EXAMINATION

1 June 2022 (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. *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. *You are required to submit your answers in Word format ONLY using the answer template provided. No answers in any other format (e.g. handwritten) will be accepted.*

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.*

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.*** *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

An insurance company sells conventional without-profits term assurance policies. As the product actuary, you have been tasked with reviewing the premium rates.

i. Describe how you would use a cashflow projection model to perform the profit test exercise.
[5]

The sales manager requests an enhancement for new term assurance contracts whereby policyholders would be allowed to extend the term of the contract at the end of the original contract term. This option to extend the contract term will be offered at standard premium rates at the time of the extension, without underwriting at that time.

ii. Outline how you would use the cashflow model to determine the cost of the option.
[3]
[Total 8]

QUESTION 2

An insurance company writes long-term disability insurance business.

i. List 8 common exclusions associated with such insurance.
[4]

ii. Explain, giving examples where appropriate, the reasons why the insurer might make use of exclusions for these contracts.
[6]
[Total 10]

QUESTION 3

You work for a medium-sized life insurer that has been selling group life business for many years. Until now the insurer's target market has been small- to medium-sized companies which employ mainly professional and administrative staff. The insurer plans to expand its target market to include larger companies in the industrial and manufacturing industries.

i. Outline briefly the factors, relating to pricing and administering group life business, which need to be considered by the insurer before implementing its plan.
[5]

ii. Outline the benefits available to the insurer of reinsuring this business.
[6]

iii. Explain how initial underwriting differs for group life compared to individual life insurance.
[4]
[Total 15]

PLEASE TURN OVER

QUESTION 4

A life insurer in a developed country sells single-premium with-profits (additions to benefit) endowment assurances of varying terms. The life insurer is reviewing its investment strategy for this business.

i. Explain the factors that the company should consider in assessing the appropriateness of its investment strategy.

[4]

ii. Describe the stochastic modelling exercise that should be carried out to determine the appropriateness of its investment strategy.

[5]

The sales director comments that the endowment assurances could be more marketable if a guaranteed annuity option were available at maturity.

iii. Describe how the stochastic model used to determine the investment strategy could be used to determine the cost of offering a guaranteed annuity option for the model point of a 10-year endowment sold to a policyholder aged 55, explaining any modifications that would need to be made to the model.

[4]

iv. Outline how market option-pricing methods could be used to determine the cost of offering a guaranteed annuity option.

[2]

[Total 15]

QUESTION 5

i. State the principles that should be considered when designing the surrender value terms for conventional life insurance products.

[5]

A life insurance company plans to introduce a new without-profits whole life assurance policy, with premiums that escalate at a fixed effective rate of 5% per annum, compound, and with benefits which remain unchanged.

It has been proposed that the surrender value for this policy should be equal to the prospective policy value on a realistic basis and that no surrender value should be paid if this policy value is negative.

ii. Discuss the suitability of this proposal.

[8]

[Total 13]

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QUESTION 6

A life insurer sells a large volume of with-profits immediate annuity policies. Policy benefits are a guaranteed level monthly benefit and a cash dividend distributed at the end of each year. Dividends are calculated using the contribution method and are guaranteed not to fall below zero.

i. Outline the consumer needs met by this product, and the risks faced by an annuitant purchasing the product.

[5]

ii. Outline the potential sources of surplus for these policies, and the other factors to be considered for calculating and distributing the surplus arising.

[4]

iii. Explain how the insurer would perform its annual expense investigation for the with-profits annuity business.

[7]

[Total 16]

QUESTION 7

The insurance regulator in a small developing country is revising the solvency regime. Under the current regime insurance liabilities are determined using a passive approach and the net premium valuation method. The new regime will require an active approach where insurance liabilities will be calculated using the gross premium valuation method on a market consistent basis.

i. Outline 2 advantages and 2 disadvantages of the new approach for calculating the insurance liabilities.

[2]

Current regulatory minimum solvency requirements are based on percentages of insurance liabilities, with percentages varying by class of business. For purposes of demonstrating solvency, the market value of assets is reduced by specified discount factors, with discount factors varying by asset class.

ii. Outline the weaknesses of the current solvency approach compared to a "Value at Risk" approach.

[4]

An insurer in the market has a small portfolio of 15-year without-profits term assurances. The insurer is calculating its insurance liabilities under the new regime for the first time.

iii. List the data and assumptions required for the valuation of these insurance liabilities on a market-consistent basis and explain how the insurer would set the discount rate.

[6]

[Total 12]

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QUESTION 8

A newly-established life insurance company decides to sell a 20-year regular premium unitised with-profits endowment assurance. The product has the following features:

- Policyholders select one of the following death benefits from inception:
  - R1 million (or the value of the unitised fund if higher), only requiring the completion of a short health questionnaire; or
  - R2 million (or the value of the unitised fund if higher), requiring full underwriting.
- Bonuses (which may not be negative) are declared monthly based on investment performance of the with-profits fund.
- The only charge is an annual policy fee of 2% p.a. on the unitised fund.
- There is no market value reduction on surrenders.

The with-profits fund is invested in a range of assets, including equities. Investment guarantees are partly managed by making use of derivatives.

i. List 4 other types of charges that the company could have used for this product.

[2]

ii. Describe briefly the risks that offering this product exposes the company to in respect of:

   a. mortality;
   b. expenses; and
   c. investment.

[9]
[Total 11]

END OF PAPER

