



EXAMINATION

2 June 2023 (am)

Subject F103 — General Insurance Fellowship Principles

Time allowed: Three hours and twenty minutes (which includes five minutes for downloading and uploading your answer document)

Total marks: 100

INSTRUCTIONS TO THE CANDIDATE

1. Ensure that you are logged in and authenticated through Examity before you attempt the examination.
2. The question paper is only available in 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.
3. Download the Word answer document template from the ASSA Exam Platform. Save this Word answer document on your desktop using your Candidate Number as filename. 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 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 program (e.g., Email or Excel), or open any other browser during the examination.
6. 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 within 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 use blank paper to carry out rough work calculations. You may use a calculator from the approved list only.
11. Upload your Word answer document only into 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 make changes (**Review Attempt**) if you have time.
12. 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.
13. **You must submit your Word answer document BEFORE the end of the allotted examination time.** You should stop writing and start uploading during the last five minutes. Take this into account when planning your review and submission. There will be no time announcements.

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.

END OF INSTRUCTIONS

QUESTION 1

- i. Define what is meant by an “industry loss warranty” and outline briefly the advantages and disadvantages of such an arrangement to an insurer specialising in property insurance in an area subject to the risk of hurricanes.

[6]

XSpace is a general insurer specialising in the insurance of satellites against the risk of their damage during launch. XSpace is considering implementing the following arrangements, which will operate in the order given:

- Component 1: 20% Quota Share.
- Component 2: Surplus, which has the following conditions for each reinsured risk:
 - A maximum of 4 lines of cover;
 - A maximum retention limit of \$100 million; and
 - A minimum retention limit of \$10 million.
- Component 3: Cover paying a fixed amount of \$100 million to XSpace at the end of the year if global losses relating to satellite launches exceed \$1 billion (i.e. \$1000 million).
The provider of this component of the cover bases its premiums on the following assumptions:
 - There will be 125 rocket launches globally per year, deploying 1000 satellites.
 - 2% of the launches fail, each resulting in a total loss of the payload.
 - The average value of satellites lost following a launch failure is \$400 million.
 - Launch failures resulting in satellite destruction are distributed binomially.

- ii. Determine the maximum proportion of the policy premium that XSpace would pay to the Surplus reinsurer in respect of the following insured policies:

- a. A policy with Sum Insured of \$200 million on which a total loss occurs during the period of cover; and
- b. A policy with a Sum Insured of \$50 million on which no claim occurs.

[3]

- iii. Calculate the risk premium for Component 3 above.

[3]

[Total 12]

QUESTION 2

- i. List 8 items of data you might expect to see on a claim record established by a general insurer.

[4]

You are a newly appointed pricing actuary for a small general insurer about to start a review of premium rates. Your first task is to assess the quality of data held by the company’s data system.

- ii. Outline 4 types of data checks, and give an example of each, that should be performed to check that the internal data held by the company’s data system is free of errors.

[4]

PLEASE TURN OVER

The insurer writes personal lines motor policies through motor dealerships.

- iii. Explain how the method of distribution used by this insurer might impact the quality and quantity of data on the insurer's data system.

[4]

[Total 12]

QUESTION 3

- i. Define what is meant by "underwriting" and briefly outline what underwriting entails.

[3]

A large insurance company is investigating the use of computerised algorithms to continuously underwrite its motor insurance business whereby premiums and cover for existing policyholders are reviewed and, if necessary, adjusted monthly to reflect changes in relevant factors.

- ii. Outline the potential (internal and external) data that can be used in underwriting a personal motor insurance policy.

[6]

- iii. Discuss the factors that should be considered before implementing such a continuous underwriting approach.

[6]

[Total 15]

QUESTION 4

An insurer is undertaking a review of its capital allocation strategy and has asked you for advice on how it may go about allocating capital to its various business units.

- i. Explain 4 different methods that could be used to allocate capital, including the practical considerations in using each method.

[6]

The insurer sells a wide range of products including comprehensive motor and property insurance, employer's liability, product liability, crop and livestock, and a pet insurance product. It is planning on using a deterministic model to determine capital requirements.

- ii. Discuss briefly the suitability of each of the above 4 methods for the insurer.

[2]

[Total 8]

PLEASE TURN OVER

QUESTION 5

The country of Actuarial is located in an active earthquake region. Despite a high need for earthquake protection, the take-up of earthquake insurance by both residential and commercial building owners in the private insurance market is low. Some limited financial assistance has been provided by government in the past to assist parties whose buildings have been damaged by earthquakes.

The government intends to establish an insurance company that will sell earthquake insurance to individuals and companies to indemnify them in the event of damage to buildings during an earthquake. Reserves, to be funded by premium income, will be supplemented by government funds should these reserves (and any reinsurance recoveries) be insufficient to meet all claims following an earthquake.

- i. Describe the characteristics, making reference to the benefit provided, basis for cover, claim characteristics, and any other contract terms that such a product would require. [6]
 - ii. Outline briefly 6 possible rating factors that could be used when determining a suitable risk premium for this product. [3]
 - iii. Suggest and explain possible reasons for the government intending to establish such an insurer. [4]
- [Total 13]

QUESTION 6

- i. Define what is meant by a policy “exclusion” and provide an example of such an exclusion that may be applicable under a standard household contents insurance policy. [1]

An insurer in Powerland provides personal lines cover (including household and motor). Powerland recently began experiencing rolling blackouts throughout the country as the state electricity provider has been unable to sufficiently meet the country’s electricity demand.

- ii. Comment on the risks that the blackouts pose to the insurer under the following headings:
 - a. Claims experience risk;
 - b. Expense risk;
 - c. Investment risk; and
 - d. Business risk.

[7]

The insurer is considering introducing an exclusion on the household contents product in respect of claims arising from damage to electrical appliances from power surges that sometimes occur on the restoration of power following blackouts.

- iii. Outline briefly 4 factors the insurer should consider before deciding on whether or not to proceed with the introduction of this exclusion.

[2]

[Total 10]

PLEASE TURN OVER

QUESTION 7

- i. Outline 3 key strengths and 3 weaknesses of the chain ladder reserving method.

[3]

You are the reserving actuary for a large general insurance company that writes a diverse range of property and liability insurance products. You are carrying out the claims reserve calculation, using the inflation-adjusted chain ladder method, as at 31 December 2022.

- ii. Outline factors that will affect the extent to which claims, and hence the claims reserves, will be impacted by a rapid rise in consumer price inflation.

[5]

Your company's reserves are subjected to regular independent audits and internal reviews. The reserving process includes obtaining input from the underwriting and claims teams and performing an analysis of experience. Your company's reserving policy requires that the published claims reserves be calculated at least at the 75th percentile level of confidence. The 75th percentile is recalculated quarterly.

In a recent meeting your company's Chief Risk Officer (CRO) raised a concern that the recent rapid rise in consumer price inflation increases the risk that the claims reserves are insufficient.

- iii. Outline points that you could include in your reply to the CRO to provide some comfort that the published claims reserve should be sufficient despite high inflation.

[4]

You have decided to use the expected loss ratio method as a check on the reserves calculated using the inflation-adjusted chain ladder method.

You calculate the ultimate loss ratio for the 2019 accident year as 70% based on the inflation-adjusted chain ladder method. To determine ultimate loss ratios for accident years 2020 to 2022 you adjust the 2019 ultimate loss ratio allowing for assumed changes in ultimate claims and actual premium rate changes. Additional information is given below:

Accident Year	2019	2020	2021	2022
Claims paid (R millions) as at 31/12/2022	150	100	80	50
Earned premium (R millions)	250	275	300	320
Assumed year-on-year increase in ultimate claims		10%	11%	14%
Actual year-on-year increase in premium rates		8%	8%	8%

- iv. Calculate the claims reserve aggregated for the 2019 to 2022 accident years using the expected loss ratio method.

[4]

[Total 16]

PLEASE TURN OVER

QUESTION 8

- i. List and explain briefly 4 generally accepted accounting concepts that insurers' financial accounts need to comply with.

[2]

An extract of the financial results of a specialised insurer selling product liability cover to multinational pharmaceutical companies is summarised below:

P&L Account (R millions)			Balance sheet (R millions)		
	2021	2022		Dec 2021	Dec 2022
Premiums earned	500	500	Total assets	400	450
Claims incurred	400	450	Outstanding claims	80	50
Post-tax profit	20	20	Total shareholder funds	200	250

- ii. Calculate 2 profitability ratios and 2 financial strength ratios for the insurer for 2022, stating any assumptions you make.

[4]

The company reveals that up to the end of 2021 all policies were sold on a losses-occurring basis, and that those sold from 2022 are on a claims-made basis.

- iii. Suggest possible reasons for the insurer changing the basis of cover to claims-made.

[3]

- iv. Discuss the impact on the insurer's investment strategy of the change in the basis of cover.

[5]

[Total 14]

END OF PAPER