EXAMINATION

28 May 2025 (am)

Subject F102 — *Life Insurance* Fellowship Principles

Examination time: Three hours and fifteen minutes (includes reading time)

Upload time: Five minutes

[Total time on examination countdown clock: Three hours and twenty minutes]

Total marks: 100

INSTRUCTIONS TO THE CANDIDATE

Failure to adhere to any of these instructions could incur examination sanctions including disqualification from the examination.

1. *The question paper is only available on the ASSA Exam Platform as a PDF download and may not be printed. Copy/paste of questions or parts thereof is allowed from the question paper to your Word answer document only.*
2. *Download the Word answer document template from the ASSA Exam Platform. Save this Word answer document on your desktop using your **full Candidate Number**, which starts with "F102-exa-2025-…", as filename.* ***Do not name your answer script with your name or member number.***
3. *You are required to submit your answers in Word format ONLY using this document. No answers in any other format (e.g. handwritten) will be accepted. Save work regularly.*
4. *Ensure that your **full Candidate Number** appears in the "header" of your Word answer document. [Double-click on the header at the top of the Word document, input your Candidate Number only in the header, then press "Esc" to close the header.]* ***Do not use your name or member number anywhere in your Word answer document.***
5. *You may not access any file from your computer, use any other computer software (e.g., Email or Excel), or open any other browser, collaboration tools or AI tools (e.g. Copilot, ChatGPT etc.) during the examination. Nor may you use Grammarly, Grammarly Premium or similar add-ins. Microsoft Word spellcheck is allowed.*
6. *You are not permitted to bring any other material into the examination (e.g. a Formulae and Tables book). Any such information/material that may be required will be provided to you in the examination.*
7. *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.*
8. *Mark allocations are shown in brackets.*
9. *Attempt all eight (8) questions, starting each on a new page (as provided for in the Word answer document).*
10. *Show calculations where appropriate. You may not use other materials except blank paper for calculations. You may use a calculator from the ASSA-approved list only.*
11. *At the end of the three hours and 15 minutes examination time, you must stop writing and start uploading your Word answer document.* ***You may NOT continue to write during the five minutes upload time.***
12. *Upload your Word answer document only onto the ASSA Exam Platform. Once you have uploaded your document, you must click on **Finish Attempt** to save your document. You will still be allowed to go back and check that you have uploaded the correct version of your answer script (**Review Attempt**) if you have time. Remember that you may not type answers in the last 5 minutes of upload time.*
13. *Once you are satisfied with your uploaded document, click **Finish Attempt** and **Finish all and Submit**. Once you have submitted, you will not be able to make any changes.*
14. ***You must submit your Word answer document BEFORE the time on your examination countdown clock runs out.***

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. The onus remains on you to read and implement all examination instructions.

END OF INSTRUCTIONS

QUESTION 1

A life insurance company is designing a new conventional without-profits whole life product. Premiums will be payable monthly in advance. The proposed surrender value for this product is:

- 50% of premiums paid to date of surrender if surrender takes place during the first 2 years, and
- a prospective policy value on best estimate assumptions for any surrender thereafter.

i. Describe how the basis is likely to be determined for the calculation of the policy value.

[6]

ii. Explain how each of the following events, considered independently, is likely to affect the asset share, the surrender value and hence the retained profit on a policy that surrenders:

   a. A sharp decrease in long-term interest rates; and
   b. The onset of a new incurable disease leading to an increase in mortality.

[7]

[Total 13]

QUESTION 2

A life insurance company launched a simplified-underwriting term assurance product three years ago. The simplified-underwriting product allows policyholders to obtain life insurance cover up to a specified sum assured by only answering a few health- and lifestyle-related questions without requiring the usual physical examinations or the collection of body-fluid samples.

i. Outline the advantages of such a simplified-underwriting product for applicants.

[2]

ii. Outline the risks to the insurer of offering the simplified-underwriting product.

[3]

After carrying out an experience investigation, the company has identified that the actual mortality experience is higher than that anticipated in its pricing basis.

iii. Discuss possible reasons for this and why the company may be concerned about it.

[5]

iv. Outline the actions that the company could take to improve its mortality experience.

[6]

[Total 16]

PLEASE TURN OVER

QUESTION 3

i. Define the cost of a mortality option.

[1]

A life insurance company offers a continuation option to members leaving a group life scheme which it underwrites and which offers death benefits equal to three times employees' annual salary. The option allows exiting members to effect an individual without-profits whole life assurance with the same sum assured at standard (non-smoker) rates before their retirement age, contingent on their passing a test confirming that they are not smokers.

ii. Discuss the key factors the company should consider when pricing this mortality option.

[6]

iii. Explain 2 ways in which anti-selection could manifest under the option.

[1]

iv. Suggest, with reasons, strategies to mitigate the anti-selection risk.

[4]

[Total 12]

QUESTION 4

A life insurance company recently started offering conventional without-profits deferred annuities with a 10-year deferred period where the policyholder pays monthly premiums in arrears during the deferred period and receives a guaranteed monthly annuity thereafter until death.

Policyholders who are deemed to be in suitably poor health at the end of the deferred period, subject to confirmation by underwriting, will be granted an enhanced annuity. The amount by which this annuity will exceed their guaranteed standard annuity will depend on their state of health as assessed at the end of the deferred period. Enhancement terms will be guaranteed and specified on sale of the deferred annuity.

i. Outline the needs that the product meets for policyholders and for the company.

[5]

ii. Identify and outline the key risks faced by the company from offering the enhanced annuity as well as how each of these risks can be managed.

[8]

[Total 13]

PLEASE TURN OVER

QUESTION 5

A life insurance company in a developed country has a large in-force book of income protection policies. The Chief Financial Officer has asked you to calculate the market-consistent value of the liabilities assuming the book will now be closed to new business.

i. Describe the features of a model that you could use to determine the value of the liabilities.

[4]

ii. Discuss how the assumptions used within the model may be determined.

[7]

[Total 11]

QUESTION 6

i. Outline the key features of the contribution method for distributing with-profits bonuses.

[3]

A life insurer sells with-profits whole life assurances with bonuses calculated and distributed using the contribution method.

Information for a particular contract, in local currency units, is summarised below:

Value of the contract at the start of the year (on the valuation basis)	50 000
Value of the contract at the end of the year (on the valuation basis)	60 000
Sum assured (payable at the end of the year of death)	100 000
Gross annual premium (payable at the start of the year)	2 000

Information of relevant experience over the year is also provided:

	Actual experience	Valuation assumption
Interest rate	7% p.a.	5% p.a.
Mortality rate	0.010 p.a.	0.005 p.a.
Expenses at the start of the year	100 p.a.	200 p.a.

ii. Calculate the dividend applicable at the end of the year for the contract outlined above.

[4]

iii. Suggest possible reasons why the total dividend paid to policyholders at the end of the year may differ from the actual profit made by the company over the year on the book of with-profits policies.

[4]

[Total 11]

PLEASE TURN OVER

QUESTION 7

A life insurance company has two books of annuities that are open to new business. The first book offers policyholders level annuities. The second book offers policyholders inflation-linked annuities.

i. Outline the characteristics of these liabilities, and hence suggest suitable assets for matching them

[5]

An analysis of surplus has revealed that in each of the last two years the level annuity book has been loss making. The insurer uses a best-estimate valuation basis for this analysis.

ii. Discuss possible reasons for losses on the level annuity book, including elements of experience that could be contributing to these losses.

[6]
[Total 11]

QUESTION 8

A recently established life insurance company intends to issue regular premium unit-linked individual income protection contracts, with the following structure:

- The risk benefit will be a fixed regular amount per policy determined at outset.
- There will be a premium waiver during a claim, with unit allocations and cancellations continuing.
- On death, surrender or at the end of the policy term, the policyholder will receive the bid value of the units (although this is not expected to be a significant amount).
- Units will be held in the company's conservative investment fund.
- Units will be cancelled regularly to meet the risk premiums. The office will retain the right to vary these charges to reflect experience.
- Office premiums will be reviewed on a 5-yearly basis.

i. Describe the advantages and disadvantages of the proposed product design to the policyholder compared with a conventional income protection product.

[6]

ii. Suggest, giving reasons for each, types of reinsurance which the insurer may use to protect itself against claims risk only.

[7]
[Total 13]

END OF PAPER