EXAMINATIONS

April 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 8 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 A life insurance company writes whole of life assurance contracts on the following bases:

(a) without profits non-linked
(b) with profits non-linked

Describe the methods the company has available to limit its exposure to each of the principal risks it faces in issuing these contracts. [9]

2 A life insurance company is repricing its unit-linked whole of life critical illness contract under which no benefit is payable on death or surrender.

(i) Describe the sources of data which the life company would have available for each of the principal elements of the pricing basis, explaining how the assumptions might be determined (a numerical basis is not required). [20]

(ii) List those items of the pricing basis which would also be needed for the supervisory valuation of the contract and comment how the valuation basis might differ from the pricing basis. [5]

(iii) List the elements of the pricing basis which are not normally part of the supervisory valuation basis. [2]
[Total 27]

3 A life insurance company offers a unit-linked single premium whole of life assurance contract for sale through independent advisers. The product design includes the following features:

- sum assured 102.5% of the value of units;
- surrender value 100% of the value of units;
- partial surrender option on each policy anniversary, up to 7.5% of the value of units;
- initial commission 5% of the single premium;
- maximum age at entry 85;
- no medical underwriting.

The only charges made are:

- an initial charge of 5% of the single premium;
- a monthly charge of 0.125% of the value of units.

(i) Describe the principal risks to the company associated with this product.
[4]

(ii) To improve the competitive position of the product, the company now proposes to introduce the following additional features for new business:

- guaranteed minimum sum assured equal to the single premium;
- guaranteed minimum surrender value, equal to the single premium, at any time after five years from the date of premium payment.

Describe the new or increased risks to the company associated with these changes. [4]

(iii) Suggest how the product design could be changed to control the risks identified in parts (i) and (ii). [4]
[Total 12]

4 (i) Describe how underwriting may be used to manage a life insurance company's risks. [4]

(ii) A disease has been identified that potentially affects anyone who has spent time in a specific foreign region — a popular holiday destination. Visitors to this region have a chance of developing the disease, which depends on the duration of their stay. The development of the disease has now been well documented.

In the early years after infection there are no noticeable symptoms. Later, symptoms develop and the health of the infected person progressively deteriorates. The disease is not contagious.

The disease always proves fatal, with death occurring around 20 years after the original exposure. There are no tests for infection with the disease, and there is no cure.

Describe how a life assurance company can reduce the risk of anti-selection from people who are applying for the cover and who have travelled to the region. [5]

(iii) Describe what terms might be offered to the applicants in the circumstances described in (ii) in each of the following cases:

(a) A person currently showing no signs of the disease who visited the region in 1995 who wants a 25 year endowment assurance for mortgage purposes.

(b) A person showing early signs of the disease, who visited the region in 1990 and who is applying for a five year term assurance.

(c) A couple who want a last survivor whole of life assurance contract. One of the couple is in the final stages of the disease. The partner has never visited the region and is not likely to. [6]
[Total 15]

5 A life insurance company writes unit-linked long term sickness insurance contracts.

(i) State reasons why the company would want to analyse its sickness experience. [4]

(ii) The state of the economy in the country where the company is based has resulted in a large rise in the level of unemployment.

Describe what effect this may have on the company's sickness experience, and what action the company may take as a result. [6]
[Total 10]

6 (i) Describe the principal features of the following methods of distributing surplus:

(a) Additions to benefits
(b) Revalorisation
(c) Contribution method [9]

(ii) In a certain country it has been the practice for many years for life insurance companies to invest a significant part of the assets supporting their with profits business in quoted equities.

Discuss the suitability of each of the three methods of distributing surplus given in (i) for life insurance companies in that country. [3]
[Total 12]

7 The surrender value of a with profits policy is normally set by reference to the asset share underlying the policy.

Explain why the surrender value might differ from the asset share. [6]

8 Discuss the suitability of the assets to match the following liabilities for a life insurance company with substantial free assets:

(a) Liabilities: a block of immediate and deferred annuities

Assets: a portfolio of medium-dated and long-dated fixed interest securities

(b) Liabilities: a block of with profits endowment assurances

Assets: a portfolio of equity shares

(c) Liabilities: the future expenses arising from a block of single premium linked contracts

Assets: the future management charges under the contracts. These charges are at a fixed rate of 1% per annum of the linked funds. No other charges may be levied. [9]