EXAMINATIONS

9 September 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.

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1 A life insurance company initially underwrites applications for term assurance based on the details provided in the proposal form. It has been suggested that the form should be simplified by reducing the number of questions asked.

Discuss the possible implications of the proposed change for the life insurance company. [6]

2 A proprietary life insurance company sells without profits term assurances through insurance intermediaries and its own salesforce. It is now considering selling direct to the public via the internet. Prospective policyholders will be able to submit an application on-line and be underwritten solely on the basis of responses to a short health questionnaire.

List with reasons the elements of the pricing basis that may be expected to be different for the new sales channel. [9]

3 A life insurance company is about to calculate its supervisory reserves using a net premium method. The company writes both with and without profits conventional business.

(i) State the principles that should be followed in setting the basis for:

- interest rates
- mortality
- expenses [7]

(ii) Discuss how overall the basis might relate to that used to price the contract. [3]
[Total 10]

4 A life insurance company is proposing a new immediate annuity product to attract financially sophisticated investors at retirement. It is proposed that the benefits, payable throughout life, should be linked to the performance of the domestic equity market but with the guarantee that income cannot fall by more than a certain percentage in any one year.

Discuss the factors that should be taken into account when determining a suitable design for this product and deciding whether or not it should be launched. [11]

5 A life insurance company is one of the market leaders in term assurance in the country in which it operates. Details of the existing policyholders are as follows:

80% male	20% female

Of which:

90% non-smoker	10% smoker

This mix has been constant for many years.

In keeping with the other major companies in this market, a non-smoker is defined to be a person who has not smoked any tobacco product for a period of at least three years.

Because of the mix of business, the pricing mortality assumption is set for male non-smokers. Females are assumed to have the same mortality as a male three years younger and smokers are assumed to have the same mortality as a non-smoker five years older.

(i) List the possible sources of data that could be used by the company to set its pricing mortality assumption and describe how the data would be used. [5]

(ii) The company is considering altering its non-smoker definition by reducing the three year period to one year.

Discuss the differences this would make to the pricing basis by considering the following categories of people:

- non-smokers, including those who gave up smoking more than three years ago
- those who gave up smoking between three years and one year ago
- smokers, including those that gave up less than one year ago [7]

(iii) The company has entered into an arrangement with the country's leading chain of women's clothes stores. The company has direct access to the chain's database to market a specifically designed term assurance product.

Discuss the factors that need to be considered in setting the mortality assumption for the pricing of this product in comparison to the existing product. [3]

[Total 15]

6 (i) Explain why a life insurance company might project its solvency position into the future. [3]

A life insurance company writes business solely through its own employed salesforce. For many years both the total new business production and the size of the salesforce has been stable. In the last year there has been a reduction of 50% in the size of the salesforce, with the average production per salesperson remaining unchanged.

(ii) Explain how this change might affect the solvency position on the supervisory basis at the next valuation date compared with the end of the previous year. [5]

(iii) Discuss how the solvency position might change in future years if the new salesforce size and average production persist. [4]

(iv) Discuss the actions the company could take in these circumstances. [4]
[Total 16]

7 A life insurance company is about to enter the annuity market for the first time. It intends to sell without profits immediate annuities with higher annuities for those lives in ill-health.

(i) Discuss how the company would determine the mortality assumptions required for the pricing basis for both the standard and ill-health annuities. [7]

(ii) Describe the use of the control cycle in the launch and ongoing management of the product. [9]
[Total 16]

8 A life insurance company has sold unit-linked whole life and deferred annuity contracts for several years through insurance intermediaries. The company has no with profits business. It has decided to market a range of without profits term assurance contracts through the same distribution channel.

The sum insured will be payable on the earlier of death or on the diagnosis of one of a specified number of diseases. Cover will be available for a fixed term, which is selected at outset.

(i) Describe the principal risks that the company faces in adopting this course of action. [10]

(ii) Identify ways in which the company could reduce its exposure to these risks.
[7]
[Total 17]