EXAMINATION

2 June 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.*

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. Explain how the relationship between:

- the earned asset share;
- the prospective reserve using the original pricing basis; and
- the prospective reserve using a realistic basis,

will give an indication of the profit extracted on the surrender of a without-profit contract.

[4]

A life insurance company is designing a new regular premium unit-linked savings product which provides no risk benefits. The only charge on the product is a management charge of 1% per annum.

An actuarial student proposed a design for a penalty to apply when a policyholder requests a reduction in the term of the policy. The proposed penalty to be deducted from the unit fund is:

$0.5\% \times n \times$ (the fund value at the time of alteration)

where n is the reduction in the outstanding term of the policy measured in years. For example, if the original term is reduced by 1.5 years, then the penalty is equal to 0.75% of the fund value at the time of alteration.

ii. Discuss briefly the suitability of the proposed alteration penalty.

[8]

[Total 12]

QUESTION 2

A large life insurer has sold a without-profits whole of life assurance product with a critical illness accelerator benefit, for many years. The product has a minimum sum assured of R500 000 and a maximum sum assured of R50 million.

i. List the factors that would influence the claims experience for the critical illness benefit.

[3]

ii. Explain why the insurance company would set a minimum and maximum sum assured.

[2]

iii. Explain why the insurance company would underwrite applications for insurance.

[3]

iv. Describe the purpose of the various types of underwriting available to the insurer at policy inception and the information on which initial underwriting decisions are based.

[5]

v. Explain how, and why, initial underwriting might vary for small, medium, and large sums assured.

[2]

[Total 15]

PLEASE TURN OVER

QUESTION 3

i. Explain the main differences between a unitised accumulating with-profit contract and a unit-linked contract.

[4]

A life insurer in a developing country sells 10-year single premium contracts on a unitised accumulating with-profit basis. Regular bonuses are declared monthly and may be zero but never negative. Death and maturity benefits are equal to the policyholder's fund value and no market value reductions will be applied in these circumstances. Terminal bonuses may be paid on death and maturity. Surrender values are not guaranteed.

ii. Discuss the factors that the company should take into account when deciding on the assets it might invest in for the above product.

[8]

The company is reviewing the adequacy of its charges for new business.

iii. Describe how the company could in practice determine a suitable premium-related charge for the cost of the investment guarantee associated with the above contract.

[5]

[Total 17]

QUESTION 4

i. Describe how a passive valuation approach differs from an active approach.

[2]

A life insurance company that sells conventional with-profit endowment assurances, on a single-premium and recurring-premium basis, has been using a passive valuation approach and the net premium valuation method for calculating its reserves for both statutory and internal management purposes.

One of the directors remarks that "The net premium valuation method makes no allowance for future bonuses and is imprudent because it does not include future renewal expenses. Furthermore, the company's passive valuation approach uses outdated assumptions and values that distort the company's true financial position."

ii. Discuss the points that you would make in addressing the director's comments.

[6]

The board of directors has decided that an active valuation approach is to be used for future internal management purposes.

iii. Outline briefly 2 advantages and 2 disadvantages of this decision for the company.

[2]

[Total 10]

PLEASE TURN OVER

QUESTION 5

Unit-linked products have been recently introduced in a country with a small developing insurance market. The country's life insurance industry association is developing a best practice guidance note to be followed by insurers in relation to unit-linked products.

i. Explain the approach to the pricing of units for an expanding internal unit-linked fund that would be set out in the guidance note.

[4]

ii. List the requirements for disclosures to policyholders at the time of sale for unit-linked products that should be included as best practice in the guidance note.

[5]
[Total 9]

QUESTION 6

People's Life writes a large volume of credit life polices where the policyholders are clients of a large micro-finance institution, People's MFI that is part of the same financial services group. It is compulsory for the borrowers of People's MFI to purchase the credit life policy from People's Life when they take out a loan from People's MFI. The credit life policies pay the outstanding balance of the loan on the death of the policyholder.

People's MFI only issues low value (average loan value R15 000) and short-term (average term 9 months) loans. People's MFI is remunerated by People's Life through commission and service fees for new business administration, on-going policy servicing and administration of claims.

People's Life has decided to expand its product range by offering a 1-year term assurance policy with a sum assured of R15 000 to the low-income market sold through an in-bound call centre staffed by salaried agents. The product will not be underwritten and there will be no differentiation in premiums by age or sex.

i. Explain the differences in the pricing assumptions for the new product compared to those for the product sold to the borrowers of People's MFI.

[9]

The low-income market has limited access to health care services. The insurer is considering adding a free annual health check-up as a benefit on the new product.

ii. Explain how the introduction of the health check-up benefit could impact the experience for the new product.

[3]
[Total 12]

PLEASE TURN OVER

QUESTION 7

A large insurer sells only unit-linked endowment assurance policies. You have been tasked with reviewing the capital efficiency of the product.

i. Describe how you would determine the various model points to be used in the model.
[2]

ii. Describe the model that you would use for this process, detailing the cashflow items that would be included.
[6]

iii. Explain how you could combine the use of stochastic and deterministic modelling for this exercise, motivating your approach.
[3]

[Total 11]

QUESTION 8

A life insurance company has a large and mature book of 10-year without-profit term assurance policies that give the policyholder the option to double the sum assured at the 5^{th} policy anniversary without providing further evidence of health.

The insurer has previously determined the cost of the option assuming that all policyholders take up the option and that mortality for the policyholders who take up the option follows the ultimate mortality rates from the standard industry mortality tables. For future sales, the insurer has decided to determine the cost of the option based on the expected take up rate and the expected mortality of policyholders taking up the option. The expected take up rate and expected mortality for those taking up the option will be based on the actual experience for this business over the last 5 years.

i. State possible reasons for a policyholder choosing to exercise the option.
[2]

ii. Explain how the investigation into the take up rates and mortality rates would be performed.
[4]

iii. Describe the different cashflows that are expected to arise over the policy term for this product.
[4]

The marketing manager has suggested that the insurer relaxes the restrictions on the option.

iv. State 2 restrictions in the current product relating to the option.
[1]

v. Explain the increased risks to the insurer if the restrictions on the option are relaxed.
[3]

[Total 14]

END OF PAPER