EXAMINATION

6 November 2020 (am)

Subject F102 — *Life Insurance*
Fellowship Principles

Time allowed: Three hours and fifteen minutes

Total marks: 100

INSTRUCTIONS TO THE CANDIDATE

1. *Ensure that you are logged into your ProctorU account before attempting the examination.*

2. *Questions are only available in this ASSA Examination platform and may not be printed.*

3. *You are required to submit all of your answers in the ASSA Examination platform only. No uploads of answers (handwritten or otherwise) to the ASSA Examination platform will be accepted.*

4. *You may not use any other computer program (e.g. Email, MS Word or Excel), files or open any other browsers during the examination.*

5. *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.*

6. *Mark allocations are shown in brackets.*

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

8. *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.*

9. *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.*

10. *It is the candidate's responsibility to ensure that all work is submitted 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. 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

A large life insurance company sells conventional with-profit immediate annuities.

i. Describe how the company would set each of the assumptions to determine the supervisory reserves for its immediate annuity business. The insurance supervisor requires that reserves are set on a prudent basis.

[6]

The life insurance company has recently performed an analysis of surplus on its supervisory valuation basis over the previous year.

ii. State possible reasons why the company would perform an analysis of surplus.

[3]

The analysis of surplus has shown a significant loss relating to its expenses for its immediate annuity business.

iii. Outline the possible steps that the company could take in response to these results.

[5]
[Total 14]

QUESTION 2

Describe briefly life insurance products that may be suitable for the following customers, explaining how they meet the needs of the customer, and the form they typically take i.e. whether they are typically without profit, with-profits or unit-linked.

i. A couple expecting to retire in 10 years' time. The couple has no debt and their children have completed tertiary education.

[3]

ii. A tourism company that offers 1-month trips to the Amazon jungle, including flights and basic accommodation. The company is owned by two partners who manage the company and employs a small number of administrative staff, pilots and tour guides.

[5]
[Total 8]

QUESTION 3

A life insurance company uses the "equating policy values" method for all alterations. The policy values before and after the alteration are calculated using the pricing basis which was applicable when the policy was originally sold.

i. List the principles that should be considered in determining the methodology for policy alterations.

[4]

ii. Discuss briefly, the suitability of the method for the situation in which a policyholder requests an increase in the sum assured on a term assurance policy.

[8]
[Total 12]

PLEASE TURN OVER

QUESTION 4

Mutual Life is a small mutual insurer with limited free assets. The insurer has recently decided to launch a new 10-year regular premium conventional with-profits product for which the majority of assets will be invested in a portfolio of relatively high-risk equity instruments. Surplus will be distributed using the "additions to benefits" method through a combination of reversionary and terminal bonuses.

i. Discuss the factors that the company should take into account when determining the bonus philosophy and the strategic split between reversionary and terminal bonuses for this product.

[8]

15 years' after the introduction of the policy there is a large fall in global equity markets, just after the declaration of the annual terminal bonus for policies maturing in that year.

ii. Describe the possible impact this fall in equity markets might have on the terminal bonus rates of the insurer.

[6]

[Total 14]

QUESTION 5

You have recently been appointed to the actuarial department of a large life insurance company with a range of products targeted at high-income customers. The two largest product portfolios are a high sum assured conventional without-profits whole of life product and a 10-year single premium unit-linked endowment product.

The insurance regulator has recently introduced a requirement for the liabilities for supervisory purposes of all insurers in the market to be determined on a market-consistent basis.

i. Describe how the liabilities for the portfolio of the whole life assurance policies would be determined on a market-consistent basis.

[7]

The managing director of the insurer has heard that option pricing techniques may be used to determine the liabilities for unit-linked products with investment guarantees. She has asked you to explain how market-traded option prices can be used to determine the liabilities for the 10-year single premium unit-linked endowment product.

You are given the following additional information about the product:

- Death and maturity benefits will be equal to the policyholder's fund value, or a return of premiums plus 2% p.a. if higher.
- The underlying fund tracks the performance of the local All-Share Index (with dividends re-invested).
- Surrender benefits will not be guaranteed.

ii. Explain how market-traded option prices can be used to determine the liabilities for this product and consider whether the approach would be suitable in practice.

[5]

[Total 12]

PLEASE TURN OVER

QUESTION 6

You are the product development actuary at a medium-sized life insurance company. Your company has a successful income protection product which it has been selling for many years. The target market for this product is professionals (medical professionals, lawyers, accountants, etc.).

One of your top brokers has come to you with an idea to expand this product. His family owns many food retailers and employs thousands of individuals who perform mainly low-skilled manual tasks. The employees' salaries are between one and two times the country's minimum wage level. The employees work on a monthly contract basis, but many of the employees have worked for the same company, in the same position, for many years.

The broker would like you to design an income protection product for these employees. He says that there are many other companies who have employees with a similar need, and that this product would be the first of its kind in your country.

i. Outline briefly the considerations which you would need to take into account when setting the benefit definitions for such a new product.

[5]

ii. Outline briefly the risks which would be faced by the insurer associated with pricing such a product.

[4]

iii. Explain the role a reinsurer may play in assisting the insurer in the development of the new product.

[3]

[Total 12]

QUESTION 7

A mid-sized life insurance company in a particular country writes mainly conventional without-profit life and income protection insurance. The company writes policies targeted mainly at the middle-income market distributed through independent brokers and its own agency force.

Over the last year, there has been a deterioration in the economy due to restrictions on business following a health pandemic. It is expected that it will take two to three years for the economy to fully recover to the economic activity levels that existed prior to the restrictions on business.

i. Outline the likely impacts on the company and the risks it is likely to face in subsequent years as a result of the health pandemic.

[10]

ii. Outline the actions that the company could take to address the risks identified in part (i).

[5]

[Total 15]

PLEASE TURN OVER

QUESTION 8

A life insurance company in a developing country sells without-profit immediate (level and fixed-increase) annuities and uses local fixed-interest corporate bonds to match these liabilities.

i. Discuss the suitability of the insurer's investments for its annuity business.

[5]

The company is reviewing its current investment strategy and there are several proposed changes to the strategy.

ii. Describe how a model may be used to determine the suitability of the proposed changes to the investment strategy.

[8]

[Total 13]

END OF PAPER

