# EXAMINATION

10 April 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 6 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 the features of an accumulating with profits contract that is written in the "unitised" form. [10]

**2** A proprietary life insurance company is considering launching a new without profits whole life assurance contract. Regular monthly premiums will be payable from inception for the first 20 years of the policy or until earlier death.

Describe the factors that the company would take into account in deciding whether to launch this product. [12]

**3** A life insurance company writes a regular premium whole life unit-linked savings contract. The premiums received in the first two years are invested in capital units, with all subsequent premiums invested in accumulation units. The capital units have a higher annual management charge than that applied to the accumulation units.

The company uses actuarial funding so that the supervisory reserves held are less than the bid value of units at the valuation date.

The contract offers a death benefit equal to the full bid value of units. The surrender value is the sum of the bid value of the accumulation units and the actuarially funded value of the capital units.

The new Finance Director has asked whether the reserves comply with the principles that he has seen proposed by the Groupe Consultatif des Associations d'Actuaires des Pays des Communautés Européennes.

(i) Explain how the supervisory reserves, as calculated by the company, could comply with the principles referred to by the Finance Director. [9]

The insurance supervisor requires that the company maintains a solvency capital requirement that is calculated as a proportion of the supervisory reserves plus a percentage of the sum at risk. The sum at risk is defined as the death benefit minus the supervisory reserve under the policy.

The Finance Director has pointed out that holding a reserve that is less than the bid value of units will mean a lower solvency capital requirement and that this will provide less protection to policyholders.

(ii) Discuss these further comments made by the Finance Director. [5]
[Total 14]

**4** For the past fifteen years a life insurance company has sold unit-linked single premium investment bonds. It regularly reviews the pricing of this contract by performing profit tests. To date it has assumed in its profit testing that the surrender rate is a level 3% per annum in each projection year.

The company has recently performed its first surrender rate experience investigation for this product. It has used data on surrenders that occurred during the previous calendar year. The data was split by the duration that each bond had been in force.

The results of the investigation are as follows:

| Curtate duration (in years): | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8+ |
|---|---|---|---|---|---|---|---|---|---|
| Annualised surrender rate: | 6.8% | 4.5% | 4.7% | 4.2% | 4.4% | 9.7% | 3.9% | 3.4% | 1.9% |

Discuss the next steps that the company should take in light of these results, including further investigations that might be required and possible changes to the profit testing surrender rate assumption.

(You are not required to discuss ways in which the actual surrender rate experience could be managed.) [18]

**5** A life insurance company writes a range of without profits immediate annuity business, both level and index-linked.

(i) Describe how the company might invest its assets in order to match its liabilities as closely as possible. [8]

It has been suggested that in order to maximise returns investments should be made in commercial property and equities as these are expected to outperform fixed interest assets in the long term.

(ii) Discuss this suggestion. [7]

The company is now considering writing with profits immediate annuities. These annuities would have a guaranteed annual annuity payment. Annual bonuses would be declared which, on declaration, would increase the guaranteed annuity payment.

(iii) Discuss any additional considerations for its investment strategy in terms of matching the liabilities. [4]

[Total 19]

**6** A small life insurance company writes mainly term assurance contracts targeted at young families. Underwriting is used to assess the terms appropriate for new business. Past experience has shown that the mortality experience for this product line can be represented as a fixed percentage of standard mortality tables.

(i) Describe how the company is currently exposed to model, parameter and random fluctuations risks relating to its mortality assumptions. [7]

The company is considering designing a without profits whole life assurance contract targeted at customers aged 50 and over. The company currently has very few customers in this age range. It is common, but not universal, in the marketplace for these contracts to be sold without underwriting. The company has yet to decide whether or not to underwrite this contract.

(ii) Describe the issues the company should consider regarding the mortality risk arising from the proposed product. [10]

The company is also considering outsourcing its administration to a major company that carries out this service for numerous other life insurance companies. The life insurance company would pay for the development and data transfer costs. The administration company would charge the life insurance company a fixed fee per policy, which would be guaranteed for 10 years and then be renegotiated for each subsequent 5 year period.

(iii) Discuss why the company may wish to outsource its administration, including the advantages and disadvantages of the proposal. [10]
[Total 27]

## END OF PAPER