# EXAMINATIONS

20 September 2004 (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 7 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 policyholder wishes to make a large withdrawal from one of an insurance company's internal linked life funds.

Describe the principal factors that would be considered in calculating the price at which units would be cancelled. [5]

**2** Describe the principal information that the Appointed Actuary of a UK life insurance company would use to help determine the reversionary bonus recommendations. [8]

**3** A life insurance company is considering how it should calculate the revised premium for a regular premium without profits endowment assurance when the policyholder requests that the term to maturity is changed with the sum assured remaining unaltered.

It has been suggested that the premium should be determined by calculating the regular premium required to provide the sum assured over the revised remaining term on the original premium basis. From this premium should be deducted the earned asset share re-spread over the remaining term using the interest rate in the original premium basis.

Interest rates have recently fallen to historically low levels.

Discuss the following aspects of this suggestion:

(i) Use of the earned asset share as opposed to the surrender value. [4]

(ii) Use of the original premium basis. [8]
[Total 12]

**4** (i) Describe the accounting concepts that a UK life insurance company must adhere to in calculating the profits that have arisen during the year, for the purposes of preparing accounts in accordance with Companies Act legislation. [4]

(ii) Discuss how the methods and bases used by a UK life insurance company to calculate a realistic present value of future profits on its existing book of business can meet each of these concepts. [12]
[Total 16]

**5** A UK life insurance company is calculating the supervisory reserve for a single premium unitised with profits pension contract.

(i) Explain how the reserve for the above contract might vary with the valuation rate of interest. [5]

The company is also calculating the supervisory reserve for a block of regular premium unitised with profits pension contracts with a guaranteed minimum unit price growth rate of 4% p.a. 95% of every premium is allocated to units. There are no other charges and there is a guarantee that a market value adjustment will not be applied at the selected retirement age.

(ii) Discuss how the supervisory reserve might change when there is a sudden fall in equity values. [9]
[Total 14]

**6** A life insurance company has acquired a sub-fund, which comprises a block of conventional with profits pension deferred annuities, and the associated annuities in payment that arise from them. No new business is written in this sub-fund. 100% of the profits of the sub-fund are distributed to policyholders within it. These policyholders have no entitlement to share in other profits of the company.

The deferred annuities are designed to provide a cash sum at vesting, which is used to purchase the immediate annuity on the terms offered by the company at the vesting date. There is also an option to purchase the annuity from any other authorised insurance company. The annuities in payment do not share in profits.

(i) Describe the principal risks that could affect the sub-fund. [13]

(ii) Discuss the issues that the company faces in determining the surplus distribution strategy for the sub-fund, and how they might be addressed.
[10]
[Total 23]

**7** A life insurance company issues single premium pension immediate annuities on male lives. All such annuities are conventional without profits, providing level payments annually in advance throughout life and with no further guarantees. New business is written only on 1 January each year.

The company intends to analyse the surplus arising during 2003 on this annuity business. Information in respect of a particular tranche is as follows:

| | |
|---|---|
| Amount of annuity p.a. in force at 31 Dec 2002 | £500,000 |
| Exact age of lives at 31 December 2002 | 70 |
| New business written on 1 January 2003: | |
| Annuity p.a. | £50,000 |
| Premium received | £575,000 |
| Exact age of lives on entry | 70 |
| Amount of annuity p.a. in force at 31 Dec 2003 | £530,000 |
| Number of deaths within 2003 new business | None |
| Valuation basis at year end 2002: | |
| Mortality table | PMA92C20 |
| Valuation rate of interest | 4% p.a. |
| Renewal expenses (after 1st year) | 0.5% of annuity |
| Valuation basis at year end 2003: | As at year end 2002 |
| Assets allocated to this tranche: | |
| At 31 Dec 2002 | Equal to liabilities |
| At 31 Dec 2003 | £6,100,000 |
| Actual expenses incurred: | |
| Initial expenses on new business | 3% of premium |
| Annuity payment expenses (after 1st year) | £3,000 |

(i) Calculate the surplus arising during 2003 on this tranche of business. [3]

(ii) Carry out an analysis of this surplus by calculating each of the following items.

(a) investment surplus (all business)
(b) expense surplus
(c) mortality surplus, separately for existing and new business
(d) other new business surplus

The analysis should be performed in the order given and by changing the experience items from actual to expected. You should show the main steps in your calculations. [10]

(iii) Discuss the conclusions that can be drawn from the results of this analysis by considering each item in turn. [9]

[Total 22]

## END OF PAPER