

EXAMINATION

29 September 2009 (am)

Subject CA1 — Actuarial Risk Management

Paper One

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** An insurance company is subject to state regulation. The regulator is concerned that the company's solvency capital has deteriorated and has decided to intervene in order to protect the interests of policyholders.

(i) List four actions that the regulator can take. [2]

The regulator is developing a model to project the insurer's solvency position.

(ii) State the main aspects of the company's insurance business that need to be modelled. [3]
[Total 5]

- 2** (i) State the main conditions for:

(a) A risk to be insurable.

(b) A risk transfer to take place. [2]

A small insurance company writes a large volume of term assurance business.

(ii) State how underwriting can be used to manage risks so that the company can charge appropriate premiums. [3]

(iii) Explain why underwriting will be particularly important for this line of business. [3]
[Total 8]

- 3** A medium-sized family-owned company manufactures a range of industrial products.

(i) Outline the main sources of the operational risks that the company may face. [4]

(ii) State the aspects of the company's activities on which an actuary could provide advice. [6]
[Total 10]

- 4** A life insurance company in a certain country has been selling term assurances directly to policyholders via the internet for five years. The company is about to conduct an analysis of the mortality experience on this portfolio.

(i) Describe the considerations that should be taken into account when deciding how the data should be grouped. [6]

This analysis shows that the mortality experience on this portfolio is much lighter than what was allowed for in the pricing basis.

(ii) Discuss possible reasons for this. [3]

Currently, the company has different premium rates for males and females. The government of this country is about to introduce legislation banning gender discrimination in the provision of goods and services. There are no exceptions for insurance.

- (iii) Discuss the effect this legislation will have on the approach that this company uses to set premium rates. [5]
[Total 14]

5 A large company has sponsored a funded defined benefit scheme for many years. Benefits on retirement are in the form of pensions. The actuary to the scheme is responsible for calculating the provisions required for various purposes. Provisions are defined as the value of accrued past service liabilities in the scheme.

- (i) Outline the reasons why provisions are calculated. [5]
(ii) Explain why different reasons for calculating the provisions may lead the actuary to use different assumptions for the relevant calculations. [5]

The scheme contains various guarantees and options. In particular, there is an option for members to exchange part of their pension at retirement for a tax-free cash sum calculated by using guaranteed conversion factors.

- (iii) Describe how the provisions should take into account any guarantees and options. [3]
(iv) Discuss the approaches that could be taken when valuing the possible impact of the cash sum option. [3]
[Total 16]

6 A private investment company owned by a small number of shareholders has recently bought a large, under-performing conglomerate, which has a wide range of subsidiaries operating in many domestic industries.

The investment company financed the purchase of the conglomerate by a combination of short-term borrowing and longer-term debt in the form of corporate bonds.

- (i) Explain why the company may have chosen this approach to raising finance rather than issuing new equity. [7]
(ii) Outline the main risks to the company associated with this method of raising finance. [4]

The investment company now wishes to dispose of about half the subsidiaries of the conglomerate. It intends to finalise the disposals within one year.

- (iii) Explain possible reasons for the nature of this program of disposals. [4]
(iv) Discuss the criteria and methodology that the investment company should use in undertaking an analysis to determine which subsidiaries should be retained and which should be disposed of. [10]
[Total 25]

- 7** An insurance company is investigating offering kidnap and ransom insurance. Policies are to be sold to multinational companies to provide cover for certain named employees who are based in or travel to a range of countries. The cover provides protection against losses incurred by the company and its employees (or their families) in the event of an actual/attempted kidnap or hijack.

The main benefits include:

- Reimbursement of ransom.
 - Insurance against loss in transit of ransom.
 - Insurance for additional outgoings, which may arise as a result of a kidnap or hijack.
 - Payment of medical bills for actual injury or psychological care.
 - Compensation for the stress and trauma suffered by employees or their families, for example as a result of threats made.
 - Compensation for damage to property of the company or its employees.
- (i) List the information that would be requested on the proposal form to aid in underwriting the policy. [7]
- (ii) (a) Describe the conflicts of interest that could exist between any of the insurance company, the employer and the employee.
- (b) Explain how such conflicts could be reduced. [6]
- (iii) Describe how the insurer could provide assistance to its clients to help them manage or mitigate the risks covered under the policy. [9]
- [Total 22]

END OF PAPER