INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

23 September 2013 (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 invests in many capital projects. When deciding between projects to invest in, the company always selects the project with the highest internal rate of return.

Discuss the suitability of this approach. [8]

2 An insurance company writes long-term care insurance.

Discuss the risks and uncertainties faced by:

(a) the insurance company
(b) the policyholder

[9]

3 A global company is looking to raise capital by disposing of business units that are underperforming. An actuarial consultancy has been asked to assess which units are underperforming and also suggest potential buyers for the units.

Describe the issues that need to be taken into account to ensure that the consultancy does a professional job. [10]

4 (i) List four ways in which scenarios could be derived for use in a capital model. [2]

(ii) Outline the issues that an insurance company should consider when building a capital model. [9]
[Total 11]

5 (i) State two expressions for the expected total return (to a domestic investor) on an overseas asset. [3]

A wealthy individual is considering investing in one of the following assets with the objective of maximising return:

- a fixed interest government bond with a gross annual redemption yield of 2%

- a property currently occupied by a local business with a current annual rental yield of 7%

- ordinary shares in a global company with a current annual dividend yield of 4%

(ii) Discuss the relative merits of each of the assets above, considering the individual's objective. [9]

A friend of the individual has suggested swapping cash investment in the domestic currency for cash in a foreign currency.

(iii) Comment on the merits of this idea. [2]

The individual has found a website that allows investors to lend money to companies seeking funding over a one-year, three-year or five-year time horizon. Each company decides what amount of money it requires; and then each investor can decide what level of interest to charge to that company; the company will choose to borrow from the investors who charge the lowest interest.

The investor has approached a financial advisor to help him decide a suitable interest rate to charge. He has asked the advisor to provide him with a suitable list of questions to ask each company before choosing a suitable rate.

(iv) Set out the key questions the advisor should include in the list. [5]
[Total 19]

6 A manufacturing company currently pays its employees a fixed salary each month with no additional benefits. It has decided to introduce a benefit scheme to be available to all employees, with the following features:

- Employees will be able to contribute up to 10% of their annual income into a personal account each year and the company will also pay 10%.
- The account will increase in line with inflation each year.
- Monies can be withdrawn from this account in respect of a limited number of events set out in a predefined list.
- The company guarantees that the scheme will have enough cash to pay the benefits.

(i) Suggest possible events that could be included in the predefined list of withdrawal events. [3]

(ii) Explain why the company has decided to link the annual increase to inflation. [3]

The directors of the company have decided to invest the assets of the scheme in index-linked securities.

(iii) Discuss the advantages and disadvantages of this investment policy. [2]

An investment manager has suggested that the scheme could be invested in a much wider range of investments in order to improve investment performance.

(iv) Discuss the suitability of other investment classes for the scheme's assets. [8]

(v) Comment on the investment manager's suggestion. [3]
[Total 19]

7 A large developing country has recently experienced sustained levels of economic growth, giving rise to growth in capital markets, private and commercial sectors. However, the country's infrastructure is outdated and may constrain future growth.

The country's government has decided to embark on a large road-building project. The intention is to link the country's main cities with fast motorways.

(i) Describe the main methods the government could use to fund this project. [5]

The government has identified the major consequences of specific risks facing the project as:

- unhappy citizens leading to electoral unpopularity or protests (unpopular)
- costs being higher than anticipated (costs)
- the project taking longer than expected to complete (delays)

The government has appointed a project team and identified the major stages of the project as: planning; construction; ongoing operation and maintenance.

As part of the risk analysis, the project team has set up a risk matrix as shown below:

	Stages		
Consequences	**Planning**	**Construction**	**Ongoing**
Unpopular			
Costs			
Delays			

(ii) Suggest, for each of the nine cells in the matrix, one specific risk event that could be relevant. [5]

(iii) For each of the following methods of risk mitigation:

(a) avoiding the risk
(b) transferring the risk
(c) sharing the risk
(d) reducing the risk

Give one distinct example from the events identified in part (ii) of how risk mitigation could be achieved. [4]

As part of the project, the government plans to take possession of land and homes along the proposed routes that are currently owned by private citizens.

(iv) Discuss why the government might not pay fair value for any land or homes it takes possession of. [3]

The government decides to pay a fair value for any homes or land currently owned by private citizens.

(v) Outline how the payments could be determined using:

(a) a discounted cash flow method
(b) a market value based method [7]

[Total 24]

END OF PAPER