Actuarial Society of South Africa

COMPUTER BASED EXAMINATION

25 MAY 2021

Subject A213 — Contingencies

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

Maximum: 50 marks

INSTRUCTIONS TO THE CANDIDATE

1. *Ensure that you are logged in and authenticated through Examity before you attempt the examination. An ID verification process will only be done once you access the examination question section at the examination start time. This will NOT impact your allocated writing time and your examination time will count down only once you enter the examination 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 ASSA Exam Platform. You may not use your own Excel file.*
4. *Mark allocations are shown in brackets.*
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. *You MAY NOT make use of a Formulae and Tables book during the examination. Any such information that may be required will be provided to you within the examination.*
8. *Save your work throughout the examination. Save your file using your candidate number as file name. (DO NOT USE YOUR NAME OR MEMBER NUMBER.)*
9. *Upload your Excel answer file with your solutions into the ASSA Exam Platform. You need to upload your file BEFORE the examination time expires.*
10. *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.*
11. *Once you are happy with your uploaded file, click FINISH ATTEMPT and the FINISH ALL AND SUBMIT whereafter 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 EXAMINATION. PLEASE MANAGE YOUR TIME.

END OF INSTRUCTIONS

QUESTION 1

A large life insurance company issues a conventional without-profit endowment assurance policy to a life aged exactly 50. The policy has a term of 10 years and a sum assured of R100 000 which is payable at the end of the term or at the end of year of death, if earlier.

Level annual premiums of R10 000 are payable at the start of each year for ten years, or until the earlier death of the policyholder.

Basis:	
Mortality:	AM92 Select
Interest rate:	5% p.a. effective
Risk discount rate:	9% p.a. effective
Initial commission:	20% of the first premium
Renewal commission:	2% of each premium except the first
Initial expenses:	R2 000
Renewal expenses:	R150 pa incurred at the start of each year except the first
Death claim expense:	R5 600, payable at the end of year of death
Maturity claim expense:	R4 000
Expense inflation:	All non-commission expense amounts are quoted at the outset; they are assumed to inflate at the rate of 4% p.a. from outset to the date of payment.

i. Calculate the expected cashflows per policy in force at the start of each year.

[12]

The insurance company then decides to start paying surrender values on this policy. Surrenders are only allowed at the end of each of the first nine policy years. The surrender value payable will be 60% of all premiums paid prior to the date of surrender during the first five years of the policy and thereafter will be 90% of all premiums paid prior to the date of surrender.

ii. Calculate the expected cashflows per policy in force at the start of each year now allowing for surrenders. Assume that, during each of the first five years, the independent probability of surrender is 20% and that the independent probability of surrender is 8% in each of the subsequent years where surrender is allowed.

[8]

iii. Comment on the reasonability of the change in the net present value observed when allowing for surrenders in your calculation.

[2]

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REMEMBER TO SAVE

iv. Calculate the profit signature and net present value of the policy assuming that the expected cashflows per policy in force at the start of each year are as outlined below. Also allow for the following reserves at the start of each policy duration. These values are also provided in the template.

Duration	Expected cashflow	Reserve per policy in force at the start of each year
1	4 893.79	-
2	7 443.01	16 000.0
3	6 195.94	24 000.0
4	4 952.74	32 000.0
5	3 704.91	40 000.0
6	5 319.12	48 000.0
7	4 536.51	56 000.0
8	3 746.98	64 000.0
9	2 949.78	72 000.0
10	- 95 872.06	80 000.0

[8]

[Total 30]

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QUESTION 2

A life insurance company offers a new family plan called FamCover.

The benefits are as follows:

- A lump sum benefit of R1 500 000 is paid on the death of the main policyholder within a 20-year period. The benefit is paid at the end of the year of death.

- A child education income benefit is provided on the death of a policyholder and pays an annual annuity payment of R60 000. The benefit is payable until the end of the original policy term or until earlier death of the dependent child. The first payment is made at the time of the lump sum death benefit payment.

i. Calculate the profit margin for these benefits sold to a prospective male policyholder aged 40 exactly with a single female child currently aged 20 exactly.

Basis:	
Male mortality:	AM92 Ultimate
Female mortality:	AM92 Ultimate
Risk discount rate:	8% p.a. effective
Initial expenses:	R1 000
Claims expense:	R2 000 for the lump sum benefit and R1200 per year for each of the annuity payments
Single premium:	R53 000

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ii. Describe, with reasons, the impact on the profit margin should the risk discount rate increase to 10% p.a. effective.

[3]

[Total 20]

[GRAND TOTAL 50]

END OF EXAMINATION

