EXAMINATIONS

April 1998

Subject F — Life Insurance

Paper One

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 11 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.

In addition to this paper you should have available Actuarial Tables and an electronic calculator.

1 A life office writes without-profit level term assurances through independent advisers. It currently requests a doctor's report or a medical examination either if the sum assured is to exceed a certain limit or if the information on the proposal form suggests a need for additional information on the life assured. It is now proposing to dispense with this practice and instead to underwrite entirely on the basis of the information contained in the proposal form.

Discuss the implications of the proposed change for the life office. [7]

2 (i) Describe briefly the gross premium method of valuation, and describe how it can be used to assist a life office in setting rates of reversionary bonus for a portfolio of with-profits personal pension products. [6]

(ii) Explain why the life office may choose not to declare the rates of bonus indicated by such a valuation. [6]

[Total 12]

3 Outline the professional guidance relating to the role of the Appointed Actuary in connection with the product pricing and unit pricing of unit-linked life and pensions business. [5]

4 A mutual life office is about to launch a single premium unitised with-profits whole-life contract. The price of the units allocated to a policy will increase daily at a rate declared in advance. This rate will be made up of a guaranteed element, which is set at the outset of the contract, and a bonus element which may be varied from time to time. It is intended to pay a terminal bonus if circumstances permit, and to apply a market value adjustment if necessary.

Describe the factors to be taken into account in setting the guaranteed and the bonus elements of the unit price increase rate at the launch date of the product.

[13]

5 A life office sells a 10-year unit-linked endowment assurance. The contract has a reduced allocation rate in the first year, a surrender value equal to the bid value of the units allocated to the policy, and a maturity value equal to the greater of the sum of premiums paid and the bid value of units.

The unit allocation rates and fund management charge are guaranteed throughout the term of the contract. Policy fees are deducted from the premium prior to allocation and are guaranteed not to increase for five years. There are no other charges.

(i) State the formulae for the calculation of the required solvency margin for UK supervisory purposes. [3]

(ii) Explain how your answer to (i) would differ if the maturity benefit had no guarantee. [2]
[Total 5]

6 (i) List the key elements of the control cycle. [5]

(ii) Describe how the control cycle can be used to monitor and control the profitability of a life office. [3]
[Total 8]

7 A life office has made the following capital purchases during the year:

(a) A new city centre sales office, to be owned by the life fund.

(b) A new computer system to facilitate payment of annuities.

(c) A new computer system to facilitate payment of staff salaries.

(d) The regular replacement of a proportion of staff cars.

Explain how each of these might be dealt with in the annual analysis and allocation of expenses. [6]

8 Explain how a cash flow model can be used to assess the capital required to finance a life office's business activities, stating the principal experience assumptions that may be required. [5]

9 List the policy data required to carry out the statutory valuation of a block of unit-linked PHI policies using the inception/annuity approach. [7]

10 A unitised with-profits personal pension contract includes a guaranteed annuity rate option on retirement at the normal retirement date.

Describe a method of valuing the option for the statutory valuation. [4]

11 A proprietary life office wishes to launch a term assurance policy under which the sum assured will repay the outstanding capital on death under a variable interest repayment mortgage. This type of mortgage is repaid by level instalments which combine interest and capital. The lender has the right to vary the mortgage rate at any time, and to recalculate the future instalments due accordingly.

The life office is to guarantee repayment of the mortgage on death, irrespective of changes in mortgage interest rates after the contract is effected, provided that all premiums and mortgage instalments due have been paid at the date of death.

(i) Discuss the factors which need to be considered when determining the contract design and how they conflict. [8]

(ii) Describe a method that could be used to price the product. [8]

(iii) State a suitable basis for pricing the product. [12]
[Total 28]