

EXAMINATION

25 May 2016 (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 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.

<p><i>In addition to this paper you should have available the 2002 edition of the <i>Formulae and Tables</i> and your own electronic calculator from the approved list.</i></p>

QUESTION 1

A life insurance company has historically sold conventional with-profits (CWP) policies, but has now decided to stop selling CWP contracts and to launch unitised with-profits (UWP) contracts for new business, in a separate fund.

Outline the advantages and disadvantages of this decision for the insurer as well as for the CWP and UWP policyholders.

[8]

QUESTION 2

An insurer is planning to add a new benefit to its product range, namely a critical illness benefit. This benefit, like others from this insurer, will be unit-linked. The benefit is offered on the following terms:

- Guaranteed lump sum benefit on occurrence of one of the critical illnesses as defined in the policy document
- The benefit payable on death or maturity is the value of the unit fund (if positive)
- The surrender value is equal to the bid value of units less a surrender penalty (if positive)
- Units can be purchased in a wide range of investment funds
- Risk charges and management charges are deducted monthly from the unit fund to cover the cost of the critical illness benefit and expenses, respectively
- Premiums are calculated such that the unit fund is projected to be equal to the sum insured at the maturity date, under prudent assumptions

i. Outline the benefits that are provided, and the policyholder needs that are met, by such a product.

[3]

ii. Outline the investment-related risks to the insurer of this product and how such risks can be mitigated.

[5]

After consulting with brokers, the company now plans to offer a minimum guaranteed unit fund on death or maturity based on an investment return (before taxes and charges) equal to 3% p.a., in an environment where CPI is expected to be around 3% p.a.

iii. Outline both how this benefit change increases the risks to the insurer, and ways to mitigate these risks.

[7]

[Total 15]

PLEASE TURN OVER

QUESTION 3

A company has a large book of without-profit critical illness business, which is 100% reinsured on a risk premium basis.

- i. List the risk factors which can be used to classify the critical illness data into homogeneous groups for a claims experience investigation.

[3]

Each year the company's actuarial team spends a significant amount of time investigating the claims experience on all of the company's products, including the above-mentioned critical illness product. A manager in the company has made the following comment regarding this book of critical illness business.

“Since this business is fully reinsured, the company is not exposed to any morbidity risk on it. This book should thus be excluded from future investigations into claims experience, as the claim investigation results for this product do not add value to the company. This change will also save the actuarial team a significant amount of time.”

- ii. Discuss the manager's statement, noting areas where these investigations might add value.

[9]

[Total 12]

QUESTION 4

You are a product design actuary working for a large insurance company with a significant existing book of immediate annuity business. Historically, only age and gender have been used as rating factors when determining the single premium for annuities in this market.

The regulatory authority in this country has expressed concern that the current market practice leads to poor value for money for the low income market. The regulator suggested that socio-economic class should be introduced as an additional rating factor. A small specialist annuity writer recently launched such a product and you now want to launch a competing product.

- i. Explain briefly why the current market practice may lead to poor value for money for the low income market.

[1]

- ii. Discuss briefly the factors that you will consider when designing your company's annuity product.

[12]

[Total 13]

PLEASE TURN OVER

QUESTION 5

A life insurance company allows its without-profits endowment assurance policyholders to extend the terms of their policies on request. The new premium payable after such an alteration is calculated by equating present values before and after the alteration, on the current premium basis (which may differ from the policy's original premium basis).

Outline the factors that the company would have considered in assessing the suitability of this method for calculating the altered premium.

[10]

QUESTION 6

The insurance supervisor in a well-developed life insurance market has introduced a new regime for valuing policyholder liabilities and calculating the solvency margin for life insurers. Policyholder liabilities are calculated using a market-consistent approach using best estimate assumptions and the minimum solvency margin is determined using a value-at-risk measure that will ensure that the assets will be sufficient to cover the liabilities at a 99.5% level of confidence over a one-year time horizon.

- i. Describe the market-consistent method for determining the provisions for the policyholder liabilities for life insurers.
[7]
- ii. Explain why the insurance supervisor requires life insurers to maintain a minimum solvency margin and explain the relationship between the strength of the provisions for policyholder liabilities and minimum solvency margin requirements.
[2]

The new solvency regime requires insurers to apply a set of stress tests to their assets and liabilities. These stress tests are selected to reflect extreme cases of risk events for life insurers. A medium-sized insurer offering a range of life products in this market has calculated the additional solvency margin required under each of four individual stress tests. These amounts are as follows:

Mortality stress test:	\$3 million
Longevity stress test:	\$2 million
Market stress test:	\$4.5 million
Default of reinsurers:	\$0.5 million

- iii. Explain why the aggregated amount of additional solvency margin for these risks should be less than \$10 million for this insurer, including in the explanation a description of how the aggregated solvency margin could be calculated.
[3]

[Total 12]

PLEASE TURN OVER

QUESTION 7

You are the senior pricing actuary at a large life insurance company in a well-established market. Your company has written group income protection policies for the last 20 years. It is now considering entering the individual life (without-profits) income protection market. All sales will be made through intermediaries, who are either tied agents or independent brokers. The State does not offer any income protection benefits to individuals.

- i. Outline briefly how the underwriting of the individual life product will differ from that of the group product. [2]
- ii. List the factors defining the benefit, and the assumptions that you would require, to price the new individual life income protection product. [7]
- iii. Outline how you would go about setting the claim inception and termination rates for pricing the individual life income protection product, explaining to what extent the data from the company's group product may be relevant. [6]

[Total 15]

QUESTION 8

The insurance industry in your country has agreed to new requirements for products that are designed for low-income consumers. You are the actuary to a small life insurance company which currently sells to this market.

The requirements, agreed by the industry, include that no medical examinations may be requested when underwriting and HIV/AIDS exclusions may not be used. Rates may only differ by age.

- i. Discuss the risks arising from the industry agreement and from offering products to this market, and explain how product design factors (excluding reinsurance and underwriting) could help to reduce this risk. [10]

Your company's main source of new business is from the parent company which is a bank.

- ii. Discuss the advantages and disadvantages of selling to the low-income market through the bank versus selling via direct marketing. [5]

[Total 15]

END OF PAPER