

Actuarial Society of South Africa

EXAMINATION

10 October 2016

Subject A301 — Actuarial Risk Management

Paper One

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

- 1. You will receive instructions to log in using a password which you 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 examination.*
- 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 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 on 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>

QUESTION 1

List the main factors that should be considered before an individual decides on an appropriate investment strategy.

[Total 3]

QUESTION 2

You are the consulting actuary to an employer who is establishing a pension fund for its employees. You are recommending either a defined benefit (DB) or a defined contribution (DC) scheme.

- i. Define the main characteristics of a DB and a DC scheme. [2]

The employer has decided on a DC scheme for its employees. You are investigating the risks that the members and the employer/sponsor will face.

- ii. Describe the risks that each of these stakeholders will face (if any). [3]

[Total 5]

QUESTION 3

Explain three possible types of advice, along with a simple example of each, that can be given by an actuary.

[Total 5]

QUESTION 4

The insurance company you work for has expanded significantly over the last few years. Currently the office housing its employees is becoming too small, and the lease contract is coming to an end within 18 months.

The board has therefore decided to develop a new office building that will be the new head office of the company. Note that this will also become part of the shareholders' property portfolio.

You are overseeing this project on behalf of the board, and have been tasked to complete a risk identification exercise.

Identify the major risks introduced by this project and describe potential risk mitigation plans for each.

[Total 8]

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QUESTION 5

- i. Explain what a fidelity guarantee insurance policy is and what it covers. [2]
 - ii. Define what is meant by a "rating factor" in the context of general insurance. Your answer should include some requirements of a good rating factor as well. [3]
 - iii. Propose and discuss potential rating factors that could be used when issuing a fidelity guarantee contract. [4]
- [Total 9]

QUESTION 6

You are the pricing actuary for a life insurer and you were responsible for pricing the disability income product. The product has made significant losses in the last 12 months.

- i. Provide possible reasons and discuss why the product could be making substantial losses. [7]
 - ii. Suggest what you can do to possibly rectify the profitability of the product. [4]
- [Total 11]

QUESTION 7

BestCo is a very large company and popular employer that employs almost 10,000 people. As part of everyone's staff benefits, they have a programme in place that pays a long service award to a staff member after every five years of continuous employment.

Each award is equal to $\frac{n}{120} \times S$, where n is the number of years worked and S the annual salary in the month that the milestone is reached.

The value of awards has steadily risen in recent years and the company auditors want to understand what the overall current liability to the company of this programme is. This liability has not been calculated previously.

Your actuarial consulting firm has been approached to assist with the calculations.

- i. Briefly explain the approach you would follow to go about calculating this liability. [2]
 - ii. Outline the most important data and assumptions required to perform this calculation and discuss how you might go about obtaining or setting them. [8]
 - iii. List four actions that can be taken to reduce the cost of this benefit. [2]
- [Total 12]

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QUESTION 8

- i. List the main uses of data in an insurance company. [5]
- ii. List what general data you would require to do a mortality experience analysis for a particular time period. [3]
- iii. What checks would you need to make on the data before performing an experience analysis? [5]

[Total 13]

QUESTION 9

ABC Insurance is a general (non-life) insurance company. Having enjoyed success in the local market with their innovative range of vehicle and asset insurance products, they are now considering expanding by setting up a subsidiary in another country.

They are busy assembling a team to visit the country for a few weeks and they have asked you to draw up a framework that can be used to guide their research there.

Discuss the most important elements you believe should be included in this research. Amongst other things, you should consider the likely constraints on the new subsidiary, how it might be structured as well as the sort of products it might offer.

[Total 16]

QUESTION 10

A life insurance company needs to determine the value of its assets and liabilities in order to perform sensitivity analyses for certain economic changes that might occur in future. The insurer only provides life annuities to its policyholders.

- i. Provide a description for each of the following valuation methods for individual investments. Also describe the main shortcoming(s) encountered when utilising each valuation method:
 - a. Written up book value
 - b. Market value
 - c. Fair value
 - d. Discounted cashflow [8]

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The insurer only invests in bonds (government issued and corporate bonds) and property to back its liabilities.

- ii. Discuss the methods (from those provided in part (a) above that are the most appropriate for the valuation process of the investments. Where appropriate, discuss how the discount rate will be derived. [7]
- iii. Describe possible reasons why a discounted cashflow method and the market value method might provide different results for the property valuation. [3]

[Total 18]

[GRAND TOTAL 100]

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END OF EXAMINATION