EXAMINATION

24 May 2017 (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 <u>IN A SEPARATE BOOKLET</u>.*

6. *Candidates should 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

You are the senior pricing actuary at a large sub-Saharan life insurance company. One of the company's main risk products is a without-profits whole of life insurance with no surrender value, sold through independent intermediaries. The company has sold this product for several decades. Due to the company's relatively strict underwriting the premium rates are very competitive.

The company is planning to launch a direct offering of the whole of life insurance within the next 12 months. You expect the average sum insured to be less than half of that on the existing product. The company intends to do all of the underwriting on-line and through a call centre. The product will be marketed through mass media advertising (television, radio, newspaper, internet) as well as through mobile phone SMS campaigns.

i. List 8 key parameters that you would require assumptions for in order to price the new product.

[2]

ii. Outline how you would set the assumptions for the parameters listed in (i), with specific emphasis on the three most important parameters.

[12]

[Total 14]

QUESTION 2

i. Describe briefly the two methods which could be used for allocating bonuses to the unit fund for a unitised with-profits (UWP) contract.

[1]

ii. Explain the key differences between UWP and unit-linked contracts.

[3]

A UWP single premium product with a term of 15 years allocates bonuses to policyholders' unit funds through a mixture of regular and terminal bonuses. The product provides:

- A death benefit of the value of the unit fund subject to a minimum of a return of the premium.
- A maturity benefit of the accumulated fund value including any regular and terminal bonuses.
- A surrender benefit equal to the accumulated fund value less a pre-determined surrender penalty. No Market Value Adjustment is applied to a surrender.

The following charges are levied on the policy: a bid-offer spread, annual management charge and a charge for risk benefits.

iii. Describe how a cashflow model could be used to determine the value of the expected future profit from the in-force UWP business.

[10]

[Total 14]

PLEASE TURN OVER

QUESTION 3

Insurer A, a large life insurer in a country with a well-developed investment market is considering taking over a portfolio of in-force without-profit immediate annuities from Insurer B. The liabilities relating to this portfolio of annuity business will be transferred to Insurer A together with a transfer of assets from Insurer B.

Describe how Insurer A could determine the value of the transfer of assets required, using a market-consistent approach, in exchange for the transfer of the annuity portfolio liabilities.

[8]

QUESTION 4

i. Outline briefly the principles that a life insurance company should follow when setting surrender values.

[4]

It is proposed that the surrender values for a new conventional without-profit whole life product be determined using a blended approach based on:

- Retrospective values (based on the asset share) at early durations; and
- Prospective values using assumptions (based on the current premium basis) at later durations.

The surrender values will not be guaranteed and projected surrender values are not included in disclosures to policyholders.

ii. Explain how such a blended approach would meet the principles outlined in (i).

[5]

iii. Outline ways in which the approach to setting surrender values could be changed in order to increase the profit made on surrenders.

[2]
[Total 11]

QUESTION 5

i. Explain how regulations might affect the investments of a life insurance company.

[4]

A small, but rapidly growing, life insurer which sells mostly with-profits endowment assurances whereby profits are distributed by the additions to benefits approach, is currently facing a low level of free assets. The proportion of its liabilities backed by fixed-interest investments is significantly higher than the industry average.

ii. Explain why the insurer might have such a high level of fixed-interest investments.

[6]
[Total 10]

PLEASE TURN OVER

QUESTION 6

You are the product development actuary of a small life insurance company that currently only sells term assurance products. The company is in the process of redesigning this product and is considering adding an option to new policies under which policyholders may increase the level of cover during the term of the policy and/or renew the policy at the end of its original term without providing additional evidence of health.

i. Define the cost of a mortality option and outline the factors affecting the cost of a mortality option to the life insurance company.

[6]

ii. Discuss the impact this redesign would have on the company's underwriting process.

[3]

iii. Discuss the other considerations that the company should take into account before adding the option.

[6]

[Total 15]

QUESTION 7

A large well-capitalised insurer with a wide product range has recently launched an annually-renewable funeral insurance product covering the policyholder and his/her immediate family members. The product targets low income customers and will be sold through funeral parlours on a voluntary basis. The product has been initially priced assuming the same probability of claim for all individuals covered by adjusting the mortality assumption for a similar product sold to the lower-middle income market. The business model relies on salaried agents of the insurer for the marketing and ongoing servicing of the product to funeral parlours.

i. Outline the mortality, persistency and expense risks that the insurer faces relating to this product.

[7]

The insurer has been losing money on this product for the last four years.

ii. Outline briefly various investigations which the insurer could perform in order to understand the factors causing the losses.

[5]

The investigations performed by the insurer have indicated that higher than expected mortality and lower than expected retentions have caused the losses.

iii. Suggest four actions, for each of these two problem areas, which could be taken by the insurer to address the poor experience.

[4]

[Total 16]

PLEASE TURN OVER

QUESTION 8

i. Define long term care insurance.

[2]

A life insurance company in a developed country currently sells mainly regular premium unit-linked whole life assurance contracts. Mortality improvements in the country have been greater than expected by the insurance industry over the past decade

The insurer is considering introducing an optional long term care rider to its regular premium unit-linked whole life assurances. It is proposed that the combined new product will have the following features.

- The surrender value will be the bid value of the units less a surrender penalty.
- The death benefit will be the bid value of the units.
- The long term care benefit will be an annuity purchased at the prevailing annuity rates in the market (at the time of a claim) using the full bid value of the units. The annuity will be subject to a guaranteed minimum monthly amount, which will be selected at the time of purchasing the rider.
- If a policyholder claims the long term care benefit the unit fund will reduce to zero and will start building up again (through the continuing payment of premiums) until subsequent surrender or death.
- The long term care rider will only be available to individuals aged below 50 effecting new policies.

ii. Discuss the key factors to be considered by the insurer when assessing the suitability of the proposed product design.

[10]

[Total 12]

END OF PAPER

