

# INSTITUTE AND FACULTY OF ACTUARIES

## EXAMINATION

17 April 2012 (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 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** Compare and contrast the following risk measures:
- value at risk (VaR) and
  - tail value at risk (Tail VaR)
- [7]
- 2** (i) Outline the functions of the money markets. [3]
- (ii) Discuss the principal influences on the various short term interest rates prevailing in the money markets. [7]
- [Total 10]
- 3** A solvency reserving basis requires that assets are valued at market value. Liabilities are discounted at risk free rates based on government bonds, with a best estimate basis used for other assumptions.
- (i) Discuss how the adoption of this basis may affect the risks faced by an insurance company that writes single premium annuity business. [6]
- A government has recently introduced new capital requirements for life insurance companies with the aim of increasing protection for policyholders.
- It has been suggested that introducing similar requirements in respect of the funding levels of defined benefit pension schemes would give extra protection for schemes and scheme members.
- (ii) Discuss the merits and potential difficulties of adopting this suggestion. [8]
- [Total 14]
- 4** A group of neighbours living in a city have decided they would like occasional access to a car. They are investigating purchasing a car between them and sharing all the expenses of owning the car.
- (i) List the expenses likely to be incurred. [3]
- (ii) Outline how these expenses could be allocated between each member of the group. [3]
- Car Club is an established company that has recently started operating in the city. An individual can become a member of Car Club by paying an annual fee and can then hire a car when needed on a pay as you go basis.
- (iii) Discuss the relative attractions of joining Car Club compared with participating in the shared car purchase arrangement. [5]
- Car Club is reviewing its insurance arrangements.
- (iv) Suggest restrictions Car Club can put on its members to keep insurance premiums low. [4]
- [Total 15]

- 5** A medium sized manufacturing and distribution company currently has no formal provisions for sick pay. The written contractual employment terms are that if an employee is unable to work due to sickness the employee will not be paid by the employer.

The company operates an informal, discretionary policy where, depending on circumstances and on the decision of their immediate manager, some employees do receive some sick pay. The level and duration of such payments varies and can be changed or stopped with minimal notice.

- (i) Outline the possible rationale behind the company's existing arrangements for sick pay. [4]

The company is now proposing to introduce formal sick pay arrangements.

Employees who are absent due to sickness will receive full pay from the company for five working days without the need to produce evidence of sickness.

After that time, if certification of sickness from a doctor is provided, payments will be made as a percentage of full pay and the percentage will be as follows:

First three months 100%

Next three months 50%

Thereafter, payments will cease and no discretionary payments will be made under any circumstances.

- (ii) Explain why the company's recent sickness experience may not be suitable for estimating future sickness experience and hence payments arising under the new arrangements. [9]
- (iii) Set out difficulties the company may face were it to try to use any other sources of experience data for sickness rates. [3]
- [Total 16]

- 6**
- (i) Define information asymmetry. [1]
- (ii) Explain why there may be information asymmetry between an insurance company and its policyholders. [3]
- (iii) Discuss how the information asymmetries arising in the following contracts could be mitigated:
- (a) endowment assurance policies
  - (b) long term care contracts
  - (c) product liability insurance

[14]  
[Total 18]

- 7**
- (i) Discuss how a portfolio of assets could be constructed to match liabilities. [4]
  - (ii) Outline why it might be important for an investor to select assets that match their liabilities. [3]
  - (iii) Discuss the extent to which the investments of a defined benefit pension scheme that is closed to new members and future accruals could be mismatched relative to its liabilities. [5]

A couple both aged 50 have four children aged between 10 and 16. They have been investing part of their resources with the aim of providing enough money to pay for university tuition fees for all four children. They have assumed that tuition fees in future will increase from the current rate in line with inflation.

A substantial change to university tuition fees has been announced for the following year. They will increase to three times the current rate.

- (iv) Explain how this increase in fees may affect the couple's future financial planning. [8]
- [Total 20]

**END OF PAPER**