EXAMINATION

4 November 2019 (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.

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

i. State 8 ways in which a life insurer could use the results of a persistency analysis.

[4]

Eureka is a well-established life insurer which has historically sold term assurance, whole of life assurance and pure endowments to both the individual retail and employer group markets. Eureka launched its first endowment assurance five years ago. The chief actuary has noticed a reduction in persistency for all long-standing well-established business lines and has tasked you with examining the persistency experience over the past five years.

ii. Describe how you would go about performing the analysis of persistency experience in order to identify the key features behind the trends seen.

[5]
[Total 9]

QUESTION 2

In a certain country, legislation stipulates that retiring members of pension schemes are required to invest at least two-thirds value of their pension scheme benefits in an immediate annuity and the remainder may be taken as a cash lump.

New regulations have recently been introduced requiring pension fund trustees to set up a default annuity procedure. Under this procedure, if the member does not elect otherwise, two-thirds of the value of the member's pension fund is used to buy a default annuity, selected by the pension scheme, and the remainder given as cash to the member. Members may elect to purchase an annuity product available in the open insurance market or to purchase the default annuity, where there is no involvement of a broker and therefore no associated commission.

You are the actuary at a large life insurance company looking to develop a new without-profits immediate annuity product suitable to be used by pension schemes as the default annuity. Most of the existing annuities of the company are sold through brokers and tied agents.

i. Outline briefly the product features that you would need to specify in the product design.

[2]

The insurance company has signed agreements with a number of large pension schemes to provide default annuities to their members on retirement; however it remains concerned about the risk of low premium volumes for this business.

ii. Suggest reasons why premium income for the default annuity product may be lower than anticipated.

[3]

iii. Describe the risks faced by the insurance company in relation to premium volume being different to that anticipated.

[2]

iv. Outline the other risks faced by the insurance company in relation to this product.

[8]
[Total 15]

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QUESTION 3

ABC Life is a life insurance company operating in a developing country. The local regulatory standards for supervisory valuation bases are still under development and only provide very basic guidance to valuators.

ABC Life has been selling a regular premium unit-linked endowment assurance product for many years. The product has the following features.

- Death benefit: The larger of the bid value of units at the time of death or a guaranteed minimum (fixed) sum assured.
- Maturity benefit: The bid value of units.
- Surrender benefit: The bid value of units less a surrender penalty. The surrender penalty is not guaranteed.
- Charges: Charges are deducted from the unit fund to cover expenses and the cost of the death benefit.

You are a valuations actuary working for ABC Life and you are responsible for carrying out the annual supervisory valuation.

i. Describe the method you would use for determining the supervisory reserves for the portfolio of unit-linked contracts described above and explain why you would need each component of the reserve.

[5]

The insurance regulator is in the process of developing requirements for determining reserves for minimum guaranteed amounts payable at maturity for unit-linked endowment policies. The regulator has asked for input on the proposed approach, particularly the suitability of a stochastic approach relative to a deterministic approach for calculating these reserves.

ii. Reply to the regulator suggesting, with reasons, a preferred approach and outline how the approach would be used to determine the supervisory reserves for investment guarantees for unit-linked policies.

[7]
[Total 12]

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QUESTION 4

In a particular market there are two classes of without-profits whole of life products, "traditional" and "new-generation". Surrender values for these two classes of whole of life products are determined as follows:

- Traditional product class: Surrender values are the cumulative premiums paid up to the surrender date.
- New-generation product class: Surrender values are calculated using a blended approach of the return of the cumulative premiums paid for surrenders that take place on or before the second policy anniversary and the prospective method thereafter.

i. Explain the extent to which the surrender value method for each product class meets the principles for determining surrender values.

[10]

A new life insurer operating in the market plans to launch a new-generation without-profits whole of life product. The insurer is in the process of choosing between an "original premium" basis and a "best-estimate" basis for determining the surrender values under the prospective method.

ii. Describe the amount of profit that will arise on surrender under each of the two bases.

[3]

[Total 13]

QUESTION 5

A large life insurance company only issues with-profits endowment assurance policies and distributes surplus through the additions to benefits approach, using regular reversionary bonuses, special reversionary bonuses and terminal bonuses.

i. Describe each of the above bonus types.

[3]

ii. Comment on how each bonus type might be allowed for in pricing the product.

[3]

The company has historically maintained solvency levels well in excess of those required by regulations and has consequently followed an investment strategy aimed at maximising investment returns for both policyholders and shareholders.

iii. Explain how the solvency position and investment strategy of the company might affect the choice of bonus type when distributing surplus.

[5]

[Total 11]

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QUESTION 6

An insurer has been selling conventional without-profit business (term assurance, whole life and immediate life annuities) for a number of years and is now reviewing its investment strategy.

i. Suggest suitable matching assets for the insurer's liabilities.

[5]

One of the directors notes that local government bonds of terms greater than 10 years are yielding negative yields to maturity. He suggests that the insurer should not hold any negative-yielding bonds and that equities should be held instead to achieve positive returns.

ii. Discuss the director's proposal.

[4]
[Total 9]

QUESTION 7

A large established life insurer has been selling a conventional whole of life insurance with a critical illness rider covering a wide range of conditions. The product is sold through independent intermediaries and tied agents. The majority of its clients are aged between 40 and 50 when they purchase the policy and are middle- to upper-income individuals.

The insurance company's new business sales have been static for the past two years, and it is looking to expand its target market by launching a 15-year term stand-alone critical illness product covering only core conditions that it hopes will be attractive to younger lives who have just started working. The product will be marketed and sold online.

i. List 4 medical conditions that are commonly included as core conditions for critical illness insurance products.

[1]

ii. a. Outline the needs and preferences of the new target market and how these may differ from those of the existing client base.
a. Explain why the new product may be more appropriate for this target market.

[4]

iii. Describe the underwriting process you would expect for the existing product, and how this is likely to change for the new product.

[7]

iv. Outline briefly the areas that the regulator would investigate and monitor to ensure that customers are treated fairly in relation to this new product.

[5]
[Total 17]

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QUESTION 8

A life insurance company sells a unit-linked "income provider" product targeting individuals at retirement who need to invest their accumulated retirement savings. Under this product, the policyholder invests a single lump sum in a unit-linked fund and may withdraw a certain percentage of the unit fund on a monthly basis until their death or their unit fund is exhausted. If the policyholder dies before their fund is exhausted, the balance is paid to their nominated beneficiaries. The features of the income provider product are as follows:

- The percentage of the unit fund withdrawn as monthly income is selected by the policyholder and can be changed at each policy anniversary date;
- A fund management charge of 1% p.a. chargeable monthly is levied on the fund and may be varied by the insurer over the term of the policy;
- A range of investment portfolios is offered and policyholders may change or switch between investment portfolios at any time during the term of the policy;
- Policyholders may transfer the value of the unit fund to another insurer on any policy anniversary, resulting in a highly competitive market for this product; and
- A fee is applied to the unit fund value on switching of portfolios or transfer of funds to another insurer.

i. Outline briefly the risks accepted by policyholders who take out such a policy.

[3]

ii. Comment briefly on the following aspects of such policies:

a. Marketability and competitiveness; and
b. Profitability and financing requirements.

[7]

The country in which the insurer operates is currently experiencing an economic recession and economic uncertainty has increased significantly recently.

iii. Outline how the change in the economic environment would impact the main assumptions for calculating the non-unit reserves on a supervisory basis for this product.

[4]
[Total 14]

END OF PAPER

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