EXAMINATION

7 November 2011 (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 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

A proprietary life company sells regular premium 10-year pure endowment assurance policies targeted at parents wishing to save for a child's tertiary education. The insurer currently offers two versions of the product:

Product A: Without-profits conventional endowment assurance

Product B: With-profits (additions to benefit) endowment assurance

The assets backing these liabilities are a portfolio of medium-dated government fixed interest securities of the country in which the company operates.

i. State the principles of investment that apply to a life insurance company.
[1]

ii. Discuss whether the current asset mix is appropriate as an investment strategy for each of the product versions (A and B).
[5]

iii. Outline the factors that should be considered by the company before adding equity investments to its asset portfolio.
[6]

[Total 12]

QUESTION 2

A life insurance company that writes only with-profits contracts has just closed to new business.

i. Discuss the factors that should be considered when setting the withdrawal assumptions in order to calculate a realistic embedded value
[4]

ii. Outline the additional risks the life insurance company faces as a result of closing to new business.
[6]

[Total 10]

PLEASE TURN OVER

QUESTION 3

You work for a small life insurance company operating in a densely populated island region exposed to seismic risk. The insurer's without-profit conventional term assurance business is currently reinsured via both an original terms quota share arrangement and a catastrophe excess of loss reinsurance treaty.

i. Explain the general purpose of underwriting.

[1]

ii. Outline briefly the various types of underwriting, other than medical underwriting, which may be carried out prior to the issue of a term assurance policy, explaining the specific purpose of each.

[5]

iii. List the potential sources of data that could have been used when setting the mortality assumptions for pricing this portfolio of business, giving reasons why each might be used.

[3]

iv. Recent mortality experience has been poor and volatile on an annual basis. One of the directors is concerned about the effect of the poor mortality experience on the solvency of the company.

She has made two suggestions:

- The insurer increases the percentage reinsured on the quota share.
- The catastrophe cover treaty is not renewed because of its high cost.

Comment on the director's suggestions and discuss the approach that should be taken and issues that need to be considered in order for you to be able to evaluate the reinsurance programme for this book of business.

[9]

[Total 18]

QUESTION 4

You are an actuary working for a life insurance company that sells accumulating with-profit contracts.

i. Describe the features of an accumulating with-profits contract that is written in a unitised form.

[9]

ii. The management of the company proposes that the product design should be changed so that the regular bonus rate is subject to a minimum guaranteed rate, which is specified at the outset of a contract. Describe the factors that should be taken into account in setting the guaranteed element of the regular bonus rate.

[5]

[Total 14]

PLEASE TURN OVER

QUESTION 5

Your company has an established portfolio of single premium conventional endowment assurances. The company is currently designing a recurring premium unit-linked endowment assurance product.

i. Outline briefly the considerations that you would take into account in setting the surrender penalty on this product.

[7]

ii. Describe the profit test model that you would use to determine the charging structure of the unit-linked product.

[6]

iii. After performing the profit testing, two acceptably profitable charging structures are proposed for the new product:

   a. 40% of the premium is allocated to the unit fund in the first two years with an allocation percentage of more than 100% thereafter. Management fees are low at 0.5% *p.a*. The bid offer spread is 5%.
   b. 95% of the premium is allocated to two unit funds. In the first 2 years, the premium is allocated to a capital unit fund with a management charge of 4.75% *p.a.* Thereafter, premiums are allocated to an accumulation unit fund with a management charge of 0.75% *p.a.* The bid offer spread is 5%.

   The only other regular charge present is a charge for the risk benefit.

   Discuss the considerations that should be taken into account when deciding which product design to use.

[11]

[Total 24]

QUESTION 6

You work for a well-established insurance conglomerate operating in a sophisticated market. The conglomerate has two specialist subsidiary life companies, one specialising in savings and the other in risk products. Both product lines are recurring premium products, and are only sold via intermediaries. Commission is currently the same on both lines: an upfront commission with a pro-rata clawback on surrender within the first two years.

The regulator has recently changed the commission regulations for savings products so that commission is only paid as and when premiums are received at a fixed percentage of the premium. There is no change to the commission structure on risk products.

Explain the likely impact of this change on the business of each specialist subsidiary insurer, with particular reference to the capital needs and the solvency position of each.

[8]

PLEASE TURN OVER

QUESTION 7

A life insurance company has been selling regular premium non-profit and additions to benefits with-profit endowment assurances for many years. The company uses a net premium valuation for its supervisory reserves.

i. Outline the general principles that should be followed when establishing supervisory reserves.
[4]

ii. Explain the extent to which the net premium method meets these principles of reserving for the with-profits business of the above company.
[6]

iii. The company also offers guaranteed annuity options at maturity for its with-profit endowment assurances.

Outline how the company can make use of:

a. a put option strategy; and
b. a call option strategy,

to reserve for the cost of its guaranteed annuity options. You may assume that the guaranteed annuity options apply only to level annuities.
[4]
[Total 14]

END OF PAPER

