EXAMINATION

22 May 2019 (am)

Subject F102 — *Life Insurance*
Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of EACH OF your answer booklets.*

2. *You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made.*
   You then have three hours to complete the paper.

3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*

4. *Mark allocations are shown in brackets.*

5. *Attempt all eight (8) questions, beginning your answer to each question IN A SEPARATE BOOKLET.*

6. *Show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in your answer booklets, with any additional sheets firmly attached to the correct booklet, AND this question paper.

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.

QUESTION 1

A relatively new life insurer in the local market sells conventional term and whole of life assurances through a combination of call centres and independent brokers.

i. Outline why it is important for the insurer to monitor aspects of new business sales.

[7]

The insurer wishes to introduce a guaranteed insurability option on its new term assurances. All policyholders will pay a premium for the option and mid-way through the original policy term, they can double their sums assured at the then standard premium rates without further evidence of health.

ii. Suggest ways in which the company could manage the mortality risk associated with this option.

[5]
[Total 12]

QUESTION 2

Forsure is the market-leading life insurer in Actuaria and holds a significant portfolio of term assurance, whole of life and annuity policies. It has decided to review the mortality rates used to price its products.

i. Outline how the chief pricing actuary would go about setting the mortality assumptions.

[7]

A landmark constitutional court ruling in Actuaria has determined that life and health insurers are no longer able to use medical information as a rating factor for setting premiums, and that insured lives must pay the same premium (for the same benefits) regardless of their state of health, all other rating factors being equal.

ii. Describe the impact that this ruling may have on Foresure's existing and new business.

[5]

iii. Outline the effects that this ruling may have on the mortality experience of Forsure over the short-, medium- and long term.

[3]

iv. Suggest ways in which Forsure can discourage unhealthy lives, or attract healthier lives, in the absence of medical underwriting.

[2]
[Total 17]

PLEASE TURN OVER

QUESTION 3

A life insurance company sells a 20-year unit-linked endowment assurance which has been designed to target a unit fund value at maturity of 150% of total premiums paid. The fund value at maturity, which is not guaranteed, will be paid out as a maturity benefit.

i. Describe the factors that need to be considered in deriving an investment strategy for the assets underlying the unit-linked endowment insurance liabilities.

[7]

To make the product more marketable the company has decided to add a minimum guaranteed maturity value (GMV) as an added benefit.

ii. Explain how your answer to part (i) would differ as a result of adding the GMV benefit.

[4]
[Total 11]

QUESTION 4

A life insurance company has, for a number of years, sold a single premium unit-linked endowment policy with the following features:

- There is no death benefit.
- The maturity benefit is equal to the value of units at maturity, subject to a guaranteed minimum amount equal to the single premium.
- The surrender value is equal to the value of units, less a surrender penalty.
- The single premium is invested in a venture capital fund.
- A percentage of the premium is allocated to the unit fund at policy inception.
- Management charges are deducted from the fund on a monthly basis.

i. Describe two different methods that the insurer could use to value the cost of the guaranteed minimum maturity value.

[4]

Over the past few years, equity markets have shown higher volatility than in previous years. There has been a recent fall in equity market values of 30%, including venture capital equity investments.

ii. Explain how the recent investment market experience would have impacted on the relative position of the venture capital investment product's assets and liabilities.

[4]
[Total 8]

PLEASE TURN OVER

QUESTION 5

You are an actuary at a medium-sized life insurance company that sells mortality, lump sum disability and critical illness products. To keep up to date with market trends the company has decided to launch an income protection product. You have been tasked with the design, pricing and risk management of the new product.

i. Outline briefly the purpose and product features of an income protection product.

[5]

ii. Describe how reinsurance can be used to mitigate the risks of launching this new product, mentioning the suitability of the different types of reinsurance as well as the downside of reinsuring the product.

[7]

[Total 12]

QUESTION 6

BestValue is an insurance company that sells both without-profit and unit-linked endowment assurances.

i. Outline briefly the principles that BestValue should consider when determining surrender values for its without-profit policies.

[4]

ii. BestValue uses a prospective method for determining surrender values for its without-profit policies.

Outline, without the use of formulas, how BestValue would determine surrender values for its regular premium without-profit policies and discuss the profit extracted on the surrender.

[4]

iii. Outline the considerations that would specifically influence the design of surrender values for BestValue's unit-linked policies.

[3]

[Total 11]

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QUESTION 7

A man is considering taking out an 18-year, regular premium, endowment assurance to provide for his new-born daughter's tertiary education. He would like to receive at least R1 million in maturity benefits. He is considering investing in a with-profit product with an initial sum assured of R500 000 payable in the event of death or maturity.

Companies A, B and C operate in the local life insurance market, and all offer conventional with-profit endowment assurance policies.

- Company A distributes surplus by means of regular, simple reversionary bonuses.
- Company B distributes surplus by means of regular, compound reversionary bonuses as well as by terminal bonuses which vary by term and duration.
- Company C distributes surplus by methods other than increasing the benefits.

i. Discuss why Company B's endowment assurance policy may be expected to have a higher maturity value than Company A's.

[4]

ii. Suggest how Company C is likely to be distributing surplus, and explain briefly why this is unlikely to be an appropriate option for the man.

[2]

iii. Outline other considerations that the man should take into account when deciding between a policy from Company A and one from Company B.

[4]

Assume that the man survives to the end of the term of the endowment assurance policy, and that Company B declares a terminal bonus at maturity of 25% of attaching bonus only.

iv. Calculate the average annual bonus rates that Companies A and B would have to declare for the man to receive his targeted maturity benefit.

[3]

[Total 13]

QUESTION 8

The insurance regulator in a developing country has commissioned the industry association to develop standardised features for two single premium retirement income products:

- Conventional level annuity, guaranteed for the life-time of the policyholder.
- Unit-linked "income drawdown" product, where the single premium (less initial fees) is invested in one of a range of investment funds, as selected by the policyholder. The policyholder selects a percentage, subject to a specified maximum, of the fund value to be received every month. This percentage may be changed at each policy anniversary. Management charges will be deducted from the fund on a monthly basis.

PLEASE TURN OVER

Individual insurers are expected to determine their own annuity rates and charging structures for these standardised products.

i. Outline briefly, for each of the products above:

   a. the benefits to the policyholder; and
   b. the risks remaining with the policyholder.

[4]

The insurance regulatory authority is developing a guidance note on the unit pricing of the internal unit-linked funds for the "income drawdown" product.

ii. Describe the approach to the calculation of the appropriation price as it would be covered in the guidance note.

[4]

Phoenix Life is planning to offer a unit-linked "income drawdown" product. The company intends to offer three investment funds and charge the same monthly management charge for all funds.

iii. Explain how the insurer could use a model to determine the level of the monthly management charge for this product.

[8]
[Total 16]

END OF PAPER

