

EXAMINATION

8 November 2023 (am)

Subject F101 — *Health and Care* 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 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

A large insurance company in a developed country is assessing its book of pre-funded long-term care insurance (LTCI) policies. The policies offer cash benefits in a series of regular payments (for life) after claim inception.

Identify the key risks facing the insurer's LTCI book.

[Total 7]

QUESTION 2

Company X has an established book of Critical Illness policies. Company X is assessing the impact of the Covid-19 pandemic on its claims risk and has noted the following concerns:

- (a) There was a reduction in the take-up of healthcare screening during the Covid-19 pandemic.
- (b) There appears to be an elevated risk of cardiac conditions and diabetes amongst people who have had a Covid-19 infection.
- (c) There is no data on the long-term side effects of Covid-19 vaccinations (which were widely administered to the population during the pandemic).

Discuss how each of these could affect the claims risk for Company X and describe the risk management steps Company X could apply to mitigate the impact.

[Total 9]

QUESTION 3

The country of Actuarial provides cover for medical expenses associated with motor vehicle accidents through a State-sponsored insurance fund that is funded by a fuel levy. The medical expenses are reimbursed by the fund according to tariffs that are published annually. PMI insurers are able to recover medical expenses in respect of their policyholders who have motor vehicle accidents in line with these published tariffs from the fund.

Company A offers comprehensive PMI cover that includes full indemnity for medical expenses associated with motor vehicle accidents. The State-sponsored fund has recently published a revised set of tariffs which includes a significant reduction in the level of the tariffs for some services.

- i. Discuss why the State-sponsored insurance fund would require regulated medical tariffs. [3]
- ii. Outline the implications for Company A of the change in the tariffs. [2]
- iii. Discuss the courses of action Company A could take in response to the change in tariffs and the implication of these. [6]

[Total 11]

PLEASE TURN OVER

QUESTION 4

Support4Life is an insurance product that offers a critical illness benefit as a rider to a whole of life assurance contract. The critical illness benefit covers the four core critical illness conditions – cancer, stroke, heart attack and coronary artery bypass graft.

The Marketing Manager is seeking ways to increase the marketability of the product and has suggested adding a terminal illness benefit to the current product offering at zero additional cost to the policyholders.

- i. Define a terminal illness benefit.

[2]

You are the Pricing Actuary who previously worked on the pricing of the Support4Life product. You believe that you can add the terminal illness benefit to Support4Life without it having a significant impact on the cost of offering the product.

- ii. Explain why the terminal illness benefit might not significantly impact the cost of offering the Support4Life insurance product.

[2]

- iii. State, with reasons, whether you believe that the terminal illness benefit should be added to both existing and new policies.

[2]

The Marketing Manager has also proposed adding an optional child benefit to the current Support4Life product. The child benefit provides a benefit of 10% of the main life's sum assured should a child dependent be diagnosed with cancer. The Marketing Manager further suggests that the cost of this additional cover should be an additional 10% of premium to those taking up the offer.

- iv. Comment on this suggestion.

[6]

[Total 12]

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QUESTION 5

- i. Outline the key characteristics of deterministic and stochastic models, highlighting their relative merits.

[4]

In a particular territory, regulation requires all PMI insurers to cover a minimum set of benefits and that these benefits need to be community rated with income and family size being the only permitted rating factors. The regulator has expressed concern over the disparity in community rates between different PMI insurers in the market. The government has approached you, a consulting actuary, to assist with the modelling of an envisaged industry-wide risk-equalisation fund for PMI insurers.

- ii. Describe briefly the rationale for the introduction of a risk-equalisation fund and outline how it may operate.

[4]

- iii. Outline the drawbacks of introducing the risk-equalisation fund.

[3]

- iv. Discuss whether deterministic or stochastic models may be the most appropriate for modelling the operation of the risk-equalisation fund.

[4]

[Total 15]

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QUESTION 6

You are an actuary working at a medium-sized health insurer selling PMI cover. The insurer has three cover options available to policyholders. The In-Hospital benefits between the three options are identical.

Basic – In-Hospital cover only

Savings – In-Hospital cover with a Medical Savings Account (MSA)

Comprehensive – In-Hospital cover plus Day-2-day benefits cover.

- i. Explain briefly how a MSA operates and state the differences between the Savings and Comprehensive options.

[4]

You have just performed a recent claims experience investigation.

- ii. List reasons for performing such an investigation.

[3]

A colleague has commented: “PMI is a short-term product with annually renewable cover and reviewable premiums, so it makes sense to look only at the past year’s experience in order to set the contribution rates for the following year.”

- iii. Comment on your colleague’s statement.

[3]

The CEO has proposed to the Board the idea of closing down the Savings option, citing that the cost of administering three distinct options is excessive. No benefit changes are proposed for the two remaining options.

- iv. Discuss the implications of the CEO’s proposal for the insurer.

[6]

[Total 16]

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QUESTION 7

Angel Health is a start-up health insurer that has started selling hospital cover insurance plans in the country Zibia. The average monthly premium for their current book of business is Z\$90. The tables below show the emerging claims experience:

Month	Claims ratio
October 2022	87%
November 2022	96%
December 2022	106%

Month	Claims	Lives
January 2023	Z\$255,000	2,456
February 2023	Z\$300,000	2,600
March 2023	Z\$290,000	2,605

In addition, the premium includes a 23% expense loading as a percentage of premium.

- i. Calculate the claims ratios for 2023 using net premiums (before loadings). [3]
- ii. Discuss the trends observed in Angel Health's experience and the risks posed by these trends. [7]

Angel Health is considering obtaining reinsurance, and implementing additional risk management techniques to assist it in managing its claims experience and reducing their claims ratios.

- iii. Outline the benefits, other than risk transfer, that reinsurance could offer to Angel Health. [4]
- iv. Discuss 3 other risk management techniques that could be used by Angel Health to help improve their claims experience. [3]

[Total 17]

PLEASE TURN OVER

QUESTION 8

LWE is a large PMI insurer. PCC is a large chain of primary healthcare providers offering GP visits and medication for both acute and chronic conditions. LWE is considering entering into a capitation agreement with PCC to manage the primary healthcare needs of its insured population. The contract will cover GP visits and medication.

- i. Define capitation. [1]
- ii. Outline the key assumptions required to price the capitation agreement. [4]

Expected distributions and costs for covered lives			
Gender	Chronic Status	Expected life years	Expected Cost per life year (R)
Male	Non-Chronic	1245	3,030
Male	Chronic	684	4,370
Female	Non-Chronic	949	3,510
Female	Chronic	588	4,360

Based on the expected distribution and costs, LWE will pay a single monthly fee, per covered life, to PCC to provide these benefits to its insured population.

- iii. Calculate the monthly capitation fee per insured life payable to PCC. [2]

One year later, LWE evaluates the performance of the contract based on the actual experience as shown below:

Gender	Chronic Status	Actual life years	Actual cost per life year (R)
Male	Non-Chronic	1200	3 670
Male	Chronic	820	3 890
Female	Non-Chronic	1000	3 720
Female	Chronic	317	4 450

- iv. Calculate the total amount paid to PCC and the profit/loss of the contract to LWE based on the actual experience. [2]
 - v. Discuss the benefits and risks to LWE of entering this capitation agreement with PCC. [4]
- [Total 13]

END OF PAPER