

# Actuarial Society of South Africa

## COMPUTER BASED EXAMINATION

17 May 2022

### Subject A213 — Contingencies

*Time allowed: One 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 or files, nor open any other browser 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 satisfied with your uploaded file, click **FINISH ATTEMPT** and the **FINISH ALL AND SUBMIT** whereafter you will not be able to make more changes.*

*12. An option to opt out of the exam will become available one hour after the official examination start time. If you select the Opt-Out option, you agree and understand that your entire script/answers will be deleted and cannot be retrieved at a later stage and that your script or part thereof will not be put forward for marking.*

**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

(i) Outline the main features of a regular premium accumulating with-profits whole of life policy.

[4]

An insurer has just sold a unitised with-profits endowment assurance policy with a policy term of 15 years to a female aged exactly 50 years old.

The policy has the following features:

- An allocation rate of 90% in years 1 and 2; 95% in years 3 and 4 and 100% thereafter.
- An annual premium of R5 000 paid at the start of each year.
- Bonus rates are declared at the end of year.
- A policy fee of 1% of the unit fund value, after bonus have been added, is deducted at the end of each year.
- A death benefit is payable at the end of the year of death. The benefit payable is equal to the higher of R50 000 or the end of year unit fund value (after deduction of all applicable charges and addition of any **regular bonus** during the year) plus a **terminal bonus**.
- A maturity benefit is payable equal to the end of year unit fund value (after deduction of all applicable charges and addition of any **regular bonus** during the year) plus a **terminal bonus**.
- A benefit is payable on surrender equal to the unit fund value less a surrender penalty. Surrenders can only occur at the end of each year.
- The following surrender penalties are applicable:
  - 2% of the unit fund value (after deduction of all applicable charges and addition of any **regular bonus** during the year) if the surrender happens within the first 4 years,
  - 1% of the unit fund value (after deduction of all applicable charges and addition of any **regular bonus** during the year) if the surrender happens thereafter.

(ii) Calculate the expected present value of the profit from this policy, given the assumptions below. You may ignore any reserving requirements.

Basis:

Risk discount rate:	10% per annum
Regular bonus rate:	5% per annum in first 5 years, and 5.5% per annum thereafter
Terminal bonus rates:	Years 1 to 3: 2.5% of the unit fund value at the end of the year Years 4 to 6: 5.0% of the unit fund value at the end of the year Years 7 to 9: 7.5% of the unit fund value at the end of the year Year 10 onwards: 10% of the unit fund value at the end of the year
Non-unit interest rate:	2% per annum calculated
Mortality rates:	AM92 Ultimate rated down by 4 years
Surrender rates:	Year 1: 10% Year 2: 8% Years 3 to 7: 5% in each year Years 8 to 12: 1% in each year and Year 13 onwards: no surrenders
Initial expenses:	R500
Renewal expenses:	R100 per annum, payable annually in advance
Claims expenses:	R150 payable on death, surrender or maturity
Expense inflation:	5% per annum
Initial commission:	2% of the first year's annual premium
Renewal commission:	1% of the annual premium from the second policy year onwards

[30]

**REMEMBER TO SAVE**

**PLEASE TURN OVER**

(iii) Without carrying out any further calculations, state with reasons, what the effect on the expected present value of profit would be in each of the following cases:

- a) No age rating is allowed for in the mortality assumptions
- b) The insurer assumes a discount rate of 8% per annum

[6]

[Total 40]

## QUESTION 2

- i. Define what a multi-decrement table is? [2]

The Actuarial army is currently reviewing its decrement statistics and experience. The independent mortality and withdrawal rates are provided in the template. Upon further investigation, it was discovered that there was an error in recording the independent withdrawal rates. The correct independent rates of withdrawal are 15% higher.

- ii. Calculate, for each age, the dependent probabilities of withdrawal and death and then construct a multiple decrement table based on the revised rates. State any assumptions that you make.

[8]

[Total 10]

[GRAND TOTAL 50]

**REMEMBER TO SAVE**

**END OF EXAMINATION**