INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

18 April 2011 (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 A company provides a range of benefits to its employees.

(i) Describe the key factors that influence the level and timing of contributions for these benefits. [3]

(ii) Outline why the expected cost of the benefit payments may be different from the price charged by an insurance company to insure these benefits. [5]
[Total 8]

2 (i) Describe, in the context of domestic property insurance, the following terms:

(a) Excess
(b) No claims discount
(c) Exclusion clause

[8]

A six storey residential property is divided into three self-contained apartments, each of which occupies two floors of the building.

(ii) Explain why property insurance premiums could vary depending on the position of the apartment within the building. [3]
[Total 11]

3 A commercial television company produces and broadcasts a successful quiz show, which has had high viewing figures over a number of years. After a short break, the show is to be re-launched for an expected run of two years.

The format is that contestants, who are members of the public, have to answer a series of general knowledge questions, which get progressively harder. The contestant wins prizes depending on how many questions they get right. The more correct questions the higher the prize. Should the contestant answer twelve questions correctly, they win a jackpot of €10,000,000. The next highest prize, for answering eleven questions correctly, is €1,000,000.

In conjunction with the show, the company intends to introduce a new competition for viewers. A simple multiple-choice question will be asked during each show. Viewers will be able to phone-in their answers. Of the viewers who phone in with the correct answer, one will be selected at random and a €5,000 cash prize will be given.

(i) Outline the risks specific to this show for which the company may wish to take out insurance cover. [5]

(ii) Discuss the factors that will contribute to the moral hazard an insurance company will face when providing such cover. [4]

(iii) Set out the benefits to the insurance company, other than profits to be made on the contract, of providing this cover. [3]
[Total 12]

4 (i) List reasons why a benefit scheme may need to calculate provisions. [4]

A large benefit scheme has recently completed a valuation for supervisory purposes. The basis for the supervisory valuation is more prudent than a best estimate of future experience. The scheme is required to disclose a summary of the supervisory valuation report to beneficiaries.

(ii) List the information from the supervisory valuation report that should be disclosed to beneficiaries. [4]

The scheme's investment advisor is about to conduct a review of the scheme's investment strategy.

(iii) Discuss why the results of the supervisory valuation may not be appropriate for use by the investment advisor in conducting this review. Your answer should include commentary both on relevant specific assumptions and on broader general issues. [9]
[Total 17]

5 A large bank operates many business lines in many countries. One of the products it offers is a derivative based on the level of property prices in a particular country with a developed property market. The derivative increases in value if a specific property price index (published by a local property surveyor) falls in value. An investor is considering purchasing the derivative.

(i) Comment, from the perspective of the investor, on the importance of different financial risks relating to the derivative and the bank. [9]

The bank has one employee in this country, who is assigned to price and monitor the derivative.

(ii) Describe the operational risks associated with this arrangement. [4]

(iii) Suggest ways the bank could reduce the operational risk presented by this arrangement. [3]

The derivative is frequently combined with a second derivative linked to the profitability of the bank's mortgage portfolio and then traded as a single investment. The second derivative increases in value as profitability of the mortgage portfolio increases.

(iv) Discuss why the market price of this combined investment:

(a) may be less volatile than the price of the separate derivatives; or
(b) may be more volatile than the price of the separate derivatives [3]
[Total 19]

6 A company which writes general insurance business is developing a new line of insurance policies aimed at university students.

(i) List the types of insurance it could offer. [5]

(ii) Outline how the assumptions used to price these policies may differ from those used for the company's existing business. [9]

[Total 14]

7 An airline that only operates within its domestic country is considering expanding by offering overseas flights. It has started a project to decide the geographical region to which it will commence flights, from a shortlist of three regions.

(i) Outline the steps necessary to identify the risks facing the project. [5]

(ii) Identify the major risks to the airline of operating in overseas markets, and for each risk suggest a way to mitigate that risk. [8]

The airline has decided to focus on a region in which the authorities only offer three-year licences to new airlines. For this region the airline's project team has identified three possible scenarios which may occur.

	Scenario A	*Scenario B*	*Scenario C*
Probability of Occurrence	30%	50%	20%
	£m	£m	£m
Set Up Costs	–100	–110	–120
Net revenue			
Year 1	50	40	30
Year 2	50	40	30
Year 3	50	45	30

(iii) Calculate the Net Present Value of the project, using a discount rate of 5% per annum. [3]

(iv) (a) Comment on the probability of profit and loss on the project; and

(b) List other factors which may influence the decision on whether to invest in this project. [3]

[Total 19]

END OF PAPER