

EXAMINATIONS

September 1999

Subject 302 — Life Insurance

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *You have 15 minutes at 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.*
2. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
3. *Write your surname in full, the initials of your other names and your Candidate's Number on the front of the answer booklet.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all 9 questions, beginning your answer to each question on a separate sheet.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet and this question paper.

*In addition to this paper you should have available
Actuarial Tables and an electronic calculator.*

- 1** (i) Discuss the principal requirements that should be met by an actuarial model used to assist in the financial management of a life insurance company. [7]
- (ii) Describe the steps that should be followed when using a model to set the charges under a new single premium unit-linked product. [9]
- [Total 16]
- 2** A mutual life assurance company writes only with profits endowment assurance contracts. The experience for the last year has the following features:
- a once-off increase in expenses due to the purchase of a new computer system
 - an increase in yields on the fixed interest assets from 7% per annum to 9% per annum
 - a large increase in unrealised gains due to the revaluation of the company's property portfolio, which now makes up 25% of the company's assets
- Describe how this experience would impact on the bonus declaration if the company distributed surplus using:
- (i) additions to benefits [5]
- (ii) contribution method [4]
- [Total 9]
- 3** A life company is about to calculate its supervisory reserves using a net premium valuation method. The company writes both with and without profits policies.
- (i) State the principles that should be followed when setting the bases for each of:
- interest rate
 - mortality
 - expenses [8]
- (ii) Discuss how the bases might relate to those used to price the products. [2]
- [Total 10]
- 4** A life insurance company wishes to launch a new regular premium unit-linked whole of life product. This will provide benefits on the first event of death or diagnosis of a critical illness stated in the policy documents. The charges in the product will be guaranteed.
- (i) Describe the major areas of risk which the company will face as a result of introducing this product. [10]
- (ii) Discuss the actions the company could take to limit and control these risks. [6]
- [Total 16]

- 5** A mutual life insurance company writes non-linked with and without profits endowment products.
- (i) State the principles that should be followed in determining the lump sum discontinuance terms under these products. [5]
 - (ii) A consumer group has suggested that life insurance companies should be required to pay on discontinuance a lump sum equal to the reserve being held for supervisory purposes.
- Discuss how this suggestion fits in with the principles given in (i). [8]
[Total 13]
- 6** A small life insurance company has recently repriced its product range. As a result, it is selling significantly higher volumes of new business.
- Describe the sources of risk to the company that may result from this. [4]
- 7** A life insurance company writes a significant volume of group life cover benefits associated with the death-in-service element of occupational pension schemes.
- (i) Describe how the company might review its retention limit for this portfolio. [5]
 - (ii) The company establishes a one-third quota share reinsurance arrangement with Reinsurer A. For the balance of risk it establishes a surplus treaty with Reinsurer B. This provides surplus cover in excess of £80,000 up to a maximum reinsured of £600,000.
- Calculate how the claim payment would be apportioned between the company and its two reinsurers in the event of a total claim on a single life of
- (a) £90,000
 - (b) £290,000
 - (c) £1,000,000
 - (d) £1,200,000 [2]
- (iii) Describe the reinsurance methods available to the company to protect itself against very large claims. [3]
[Total 10]

- 8** A country with a sophisticated financial economy is to introduce legislation to require an investigation by an actuary into the financial condition of each life company. Only non-linked business is written in this country.

A summary of the valuation of liabilities using a prospective gross premium valuation is to be presented to the regulatory authorities each year together with a valuation of assets at market value. It has been proposed that statutory regulations governing the valuation of assets and liabilities should be incorporated into the legislation.

Describe the main rules that would be expected, assuming the purpose is to demonstrate solvency:

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|------|----------------------------------|------------|
| (i) | for the valuation of assets | [5] |
| (ii) | for the valuation of liabilities | [12] |
| | | [Total 17] |

- 9** State the principles which should be taken into account when setting the demographic pricing assumptions for a new life assurance product. [5]