

Actuarial Society of South Africa

COMPUTER BASED EXAMINATION

2 OCTOBER 2020

Subject A213 — Contingencies

Time allowed: 1 hour and 45 minutes (which includes reading time)

(5 minutes will be added to your total exam time to allow for uploading your file)

Maximum: 50 marks

INSTRUCTIONS TO THE CANDIDATE

1. Ensure you have logged into your ProctorU account before attempting the exam. An ID verification process will only be done once you access the exam question section at the exam start time. This will **NOT** impact your allocated writing time and your exam time will count down only once you enter the exam after ID verification.
2. You are strongly encouraged to use the first 15 minutes as reading time only, however, you may commence answering the paper whenever you are ready.
3. You are given this question paper and the Excel file. You will download the Excel file in the Exam. You may **not** use your own Excel file.
4. Mark allocations are shown in brackets. This exam has a total of 50 marks.
5. Attempt all questions. Each question is to be answered on a separate Excel sheet as per the provided template.
6. You **MAY NOT** use any other computer program during the examination.
7. Save your work throughout the exam. Save your file using your candidate number as file name. (**DO NOT USE YOUR NAME**)
8. Upload your Excel answer file with your solutions into the ASSA Exam Platform. You need to upload your file **BEFORE** the exam time expires.
9. Once you have added your file you **MUST** click on **FINISH ATTEMPT** to save your file. You will still be allowed to go back and make changes (Review Attempt) if you have time.
10. Once you are happy with your uploaded file click **FINISH ATTEMPT** and the **FINISH ALL AND SUBMIT** where after you will not be able to make more changes.

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

**NO TIME ANNOUNCEMENTS ARE MADE DURING THE EXAM. PLEASE
MANAGE YOUR TIME.**

END OF INSTRUCTIONS

QUESTION 1

An insurance company sells unit-linked endowment assurance policies to males aged 45 exactly covering them to their normal retirement age. The country's standard normal retirement age is currently set at 65.

The policy has the following features:

- Annual premiums are paid in advance throughout the policy or until earlier death.
- 90% of the premium is used to buy units at the offer price.
- A bid-offer spread of 5% applies.
- On the death of the policyholder during the term of the policy, a benefit equal to the bid value of the units is paid to the estate of the policyholder, subject to a minimum sum assured. The death benefit is payable at the end of the year of death.
- A minimum sum assured of R300 000 applies on death in the first policy year increasing at the start of each subsequent policy year at a rate of 5% p.a. compound.
- On maturity of the contract, the bid value of the units is paid plus a bonus of 6% of the bid value of the units.

Unit reserves equal to the bid value of units are held. Non-unit fund reserves are kept to zeroise any negative non-unit fund cashflows other than those occurring in the first year.

The company would like to understand how profitable the product would be under different premium rate scenarios.

- i) Calculate the net present value of the profit under this policy using an annual premium rate of R20 000, R25 000 and R30 000 respectively.

Basis:

Risk discount rate:

13% p.a. effective

Mortality:

AM92 Ultimate

Expenses:

Initial expenses of R9 000 and renewal expenses of R250 at the start of each of the second and subsequent policy years

Unit fund growth rate:

10% p.a. effective

Non-unit fund interest and growth rate:

6% p.a. effective

[31]

- ii) The marketing director of the company has recommended that the minimum death benefit be escalated annually by 10% p.a. rather than 5% p.a. as this would double the expected sales volumes with an overall increase in profit. Discuss the reasonableness of this recommendation if the final premium rate was set at R25 000 by using your calculations in i) above. [5]

[Total 36]

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QUESTION 2

A South African company has recently decided to offer its employees free insurance benefits as part of its strategy to retain and attract top employees to the company.

The benefits considered are as follows:

- A spouse's pension benefit, provided on the death of an employee, pays an annual annuity payment of R75 000. The benefit ceases on the death of the spouse or upon him/her reaching the age of 60. The first payment is made at the time of the lump sum benefit payment.
 - A lump sum benefit of R2 500 000 is paid on the death of an employee before reaching normal retirement age of 60. The benefit is paid at the end of the year of death.
- i. Calculate the cost to the company of the lump sum death benefit **and** the spouse's benefit for a new male employee aged 40 exactly with a female spouse aged 37 exactly.

Basis:

Male mortality: AM92 Ultimate mortality increased by 25%

Female mortality: AM92 Ultimate mortality decreased by 15%

Interest rate: 9% p.a. effective

[7]

The senior actuary reviewed your calculations and noted that no allowance was made for employees leaving the company. She believes this oversight could have a material impact on the cost of these benefit to the company. She provided you with a multiple-decrement table which she believes represents the company's experience over the past years.

- ii. Calculate the independent forces of mortality and withdrawal implied by this multiple decrement table. State any assumptions you make. Given your results, comment on whether you agree with the senior actuary's comment that the oversight is material for a 35-year-old (no additional calculations are required).

[7]

[Total 14]

[GRAND TOTAL 50]

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END OF EXAMINATION