

# EXAMINATION

20 October 2014

## Subject F202 — Life Insurance Specialist Applications

*Time allowed: Three hours*

### **INSTRUCTIONS TO THE CANDIDATE**

- 1. Candidates will be issued with instructions to log-in using a password (which you will be provided with at the exam center).*
- 2. Candidates are required to submit their answers in Word format only using the template provided.*
- 3. Save your work continuously throughout the exam, on your computer's hard drive with which you have been provided.*
- 4. 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.*
- 5. You must not start typing your answers until instructed to do so by the invigilator/supervisor.*
- 6. Mark allocations are shown in brackets on exam papers.*
- 7. Attempt all questions, beginning your answer to each question on a new page.*
- 8. Candidates should show calculations where this is appropriate.*

**Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.**

### **AT THE END OF THE EXAMINATION**

*Save your answers on the hard drive.*

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.
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## QUESTION 1

A South African parent company has subsidiaries in several African countries. The parent company also acts as a head office and support services company for the subsidiaries for shared services such as IT, actuarial, legal and finance. The subsidiaries are long term life insurance companies, health companies (underwriting medical risks and doing health administration) and asset management companies. Companies vary in size, some are mature and well established and others are new smaller companies. Some of the companies are also partly owned by minority shareholders in the particular African country.

The embedded value of the group needs to be calculated.

- (i) Describe the South African professional guidance that would be considered relevant for the calculation and set out the complications that would emerge from dealing with multiple countries. [5]
- (ii) Identify the entities and contracts that will be included as covered business (with reasons), and describe the components of the embedded value of covered business. [11]

The parent company earns fees for support services from the long term life insurance and health companies and incurs expenses such as office administration cost and staff remuneration. The company's objective is to provide the support services at a cost effective rate to the life and health companies.

- (iii) Describe the methodology and assumptions which could be used to calculate the allowance for future parent company operating profits or losses in the embedded value of the group. [6]
- [Total 22]

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## QUESTION 2

Attached is the draft “embedded value: analysis of change” report from the valuations department of a mature South African life insurance company for the last 6 months. It is compared against the published “embedded value: analysis of change” report for the previous 12 months in order to review the draft results for the last 6 months. The economic basis is determined by adding (or deducting) fixed differences to (or from) the risk free return. There were no changes to these fixed differences when setting the economic assumptions for the last 18 months.

<b>Published Embedded value : Analysis of change for 12 months (01/01/Year X to 31/12/Year X)</b>					
All amounts R'm					
	<b>Adjusted net worth (ANW)</b>	<b>Present value of in-force business (PVIF)</b>	<b>Cost of required capital</b>	<b>Total Embedded Value</b>	
<b>Embedded value at start of financial period (01/01/Year X)</b>	<b>7 553</b>	<b>15 320</b>	<b>-1 520</b>	<b>21 353</b>	a
Value of new business at point of sale	-270	503	-43	190	b
Expected return (Unwinding of risk discount rate)	-	1 685	-167	1 518	c
Expected profit transfer to ANW	1 702	-1 702	-	-	d
Operating experience variances (relative to opening assumptions)	312	150	15	477	e
Operating assumption and model changes	80	30	3	113	f
Expected return on ANW	529	-	-	529	g
<b>Embedded value operating return</b>	<b>2353</b>	<b>666</b>	<b>-192</b>	<b>2827</b>	h = b+c+d+e+f+g
plus Investment return variances on in-force covered business	-	153	-	153	i
plus Investment return variances on ANW	76	-	-	76	j
plus Effect of economic assumption changes	-543	63	-	-480	k
<b>Embedded value earnings</b>	<b>1 886</b>	<b>882</b>	<b>-192</b>	<b>2 576</b>	l=h+i+j+k
less Dividends accrued or paid	-2000	-	-	-2 000	m
<b>Total change in embedded value</b>	<b>-114</b>	<b>882</b>	<b>-192</b>	<b>576</b>	n=l+m
<b>Embedded value at end of financial period (31/12/Year X)</b>	<b>7 439</b>	<b>16 202</b>	<b>-1 712</b>	<b>21 929</b>	o=a+n
<b>Return on embedded value</b>				12.1%	p=l/a

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<b>Draft Embedded value : Analysis of change for 6 months (01/01/Year X+1 to 30/06/Year X+1)</b>					
All amounts R'm					
	<b>Adjusted net worth (ANW)</b>	<b>Present value of in-force business (PVIF)</b>	<b>Cost of required capital</b>	<b>Total Embedded Value</b>	
<b>Embedded value at start of financial period (01/01/Year X+1)</b>	<b>7 439</b>	<b>16 227</b>	<b>-1 713</b>	<b>21 953</b>	a
Value of new business at point of sale	-200	352	-31	121	b
Expected return (Unwinding of risk discount rate)	-	857	-90	767	c
Expected profit transfer to ANW	902	-902	-	-	d
Operating experience variances (relative to opening assumptions)	200	80	6	286	e
Operating assumption and model changes	100	20	1	121	f
Expected return on ANW	260	-	-	260	g
<b>Embedded value operating return</b>	<b>1262</b>	<b>407</b>	<b>-114</b>	<b>1555</b>	h = b+c+d+e+f+g
plus Investment return variances on in-force covered business	-	-162	-	-162	i
plus Investment return variances on ANW	-74	-	-	-74	j
plus Effect of economic assumption changes	150	-25	-	125	k
<b>Embedded value earnings</b>	<b>1 338</b>	<b>220</b>	<b>-114</b>	<b>1 444</b>	l=h+i+j+k
less Dividends accrued or paid	0	-	-	-	m
<b>Total change in embedded value</b>	<b>1 338</b>	<b>220</b>	<b>-114.0</b>	<b>1 444</b>	n=l+m
<b>Embedded value at end of financial period (30/06/Year X+1)</b>	<b>8 777</b>	<b>16 447</b>	<b>-1 827.0</b>	<b>23 397</b>	o=a+n
<b>Return on embedded value</b>				6.6%	p=l/a

Describe the checks that will be performed in the review and include:

- any high level calculations that will be performed
- the questions that will be posed to the valuation actuary
- possible reasons for deviations from the previous 12 months

(Note : Reserves are calculated on a prospective basis and dividends to shareholders are paid annually.)

[Total 28]

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### QUESTION 3

A life insurance company is reviewing the benefits and premium rates for an individual risk product which has been sold for many years. The benefits and structure of the product will remain broadly similar. The main benefits provided by the product are a death benefit, lump sum disability benefit and a cash-back benefit (return of 12 months premium every 5 years without claim).

- i. Explain how the assumptions to be used in the pricing exercise would be determined, highlighting any additional investigations required. [18]

The initial pricing has been done and the new premium rates have come out higher than the existing premium rates. The initial and renewal expense assumptions that were used have been questioned as these appear to be significantly higher than those used in the pricing of the existing product.

- ii. Discuss why this might be the case. [10]

Following further investigation, it is established that the withdrawal experience on the existing product is much higher than expected and should receive some focus. It has also been noticed that a large proportion of the existing book is sold to mid to lower income individuals.

- iii. Discuss how the company could reduce withdrawals. [14]

It has also been agreed to assess whether there are any ways to reduce the premium rates on the product to be more in line with the existing product.

- iv. Discuss the options available to achieve the reduction in premium rates, highlighting the risk associated with each of the options. [8]

[Total 50]

[Total 100]

**END OF EXAMINATION**