EXAMINATION

9 November 2015 (am)

Subject F102 — *Life Insurance* Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Use the instructions and password provided at the examination center to log in.*
2. *Submit your answers in Word format only using the template provided. You MAY NOT use any other computer program (e.g. Excel) during the examination.*
3. *Save your work regularly throughout the examination on the supplied computer's hard drive.*
4. *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.
5. *You must not start typing your answers until instructed to do so by the supervisor.*
6. *Mark allocations are shown in brackets on exam papers.*
7. *Attempt all seven (7) questions, beginning your answer to each question on a new page.*
8. *Candidates should show calculations where this is appropriate.*

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.

AT THE END OF THE EXAMINATION

Save your answers on the hard drive AND hand in 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 work for a reinsurance company as a pricing actuary. Your company has not won any treaty tenders in the last 12 months relating to life products with lump sum accelerated critical illness benefits.

i. List the factors which ceding companies might consider when placing their reinsurance of such business.

[4]

ii. List, with reasons, pricing assumptions which could be investigated in order to improve your company's competitiveness with respect to such products.

[6]

[Total 10]

QUESTION 2

i. Outline the various policyholder needs that could be met by products that incorporate an income protection benefit.

[3]

A small life company has been experiencing poor sales of its income protection product, where premiums are guaranteed for the lifetime of the contract. The marketing manager is concerned that the onerous underwriting process is deterring sales.

ii. Outline both product-related and other factors (other than underwriting factors) that may be leading to poor sales.

[6]

The company wishes to increase its medical limits for underwriting (i.e. there will be an increase in the benefit level where medical examinations will be required) and change its product to allow premium reviews every five years from a contract's inception.

iii. Discuss the possible negative implications for the company of increasing its medical limits for underwriting.

[4]

iv. Discuss the main advantages and disadvantages to the insurer of reviewable premium as opposed to guaranteed premium contracts.

[3]

[Total 16]

PLEASE TURN OVER

QUESTION 3

i. List the main features of single premium unit-linked investment products.

[5]

ii. a. Explain the basic equity principle that applies to the pricing of an internal unit-linked fund.

b. Define the appropriation price of a unit fund and describe how the basic equity principle is applied when determining the appropriation price for a fund.

[3]

Summit Life sells a single premium retirement income product designed to be purchased by individuals at retirement. The premium less commission and initial fees is used to purchase units in an investment fund at policy inception. Annuity payments and management charges are deducted from the fund on a monthly basis. The annuity payments are expressed as an agreed percentage, determined at the outset, of the fund value at the time of payment of the annuity. After 10 years the bid value of the units in the fund is converted to a level monthly annuity, at the insurer's annuity rates at that time. The bid value of units is also payable as a lump sum on death or surrender within the first 10 years of the policy.

The insurer is considering adding a guarantee to new policies. The guarantee would provide a minimum annuity payment for the level annuity equal to the average monthly amount paid from the fund in the three years prior to conversion to a level annuity. Policyholders selecting this guarantee will be restricted to investment in a single unit-fund. The guarantee will be charged for by adding a guarantee fee into the initial fees charged at the inception of the policy.

iii. Outline the benefits to the policyholder of the addition of this guarantee and the risks that remain with the policyholder, in relation to both the unit-linked savings income and the level annuity component of the product.

[5]

iv. Describe how a cashflow model could be used to estimate the cost of the guarantee.

[7]

[Total 20]

QUESTION 4

You are an actuary working for an established life office with a large portfolio of with-profits policies. Until now, surrender values have been prescribed by regulation; however, in future, surrender values will be paid on a basis determined by the Statutory Actuary.

i. Outline briefly the principles that should be considered in developing a surrender value basis.

[4]

ii. Outline the risks to the company of the surrender values being too high or too low.

[5]

[Total 9]

PLEASE TURN OVER

QUESTION 5

Community Bank is a large bank providing banking services to the low-income market. The bank has recently established a subsidiary licensed to write life insurance business. Initially, the only product to be sold by this subsidiary is a low sum assured whole life insurance product with monthly premiums. Policies are sold through sales agents in the country-wide network of bank branches. Sales agents are remunerated through initial commission on the basis of nine months of premiums on the sale of a policy, without clawback on lapses. There are no surrender benefits and premiums are guaranteed for the duration of the contract. The insurer has added the following differentiating product features:

- Loyalty benefit: Policyholders receive a cash benefit of one year's premium if their premiums are up to date at the fifth policy anniversary.
- Premium skip: Policyholders may miss two premium payments, but the policy will lapse if the missed and current premiums are not paid at the next premium payment date.

The supervisory authority requires annual valuations of the policyholder liabilities using a gross premium valuation approach.

i. Describe the gross premium valuation method for determining the policyholder liabilities for this product.

[4]

ii. List the checks on the data and outputs of the valuation of the policyholder liabilities that would generally be performed to validate the results.

[5]

The product is initially priced using lapse assumptions for products with standard features in the market. After six years a lapse experience investigation is conducted, which shows that actual lapses have been much lower than the assumption used in the valuation of policyholder liabilities. It is expected that lapse rates will continue at this lower level for the foreseeable future and the insurer decides to reduce its best estimate assumption for lapse rates for the calculation of the policyholder liabilities.

iii. Explain the expected effect on the value placed on policyholder liabilities as a result of this change in the valuation assumptions.

[3]

The better-than-expected lapse experience has motivated the insurer to take further actions to try to reduce its lapse experience.

iv. Outline actions that the insurer could take to reduce its lapse risk and improve lapse experience.

[3]
[Total 15]

PLEASE TURN OVER

QUESTION 6

i.

a. Define the term 'embedded value'.

b. List the assumptions that are required to calculate an Embedded Value for a without-profits life assurance business.

[4]

You are the Statutory Actuary for a large, well-established life insurance company. The company's executive remuneration scheme is currently based on its after-tax profits for the year, which are compared against the company's after-tax profits for the previous year. It has been concluded that the executive remuneration scheme should balance overall performance with performance in the areas which the particular executive can influence. You have proposed that this might be achieved by the use of Embedded Value profit methodology.

ii. Discuss, using examples, how this might be done and comment briefly on whether it might result in the interests of management and shareholders being better aligned.

[5]

iii. List other reasons for performing an analysis of Embedded Value profit.

[2]

[Total 11]

QUESTION 7

An established life insurance company in a particular market writes mainly UK-style with-profits business.

i. Outline the factors that the insurer should consider when selecting assets to back the liabilities for its with-profits business.

[8]

The investment guidelines currently allow asset allocations of 70%-80% in equities, 15%-25% in fixed interest investments and 0%-5% in cash. The company is now proposing to change its investment policy to have up to a maximum of 60% in equities/property and the rest in fixed interest investments and cash.

ii. Discuss the possible impact of the change in investment guidelines on the company's bonus distribution strategy and the factors the company should consider before implementing a change.

[6]

A new life insurance company to the market is planning to introduce a with-profits product range, but intends to move away from UK-bonus style of reversionary and terminal bonuses. This company is considering distributing surplus to policyholders only via regular cash dividends on the contribution method.

iii. Outline briefly the advantages and disadvantages for the policyholder and the company of distributing bonuses in this form, as opposed to the use of a reversionary and terminal bonus structure.

[5]

[Total 19]

END OF PAPER