

EXAMINATIONS

April 1999

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. *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.*
2. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
3. *Write your surname in full, the initials of your other names and your Candidate's Number on the front of the answer booklet.*
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 and this question paper.

<p><i>In addition to this paper you should have available Actuarial Tables and an electronic calculator.</i></p>
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- 1** (i) Compare how the valuation of assets regulations apply to linked and non-linked assets in the context of the UK supervisory returns for life assurance companies. [4]
- (ii) List the main types of admissible asset which might normally be held in a non-linked fund, and for each type state the valuation method prescribed by the regulations. [5]
- [Total 9]

- 2** A mutual life insurance company writes both unit-linked and non-linked life assurance contracts. The company's free assets have been eroded because of the need to make compensation payments to a large number of clients who have been mis-sold a particular product.

Published valuation liabilities for unit-linked and non-linked business are approximately equal. 80% of new business is unit-linked, 5% with profits and 15% non-linked without profits business.

- (i) The Appointed Actuary is assessing the impact of the compensation payments on the financial position of the company:
- (a) Describe how reference to policyholders' reasonable expectations in legislation and professional guidance would influence the Appointed Actuary's investigations; and
- (b) Describe how the courses of action that might be proposed to replenish the capital base may influence policyholders' future expectations.

You do not need to discuss how the amount of any compensation might be assessed. [17]

- (ii) A director has proposed that, in order to rebuild the capital base quickly, terminal bonuses should be adjusted so that payouts on with profits policies are approximately 90% of asset shares. Currently, the policy is to pay 100% of asset shares, on average, subject to smoothing.

Discuss the points that would be made in the Appointed Actuary's response to this proposal. [8]

[Total 25]

- 3** The UK actuarial profession has produced guidance (GN2) on dynamic solvency testing.

List the assumptions in the guidance for which variations would normally be tested and for which variations may be tested depending on the nature of the company. [5]

- 4** A UK life insurance company issues a unit-linked immediate pensions annuity product. The monthly annuity payment for a particular contract is defined as the bid-price value of a specified number of units. The unit linked fund is only used to determine the unit price each month – there are no deductions for the cost of mortality, so the policyholder bears none of the mortality risk.

The units may be invested in a variety of different linked funds, but for a particular contract the split between funds is determined at entry and cannot subsequently be changed.

There is a fixed fund management charge of 1% per annum, which is deducted on a daily basis, and an index-linked per-payment charge of £2, which is deducted from each annuity payment before it is made.

- (i) Describe how you would determine the reserve for supervisory purposes [5]
- (ii) State, with reasons, a basis which might be used at the present time to calculate the reserve in (i). [8]
- [Total 13]

- 5** (i) Compare the formula and non-formula projection approaches to carrying out an analysis of surplus. [3]
- (ii) A life insurance company has a very old tranche of without profits whole of life contracts. Under these contracts annual premiums are due on 1 April and death claims are settled on 31 March following death. The terms of the contract are such that there are no withdrawals. The company is closed to new business.

The company undertakes a gross premium valuation every year-end on 31 March. Expenses are assumed to be incurred at the point of premium collection.

On 31 March 1997 assets were assigned to the tranche of business that exactly equalled the reserves at that time.

At 31/3/97:

Reserve per policy = 7866.736
Number of policies = 1000
Average sum assured = £10,000
Average annual premium £152

Valuation Basis:

interest = 5%
renewal expense = £10
average age 90 exact ($q_{90} = 0.21651335$)

During the year 1/4/97 to 31/3/98:

Actual investment return = 8%

Actual expenses per policy = £12

Actual Number of deaths = 157

At 31/3/98 the gross premium reserve is carried out with the same basis.

Reserve per policy = 7969.55012

Assets = 7077274.88

Give the formulae you would use to analyse the surplus arising at 31/3/98 in the order investment, expenses, mortality, defining any terms used. [4]

(iii) Carry out the analysis of surplus using the formulae in (ii) and show that it adds up to the correct surplus (after allowing for rounding). [6]

(iv) Repeat (ii) and (iii) using the order of analysis: expenses, mortality, investment. [4]
[Total 17]

6 Describe the principles underlying the determination of a surrender value scale for a portfolio of with profits endowments. [6]

7 (i) List the principal uses of capital for a UK life insurance company. [3]

(ii) Explain how the UK supervisory regime tests for adequacy of a life insurance company's capital. Details of the calculation of the required minimum margin are not required. [5]

(iii) Explain how with profits business can be a source of capital for a mutual company, and state what restrictions may apply in practice. [6]

(iv) List the main reasons why the free assets shown in a company's supervisory valuation may not be equal to the company's capital. [4]
[Total 18]

8 Discuss the principal factors that determine the level of the accumulation rate under a unitised with profits policy. [7]