

EXAMINATION

18 September 2008 (pm)

Subject ST2 — Life Insurance Specialist Technical

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 7 questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

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 the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.

1 Describe what is meant by a non-unit reserve in the context of unit-linked life insurance contracts. [3]

2 A life insurance company has a portfolio of conventional without profit endowment assurances.

(i) Give the formula used for calculating the surrender value on a prospective reserve basis, defining all terms used. [4]

(ii) Outline the principles that should be taken into account when determining the surrender value. [4]

As an alternative to surrendering the policy, there is an option for the policyholder to make the policy paid up for a reduced sum assured.

(iii) Describe the additional considerations that should be taken into account when calculating the paid up sum assured. [3]

[Total 11]

3 (i) State the main reasons a company would perform an analysis of Embedded Value profit. [2]

A life insurance company has just performed an analysis of Embedded Value profit and identified that the withdrawal experience on its term assurance business was higher than its assumptions.

(ii) Discuss the likely impact of the higher withdrawals on its embedded value. [5]

(iii) Suggest possible causes of the higher withdrawals. [3]

The company wishes to understand the cause of these higher withdrawals and has decided to perform an analysis of its withdrawal experience.

(iv) Describe how it might choose to subdivide its data in order to get a better understanding of the causes. [5]

[Total 15]

- 4 A proprietary life insurance company sells monthly premium conventional with profits endowment assurance policies.

Consider one such policy that was in-force at both the start and the end of a calendar year, and for which the asset share was known at the start of the calendar year. An inexperienced actuarial student has been asked to write a formula for the calculation of the asset share of that policy at the end of the calendar year.

He has proposed the following formula:

$$\begin{aligned} \text{Asset share at end of calendar year} = & \\ & \text{Asset share at start of calendar year} \times (1 + \text{Investment return}) \\ & + \text{Total annual premium} \\ & - \text{Per policy renewal expense loading} \\ & - \text{Commission} \\ & - \text{Cost of guaranteed death benefit} \\ & + \text{Annual bonus} \\ & + \text{Transfer of profit to shareholder} \end{aligned}$$

Where:

- “Investment return” is the total domestic equity market return over that calendar year, derived from indices.
- “Per policy renewal expense loading” is obtained from a detailed expense allocation model that splits direct salary, property and computer costs between products and between initial, renewal and termination expenses.
- “Cost of guaranteed death benefit” is defined as the guaranteed minimum sum assured multiplied by q_x (where x is the age of the policyholder at the start of the year).
- The company uses an “addition to benefits” approach to profit distribution.

Describe the improvements that could be made to this proposed formula. [12]

- 5** A life insurance company is considering writing a new flexible unit-linked product that would be targeted at high net worth individuals. The product would allow flexibility in terms of premiums payable and could be used either as a savings vehicle or to provide life cover, or a mixture of the two. The life cover would be charged via deductions from units. These charges would be based on mortality rates guaranteed at the point of sale.

The only other charge would be an annual management charge of 1% p.a., and this would be guaranteed not to change. The surrender value would be the bid value of the units.

The contract would allow cover to be increased or decreased within limits without any medical evidence at the time of certain lifestyle changes (e.g. marriage, birth of a child); otherwise the usual underwriting procedures would be used.

Commission would be paid by the customer directly to the insurance intermediary. Any medical fees incurred as a result of medical tests required during the underwriting process would also be paid directly by the customer.

- (i) Discuss the factors to take into account when considering the profitability and marketability of the product. [10]

The marketing manager has suggested that since the product is aimed at high net worth individuals, any policyholders who have been accepted at standard rates should be able to increase the level of life cover within the previous limits at any time without the need for further underwriting. He says that the decrease in expenses should outweigh the cost of any downside in experience rates, and that sales should increase. He also suggests that any impact on experience could be managed by making the charges applied for life cover reviewable.

- (ii) Discuss these suggestions. [9]
[Total 19]

- 6** (i) Outline the key requirements of an actuarial model. [5]

A life insurance company uses a deterministic model in the profit testing of its immediate annuity business.

- (ii) Describe why it might wish to use sensitivity analysis as part of this exercise. [4]

- (iii) Discuss the assumptions on which sensitivity analysis is likely to be performed. [5]
[Total 14]

- 7** A well established proprietary life insurance company has decided to start selling a new type of regular premium with profits endowment assurance contract.

The product is aimed at the parents of young children. It has a term to maturity of 20 years and is taken out on a single life basis. Each year regular bonuses are added to the initial sum assured. Payments of benefits are at the durations set out in the table below.

Duration	14 years	16 years	18 years	20 years
Benefit Payable	25% of Initial Sum Assured	25% of Initial Sum Assured	25% of Initial Sum Assured	25% of Initial Sum Assured plus Regular and Terminal Bonus

If the parent taking out the policy dies at any time during the policy term, a death benefit equal to the initial sum assured is payable and all future premiums are waived. The benefits at duration 14, 16, 18 and 20 are also still payable.

In the event of the death of the child no further premiums or benefits are payable and the policy ceases.

No surrender benefit is payable during the first two years of the contract, although a surrender benefit is payable thereafter.

- (i) Discuss the advantages and disadvantages of this product for a young couple who have just had their first child. [10]
 - (ii) Discuss the risks that the insurance company should consider when launching this contract. [16]
- [Total 26]

END OF PAPER