EXAMINATIONS

8 April 2002 (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 A life insurance company writes a unit-linked regular premium pension contract. No premiums are allocated to units for an initial period. The initial period is determined at outset and is designed to cover initial expenses and commission. It is proposed to change this design to one that has no nil allocation period, but where the annual management charge deducted from the linked funds is increased. The pricing assumptions, profit criteria and other design features are otherwise unchanged. The contract has no early termination penalty and provides no significant amount of life cover.

(i) Discuss the additional risks the company accepts, and the risks that are increased or reduced, by the change in design. [4]

(ii) Explain how the early termination values and the final maturity values would be expected to change as a result of the revised design. [3]
[Total 7]

2 A life insurance company writes the majority of its business through insurance intermediaries. Each intermediary is paid initial commission at a multiple of a standard scale. The multiple is agreed between the company and the particular intermediary. All intermediaries are paid the same rate of renewal commission.

Discuss the reasons why the company might offer some intermediaries a higher multiple than others, the risks it accepts from this approach, and how it can reduce these risks. [9]

3 A life insurance company prices its without profits immediate annuity contracts on the assumption that it will earn an investment return in excess of the redemption yield on appropriately dated government stocks. It invests 75% of the single premiums received in company loan stocks and 25% in ordinary shares (equities).

Discuss whether this investment policy is appropriate, identify the risks to the company from following it, and mention possible alternative investment strategies.
[10]

4 A life insurance company is about to launch a new immediate annuity product. Rather than paying cash to purchase the annuity, the policyholder gives the company a reversionary interest in a specified proportion of the residential property belonging to the policyholder. The benefits are that the policyholder continues to live rent free in the property until his or her death, and meanwhile receives an annuity. On death, that proportion of the property used to purchase the annuity will belong to the life insurance company.

The annuity is payable throughout life and can be either level or linked to an inflation index, and can be written on a single or joint life last survivor basis.

(i) Outline the advantages and disadvantages for the policyholder of this product design. [6]

(ii) Describe the risks taken on by the life insurance company in writing this product. [6]
[Total 12]

5 A life insurance company is launching a regular premium individual long-term sickness contract.

(i) Describe how the company would determine the assumptions for claim inception and termination rates to be used in the pricing basis. You do not need to detail how experience investigations would be carried out. [5]

(ii) Describe how the company could use the results of its expense analyses to determine the expense assumptions in the pricing basis, explaining any modifications likely to be required. [7]
[Total 12]

6 A life insurance company has been selling without profits term assurance business for many years. The company is setting up a model to assess the profitability of the existing book of business that has not been modelled before.

(i) State what is meant by the term "model point" and describe how the model points might be derived for this model. [11]

(ii) Describe the data checks and other investigations that would be carried out to determine whether the model points chosen are appropriate. [4]
[Total 15]

7 (i) Describe the principal reasons why a life insurance company may wish to defer profit distribution. [6]

(ii) Describe how deferral of profit distribution is achieved for each of the following methods of surplus distribution:

(a) additions to benefits
(b) revalorisation method
(c) contribution method [10]
[Total 16]

8 A life insurance company sells a large volume of level and index-linked immediate annuities through insurance intermediaries.

(i) List the items that would be used in a cash flow profit test to price this product and identify the items on your list that would not be used in a formula approach. [7]

(ii) Describe the factors that influence the choice of the investment return parameter for pricing this product. [3]

(iii) Recently new business volumes have fallen significantly.

Discuss how the company might reverse this position. [9]
[Total 19]