

# INSTITUTE AND FACULTY OF ACTUARIES



## EXAMINATION

12 April 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 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 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) Describe “Value at Risk”. [3]
- (ii) Outline using formulae “Expected Shortfall”. [3]
- [Total 6]

- 2** Lily and Poppy want to open a flower shop. They have conducted an initial appraisal and have concluded that this project is viable and the net present value and payback period are both satisfactory.

Poppy has now suggested that, rather than open one shop, they should open a chain of flower shops. She states that this would be more profitable and so they should aim for this more ambitious project.

Discuss this suggestion. [11]

- 3** An insurance company is considering introducing a no claims discount system for its motor portfolio.

(i) Explain the advantages and disadvantages of this to the insurer. [9]

(ii) Explain the advantages and disadvantages of this to the policyholder. [2]

[Total 11]

- 4** Legal action is being taken by former professional players of a major national sport for long-term health issues related to past head injuries which they suffered whilst playing the sport. The legal action is being taken against the sports club owners who employed the players. You have been asked to provide advice to the club owners on structuring a settlement scheme to make payments to the former players.

Discuss how an actuary can contribute to structuring this settlement scheme. [15]

**5** A government provides a retirement benefit to its citizens in the form of a basic state pension. This pension is the same for everyone but it is relatively low in comparison with the average cost of living.

- (i) Outline the problems individuals may face if they were to rely on this basic state pension as their main source of income in retirement. [3]

The government is proposing to introduce a second element to state pension provision. Individuals and the government will both pay contributions into a fund which will be used at retirement to provide a pension in addition to the basic state pension. All individuals will be required to participate. There is no tradition of employers providing pensions arrangements for their employees in this country.

- (ii) Explain why the government might adopt this policy. [3]

The government is considering the following approach to determine the secondary pension. The fund will be held and managed by the government.

Option A – The pension will be based on a proportion of annual salary earned over the period to retirement. There will be a maximum limit to the amount of salary that will qualify. The salary above this limit will be ignored when determining benefits and contributions.

- (iii) Discuss the merits of Option A in terms of meeting the government's objectives. [8]

The government decides instead to implement Option B. It also decides to outsource the administration and fund management.

Option B – A pension will be purchased with the individual's fund, the accumulated value of contributions made by and on behalf of the individual.

- (iv) Set out possible ways the outsourced services could be charged for. [3]

- (v) Discuss the risks the administrators and fund managers may face. [8]

[Total 25]

- 6 (i) List factors in the external environment which impact on providers of benefits. [5]

In a developing country, an increasing number of individuals are becoming home owners. Due to the lack of maturity in the financial market the government has two concerns:

- That individuals may take out a mortgage which they cannot afford in the long term and risk losing their homes.
- That individuals are not taking out adequate property insurance due to a lack of insurance companies in the country.

To encourage individuals to address these concerns the government has set up a benefit trust. An individual is guaranteed to be able to join the benefit trust at the point they first purchase a property and will remain a member only as long as they continue to pay contributions.

Contributions payable on joining the benefit trust are to be a fixed (non-increasing) monthly amount payable from the point of house purchase until any mortgage has been fully paid off. The amount of monthly contribution is set by the Trustees on joining the benefit trust. A maximum contribution rate (expressed as a percentage of the value of the property) has been set by the government.

The benefit trust is intended to be non-profit making with the Trustees aiming to keep monthly contributions at an affordable level. To make membership of the benefit trust attractive the government is proposing that the following benefits will be provided:

- (a) Mortgage payments will be paid for a maximum of 24 months on disability or if made redundant (qualification criteria to be defined by the benefit trust).
  - (b) Property insurance and contents insurance.
  - (c) A lump sum equal to all contributions paid if the individual dies and has never made a claim under (a) or (b).
- (ii) Describe how the following factors in the external environment might impact the benefit trust:
- (a) capital adequacy and solvency
  - (b) changing cultural and social trends
  - (c) risk management requirements
  - (d) state benefits
- [8]
- (iii) Outline how the Trustees may attempt to match the assets and liabilities of the benefit trust. [3]
- (iv) Discuss reasons why investment in large infrastructure projects may be appropriate for the benefit trust. [7]

- (v) Define “risk classification”. [2]

The government has decided that the risks being run by the benefit trust are too high. Its main concern is that the benefit trust may need additional financial support if changes are not made. However, the government also has concerns over the public perception and popularity of the benefit trust.

- (vi) Discuss how the government’s concerns could be addressed by the following risk management proposals:

(a) Removing the maximum contribution rate.

(b) Allowing the Trustees to change the contribution amount for existing members on an annual basis. [7]

[Total 32]

**END OF PAPER**