

# INSTITUTE AND FACULTY OF ACTUARIES



## EXAMINATION

23 April 2014 (am)

### Subject CA1 – Actuarial Risk Management

#### Paper Two

*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 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** Describe the likely cashflows and appropriate matching investments for the following:

- (a) professional indemnity insurance contracts
  - (b) income protection insurance contracts
  - (c) critical illness insurance contracts
  - (d) a €1m prize which is on offer for proving an unsolved mathematical theorem
- [8]

**2** (i) Outline why a defined benefit pension scheme would want to calculate its provisions. [4]

- (ii) Describe three different methods that could be used to allow for the risks in the cash flows for the pension scheme. [6]
- [Total 10]

**3** A large life insurance company has just completed its internal lapse experience analysis. The lapse rates are lower than for competitors with similar products (as shown in industry results). A director of the company has suggested that the internal analysis may not be correct and that the industry average lapse rates should be used instead.

- (i) Discuss the reasons for the suggestion to use industry lapse experience and why this may not necessarily be a good idea. [6]
- (ii) Describe the validation that should be carried out on the internal experience analysis. [5]
- [Total 11]

**4** (i) Describe how insurance companies and reinsurance companies manage the risks they decide to accept. [9]

(ii) Describe how risk classification can be used for the following:

- (a) the design of a home insurance contract
  - (b) the pricing of a home insurance contract
- [4]
- [Total 13]

**5** (i) Define an insurable risk. [2]

A general insurance company only writes travel insurance.

- (ii) Discuss the areas of risk and uncertainty inherent in the claims experience of this insurance company. [7]
- (iii) Discuss how pooling of risks could help the insurance company. [5]
- [Total 14]

- 6** The shares of the following companies are listed on the stock exchange of a large developed country:

Company A: A large oil exploration, refining and retailing company. The company operates numerous drilling sites in many locations throughout the world. They supply a wide range of oil-based products to many worldwide industrial and individual customers.

Company B: A manufacturer of a wide range of consumer goods. The company has significant sales in the developed country with a smaller presence in other developed markets. For several years they have been making losses. They have recently closed most of their production plants in the developed country and re-located them to a fast growing developing country.

Company C: A security consultancy. The company specialises in supplying security advisers and personnel to overseas governments, companies and individuals. Most such personnel are former members of the armed forces of the developed country. The consultancy's business is generally short-term contracts with options to renew.

- (i) Discuss for each company, the key factors that could have the most impact on the level of profits arising over the next few years. [10]
- (ii) Suggest one external political shock for each company that could significantly affect (favourably or not) the expected level of such profits. [3]
- (iii) Outline how a discounted dividend model could, in general, be used to place a value on an ordinary share. [3]
- (iv) Explain for each company why the discounted dividend model may not be an appropriate method for valuing their shares. [4]

A large financial institution manages the equity investments of a wide range of clients from the developed country including pension funds and individual investors. The institution has analysed the shares of the above three companies and has concluded that they all represent good value with potential for high future investment returns. However, they have decided that none of the shares would be suitable investments for their portfolios.

- (v) Explain why the institution may have decided not to buy each of these particular shares. [6]
- [Total 26]

- 7** An insurance company is considering offering long-term care contracts. When an elderly person needs long-term care, the contract will meet the cost of care for the remainder of their life.
- (i) Discuss the factors that will need to be considered in determining a suitable design for this product. [15]
  - (ii) Outline how the answer to part (i) may differ if the contract had a cap on the total benefits provided. [3]
- [Total 18]

**END OF PAPER**