INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

26 September 2017 (pm)

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 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 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 Employers' Liability insurance. [4]

2 Describe how the Risk Management Control Cycle can be used in capital investment projects. [8]

3 In a particular country, actuaries are required to comply with a series of principles-based rules referred to as Technical Actuarial Standards (TASs).

Describe the issues an actuary should take into account when deciding on the materiality and proportionality of the principles in any particular TAS in relation to actuarial work. [8]

4 (i) Outline the four key ways an insurance company may choose to deal with a new risk that it faces. [4]

(ii) Compare the suitability of the main possible methods of risk transfer each of the following companies could use:

- A large global general insurance company

- A general insurance company which writes only hurricane and earthquake risks on the east coast of North America. (The east coast of North America is exposed to high hurricane risk and lower earthquake risk.)

[10]
[Total 14]

5 An insurance company writes a variety of without profit non-linked contracts.

(i) Describe how expenses might be allocated across the different classes of business. [7]

The company has just completed a theoretical allocation of its expenses across the different classes of business, and has calculated the corresponding loadings to be applied in pricing.

Contracts are priced using a traditional equation of value approach. The company has set up the equations to calculate the risk premiums. It now needs to incorporate the theoretical expense loadings into the equations.

(ii) Describe, for each of the following, how the expense loadings should be incorporated into the equation of value. You should ignore allowances for tax and reserving.

(a) expenses of paying level immediate annuities

(b) investment expenses of endowment assurances

(c) underwriting expenses of term assurances

(d) underwriting expenses of long term care contracts

[8]

(iii) Discuss why the theoretical expense loadings may not be used in practice. [2]
[Total 17]

6 Two small specialist banks, based in the same country, exist mainly to provide loans:

- Shortloan Bank lends to retailers and other trading companies. The loans they provide are for up to six months, to help borrowers meet their short term working capital requirements.

- Longloan Bank lends to large organisations that undertake long term development projects. The loans they provide are generally for at least five years.

In order to raise part of the funds necessary to provide these loans, both banks borrow from their government. The interest rate charged by the government is less than that charged by the banks on the loans they provide.

(i) Suggest how a regulatory framework set by the government may limit what **these banks** are able to do in terms of investment. [6]

(ii) Suggest possible reasons why the government chooses to lend to the banks rather than directly to the banks' customers. [4]

In addition, these banks also raise funds by issuing securities into the financial markets.

(iii) Justify, for each of the two banks, which of the following securities would be the most appropriate to issue:

- money market instruments

- index linked bonds

[5]

(iv) Describe how Shortloan Bank could use the fundamental principles of good lending to assess the suitability of individual loan applications it receives. [9]
[Total 24]

7 For many years a large life insurance company has written substantial volumes of a flexible unit-linked investment product in a particular country. The product:

- provides a benefit of the full value of the units held on surrender at any time.
- allows the policyholder to vary their contributions.
- provides no additional benefit on death (other than the full value of the units).

The company is now planning to launch a guaranteed version of this product in a different country. All of the above product features will remain unchanged but a benefit guarantee will be added. The detailed terms and conditions of the guarantee are yet to be specified but the basic features are:

- at various points in time, units will be able to be cashed in for the higher of full value of the units and a minimum monetary amount.
- the minimum monetary amount is based on an accumulation of contributions at guaranteed rates of interest set at outset.

(i) Suggest possible reasons why the company may have decided to offer this guarantee. [5]

(ii) Consider a guaranteed contract that has just been issued and received its first contribution. Explain how the guarantee will have a value to the customer, immediately and in the future. [4]

(iii) Propose ways in which the detailed terms and conditions of the guarantee could be set to minimise the financial impact of the guarantee to the company. [9]

(iv) Explain why derivative investments are likely to be used to help the company manage the guarantee. [4]

(v) Discuss why derivative investments may not be completely effective in managing the risks associated with the guarantee. [3]
[Total 25]

END OF PAPER