

# INSTITUTE AND FACULTY OF ACTUARIES



## EXAMINATION

27 September 2016 (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 the following:

- (a) liquidity risk
- (b) market risk
- (c) operational risk
- (d) business risk

[6]

**2** A defined benefit pension scheme provides, as the default option, a level pension to each member with a 50% spouse's pension on the death of the member.

However, the scheme allows members reaching retirement to choose any particular rate of payment escalation and any particular percentage spouse's pension.

The amount of the amended level of pension is then determined by the scheme applying adjustment factors to the default level of pension.

An actuary is advising the trustees of the pension scheme on what adjustment factors should be used, so as to minimise additional risks to the funding of the scheme under this arrangement.

(i) Explain how the actuary should set the adjustment factors. [7]

(ii) Outline how the actuary can use the actuarial control cycle in producing the advice. [4]

[Total 11]

**3** Andrew, a cake baker, has recently won a national television competition based on the quality of his cakes. He currently bakes these in his own kitchen and sells them locally to a small number of shops and caf  s. Because of the national publicity gained from winning the competition, Andrew is now considering directly selling his award winning cakes across the nation via the internet.

Discuss the main risks that Andrew would face if he launched this venture, and ways that these risks might be mitigated. [12]

- 4** (i) Define information asymmetry. [1]
- (ii) Discuss the information asymmetries, between the policyholder and the insurance company, for the following:
- (a) an impaired life annuity policy
  - (b) a car insurance policy with two named drivers
  - (c) an insurability option where an individual can increase the level of life cover without supplying medical evidence
- [8]
- (iii) Discuss how the information asymmetries in (ii) could be mitigated. [4]
- [Total 13]

**5** A family have just returned from holiday to find that their home has been severely damaged by fire.

They intend to make a claim under their home insurance policy to cover the significant losses and costs they have incurred.

- (i) List the steps an insurance company may require the family to follow in order to process their claim. [4]
  - (ii) Discuss why the insurance company will view each step as being necessary. [9]
- [Total 13]

**6** (i) List aspects of the external environment which can have implications for the main providers of benefits on contingent future events. [5]

An insurance company has been selling a wide range of pension products across a wide range of countries for a number of years.

- (ii) Discuss how each of the aspects of the external environment can have implications for this insurance company. [15]
- [Total 20]

- 7 A life insurance company is performing a supervisory valuation of its many lines of business.

Most material lines of business are valued using an industry-standard actuarial modelling system, called ELL, purchased from an external actuarial consultancy. Some material lines of business are, however, still valued using spreadsheets.

ELL is the company's strategic preferred system for all actuarial calculations across its operations. It is run and controlled by the company's central actuarial team, and receives data feeds directly from the company's administration systems.

Spreadsheets are controlled by the valuation team, separate from the central actuarial team, and rely on data supplied manually by the relevant administration teams.

- (i) Discuss the advantages and disadvantages to the company of performing its supervisory valuation using ELL compared with the spreadsheets. [13]

One of the material lines of business which is still valued on a spreadsheet is required to be valued on ELL instead, in time for the next supervisory valuation. Relevant project conversion teams will be put in place to plan and implement this conversion. Implementation can occur only if the valuation team's actuary provides written approval that the revised system is fit for the purpose of the next supervisory valuation. The valuation team's actuary is not part of the project conversion teams.

- (ii) Discuss the steps and investigations that the valuation team's actuary should perform before providing written approval of the revised system. [8]

At the first supervisory valuation to be published following conversion of this line of business, the valuation team's actuary is unable to reconcile the ELL reserves for this line of business with the reserves that would have been obtained using the spreadsheet. The Directors are about to need to sign off the published valuation to meet the deadline set by the regulator.

- (iii) Outline how the valuation team's actuary should now proceed. [4]  
[Total 25]

**END OF PAPER**