

EXAMINATION

5 November 2018 (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. *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 Formulae and Tables and your own electronic calculator from the approved list.</i></p>
--

QUESTION 1

Capital Life sells a level term assurance which is marketed to parents to provide life cover until their child completes secondary school, it is expected that a separate policy is purchased for each child. The policies all include an option to extend the term of cover for a period of five years, at the insurer's standard premium rates at that time and without further evidence of health being required.

- i. Outline briefly the benefits to the policyholder of the above policy. [2]
- ii. Outline briefly the main risks to which the company is exposed in respect of the policy. [4]

The insurer intends to use a cashflow model to determine the cost of the 5-year extension option.

- iii. List 6 assumptions that would be required in this cashflow model. [3]
 - iv. Outline the relative advantages and disadvantages of using a stochastic model to determine the cost of the option to extend the contract compared to using a deterministic model. [4]
- [Total 13]

QUESTION 2

For many years a large life insurer has sold whole of life and term assurance products through independent brokers. The company has a stringent medical and financial underwriting process, which is in line with the market standard.

- i. State how underwriting can help to manage the insurer's risk. [3]

The insurer plans to introduce a simplified underwriting process that will apply for all sums assured up to R1.5 million, which currently constitute 90% of the company's mortality business. For sums assured above R1.5 million the existing (stringent) underwriting will apply.

- ii. Outline how a "simplified" underwriting approach could differ from a "stringent" approach. [2]
 - iii. Describe two distinct reasons why the company may be considering introducing a simplified underwriting approach. [4]
 - iv. Outline approaches that the company could adopt to manage any additional risks caused by the change and to ensure that the profitability of the product under the simplified underwriting approach remains acceptable. [4]
- [Total 13]

PLEASE TURN OVER

QUESTION 3

Dreadsure, which operates in a particular country, offers stand-alone without-profit critical illness insurance that covers the four core conditions: heart attack; cancer; stroke and coronary-artery by-pass graft. The product requires a 30-day survival period between diagnosis and the payment of the (lump sum) benefit. Dreadsure has experienced higher than anticipated claims incidence rates, particularly for cancer claims, since launching its critical illness product five years ago.

- i. Outline 4 possible reasons for the higher than anticipated claims incidence rates.

[4]

The following data are available on cancer claims:

Cancer Stage	Cancer diagnosis rate	30-day post-diagnosis mortality rate
Stage 1	0.0006	0.002
Stage 2+	0.0002	0.050

- ii. Calculate the proportion of cancer claim payments that would be expected to relate to diagnoses of Stage 1 cancer.

[2]

A director has proposed that the policy wording be changed to remove coverage for Stage 1 cancer diagnoses on both existing and new policies. Dreadsure's critical illness contracts give it the right to review the covered conditions annually, which is in line with standard industry practice in the market in which Dreadsure operates.

- iii. Discuss the possible impact on Dreadsure were it to adopt this proposal.

[6]

[Total 12]

PLEASE TURN OVER

QUESTION 4

Africa Life writes two different regular premium endowment assurance contracts:

- A unit-linked contract, where:
 - 95% of the premiums are allocated to units;
 - a monthly mortality charge is deducted from the unit fund;
 - an annual management charge of 2% is deducted from the unit fund; and
 - a penalty is charged on early surrender.
- An index-linked contract, with benefits linked to an equity index

Both products are sold through independent brokers who receive substantial upfront commission at the point of sale.

- i. Describe two approaches to reserving that the insurer could use to reduce new business strain for the unit-linked contract described above.

[5]

The profitability of the insurer has declined in recent years and the insurer is concerned that poor persistency has contributed to the poor financial performance of the products.

- ii. Briefly explain how the life insurer company would analyse its persistency experience.

[3]

- iii. Suggest possible reasons for the decline in profitability of the insurer.

[3]

[Total 11]

PLEASE TURN OVER

QUESTION 5

LifeSure is a mutual insurer providing both without-profits and with-profits life insurance products. LifeSure currently distributes all surplus to with-profits policyholders via an annual cash dividend, using the contribution method of surplus distribution, on a basis providing very limited deferral of distribution of surplus.

- i. Describe how LifeSure would determine cash dividends, providing formulas to support your description, where appropriate. Define all terms used in any formulas.

[3]

LifeSure has in recent years received criticism from intermediaries and policyholders on its approach to bonus distribution. It is considering changing its approach to the additions to benefits method, using reversionary and terminal bonuses.

- ii. Explain the advantages and disadvantages such a change in approach may produce, if applied to both new and existing policies.

[6]

LifeSure operates in an emerging market economy which has a very turbulent investment environment. Equity and property market returns have been very volatile over the last ten years and provided only marginally higher returns than bonds and cash over this period.

- iii. Describe the challenges that LifeSure is expected to face when declaring bonuses under a newly launched with-profits endowment policy using the additions to benefits method.

[6]

[Total 15]

PLEASE TURN OVER

QUESTION 6

- i. Explain the difference between a passive and active valuation approach and state the relative advantages of each approach.

[3]

A life insurer sells three products: conventional life annuities, whole life cover and an investment product that offers a guaranteed return after 5 years.

The discount rate for calculating the reserves has been based on a yield, of appropriate duration for each product, from the government bond curve. The duration for the whole of life cover product is 10 years. The regulator has required that policyholder liabilities be valued with prudential margins.

The regulator has now implemented a new solvency regime requiring the assets and policyholder liabilities to be valued on a market-consistent basis.

- ii. Describe the potential impact on the solvency of the insurer of changing its reserving basis for the whole life cover product, from using prudent assumptions and the 10-year yield on the government bond curve as the discount rate, to using a market-consistent basis.

[4]

Under the new solvency regime, the regulator requires that capital be held for the risk that experience differs from reserving assumptions. The capital requirement is based on a 99.5% Value at Risk approach.

- iii. Explain the potential impact on the reserves and capital requirements of the company of each of the scenarios below:
- A decrease in the mortality rate assumptions and an increase in the assumed rate of longevity improvement in the future.
 - An increase in government bond yields.
 - The addition of an illiquidity premium to the risk-free curve when valuing the 5-year guaranteed investment product.

[7]

[Total 14]

PLEASE TURN OVER

QUESTION 7

A rapidly growing life insurance company specialising in stand-alone without-profits income protection policies is reviewing its investment strategy.

- i. Describe the characteristics of the company's liabilities and hence outline the most suitable matching assets.

[7]

The most recent financial projections for the company show that if the company continues to grow as planned its free assets are expected to fall below the statutory minimum capital requirements in three years' time. A director has suggested that in order to achieve higher expected returns and improve the expected free asset position, the company should be entirely invested in commercial property and equities.

- ii. Discuss the points that should be made in response to the director's suggestion.
- iii. Explain how your answer to part (ii) would differ if the financial projections show only a very small chance of free assets falling below the minimum capital requirements over the next three years.

[5]

[2]

[Total 14]

QUESTION 8

- i. Define the embedded value of a life insurance company.

[1]

A well-established life insurance company sells whole of life insurance contracts. The solvency regime in the country stipulates that reserves are to be calculated on a prudent basis.

- ii. Describe briefly the traditional method for determining the embedded value of this life insurance company.

[5]

The insurance regulator is in the process of developing a revised solvency regime requiring reserves to be calculated on a best-estimate basis and solvency requirements to be based on the risks faced by the insurer.

- iii. Describe how the change in solvency regime may affect the embedded value of the insurance company, assuming that the embedded value basis remains unchanged.

[2]

[Total 8]

END OF PAPER

