EXAMINATIONS

11 April 2002 (am)

Subject 402 — UK Fellowship Life Insurance

Paper One

You must answer this subject only, you may not attempt another subject in the 400 series.

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.*

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 (i) Describe the equating present values method and the emerging costs method used to price a life insurance contract. [5]

(ii) State with reasons why the emerging costs method might be preferable. [4]
[Total 9]

2 Describe the following types of financial reinsurance and how they can be used to increase the available solvency capital of a life insurance company:

(i) surplus relief [6]
(ii) virtual capital [5]
[Total 11]

3 A life insurance company in Country X has a simple portfolio of without profit business. It writes only one type of contract and all premiums are payable annually in advance. New business is written only on 1 January each year, and this has been the case since the company initially started writing business.

Expenses are incurred at the same time as the premium is received and during 2001 were as expected: initial expenses of 50% of premium and renewal expenses (from year two onwards) of 5% of premium.

All claims, including deaths, are paid out at the end of the policy year in which the decrement occurs. In 2001 no claims were made in respect of any of the new business written in that year, but 8% of the policies written prior to 2001 were terminated (measured as a % of in-force premium). In total £Cm was paid out in claims.

In-force annual premiums at the start of 2001 (excluding new business) were £Pm, and new business premium volumes in 2001 were twice the amount of premium terminated during 2001.

Reserves for supervisory valuation purposes are calculated using a gross premium valuation approach. The reserving methodology ignores all decrements and the expense margin is in the form of a 10% loading on expected expenses.

Taxation should be ignored and it can be assumed that the supervisory valuation basis was unchanged over the year.

(i) Derive an expression for the total surplus arising in 2001 (on the supervisory valuation basis) using the formula approach. You should define all additional symbols used in your formulae. [6]

(ii) Derive expressions for the items into which the surplus arising during 2001 can be analysed. [8]

(iii) Demonstrate that the items derived in (ii) sum to the total surplus arising in 2001. [3]
[Total 17]

4 A life insurance company markets a unit-linked regular savings policy. The policy is predominantly sold through insurance intermediaries.

In line with the rest of the market, it has the following charging structure:

- a low percentage allocation in year one
- a level percentage (less than 100%) allocation in years two on
- a bid offer spread
- 1% per annum annual management charge

A surrender penalty is charged during the first ten years and is a percentage of the unpaid premiums up to the tenth policy anniversary.

The company is taxed on an "I-E" basis.

This charging structure exactly meets the shareholders' required profit margin.

(i) Describe how the company is likely to reduce the effects of new business strain. [3]

(ii) The government wishes to encourage savings. It will allow unit-linked savings policies to be sold where the gross investment return can be passed to the policyholder tax free. All proceeds of the policy will be free of tax in the hands of the policyholder. The taxation basis of the life company would no longer allow relief on the expenses of this business. To ensure value for money, the only charge permissible would be the annual management charge, which would be capped at 1% per annum.

Discuss the impact of the proposals on the company and the options open to it in the light of the government initiative. [15]

[Total 18]

5 A mutual life insurance company distributes surplus to with profit policies by the additions to benefits method through a combination of regular reversionary bonus and terminal bonus. It has recently reduced its reversionary bonus rates.

(i) The Report and Accounts contains a statement that it has been a very successful year for the company since it has sold large volumes of profitable new business.

Discuss the possible reasons for why this did not lead to an increase in reversionary bonus rates. [9]

(ii) Over the following year the company sells a very large volume of single premium unit-linked bonds. It is expected that this will not be a permanent feature of future new business levels.

A Director has suggested that the embedded value of this business should be fully distributed to policyholders by increasing the terminal bonus of policies which become claims in the following year. He believes this should significantly improve the company's past performance figures and hence generate higher new business volumes.

Discuss his suggestion. [11]
[Total 20]

6 Stock market returns have fallen over a sustained period and this has had a significant impact on the free asset ratios and embedded values of a number of life insurance companies in the UK.

(i) Discuss the actions that a mutual life insurance company can take to improve its free asset ratio. [16]

(ii) Describe how your answer to (i) would differ if the life insurance company were proprietary. [9]
[Total 25]