INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

16 April 2018 (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 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 six 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 (i) Define liquidity risk. [2]

(ii) Explain how liquidity risk might influence an investor's view of the relative attractiveness of the following asset classes:

(a) Traded Equities

(b) Property

(c) Hedge Funds

(d) Collectable Cars

[8]
[Total 10]

2 (i) Describe the following:

(a) solvency capital

(b) economic capital

[5]

The standard regulatory model shows the following funding positions for an insurance company that sells annuity business and term assurance business, on both a solvency and economic capital basis.

	Economic capital basis	*Solvency capital basis*
Assets	£1,300m	£1,300m
Liabilities (including the capital requirements in respect of its liabilities)	£1,000m	£1,100m
"Free capital"	£300m	£200m

(ii) Suggest the likely reasons why the "Free capital" is higher under the Economic capital basis. [3]

The Finance Director of the insurance company believes that it would be able to obtain a further £75m Free capital on a solvency capital basis if the insurance company used an internal model, rather than the standard regulatory model.

(iii) Discuss the advantages and disadvantages to the insurance company of using an internal model to determine its free capital. [4]
[Total 12]

3 (i) Describe methods of quantifying the risk of investing in any asset. [2]

A large insurance company has long term mostly illiquid liabilities. To achieve a higher expected return on it's investments it is investigating investing in infrastructure assets. Infrastructure investments include both funding the construction of physical assets and operating these assets.

(ii) Outline the risk characteristics of an infrastructure investments. [2]

(iii) Discuss the main features of the behaviour of market price levels and total returns for infrastructure investments. [10]
[Total 14]

4 (i) Describe five methods which can be used to value the assets that an insurance company might hold. [10]

An insurance company's liabilities are sensitive to interest rates. The company wishes to reduce its exposure to interest rate risk via the use of swaps.

(ii) Explain how:

(a) These swaps could be valued in the company's accounts.

(b) Their values will move if future interest rates are lower than expected.
[6]
[Total 16]

5 (i) State four methods a company could use to finance future benefits. [4]

An employer is setting up a benefit scheme for its employees.

(ii) Explain the advantages and disadvantages of the different methods of financing benefits to the different parties involved with the benefit scheme. [10]

The employer is considering paying an insurance company to secure all of the schemes future benefits. The insurance company offers the employer the ability to pay for future benefits using one of the methods outlined in (i).

(iii) Discuss the advantages and disadvantages of each method outlined in (i) for both parties. [7]
[Total 21]

6 In a developed country, a life insurance company writes only term assurance business. It is the largest seller of term assurance business in the country.

The country's medical profession has recently announced that a small number of people have become the first lives, in that country, to be diagnosed with a particular disease that until recently has been confined purely to a small number of developing countries on another continent.

In those developing countries, the disease has been classed as infectious and has led to a significant increase in the mortality rate in those countries.

(i) Discuss the factors which the insurance company should consider in relation to whether its new term assurance policies should be re-priced in response to the medical profession's announcement. [6]

Following this development the insurance company has decided to re-price its policies.

(ii) Discuss the data that could be used to set revised mortality assumptions following the medical profession's announcement. [14]

(iii) Describe how the remaining pricing assumptions are likely to be affected. [4]

(iv) Suggest other important areas of the insurance company's business (other than pricing) that the insurance company may now need to keep under closer review. [3]
[Total 27]

END OF PAPER