EXAMINATION

10 November 2014 (am)

Subject F102 — *Life Insurance*
Fellowship Principles

Time allowed: 3 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 seven (7) questions, beginning your answer to each question IN A SEPARATE BOOKLET.*

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

Omega Life is a niche insurer, focusing on micro-credit life insurance products.

The insurer has recently entered into an agreement with a bank targeting the middle- and upper-income market segments, to provide a 20-year term assurance product for mortgage loan customers. The bank wishes to offer two versions of this product:

- A standard 20-year level term assurance.
- A renewable 20-year level term assurance, where the policyholder has the option to renew the cover at standard premium rates for a further 10 years at the end of the original policy term. No additional underwriting will be required at the time of policy renewal.

i. Define the cost of a mortality option and outline briefly the factors that would influence the cost of the renewal option.

[4]

ii. Describe briefly two methods that can be used to price mortality options.

[3]

The insurance company expects a wide range of sums assured for the new product, with a significant increase in the maximum sum assured compared to its current products. The insurer is concerned about the variability in individual claim sizes that may arise from this product.

iii. Describe briefly a reinsurance arrangement that may be appropriate for the product, which would address the insurer's concerns.

[2]
[Total 9]

PLEASE TURN OVER

QUESTION 2

You are the actuary of a local insurer that specialises in stand-alone pre-funded long-term care products. The products are designed as without-profit single-premium products and provide a monthly income once the insured meets the requirements for long-term care. The level of monthly benefit is based on a regulated scale of monetary amounts that varies by degree of impairment. This scale is reviewed and updated annually by the insurance regulator, and has historically increased by CPI. The benefits are guaranteed to be paid as long as they are needed. There is no death or surrender benefit.

The investment strategy for this product has not been based on any modelling exercise, and has instead been based on general features of the liabilities.

i. Describe the key features of the liabilities that should have a bearing on the investment strategy for this insurer.

[5]

ii. State, with reasons, the likely assets to have been selected by the insurer to match the liabilities.

[4]

You decide to build a model to help set the investment strategy for this insurer.

iii. Outline briefly the model required for this purpose, and explain how the model can be used to help set the investment strategy for this insurer.

[5]

[Total 14]

PLEASE TURN OVER

QUESTION 3

You are the product design actuary for a life office with a good range of disability products. The life office considering the introduction of a new unitised accumulating with-profit product with level annual premiums are payable in advance. The product is only available to individuals aged 50 and younger at inception and each policy will mature on the policyholder's 65th birthday.

The benefits are as follows:

- On surrender: the bid value of the units less a surrender penalty.
- On death or maturity: the bid value of the units.
- If the policyholder is classified as permanently disabled during the product term: an immediate annuity payable until age 65 or earlier death. The annuity will be purchased with the bid value of the units and the insurance company's disability annuity rates at that time will be applied. The annual annuity will be subject to a guaranteed minimum of 5 times the policy's annual premium.

The charges on the contract are a bid-offer spread of 5% and an annual fund management charge of 3% per annum.

The company's standard disability underwriting rules will apply.

i. Discuss the factors that will affect the marketability of this product.

[10]

You are also considering offering a unit-linked version of this product where, instead of an accumulating with-profit design, the policyholder will have a choice of investment funds.

ii. Compare and contrast the features of an accumulating with-profit design and a unit-linked design, as alternatives for this product.

[4]
[Total 14]

QUESTION 4

A life insurance company selling without-profits endowment assurances currently uses the 'equating policy values' method for alterations, using the current premium basis for calculating policy values before and after alteration. The company is considering changing its alterations basis.

i. Discuss the factors that the company would need to consider if it wants to change its alterations basis to 'paid-up policy value plus premium for balance of sum assured'.

[9]

ii. Describe briefly, how the company would establish the expense loadings to be used for alterations.

[4]
[Total 13]

PLEASE TURN OVER

QUESTION 5

A life insurance company currently sells a regular (monthly) premium unit-linked endowment assurance product through independent intermediaries. Recently there has been an increase in withdrawals and a decline in new business volumes for this product. It has been suggested that the product is not competitive compared to other products in the market.

The current features of the product are as follows:

- Death benefit: 100% of the bid value of units
- Surrender value: 100% of the bid value of units
- Initial commission: 75% of the first year's premiums
- Term: 15 years
- Investment funds: Choice of low risk, medium risk or high risk investment funds
- Initial underwriting: No medical underwriting
- Charges: 25% of each premium for the first year; 2.5% of premiums for each subsequent year; and a monthly charge on the unit fund

The following changes have been proposed in order to improve the competitiveness of the product:

- Increase the death benefit to 150% of the value of the units and adjust the allowance for mortality in the charging structure, using the same mortality rates as for the existing product structure.
- Revise the charging structure to be 2.5% of premiums for the whole policy term and increase the monthly charge on the unit fund.
- Outsource the on-going administration of the policies to a unit fund administrator and revise the assumptions for future renewal expenses in the charging structure to allow for the expected cost savings.

i. Describe the new or increased risks to the insurer associated with the proposed changes.

[11]

ii. Suggest how the insurer could manage the risks identified in part (i).

[7]

The insurer is drafting a policy document describing the process of the calculation of the unit fund prices to be used by the unit fund administrator.

iii. State the equity principle that should be applied to the pricing of an internal unit-linked fund and describe the process for calculating the appropriation prices for the fund.

[4]

[Total 22]

PLEASE TURN OVER

QUESTION 6

A small life office writes group life and low sum assured individual whole of life policies.

The group life product is sold to employers to provide death and disability benefits to their workforce. The cover provides a death benefit of one times the employee’s annual salary and a disability benefit of 75% of an employee's monthly salary until the first of retirement, recovery or death. Cover is provided for a 12-month period and may be renewed. On renewal, premiums are reviewed.

The individual whole of life policies are sold through tied agents. Remuneration to agents is 10 months of premium on the successful sale of a policy (for each policy sold). The whole of life policy offers life cover of R50 000, payable on death only.

The local insurance supervisor has historically required prospective policyholder liabilities to be valued using a prudent gross premium valuation method.

You are the actuary responsible for determining the policyholder liabilities for the insurer.

i. Describe how you would determine the provision for:

   a. the claims incurred but not settled before the year end for the group life product, and
   b. the prospective policyholder liabilities for the individual whole of life product.

[6]

The insurance supervisor has recently revised the regulations relating to the valuation of policyholder liabilities, by replacing the requirement for a prudent valuation basis with a best-estimate basis.

ii. Describe the timing of expected profit over the term of the whole of life policies, for existing business and for new business following the change in regulations.

[3]

iii. Given the new best-estimate liability regime, suggest how the regulator could maintain the same level of confidence that insurers would remain in a financially sound position in the event of worse than expected experience.

[1]

[Total 10]

PLEASE TURN OVER

QUESTION 7

A large life insurance company sells individual regular premium without-profit income protection products through independent intermediaries. These products are established in the market.

The tax authorities in the country are implementing a change in the method of taxing income protection policies. The existing structure is that premiums are paid from pre-tax income (that is, there is tax relief on the premiums), and benefits are taxed as income in the hands of the beneficiary, at the appropriate income tax rates. From the start of the next calendar year, the premiums must be paid from post-tax income, and benefits will be paid tax free. The change will apply for all current and future policies and claimants.

i. Outline the underwriting and claims assessment and management processes for without-profit income protection policies.

[6]

ii. Explain the possible reasons for the tax change, from the perspective of the tax authority.

[2]

iii. Outline the possible negative consequences that the tax change may have on the company.

[5]

iv. Discuss possible actions which the company could take to mitigate the concerns raised in (iii) above.

[5]

[Total 18]

END OF PAPER