

# EXAMINATION

18 May 2018

## Subject F202 — Life Insurance Specialist Applications

*Time allowed: Three hours*

### ***INSTRUCTIONS TO THE CANDIDATE***

- 1. You will receive instructions to log in using a password which will be issued to you at the exam centre.*
- 2. You are required to submit your answers in Word format only using the template provided. You MAY NOT use any other computer program (e.g. Excel) during the exam.*
- 3. Save your work throughout the exam on your computer's hard drive.*
- 4. You have 15 minutes at the start of the exam 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.*
- 7. Attempt all questions, beginning your answer to each question on a new page.*
- 8. You 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.**

**Hand in your question paper with any additional sheets firmly attached.**

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

An insurance company writes a range of risk-only lump sum products. The critical illness product design includes stand-alone and accelerator versions of the benefit. All products have a long-term premium guarantee. An analysis of the company's critical illness claims experience has shown recent experience to be worse than that shown in industry experience studies.

- i. Discuss the possible reasons for the difference between the company's critical illness claims experience compared to that of the industry and whether this should be of concern to the company. [20]
- ii. Explain why a long-term guarantee on the critical illness premiums may be an undesirable feature from the company's point of view. [10]

It has been found that 85% of the critical illness claims cost comes from the top four diseases in terms of incidence. It has been suggested that a simplified product be developed by the company that covers only these four diseases.

- iii. Discuss the factors that should be considered in assessing this suggestion as well as the pricing assumptions that would be required should the development go ahead. [13]

The company's internal experience analysis for life and critical illness experience can be broken down into three categories:

- Life cover only (with no benefits attached)
- Life cover with a critical illness accelerator benefit
- Stand-alone critical illness cover

The experience analysis shows that the experience for the stand-alone critical illness cover is worse than expected, the experience for the life cover with no benefits attached to it is as expected and the experience for the combination of life cover with a critical illness accelerator is running better than expected. The analysis is based on expected incidence rates and actual numbers of claims.

- iv. Describe how this scenario could arise. [7]

[Total 50]

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## QUESTION 2

- i. Outline the calculation of actuarial liabilities under the Solvency Assessment and Management (SAM) valuation methodology. [13]

An African proprietary insurance company operates under a simplified SAM regulatory regime. All the company's assets are listed instruments and are valued at market value. The assets include an investment in the company's own shares. Under the simplified SAM regulations, there are three stress scenarios in the standardised formula for the Solvency Capital Requirement (SCR). The results of the base valuation and the stress scenario are summarised in the table below:

	Base	Scenario 1	Scenario 2	Scenario 3
Total value of assets	380 000	380 000	350 000	270 000
Best estimate liability	250 000	270 000	235 000	180 000
Risk Margin	30 000	30 000	30 000	30 000
Other liabilities	10 000	10 000	9 000	8 000
Value of own shares	10 000	10 000	10 000	8 000

Scenario 1 is not correlated to Scenario 2 or Scenario 3, and there is a 25% correlation between Scenario 2 & Scenario 3, as summarised in the specified correlation matrix below.

	Scenario 1	Scenario 2	Scenario 3
Scenario 1	100%		
Scenario 2	0%	100%	
Scenario 3	0%	25%	100%

The basic SCR is the result of applying this matrix to the scenario stresses.

The Operational risk component of the SCR has been calculated separately as 4 000.

- ii. Calculate the "Own Funds" [3]
- iii. Describing your steps, calculate the SCR and SCR cover. [9]

[Total 25]

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### **QUESTION 3**

An insurance company has written credit life insurance on a book of loans for the past five years. The credit life insurance provides protection on death, permanent and temporary disability, and job loss.

The life cover and permanent disability cover provide for a lump sum equal to the outstanding balance on the insured's loan amount in the event of death or permanent disability.

The temporary disability cover and job loss cover provide for a monthly benefit equal to the loan instalments on the insured's loan for up to 12 months (or end of loan term if sooner).

The premiums are set to realise a profit margin. The insurance cover terminates with the termination of the loan facility.

The company has used a retrospective valuation method to establish reserves for the credit life business as there has not been enough experience data to perform a prospective valuation. It is now believed that enough experience data has been collected in order to consider a prospective valuation.

Describe how you would establish an appropriate prospective reserve and outline the experience investigations you would perform to set the valuation assumptions.

[Total 25]

[Grand Total 100]

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**END OF PAPER**