INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

30 September 2013 (am)

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 life insurance company which is open to new business has sold unit-linked pension contracts and immediate annuities for a number of years.

Each year the company produces a traditional embedded value (EV) and performs an analysis of change from the previous year's result.

(i) List possible reasons why the company would perform an analysis of change in the EV. [3]

Below are extracts from the report produced by the company on the change in the EV.

Table A: Extract from analysis of change in EV

	Total £m	*Net assets £m*	*PVIF £m*
Opening EV	50.0	30.0	20.0
Expected return on net assets	4.5	4.5	-
Expected return on in-force business	1.2	-	1.2
Experience variance	(3.0)	(2.0)	(1.0)
Operating assumption changes	5.3	0.3	5.0
New business contribution	1.0	(2.0)	3.0
Development costs	...	...	...
Investment return variances	...	...	...
Economic assumption changes	...	...	...
...	...	...	...
Closing EV	60.0	35.0	25.0

Table B: Economic assumptions (per annum)

	Expected returns	*Actual returns*
Fixed interest	5%	7%
Equities	10%	15%
Property	10%	15%
Cash	2%	5%

	Start of year	*End of year*
Risk discount rate	5%	7.5%

Notes:

- "PVIF" is the present value of future profits on in-force business.
- Net assets are backed by equities.
- All profits emerge at the end of year.
- Assumption changes are assessed at the end of year.

An actuary working with the auditors of the company has been asked to produce a short report describing what is covered by each step of the Table A analysis extract for which figures are given. She has also been asked to include sense checks on the figures where these are possible, or details of checks which would be performed if further information were made available. Where the sense checks differ significantly from the observed results, she has been asked to give her thoughts on possible reasons for the differences.

(ii) Set out the points that should be included in this report. [26]

The auditors have now been provided with further details of the operating assumption changes. This includes the following tables:

Annuitant mortality rates	*Start of year*	*End of year*
	Percentage of base table	
EV projection basis	75%	80%
Reserving basis	60%	60%

Unit-linked pensions withdrawal rates	*Start of year*	*End of year*
	Per annum	
EV projection basis	5%	3%
Reserving basis	7%	5%

The same withdrawal rate is assumed in all future years due to modelling constraints. On withdrawal, the policyholder receives the value of the unit fund.

The actuary has now been asked to produce another short report explaining the EV movements which would be expected from the above changes. She is expected to focus on the likely direction of the movement, rather than its magnitude.

(iii) Set out the points that should be included in this additional report. [11]

Prior to the implementation of the Retail Distribution Review ("RDR"), the company sold unit-linked pensions through independent financial advisers on an up-front initial commission basis, with commission clawback on early surrender. The company reviewed this product in preparation for the RDR implementation.

(iv) Discuss the likely impact of this review in respect of this product. [8]
[Total 48]

2 A UK life insurance company is considering launching a single premium unit-linked variable annuity product, with the main feature being a Guaranteed Minimum Withdrawal Benefit (GMWB).

The GMWB will operate as follows:

- The policyholder is guaranteed an annual withdrawal amount for life that is a percentage of the "guarantee base fund".

- Withdrawals can be taken at the end of each policy year, although the policyholder does not have to take such a withdrawal.

- The guaranteed withdrawal percentage depends on the policyholder's age when the first withdrawal is taken (according to a scale which is published at outset), and then remains fixed for all policy years thereafter.

- The "guarantee base fund" is initially set as the unit fund value when the policyholder takes the first withdrawal.

- The guarantee base fund is reviewed at the end of each policy year against the policyholder's unit fund value. It is increased to the fund value if this is higher and the withdrawal amount is then calculated using this new value. The guarantee base fund can only remain unchanged or be increased. Once it has been increased, it remains at this higher level for the next policy year end review.

- If the policyholder does not take a withdrawal in the first policy year, the guarantee base fund is set as the initial unit fund value increased by 3% per annum at the end of each year until the first withdrawal is taken. If the fund value is higher at this time, it will instead be used to set the guarantee base fund.

The policyholder can choose from six investment funds, each with a different proportion of equity content. All monies must be invested in one fund.

In addition to the fund management charge, a charge is taken from the fund to cover the cost of the guarantees.

(i) Describe the risks to which the company could be exposed through writing this product, under the following categories:

- market
- credit
- operational [24]

(ii) Outline actions which the company could take to manage these risks. [14]

The company has carried out a profit testing exercise to calculate the charge to be taken for the guarantees.

(iii) Describe the key elements of the product and target market that the company would have considered in determining the charge for the guarantees. [10]

The charges calculated appear high compared to those for competitors' products.

(iv) Suggest changes that the company could make to the product design in order to reduce the guarantee charge. [4]

[Total 52]

END OF PAPER