

# INSTITUTE AND FACULTY OF ACTUARIES



## EXAMINATION

26 September 2016 (pm)

### **Subject SA1 – Health and Care Specialist Applications**

*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 three 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 specialising in writing individual private medical insurance (PMI) business is in the process of calculating its technical provisions under Pillar 1 of Solvency II.

(i) Describe how the insurer might determine the best estimate liabilities under Solvency II for the PMI business. [11]

(ii) Describe the factors that could cause the morbidity experience to change over time and hence invalidate the current best estimate morbidity assumptions. [13]

A new modelling system has been set up for the calculations of the Solvency II technical provisions.

(iii) Suggest controls that could be established to ensure the appropriateness and accuracy of the best estimate liability calculations. [9]  
[Total 33]

**2** A UK health insurance company has a small portfolio of reviewable unit-linked standalone critical illness insurance policies with the following features:

- The premiums paid in respect of each reviewable unit-linked policy are invested in a range of unit-linked funds.
- Each policy has a sum assured that is selected by the policyholder and would be payable on a valid claim.
- Each unit-linked fund includes an annual management charge that is deducted monthly from the unit-linked fund.
- Additionally, each policy has the following two fees; a monthly policy fee which indexes annually, and a monthly morbidity fee. These two fees are met by cancelling units from the policy.
- The monthly morbidity fee is calculated by applying a morbidity charge to the difference between the sum assured and the bid value of units of the policy at the time of the fee's calculation.
- The sum assured benefit is funded by the monthly morbidity fee. The monthly morbidity charge can be reviewed by the company.
- Further, either the premium payable or sum assured can be reviewed at 5 years intervals from the policy commencement based on the investment performance of the unit-linked policy and the current level of charges.
- The policy ceases when the policyholder reaches age 85.

The portfolio has been loss-making in recent years. The company is therefore undertaking an investigation of its policy review process, i.e. the process by which it decides whether to change the monthly morbidity charge and by how much.

- (i) Outline the investigations that the company should carry out to conclude that the policies are reviewable. [4]

After performing the investigations the company concludes that the monthly morbidity charges are reviewable.

- (ii) Describe the high level principles that should be followed in conducting a policy review. [6]

- (iii) Outline four typical examples of each of the following:

- (a) valid reasons for a change in morbidity charge  
(b) invalid reasons for a change in morbidity charge [4]

- (iv) Suggest the portfolio level information that would be required for a policy review, commenting on possible data issues. [6]

- (v) List, for a given policy, the data that would be required to perform the policy review. [4]

Each policy is set up on a standard basis, where the premium payable can maintain the selected sum assured throughout the policy term assuming that the current charges are non-reviewable and a 4% p.a. investment return.

- (vi) Describe a calculation method that could be used to review the premium after the monthly morbidity charges have been reviewed. [6]  
[Total 30]

- 3** An OECD (Organisation for Economic Co-operation and Development) study in 2004 recognised that governments often look to private health insurance as a possible means of addressing some health system challenges.

- (i) Give examples of the challenges that private health insurance can address. [2]

Country A and Country B are economically developed countries.

Currently all health provision in Country A is provided by the State and therefore funded by the taxpayer. Private health insurers are currently not allowed to operate in Country A.

All health provision in Country B is provided by private organisations and funded by individuals' private health insurance.

The government of Country A is negotiating a trade deal with Country B that would allow health insurers and healthcare providers from Country B to operate in Country A.

Health Care Insurance Plc is a large health insurer currently operational in Country B. It is considering expanding its operations to Country A when the trade deal is completed.

- (ii) Discuss the considerations that Health Care Insurance Plc should make before entering the new health insurance market in Country A. [13]
- (iii) Discuss the following issues for Health Care Insurance Plc regarding this expansion:
  - (a) capital requirement
  - (b) return on capital[12]
- (iv) Assess the risks in Country A to which Health Care Insurance Plc will be exposed after entering the market. [10]

[Total 37]

**END OF PAPER**