EXAMINATION

4 October 2007 (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 6 questions, beginning your answer to each question on a separate sheet.*
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.

1 Describe how a mutual life insurance company might use a model to develop an appropriate investment strategy for its in-force with profits business. [6]

2 (i) Describe how a life insurance company would analyse its withdrawal experience. [6]

A large proprietary life insurance company has been selling unitised with profits endowment assurances successfully for a number of years. Premiums for these policies are paid monthly by direct debit, and may be increased or decreased at any time. The policyholder can stop premium payments temporarily for a period of up to 12 months. After this period, the policyholder can choose to re-instate premiums, have the policy made paid-up, or surrender the policy.

To date the company's analysis of withdrawals only takes account of surrenders. The company is considering extending its withdrawal experience analysis to achieve a better understanding of the surpluses arising.

(ii) Discuss this suggestion. [6]
[Total 12]

3 A life insurance company has for many years sold policies through its own sales force and through press advertising.

(i) Describe the main features of the company's existing sales channels. [6]

The company is looking for alternative distribution channels in order to increase sales growth. It is considering both:

(a) insurance intermediaries
(b) telephone sales

(ii) Discuss how the proposed channels might achieve the company's aim. [9]
[Total 15]

4 A man purchased a without profits endowment assurance with a 25 year term on his 40^{th} birthday. The sum assured of £50,000 is payable at maturity, or at the end of the year of death if earlier. He pays a premium of £1,000 annually in advance.

He has just reached his 50^{th} birthday and has not yet paid the premium due at that date. He has decided that he no longer wishes to use this type of policy for the purpose of savings and would prefer to invest directly in equities. He has therefore requested a calculation of the surrender value and paid-up sum assured for his policy.

The insurance company calculates surrender values using a prospective calculation method. Paid-up sums assured are based on an equation of value using the surrender value as the current policy value. The following assumptions are used:

Mortality	AM92 Ult
Interest rate	6.0% p.a.
Renewal expense	£35 per annum for premium-paying policies
	£20 per annum for paid-up policies
Renewal expense inflation	1.92% p.a.
Claims expense	0.5% of benefit on death and maturity
Alteration expense	£100 on surrender and alteration

(i) Calculate the surrender value to which the policyholder would be entitled. [7]

(ii) Calculate the paid-up sum assured to which he would alternatively be entitled. [5]

(iii) Discuss the other key issues that the policyholder should consider before making a decision. [5]

[Total 17]

5 A life insurance company is repricing its term assurance product. For new policies, it is considering adding an option under which policyholders may renew the policy at the end of its original term without providing additional evidence of health.

(i) Explain why a cashflow approach would normally be preferable to a formula approach to price this product. [4]

(ii) Describe how in practice you would use a deterministic model to price this product. [14]

(iii) Discuss whether it would be appropriate to use a stochastic approach to price this product. [3]

(iv) Discuss the other considerations that the company should take into account before adding the option. [6]

[Total 27]

6 For many years a non-European life insurance company has been selling large volumes of a single premium unit-linked product that has the following design:

Term	15 years
Allocation rate	95%
Fund management charge	1.0% p.a.
Maturity benefit	Value of unit fund plus maturity bonus
Surrender benefit	90% of value of unit fund
Death benefit	Higher of premium paid and value of unit fund

The maturity bonus is only paid if the policy is still in force on the maturity date, and is calculated as a percentage of the value of unit fund at that date. The percentage is determined by the company according to an unpublished formula and is dependent on the performance of the unit-linked funds over the 15 year period. It has a guaranteed minimum of zero. Over the past ten years it has on average been 2%, but it has varied between 0% and 5%.

When the product was launched, the valuation actuary decided to adopt a simplified approach in order to calculate the statutory reserves for this product. In particular, he wanted to use an approach that would not require any explicit assumptions. He therefore decided to calculate the reserves as the higher of the current value of the unit fund and the original premium.

A colleague of the valuation actuary has now informed him that the Groupe Consultatif des Associations d'Actuaires des Pays des Communautés Européennes has proposed a set of principles for setting reserves. The colleague has asked whether the valuation actuary's approach is consistent with these principles.

(i) State which of the proposed principles for setting reserves would be applicable to the simplified method currently used to value the product. [6]

(ii) Discuss the extent to which the valuation actuary's approach meets each of the principles identified in your answer to part (i). [17]
[Total 23]

END OF PAPER