INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

27 April 2011 (pm)

Subject SA2 — Life Insurance
Specialist Applications

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 both 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 from the approved list.

1 A UK mutual life insurance company writes business through insurance intermediaries and has only ever sold conventional with and without profits business. The company is developing a new single premium unitised with profits savings product.

The only charge will be an explicit annual management charge (expressed as a percentage of the fund), which aims to cover expenses and the cost of guarantees. The charge can be varied, but is capped at a maximum level. The policyholder's fund value at any time will be determined by reference to the number of units held and the smoothed price of those units. A well defined smoothing methodology which determines the smoothed unit price will be disclosed to customers. This smoothed price will be based on an underlying unsmoothed price, which itself is based on the performance of the underlying assets in a notionally ring-fenced fund. Any profits in respect of the excess of expenses over charges will accrue to the inherited estate.

Benefits under the new product will be as follows:

- On death, the maximum of the fund value and 101% of the premium will be paid.
- On surrender, the fund value will be paid.
- There is also a "premium back guarantee", which means that, on surrender at the fifth policy anniversary, a minimum of the premium will be paid.

The assets will be invested in a mixture of equities and fixed interest assets with the following options available:

Option	*A*	*B*	*C*
Equity backing ratio	30%–40%	40%–50%	50%–60%

(i) Describe the operational and anti-selection risks to which the company would be exposed if it went ahead with the launch of this product. [8]

(ii) Discuss the other factors to be considered, from the company's perspective, in determining the suitability of the design of this contract. [36]

A stochastic model has been built in order to determine the cost of the premium back guarantee on a market consistent basis.

The marketing actuary has asked for a simple high level check to be performed on the results by using the Black Scholes formula for the price of a put option.

(iii) Describe the steps involved in producing the high level check. [8]

The first comparison of the high level check with the output from the stochastic model shows a difference between the two results.

(iv) Discuss the features that may have contributed to this difference and how the checking process could be adapted to allow for these features. [6]

The stochastic model has been fully tested and proved to be valid. The cost of guarantees is far higher than the marketing actuary expected.

(v) Explain why this might be the case. [3]

The marketing actuary has pointed out that other companies are charging much less for similar guarantees.

(vi) Explain why other companies may be charging less. [3]

The marketing actuary has suggested that in order to reduce the charge for the guarantee, the pricing should build in the option to move the guarantee out to six or seven years at the company's discretion.

(vii) Explain why this is not possible under the "Unfair Terms in Consumer Contracts Regulations 1999". [3]

[Total 67]

2 Company A is a small UK life insurance company that has only ever sold without profits business.

The following information has been extracted from its most recent FSA Returns:

- Financial data:

	Number of contracts	*Annuity per annum or sum assured £'000*	*Reserves £'000*
Immediate Annuities	10,000	17,000	200,000
Index-linked Annuities	500	1,000	25,000
Term Assurance	2,000	3,000,000	1,000

Regular Premium Unit-linked Whole Life Assurance	*Number of contracts*	*Guaranteed sum assured on death £'000*	*Unit reserves £'000*	*Non-unit reserves £'000*
Old Style	25,000	148,975	147,500	(14,000)
New Style	15,000	75,750	75,000	(10,000)

- The company has a quota share reinsurance treaty whereby it cedes 50% of all annuity business.

- The company only started selling term assurance business in the last year, and the minimum term on these contracts is 10 years.

- There are no investment guarantees given on any unit-linked contracts. However the old style unit-linked contracts had a guarantee that the policy fee would be increased annually by the Retail Prices Index, subject to a maximum of 5% in any one year.

- The annual management expenses for the company for the year were £10m and total liabilities for the company were £250m.

(i) State where in the FSA Returns all the information above is shown. [5]

Another life insurance company, Company B, is looking to expand and is in the early stages of considering making an offer for Company A.

(ii) Discuss how other information contained in the FSA Returns of Company A may be of use to Company B in assessing whether it would be appropriate to proceed with any further work on this acquisition. [16]

(iii) Discuss how other publicly available information may be used by Company B when assessing Company A. [12]
[Total 33]

END OF PAPER