selling private medical insurance (PMI) and critical illness insurance to customers in a different country from the one in which it was based. The products are sold through insurance intermediaries.

After a successful advertising campaign, sales in the new country are exceeding expectations. However, the lapse and non-renewal levels are much worse than expected.

- (i) Explain why this poor persistency experience may be a problem for the insurer. [6]

- (ii) Suggest reasons for the poor persistency experience. [14]  
[Total 20]

- 4** A small but well-established health and care insurer has, for many years, had in place a treaty with one reinsurer to provide all of its reinsurance cover.

- (i) Describe the possible types of reinsurance cover provided. [9]

The Chief Financial Officer (CFO) of the insurer is concerned that having all the cover with one reinsurer leads to an unacceptable counterparty risk.

- (ii) Suggest investigations that could be carried out in order to respond to her concern. [5]

After further consideration, the CFO decides that she would like to undertake a full review of the reinsurance strategy and explore alternatives.

- (iii) Suggest alternatives to the current reinsurance arrangements. [6]

- (iv) Outline the issues which could arise from moving away from the current reinsurance strategy. [8]

[Total 28]

- 5 A health and care insurance company has been selling pre-funded long term care insurance for many years. The product is written on a conventional (not unit-linked) long-term basis with guaranteed regular premiums. If the claim definition is met, a lifetime index-linked annuity is payable subject to ongoing disability.

The company is in the process of re-pricing this product.

Describe how the revised premium rates would be determined using a profit test model. [18]

- 6 (i) Define the embedded value of a company writing long-term insurance business. [2]

A health insurer has been writing individual critical illness insurance business for many years in one country. In recent years, the country has experienced a recession.

The company has just finished analysing the persistency experience of its critical illness business over the past few years. The results have revealed that lapse rates have increased on critical illness business written recently, but that much older business, of 15 years duration and longer, has experienced reducing lapse rates over recent years.

The insurance company is now updating its embedded value calculations. The persistency assumptions were set a few years ago, before the recession, and have not been changed since.

The company uses two sets of persistency assumptions in its embedded value calculation. One set is used to project experience and is based on best estimate assumptions; the other is used to calculate future reserves and is prudent. The regulatory authority permits lapses to be allowed for in reserving calculations.

The company views the recent persistency experience trends to be a temporary phenomenon and decides to keep the best estimate lapse rates unchanged. However, it wishes to take a more cautious approach for the reserving set of assumptions. It has therefore decided to increase the reserving basis lapse rates for the early durations and to reduce those for the longer durations.

- (ii) Explain the impacts of these reserving assumption changes on the company's embedded value and its components. [8]

The company subsequently has had a change of view and decides that the results of the persistency analysis are not temporary. It has therefore decided to change both sets of lapse assumptions (i.e. the best estimate and reserving assumptions) similarly.

- (iii) Explain the impacts of these further changes on the company's embedded value and its components. [5]  
[Total 15]

**END OF PAPER**