EXAMINATIONS

10 April 2003 (am)

Subject 302 — Life Insurance

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 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.*

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 8 questions, beginning your answer to each question on a separate sheet.*

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 Actuarial Tables and your own electronic calculator.

1 State the principal elements of the actuarial control cycle used for managing an insurance company. [3]

2 A life insurance company invests the assets supporting its with profits business in both fixed interest investments and equities.

Discuss the suitability of the additions to benefits method for distributing the investment surplus. [7]

3 A small life insurance company reinsures its term assurance contracts using an original terms quota share arrangement. It has recently increased the proportion reinsured from 30% to 90% for both new business and existing in-force business. It has been suggested that, in order to reduce costs, it is no longer necessary for the insurance company to monitor the mortality experience of this line of business, as it is no longer at risk from adverse experience.

Discuss this suggestion. [7]

4 (i) Describe how the regulatory environment in a particular territory might affect the investment strategy of a life insurance company. [6]

(ii) A small life insurance company has a low level of free assets. It distributes surplus by the additions to benefits method. The proportion of with profits liabilities backed by fixed interest investments is significantly higher than the industry average.

Explain why this company might have such a high level of fixed interest investments. [6]
[Total 12]

5 A life insurance company is considering entering the unit-linked pensions market. It is considering two possible contract designs.

Both designs pay the value of units at retirement or on earlier death or surrender. The two designs differ only in the charges for expenses:

- Design A has a low allocation rate in the early years and a monthly policy fee payable by cancellation of an equivalent number of units. This fee is variable, but is guaranteed not to increase by more than the rate of increase in national average earnings in the territory concerned. There is also an annual management charge expressed as a percentage of the value of units.

- Design B has an annual management charge and no other charges.

The charges under both designs have been set so that they each achieve the same level of profitability using the company's required rate of return on capital. Neither design includes a surrender penalty. All assumptions used in the pricing are the same for both designs.

Describe the factors that the company would consider in deciding between the two designs. [16]

6 The premium rates being charged by a life insurance company for its term assurance contracts are higher than those charged by other companies. As a result, new business volumes have fallen.

The contracts pay a benefit on death during the policy term. If death occurs as a result of suicide within the first policy year then the benefit is not paid.

The expense assumptions in the current pricing basis are derived from an analysis of the past three years' expenses, excluding exceptional items, coupled with the actual volumes of new and in force business for the relevant year.

Discuss the principal risks that the company faces in relation to the following proposals to increase the contracts' competitiveness:

(i) Revise premium rates by changing the assumption for future renewal expenses. The new assumption will be based on the projected future renewal expenses for the product, allowing for planned efficiency savings, divided by the projected future total in force business volumes for the product. [10]

(ii) Leave premium rates unchanged but revise the policy conditions so that the death benefit is paid if death occurs as a result of suicide at any point during the policy term. [6]
[Total 16]

7 (i) State what is meant by the term "net present value" and explain why life insurance companies use it. [5]

(ii) Describe why a life insurance company might choose to use the net present value as a profit criterion rather than the internal rate of return or the discounted payback period. [8]

(iii) Describe the drawbacks of using net present values as a profit criterion. [5]

[Total 18]

8 A life insurance company has been selling a regular premium unit-linked product for the last three years. This product has a guaranteed minimum maturity amount equal to the sum of the premiums paid. Investment returns have been very high for the past fifteen years, so the guarantee has been assumed by the company to have trivial cost.

Recently unit prices have fallen significantly owing to stock market movements. The company has therefore decided that it should calculate the potential costs of the minimum maturity benefit guarantee.

(i) Describe the model that the company should build in order to do this. [12]

(ii) Describe the checks the company could carry out on the model. [9]

[Total 21]