EXAMINATION

1 June 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 nine (9) 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.

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QUESTION 1

The CEO of the large life insurance company for which you work has read that in Europe it has recently been ruled that pricing of life insurance products using gender will no longer be allowed as it has been deemed to be discriminatory. He is concerned that this may impact on South Africa at some point in the future and has asked for your input.

List the main assumptions used in pricing term assurances, and outline how (if at all) their determination might be affected if a similar ruling came into force in South Africa.

[8]

QUESTION 2

You are the pricing actuary at a medium-sized life insurance company. For several years your company's sales of mortality products have been very good. The economy in which you operate has been growing strongly for a decade, and a result of this is that many people are wealthier, and requesting larger sums insured. Whilst this is good for your company's premium growth, you are concerned that it may be increasing the volatility of your results. Recently you have seen a few claims where you felt the individual may have been over-insured. In casual conversations with your underwriters they have told you that there is nothing wrong with the company's financial underwriting, which is in line with that in the market.

i. Discuss why financial underwriting is important for mortality protection products.

[4]

ii. Outline the key issues you may encounter in trying to carry out financial underwriting.

[3]

iii. Outline the ways in which your reinsurer could assist you in setting up an appropriate financial underwriting process.

[3]

[Total 10]

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QUESTION 3

As the product development actuary in a medium-sized life office, you developed a new life insurance product which was launched six months ago. Sales have been very good.

The product requires limited underwriting with the client having to answer "yes" or "no" to only five medical questions on the proposal form when applying for the policy. No blood tests are required and the purpose of the health questions is to ascertain whether the applicant is in a good state of health and is not aware of any serious latent diseases or health problems that will require treatment in future. If the client answers "no" to all of the questions, it is assumed that the client is healthy and the policy is accepted by the life office. If not, the application is declined.

The policy provides life cover up to R2m with cover limited to 50% of the sum assured on death due to natural causes during the first six months of the policy, after which full cover applies. Accidental death is covered in full from inception.

Mortality experience on the products has been very poor compared to the pricing basis. Of the approximately 2000 policies issued thus far, there have been submissions of 50 death claims due to natural causes. The pricing basis assumes a figure of approximately 10. The terms of the policy provide for underwriting at claim stage to detect material nondisclosure or inaccurate information provided by the policyholder.

The CEO has asked you to do an urgent investigation into this experience.

i. Discuss three possible reasons for the observed mortality experience.

[3]

ii. Give reasons why it is necessary to investigate and analyse the mortality experience.

[3]

iii. State, with reasons, the information required to carry out an appropriate mortality investigation.

[5]

Your investigation indicates that many of the policyholders who died did not answer the underwriting questions on the proposal form honestly. Many of them denied having had recent treatment for life-threatening diseases whereas they had in fact received such treatment.

iv. Give recommendations as to how your employer may proceed in order to manage the mortality experience internally (i.e. other than through the use of reinsurance, etc.), highlighting specific matters that need to be considered before implementing any of them.

[4]

[Total 15]

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QUESTION 4

i. Explain how a financial economic approach would differ from a traditional actuarial approach in setting the assumption for future investment returns for determining a life insurance company's liabilities.

[2]

ii. Explain how you would determine a market-consistent value of the liabilities for a portfolio of unit-linked endowment assurance policies which provide a minimum guaranteed maturity value.

[8]
[Total 10]

QUESTION 5

You are the actuary to a life company that is considering purchasing a commercially-available stochastic asset model to replace its internally-produced model. In assessing the cost of the company's financial guarantees, the results produced by the two models are very different.

i. Outline possible reasons for the differences in results.

[4]

ii. Outline briefly the various considerations which may influence your decision on whether or not to purchase the commercial model.

[5]
[Total 9]

QUESTION 6

i. Describe briefly four different uses for an asset share in the management of a life insurance company.

[4]

ii. Describe briefly the practical problems a life company is likely to face in the allocation of actual investment returns to the asset share build up.

[5]
[Total 9]

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QUESTION 7

You are the With-Profit Actuary of a company that sells primarily UK-style with profit business.

Outline the main principles you will apply in preparing your bonus recommendations for the board of directors.

[8]

QUESTION 8

A life insurance company writes only regular premium without profit endowment assurance contracts.

i. State the principles that the company should follow when setting surrender values for these contracts.

[6]

One year ago, a policyholder purchased a 10-year without profit endowment assurance from the company. He has now approached the company requesting that the policy be altered to accommodate the fact that he wishes his future premiums to be 25% lower than the original premium.

ii. List two possible alterations to the original endowment assurance contract which may meet the policyholder's needs.

[1]

iii. Compare and contrast the considerations that the company should take into account when setting the alteration bases for the two alterations suggested in (ii).

[5]

[Total 12]

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QUESTION 9

The medium-sized life insurance company for which you are the product development actuary offers a wide range of unit-linked life insurance products in a developed market. The company is planning to expand its operations to a neighbouring developing country. The developing country has a sound economy and has experienced strong recent growth in demand for life insurance. Almost all life insurance sold to date in the developing country has been conventional non-profit business.

In an attempt to gain a marketing advantage in the new market your company plans to launch a (regular premium) unit-linked whole life assurance policy with the following characteristics:

- The unit fund to be offered will be based on equities in the company's current home country.
- The death benefit will be the larger of a guaranteed minimum sum assured (selected by the policyholder at outset) and the bid value of units.
- Surrender values will be equal to the bid value of units less a surrender penalty.
- The only charges to be levied will be:
  - Annual management charges; and
  - Monthly benefit charges (in respect of any excess of the guaranteed sum assured over the value of units in the unit fund).

  Both charges will be variable at the discretion of the life office.
- Premiums are guaranteed for 10 years only at which point they may be reviewed.

i. State the needs of the policyholder which could be met with this contract.

[2]

ii. Outline the risks faced by the life office in respect of:

   a. investment performance;
   b. expenses; and
   c. mortality.

[9]

iii. Outline briefly the risks faced by policyholders who effect such contracts.

[5]

iv. Describe a method the company could use to recoup its initial expenses under the product design outlined above, explaining how it could be used to reduce new business strain.

[3]

[Total 19]

END OF PAPER

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