INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

29 April 2014 (pm)

Subject ST2 – Life Insurance
Specialist Technical

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 five questions, beginning your answer to each question on a new page.*

6. *Candidates should show calculations where this is appropriate.*

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 the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.

1 (i) State the basic equity principle of unit pricing for an internal fund. [1]

A growing life insurance company is actively selling unit-linked products.

(ii) Explain how such a company would calculate its unit prices. [7]

(iii) Describe how the company should react if there was a large outflow of money from a particular unit fund. [2]

[Total 10]

2 (i) Describe the components of embedded value, and how its calculation may vary for different types of life insurance. [8]

A proprietary life insurance company has written conventional with profits business within its With Profits Fund, and has written unit-linked and conventional without profits business within its Non Profit Fund. All profits from the Non Profit Fund are attributed to the shareholder.

Following each annual supervisory valuation, bonuses are declared on the with profits business and the cost of those bonuses is added to the supervisory reserves. An annual transfer then takes place from the With Profits Fund to the Non Profit Fund that is equal to 10% of the supervisory cost of the bonuses declared.

A summary of the annual valuation results is shown below. The assets are shown before any transfers between the Funds have taken place.

Supervisory Reserves (excluding Cost of Bonus)	Conventional With Profits	40,000
	Conventional Without Profits	10,000
	Unit-Linked business – unit reserves	30,000
	Unit-Linked business – non-unit reserves	5,000
Cost of Bonus		500
Value of Assets	With Profits Fund	45,000
	Non Profit Fund	50,000
Present value of future shareholder profits (after tax)	Conventional With Profits	1,000
	Conventional Without Profits	5,000
	Unit-Linked business	15,000

The present value of future shareholder profits for the With Profits Fund allows for an assumed level of bonus that will gradually distribute the surplus assets in that fund over the lifetime of the policies, but does not include the shareholder transfer due at the valuation date.

The regulatory solvency capital requirement is calculated as 4% of all conventional and non-unit reserves plus 1% of unit reserves.

The market in which the company operates uses two standard metrics when considering life insurance companies:

- the solvency ratio, which is calculated as the supervisory surplus (i.e. net assets) divided by the solvency capital requirement and is presented as a percentage; and
- the embedded value.

(ii) Calculate the two standard metrics as at the valuation date, showing your workings. [6]

The Chief Financial Officer has suggested that the level of prudence in the supervisory reserves could be reduced, given that the solvency requirement means that the company already holds an additional percentage of reserves.

(iii) Discuss this suggestion. [5]

[Total 19]

3 A proprietary life insurance company sells a conventional without profits endowment assurance product.

When a policy is surrendered, the company pays a surrender value equal to the sum of the premiums paid up to the surrender date.

(i) Explain the extent to which this approach satisfies the general principles for surrender values. [13]

The company also sells a conventional without profits term assurance product.

A policyholder has held one of these term assurance policies for a number of years and has now requested that it be altered to a conventional without profits endowment assurance policy for the same outstanding term and the same sum assured. The company has no existing methodology in place for such an alteration.

(ii) Discuss how the company might determine the terms that it could offer for this alteration. [9]

[Total 22]

4 (i) State the principles of investment for a life insurance company. [2]

(ii) Describe, with reasons, an appropriate asset mix for each of the following types of liability:

- Conventional with profits endowment assurance product, under which profits are distributed using the "additions to benefits" method.

- Conventional level immediate annuity product for seriously impaired lives.

[15]

Extracts from the balance sheets for two life insurance companies A and B are shown in the table below:

Liabilities	**Company A**	**Company B**
With profits liabilities based on net premium valuation	20,000	20,000
Solvency capital requirements	5,000	5,000
Free assets	23,000	2,000
Total liabilities	48,000	27,000
Assets	**48,000**	**27,000**
Other information		
Asset shares	30,000	18,000

(iii) Explain how the investment strategy may differ between the two companies. [6]

[Total 23]

5 In a particular country, the market for life insurance products has been contracting over the last few years. The government of the country would like to reverse this trend by encouraging the purchase and sale of life insurance products.

Discuss the potential actions that the government could take in order to do this, including how effective they might be. [26]

END OF PAPER