

SPECIMEN EXAMINATION

Subject F108 — *Health, Social, and Employee Benefits* Fellowship Principles

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

Total marks: 100

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 app (e.g., Email or Excel) or open any other browser during the examination. Nor may you use Grammarly, Grammarly Premium or similar add-ins.
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

You are the actuary to a large defined contribution (DC) retirement fund. The fund follows a balanced investment strategy and allocates investment returns via:

- a fixed monthly growth allocation revised annually by the actuary, and
 - a bonus return allocation at the fund's financial year end based on actual investment performance over the year.
- i. Outline the risks to the fund and its members that are associated with this method of allocating returns.
- [4]
- ii. Explain how the actuarial valuation can be utilized to manage the risks identified in (i) above.

[3]

[Total 7]

QUESTION 2

The employer sponsor to a fully funded, closed final salary retirement scheme is in financial distress and has asked the board of trustees to adapt the scheme funding methodology from the Projected Unit Method (PUM) to the Current Unit Method (CUM).

- i. Compare and contrast the PUM and CUM funding methods.
- [4]
- ii. Briefly describe why the employer would prefer the CUM of funding over the PUM.

[3]

[Total 7]

PLEASE TURN OVER

QUESTION 3

- i. Outline the principles a health and care insurer are likely to use to set its investment strategy.

[4]

A large life office has been writing without profit immediate needs long term care insurance (LTCI) cover for a number of years. The cover is indexed to inflation.

- ii. Defined 'immediate needs LTCI'.

[2]

- iii. Outline the liability profile of this book of business as it would be used to inform the investment strategy.

[3]

[Total 9]

QUESTION 4

A large health and care insurer is considering launching a new individual stand-alone critical illness (CI) product with a 28-day survival period. You are the pricing actuary tasked with setting the premium rates for this new product.

- i. State the general formula you would use to determine the risk premium for this product, defining all notation used.

[2]

- ii. List the key elements and assumptions you would require to adjust the best-estimate risk premium calculated in (i) to a proposed technical premium rate.

[3]

- iii. Outline the key risks to the insurer associated with the use of incorrect demographic assumptions including take-up rates and persistency.

[10]

[Total 15]

PLEASE TURN OVER

QUESTION 5

A large PMI insurer with a strong solvency level has seen a gradual, steady decline in their level of solvency capital cover over the past five years.

- i. List possible reasons for this decline in the insurer's solvency ratio, apart from underlying changes to the risk profile of covered lives.

[4]

A senior manager suggests that this is due to a deterioration in the risk profile of covered lives.

- ii. Describe the investigations you might perform to test this theory for the observed trend in the solvency level, commenting briefly on the limitations of your approach.

[8]

[Total 12]

QUESTION 6

A certain employer has a relatively generous leave offering for employees. However, the employer requires that at the financial year-end, employees must have an outstanding leave balance of 5 days or less. For the purposes of this calculation, any leave booked in the following year is not counted towards the outstanding balance.

- i. Explain the reasons why the employer may have such a rule in place together with the generous leave allowance.

[4]

One of the employer's executives suggests that all leave balances in excess of 5 days at the company's financial year end should be converted into an additional voluntary contribution (equal in value to the leave days) into the employer-sponsored retirement fund.

- ii. Outline the factors that should be considered before implementing this suggestion.

[6]

[Total 10]

PLEASE TURN OVER

QUESTION 7

You are working as part of an actuarial team responsible for pricing for TopHealth, a PMI insurer. You are assisting the senior actuary with pricing for 2021.

You have been told that CPI over the past three years has been relatively flat at around 4.0%, and that it is not expected to change going into 2021. You have also been given the following information:

	Total annual claims	Average policyholders per month	Average number of months a policy is in force over the year	Average claim per policyholder per month
2018	R99.5 million	15 000	11.2	X
2019	R103.8 million	15 200	10.9	R626.51
2020	R113.5 million	15 140	11.0	Y

Additional assumptions for loadings as percentage of gross premium for 2021:

Expense loading = 5.0%

Reserve loading = 2.0%

Profit margin = 1.5%

- i. The senior actuary has advised that the average growth rate in claims for the prior two years should be used to project the increase in claims for 2021. Calculate the average claim per policyholder per month growth rate over the period 2018-2020 and hence the expected average claim per policyholder per month for 2021.

[2]

PLEASE TURN OVER

One of your colleagues has been doing a competitor analysis. She presents you with the following information on PMI insurer ImpiloMed which offers similar benefits to TopHealth.

Average cost per claimant per month for 2020	Proportion of policyholders claiming	Average policyholders per month	Average number of months a policy is in force over the year
R845	75%	21 800	11.2

Claims increase for ImpiloMed for 2019 = 4.5%

Claims increase for ImpiloMed for 2020 = 4.8%

Projected claims increase for ImpiloMed for 2021 = 5.3%

- ii. Calculate the expected claim cost for insurer ImpiloMed for 2021, and comment on how this compares to the adjusted claim provision you calculated for TopHealth.

[2]

The senior actuary is concerned that claims increases for TopHealth are too high year on year. She has asked you to look into what can be done to better manage the claims costs and control the claims increases into the next few years, bearing in mind that the Board of TopHealth is unlikely to approve introducing any new benefit limits, exclusions, co-payments or deductibles.

- iii. Comment on why the senior actuary has this concern.

[4]

- iv. Discuss what actions TopHealth could take to limit claims increases given the Board's position.

[8]

[Total 16]

PLEASE TURN OVER

QUESTION 8

In a certain developing country, Noricum, all the formally employed are enrolled in a state run “notional defined contribution” fund which has been running for the last 50 years. When reaching the retirement age of 65, members may use their retirement benefit to purchase an annuity in the open market through a broker or may convert their benefit to a basic life annuity within the fund without having to pay commission. Over the last 50 years, longevity has been improving.

- i. Define ‘Notional Defined Contribution fund’.

[2]

- ii. Considering both the notional defined contribution design and the open-market option, explain the longevity risk this fund faces and the extent to which the design mitigates this risk.

[6]

Noricum is hit by a sudden onset of a mysterious virus which can be fatal in adults. The mortality rate for this disease increases with age. The virus has been resulting in increased hospital admissions and is causing an increase in observed in-hospital (IH) mortality.

- iii. As an analyst for a healthcare research firm, you have been tasked with building an epidemiology model to help better understand the spread and impact of this virus.

- a. Outline why a multi-state model would be used for this modelling exercise.

[1]

- b. Suggest 6 different states that you would consider including in this virus’s multi-state epidemiology model.

[3]

PLEASE TURN OVER

The government has also noted the increased rate of hospitalisation and increased mortality rates and has implemented measures to prevent the spread of the virus, but at great cost to the economy. A vaccine has been developed and the Noricum government is currently embarking on a mass-vaccination drive to prevent the spread of the virus and reduce the severity of its symptoms in those infected.

- iv. Explain the probable reasons why the government has chosen to intervene in the provision of health benefits in this way.

[6]

- v. State what level of care the mass-vaccination drive represents and list the key supply-side providers that will need to be involved in the mass-vaccination drive.

[3]

Scientists conclude the impact on mortality will fade to near zero over the next 100 years as effective treatment and prevention programmes are rolled out.

- vi. Explain the impact this virus would have on the population pyramid of Noricum over the next 100 years.

[3]

[Total 24]

END OF PAPER