

Actuarial Society of South Africa

COMPUTER BASED EXAMINATION

3 OCTOBER 2022

Subject A213 — Contingencies

Time allowed: One hour and forty-five minutes (includes reading time)

Total marks: 50

INSTRUCTIONS TO THE CANDIDATE

1. *Ensure that you are logged in and authenticated through Examity before you attempt the examination.*
2. *You are strongly encouraged to use the first 15 minutes as reading time only, however, you may start answering the paper whenever you are ready.*
3. *The question paper is only available on the ASSA Exam Platform as a PDF download and may not be printed.*
4. *An Excel answer template will be available for download on the ASSA Exam Platform.*
5. *You may not access any file from your computer, use any other computer program (e.g. Email, MS Word or Excel), or open any browser during the examination.*
6. *Mark allocations are shown in brackets.*
7. *Attempt all questions. Each question must be answered on a separate Excel sheet as per the provided template.*
8. *You may not use any other material (e.g. a Formulae and Tables book) during the examination. Any such information that may be required will be provided to you in the examination.*
9. *Save your work throughout the examination. Save your file using your candidate number as file name. Do not use your name or member number anywhere in your answer document nor as file name.*
10. *Upload your Excel answer file to the ASSA Exam Platform before the examination time expires. Take this into account when planning your review and submission. There will be no time announcements.*
11. *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.*
12. *Once you are satisfied with your uploaded file, click **Finish Attempt** and **Finish All and Submit**. No further changes will be possible.*

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.

END OF INSTRUCTIONS

QUESTION 1

- i. Explain why a life insurance company might need to set up non-unit reserves in respect of a unit-linked life assurance contract.

[3]

An insurer has just introduced a new niche 10-year unit-linked endowment assurance policy which is sold directly through the internet.

A level annual premium of R36 000 is payable annually in advance. 90% of the first years' premium, 101% of the second years' premium and 102% of each subsequent premium are invested in the unit fund. The bid price of the units is 99% of the offer price. The insurer deducts a fund management charge of 0.50% of the unit fund before the deduction of an administration fee. The administration fee of R1 200 is deducted from the unit fund at the end of each year. The insurer incurs an initial expense of R6 000 at the start of the first year and renewal expenses of R 1 500 are incurred at the start of each subsequent year.

The policy pays a benefit at the end of the year of death equal to the bid value of the units subject to a minimum of a return of premiums paid prior to death with interest of 6% per annum. The maturity benefit is equal to the bid value of the units.

The insurer has just sold the policy to a 50-year-old.

- ii. If the insurance company holds unit reserves but not non-unit reserves, calculate the profit vector for this policy.

[20]

Basis:

Unit growth rate	5% per annum
Non-unit growth rate	5% per annum
Withdrawals	None
Mortality	Life Table (as per the relevant sheet provided in the template)

- iii. Calculate the revised profit emerging each year, assuming that the office sets up non-unit reserves to ensure that the expected profit emerging in the second and subsequent policy years is non-negative.
- iv. Calculate the profit margin before and after allowing for reserves, first assuming a risk discount rate of 5% per annum and then a risk discount rate of 5.5% per annum.
- v. Explain your results of (iv) above.

[6]

[4]

[4]

[Total 37]

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QUESTION 2

A product development team of an innovative insurer is currently exploring providing a 20-year savings policy to unmarried lives. The suggested benefits are as follows:

- on death during the 20 years, a lump sum of R100 000 is payable immediately on death;
- on surrender during the 20 years, a return of premiums paid to date without interest, payable immediately on death;
- on marriage during the 20 years, a return of premiums paid to date with interest, payable immediately on marriage;
- on survival to the end of 20 years and not being married, a lump sum of R50 000 is payable.

The contract will cease on the payment of any benefit.

Basis:

Mortality	AM92 Select
Independent rate of surrender	10% per annum
Force of marriage	12% per annum

Construct a multiple decrement table based on a life aged 20 exact that could be used for pricing this policy.

[Total 13]

[GRAND TOTAL 50]

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END OF EXAMINATION