EXAMINATION

12 November 2021 (am)

Subject F102 — *Life Insurance*
Fellowship Principles

Time allowed: *Three hours and fifteen minutes, plus an additional five minutes to allow for scrolling in the ASSA Exam Platform*

Total marks: *100*

INSTRUCTIONS TO THE CANDIDATE

1. *Ensure that you are logged in and authenticated through Examity before you attempt the examination.*

2. *Questions are only available in the ASSA Exam Platform and may not be printed.*

3. *Submit all of your answers in the ASSA Exam Platform only. No uploads of answers (handwritten or otherwise) to the ASSA Exam Platform will be accepted.*

4. *You may not use any other computer program (e.g. Email, MS Word or Excel) or files, nor open any other browser during the examination.*

5. *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.*

6. *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.*

7. *Mark allocations are shown in brackets.*

8. *Attempt all eight (8) questions.*

9. *Show calculations where this is appropriate. You may use blank paper to carry out rough work calculations. You may use a calculator from the approved list only.*

10. *You may return to your answers to review and amend during the allotted examination time. Once you are happy with your answers you need to* ***Finish all and Submit*** *your work. Once you have submitted you will not be able to make any more changes to your answers.*

11. *You must submit all work BEFORE the end of the allotted examination time. Take this into account when planning your review and submission. There will be no time announcements.*

12. *An option to opt out of the exam will become available 1 hour after the official exam 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: Answers will be saved automatically during the examination if you are connected to the ASSA Exam Platform. However, 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 the expropriation price of a unit and explain briefly how it is calculated.

[3]

A life insurance company plans to launch a unit-linked product for the first time.

ii. Outline briefly, the principal risks specific to the derivation of the price of a unit that the life insurance company is exposed to.

[5]

[Total 8]

QUESTION 2

Phoenix Life operates in a developing country with a small life insurance market. The insurer provides the following products for private sector employees:

- An accumulating with-profits (non-unitised) pure endowment product, with a single investment fund and charges in the form of unallocated premiums and an annual management charge.
- An annually renewable group life assurance product paying a lump sum benefit on the earlier of death and permanent disability of the employee. The benefits and premiums are linked to the salary of the employee.

i. Describe how bonuses are awarded to accumulating with-profits policies.

[3]

The insurer is reviewing the premiums for the group life business and the charges for new pure endowment policies.

ii. Outline how the insurer could determine the assumptions for setting the revised premiums and charges for each of the products offered. A detailed description of experience investigations is not required.

[10]

[Total 13]

PLEASE TURN OVER

QUESTION 3

You work for a start-up insurance company which plans to start selling business in a few months' time. Your first product will be a regular premium 10-year unit-linked endowment assurance with a maximum guaranteed sum insured of R1 million. Policyholders will be allowed to vary the guaranteed sum insured during the policy term, provided it does not exceed the sum assured selected at the start of the policy. The only charge on the product will be an annual management charge, which will be the same fixed percentage for all policyholders.

Your marketing manager proposes that, because the maximum sum insured is quite low, there should be no initial underwriting on the product besides asking the applicant to state that they are in good health.

i. Discuss the advantages and disadvantages of the marketing manager's proposal.

[5]

The insurer is negotiating an Obligatory/Obligatory reinsurance arrangement.

ii. Outline briefly the advantages and disadvantages to the insurer of entering into this type of reinsurance arrangement.

[3]

Some initial underwriting will be implemented as a condition to the reinsurance arrangement. It has been agreed with the reinsurer that underwriting will be limited to encourage sales.

iii. Describe an initial underwriting programme that would be suitable for this product.

[4]

iv. State 4 ways in which the product design could be changed to reduce the risk of poor mortality experience, other than using initial underwriting.

[2]

[Total 14]

PLEASE TURN OVER

QUESTION 4

Income protection (IP) insurance in a particular developed country is highly competitive, which has led to substantial losses for all life insurers over the last five years. The local regulator has decided to intervene to ensure that new IP policies issued are sold on a sustainable basis.

The regulator's proposals include:

A. A limit on the maximum benefit amount of 100% of policyholders' net of tax income during the first six months of benefit payment and 75% thereafter; these limits are lower than benefit amounts currently offered by most insurers.
B. A maximum benefit payment term of ten years; current products pay an income up to retirement age.
C. A limit of five years on the period of guaranteed premium rates, after which premiums may be reviewed by the insurance company; current products are sold on a fully guaranteed basis.

i. Outline the likely impact on policyholders of each of the proposals.

[3]

ii. Outline the main risks and challenges to insurance companies posed by the proposals.

[3]

iii. Outline the main advantages to insurance companies of the proposals.

[2]

[Total 8]

QUESTION 5

An insurer writes stand-alone whole life conventional critical illness contracts covering four core conditions. The insurer has received requests from many policyholders to increase the sum assured on their contracts substantially.

i. Explain how the equating policy values method can be used to calculate the revised premium rate for an increased sum assured on these contracts.

[4]

The insurer has decided to review the product design. One of the changes being considered for new contracts is the inclusion of an option that allows the policyholder to increase the sum assured by 10% for each subsequent year after the exercise date of the option. The option can be exercised at any time during the contract without the need to provide any evidence of health at that time.

ii. Outline briefly, the issues that should be considered before making the suggested change to the product design.

[5]

iii. Suggest ways for the insurer to minimise its anti-selection risk on the option to increase the sum assured described above.

[4]

[Total 13]

PLEASE TURN OVER

QUESTION 6

A life insurer in a developing country sells conventional without-profits whole life funeral policies to the low income population. These funeral policies are designed to cover the policyholder as well as the spouse, children and parents of the policyholder.

i. Describe the model required to determine the present value of shareholder profits of the portfolio of funeral policies for embedded value purposes.

[7]

The insurer currently pays a high level of initial commission on regular premium contracts. There are proposals to change commission regulation to require insurers to pay level commission on the payment of each premium throughout the term of the contract.

ii. Describe the potential impact of the proposed regulations on the embedded value and overall profit for new funeral policies, if the insurer does not change any of the other pricing assumptions for these policies.

[5]
[Total 12]

QUESTION 7

A life insurer in a developing country sells without-profit immediate level annuities. Both single-life and joint-life annuities are offered.

i. Outline the characteristics of the annuity liabilities and hence suggest a suitable matching investment strategy for these liabilities.

[6]

ii. Describe how the matching investment strategy might differ for without-profit immediate annuities increasing in line with the consumer price index (CPI) of the country.

[4]

A director suggests that the insurer should adopt a mismatched investment strategy on its level and CPI increasing annuities to enhance returns for the shareholders.

iii. Discuss the director's suggestion.

[4]
[Total 14]

PLEASE TURN OVER

QUESTION 8

An established mid-sized life insurer writes mainly group life business and a small amount of conventional whole life products (with no surrender value) to middle- and high-income individuals.

i. Outline briefly a method that could be used by the insurer to determine its liability for the whole life products using a gross premium valuation method on a market-consistent basis.

[4]

The insurer performs a comprehensive mortality investigation every three years.

ii. Describe how the insurer would perform the mortality investigation.

[4]

A global pandemic has impacted the country for the past year, resulting in a higher-than-usual number of deaths. It is expected that the pandemic will last for several more years before most of the population will be immunised. Death rates from the pandemic vary by region, depending on vaccination rates and other factors.

iii. Outline how future monitoring of mortality experience might change due to the pandemic.

[2]

The mortality investigation just completed by the insurer has shown that mortality experience over the last year has been higher than previously expected for both products, with the most significant difference seen in the group life product. The insurer is about to calculate its insurance liabilities.

iv. Explain the likely impact of the pandemic on the liabilities to be calculated for the group life and whole life products.

[4]

v. Outline 3 possible actions that the insurer may take in response to the increase in mortality experience due to the pandemic.

[4]
[Total 18]

END OF PAPER