EXAMINATIONS

12 April 2001 (am)

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 Discuss the purpose of, and interaction between, the supervisory reserves and the solvency capital of a life insurance company. [3]

2 Describe the following methods of carrying out dynamic solvency testing:

(i) the deterministic method [4]

(ii) the stochastic method (a detailed description of a stochastic model is not required) [3]
[Total 7]

3 In a certain country the only tax levied on life insurance companies or life insurance policies is a premium tax. A percentage of each premium received by the company is paid to the government.

(i) State the advantages and disadvantages of this method of taxation from the perspective of the company and the government. [4]

(ii) State other practical ways of taxing life insurance business. [4]
[Total 8]

4 A life insurance company distributes surplus to with profits policies by the additions to benefits method. Yields on medium-term fixed interest securities have fallen from 6.5% p.a. at 31 December 1999 to 4.5% p.a. at 31 December 2000, after many years of stability. Equity market values have risen by 25% over the same period.

Describe how these changes and policyholders' expectations will influence the distribution of surplus at 31 December 2000. [10]

5 A small mutual life insurance company is about to enter the term assurance market.

Describe the reasons why it might choose to reinsure this business, stating the types of reinsurance that might be appropriate in each case.
[11]

6 A mutual life insurance company wishes to launch a unit-linked regular premium pension contract for sale through intermediaries. On death or transfer before retirement date 100% of the bid value of units is payable as a lump sum. At retirement 100% of the bid value of units is used to purchase a pension using the company's annuity rates at that time.

The only charge under the contract is a fund management charge of 0.75% per annum of the value of the units. All other companies in the marketplace use the same charging structure. The company still has to decide on the following features of the product design:

- The commission payable and whether this should be a percentage of the initial premium paid at outset, or a lower percentage of every premium over the duration of the contract paid at the same time as each premium.

- The minimum premium allowed.

Discuss the factors that need to be considered when deciding on these features and indicate how the factors conflict. [12]

7 A life insurance company that writes only with profits contracts has just closed to new business.

Discuss the factors that should be considered when setting the following assumptions in order to calculate a realistic embedded value:

(i) expenses [5]
(ii) withdrawals [4]
(iii) investment return [4]
[Total 13]

8 A life insurance company launched a conventional without profits critical illness term assurance contract ten years ago. The volume of new business sold has risen significantly in the last three years. Under the contract no benefit is payable on death or lapse. The company is about to review the profitability of the contract.

(i) Describe how the company might analyse its critical illness claims experience since launch. [9]

(ii) Describe how the company might use the results of this analysis to set assumptions for calculating the profitability of the contract. [3]

(iii) Describe why the results of this analysis may not be indicative of future experience. [7]
[Total 19]

9 A house-owner is considering taking out an endowment assurance to repay the capital sum under a mortgage of £60,000 due in 25 years time. During the term of the loan, interest payments are made to the lender, but no capital is repaid.

He first considers:

(a) A regular premium without profits 25-year pure endowment where the only benefit payable is £60,000 on survival to the maturity date.

He then considers two other products:

(b) A regular premium 25-year with profits endowment assurance where the basic sum assured is £40,000 payable on death or survival to the maturity date. Regular and terminal bonuses are payable. In recent years the regular bonus has been a simple bonus of 3% of the basic sum assured. On death before the maturity date the minimum benefit payable is guaranteed to be £60,000.

(c) A regular premium 25-year unit-linked endowment assurance where the sum assured payable on death before the maturity date is £60,000, or the value of units if greater. On the maturity date the value of units is payable.

(i) Describe the risks avoided and accepted by the investor in opting for product (a) and mention any insurance products available to overcome the risks accepted. [6]

(ii) Describe the additional risks avoided and accepted by the investor in opting for each of products (b) and (c) compared with (a). [6]

(iii) Compare the premiums payable under each product (b) and (c) with (a), giving reasons for the possible differences. [5]

[Total 17]