

**Actuarial Society of South Africa**

**EXAMINATION**

**2 OCTOBER 2019**

**Subject A311 — Actuarial Risk Management**

**Paper One**

*Time allowed: Three hours*

***INSTRUCTIONS TO THE CANDIDATE***

- 1. Follow log in and saving instructions issued to you at the exam venue.*
- 2. Save your work throughout the exam.*
- 3. 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 examination.*
- 4. You have 15 minutes at the start of the examination 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. 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 to the hard drive.**

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

<p><i>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.</i></p>
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## QUESTION 1

Provide a definition for each of the following valuation methods that are used for individual investment instruments.

- i. Historic book value [1]
  - ii. Written up book value [1]
  - iii. Market value [1½]
  - iv. Fair value [1½]
  - v. Stochastic models [2]
- [Total 7]

## QUESTION 2

List the major economic factors that affect the level of the equity market, and briefly describe the impact of each on the equity market.

[Total 6]

## QUESTION 3

- i. Provide definitions for a '*defined benefit scheme*' and a '*defined contribution scheme*'. [2]
- ii. Discuss the types of investment asset classes you will expect in the investment strategy of a defined benefit scheme. [4]

A large defined benefit scheme's valuation has recently indicated that it is underfunded.

- iii. List the main reasons that could have potentially contributed to the underfunded level. [3]

You have been tasked to estimate the future funding levels of the scheme. You have decided to build a deterministic model to project the liabilities and the assets.

- iv. List eight major assumptions that you will need in order to project the liabilities and assets. [4]

[Total 13]

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#### QUESTION 4

Explain why a general insurance company may have a surplus reinsurance treaty.

[Total 9]

#### QUESTION 5

You are the government actuary in a developing country. Several years ago, most employer-sponsored defined benefit schemes switched to defined contribution arrangements. A radical political party, the People's Pensions Party (PPP) criticised this switch on the basis that workers were prejudiced by the new arrangements.

Recently, the PPP won a general election and came into power, and they now wish to make good on their campaign promise to outlaw defined contribution pension schemes and require all schemes to convert to defined benefit arrangements.

List the relevant stakeholders that should be considered and discuss the impact that this proposal would have on each of the stakeholders. You are not required to comment on the wisdom of this proposal or the legal consequences.

[Total 10]

#### QUESTION 6

DewLife is a large life insurer that operates in the South African market. It has recently completed its annual profitability assessment.

- i. Other than profitability, list eight investigations that DewLife is likely to perform that would require assumptions about future experience. [4]
- ii. Following this assessment, DewLife has noticed a deterioration in the profitability in its term assurance portfolio. Discuss the corrective actions that DewLife could consider to arrest this deterioration. [6]

[Total 10]

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## QUESTION 7

- i. State the principles of investment. [2]
- ii. Describe how an institutional investor could use the Actuarial Control Cycle to develop an optimal investment strategy. [8]

An institutional investor has historically only invested in South African government bonds to match its South African liabilities. It is considering including equities going forward as part of its long-term investment strategy.

- iii. Discuss the main factors that should influence this decision. [10]

[Total 20]

## QUESTION 8

RoadSure is a general insurance company specialising in providing comprehensive insurance for motor vehicle owners that includes cover for the insured's vehicle as well as motor third party liability cover.

- i. Outline the features of motor third party liability cover and give two distinct practical examples of how a claim may arise in practice. [5]

Traditionally they have sold their product through agents employed by the company. After many years of success, they have decided to expand their business by opening a call centre sales channel where clients can phone them directly and buy a policy over the phone.

To increase sales volumes through the new channel, the executive management has indicated that they want to reduce the premiums for new business coming in through the call centre. As a result, they anticipate making losses at early policy durations in this channel, cross-subsidised by profits from later durations as well as the existing business. At the annual policy anniversary, a client may get a premium increase.

- ii. Describe the risks to the company associated with the new channel. [5]

RoadSure has just completed a comprehensive review and update of their product pricing models as well as an investigation into their policy lapse experience. You have been tasked to use the output of these investigations and use it to build a stochastic model that simulates premiums, claims and expenses and gives a view of the present value of underwriting profits over the next ten years.

- iii. Explain how you might go about constructing this model, including any assumptions that might be required. [15]

[Total 25]

[Grand Total 100]

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**END OF EXAMINATION**