EXAMINATIONS

15 September 2000 (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. *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 6 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 Describe the requirements of the Insurance Companies Act 1982 as they affect the transfer of long term business from one authorised insurance company to another. [7]

2 State the items contained in the Appointed Actuary's Certificate in the UK supervisory returns each year. [4]

3 A publicly quoted UK life insurance company transacts all types of conventional with profits business. During the past three years the market value of the company's long term business assets has increased strongly. The main factors leading to this increase have been:

- A fall in price inflation, which is expected to remain low in the long term.
- A sustained fall in fixed interest yields.
- Strong growth in corporate profits and reductions in corporation tax, leading to an upward revaluation of equities.

The last three years' supervisory valuations have shown much larger surpluses than had been expected before the change in economic conditions. To date, the company has not distributed any of this additional surplus, other than by means of terminal bonus.

Discuss the advantages and disadvantages for the shareholders and policyholders of each of the following possibilities for distributing the exceptional surplus:

(i) Continue to use terminal bonus. [4]
(ii) Declare higher reversionary bonuses for several years in the future. [5]
(iii) Declare a special reversionary bonus. [4]
[Total 13]

4 A UK life insurance company is reviewing the design and pricing of its without-profit income protection product. The current product has the following features:

- Monthly benefit is payable during incapacity, after a deferred period of 4, 13, 26 or 52 weeks. (The deferred period is chosen by the policyholder at outset.)
- Maximum monthly benefit is 70% of pre-tax monthly income before incapacity.
- Incapacity means inability to carry out the person's normal occupation, due to sickness or accident.
- Benefit increases in line with price inflation, before and during a claim.
- Policy terminates on the person's 65th birthday.
- Premium rates depend on age at entry, smoker status, occupation class, and deferred period.
- Premium rates for women are 50% higher than for men.

- Premiums increase in line with price inflation, but otherwise are guaranteed.

The company's income protection business has produced significant deficits in the last two financial years. The analysis of surplus shows that the source of the deficits was the claims experience. However, industry average rates of incapacity during those years have not been significantly different from the rates allowed for in the company's premiums.

The product review will include a more detailed investigation of the claims experience.

(i) List the factors that the company should use to subdivide the claims data for the experience investigation.

(ii) Discuss the possible reasons for the deficits that have arisen. [9]

(iii) Describe the actions the company could take to reduce the likelihood of further deficits. [7]

(iv) Discuss the problems that the company could face as a result of making these changes, and suggest actions that the company could take to resolve these problems. [7]
[Total 28]

5 A life insurance company issues single premium pension immediate annuities on male lives. All such annuities are conventional non linked non profit, with level payments annually in advance throughout life, and there are no further guarantees. It is intending to analyse the surplus arising during the year on this annuity business.

Data in respect of a particular cohort of business is as follows:

	Start Year	*End Year*
Amount of Annuity per annum	£100,000	£95,000
Valuation Mortality Basis	a (55) – 5 ult	a (55) – 5 ult
Valuation Interest Rate p.a.	6%	4%
Assets	£1.1m	£1.1m
Exact Age of lives in Cohort	70	71
Valuation Expense Basis	1% of Annuity	1% of Annuity

There is no new business into this cohort during the year.

(i) List reasons why a life insurance company would want to analyse the change in surplus over a year. [4]

(ii) Calculate the surplus at the beginning and end of the year and hence the surplus arising during the year. [2]

(iii) List the sources of surplus applicable in this year in respect of this cohort of business. [4]

(iv) The annuities are all payable on the first day of the year. Actual expenses incurred during the year were £600 in respect of annuity payments and £300 in respect of death claims. Calculate the amount of surplus arising during the year in respect of each item listed in (iii).

Show all the main steps in your calculations and state any assumptions made. [8]

[Total 18]

6 A UK proprietary life insurance company is proposing to issue a unit-linked whole of life contract with monthly premiums payable throughout life. There will be a bid/offer spread of 5% and an annual management charge of 1% of the bid value of the units. Other expense charges may be determined at the product design stage.

The benefit payable on death or diagnosis of certain specified critical illnesses will be the greater of the bid value of the allocated units and the sum assured. Charges for death and critical illness cover will be levied by deduction from the unit fund.

On effecting a contract, each policyholder selects one of two levels of sum assured for the premium payable:

(a) the "standard" sum assured, which the company will guarantee for the lifetime of the policyholder without requiring an increase in the monthly premium payable; or

(b) the "maximum" sum assured, which the company will guarantee only for the first ten years. There will be a review after ten years which may lead to an increase in the monthly premium payable.

The company requires a charging structure which minimises the requirement for capital.

(i) Discuss the points to be considered in determining the standard and maximum sum assured levels. [5]

(ii) Discuss the main factors that would be considered in choosing a risk discount rate and profit criterion appropriate for the pricing of this contract. [4]

(iii) Discuss a charging structure which could be recommended in the light of the answers to (i) and (ii) above for:

- Expenses [7]
- Mortality costs — "standard" sum assured [9]
- Mortality costs — "maximum" sum assured [5]

(You are not required to give values for the charges.) [Total 30]