INSTITUTE AND FACULTY OF ACTUARIES

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EXAMINATION

5 May 2020 (am)

Subject SP2 – Life Insurance
Specialist Principles

Time allowed: Three hours and fifteen minutes

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.

1 A life insurance company distributes profits using the contribution method. The company has the following information for an individual contract:

Value of the contract at the start of the year on the valuation basis	$7,500
Value of the contract at the end of the year on the valuation basis	$8,200
Sum assured	$50,000
Gross annual premium	$600

The valuation assumes:

- an annual interest rate of 2.4%.
- an annual mortality rate of 0.005.
- annual expenses of $55.

Over the year:

- the actual interest rate earned was 3%.
- actual mortality was 95% of the valuation mortality.
- actual expenses were $50.

Calculate the dividend the life insurance company will pay at the year end, showing your workings. [4]

2 (i) Outline the principles that should be considered when setting alteration terms for premium reduction alterations or on making policies paid up. [3]

Until recently a life insurance company calculated premium alterations on a case-by-case basis, but has recently changed its approach following increased customer demand. The company now uses a simplified approach to these premium alterations.

The new sum assured after a premium reduction or on making a policy paid up is calculated as

$$NSA = OSA\,[(PP+FPP)/TPP]$$

where:

        NSA = new sum assured
        OSA = old sum assured
        PP = premiums paid to date
        FPP = future premiums due post alteration
        TPP = total premiums due under the original policy.

(ii) Assess the proposed approach against the principles outlined in (i). [5]
[Total 8]

3 Describe the Value at Risk approach used to assess a risk-based solvency capital requirement for a life insurance company. [10]

4 A life insurance company is considering entering the single premium unit-linked savings market in a particular country. It is considering two possible contract designs.

Both designs have annual fund-based charges expressed as a percentage of the value of units and have no other charges. The charge is reviewable.

- Design A pays the value of units on death or surrender.
- Design B pays the value of units on death or surrender and guarantees to pay 110% of the premium on the 10th, 15th and 20th policy anniversaries.

The charges under both designs have been set so that they each achieve the same level of profitability using the company's required rate of return on capital. Neither design includes a surrender penalty. All assumptions used in the pricing are the same for both designs.

Among other things, the company is considering the following factors to help determine which design to choose:

- profitability
- sensitivity of profitability
- competitiveness and marketability
- financing requirements
- risk characteristics.

(i) Discuss these five factors in relation to the two designs. [12]

(ii) Assess whether the company should use a deterministic or stochastic model to price Design B. [5]

[Total 17]

5 (i) Outline the reasons why a life insurance company would monitor its experience. [3]

A life insurance company has been selling a particular product for many years. New regulations are due to be implemented in 2 years' time and the company expects a temporary increase in the number of withdrawals from its product for the first few years after the regulation change. The size of the increase in the number of withdrawals is currently not known.

The company is about to set its withdrawal assumptions for the annual supervisory valuation at the end of this year.

(ii) Discuss the issues the company might consider when setting the withdrawal assumptions for this product. [10]

[Total 13]

6 A life insurance company currently sells three types of individual level term assurance products.

The 'Basic' policy is sold to individuals, providing benefits to their dependants on the death of the policyholder. This product is sold via the internet and has a limit on the level of sum assured, and is available to only a limited age range.

The 'Standard' policy is sold to individuals, providing benefits to their dependants on the death of the policyholder. This product is sold through tied agents, and is available for a wider range of sums assured and age ranges than the Basic policy.

The 'Key Person' policy is sold to employers providing benefits to the employer on the death of certain employees. This product is sold through independent intermediaries.

(i)   Explain why an employer may purchase a Key Person policy.   [3]

(ii)   Justify the choice of distribution channels used by the company for selling each of the products.   [10]

(iii) Compare the likely approach to underwriting used for each of the products. [9]
[Total 22]

7 (i) Describe the features of an internal unit-linked fund. [3]

A life insurance company has an established portfolio of unit-linked products and a wide range of internal unit-linked funds available to policyholders.

The company is considering offering a new internal unit-linked fund in the near future.

(ii) Discuss the issues the company may consider prior to launching the new internal unit-linked fund. [10]

When launching new internal unit-linked funds the company operates a box management system, whereby it will create more units in the fund than is strictly necessary to cover the corresponding unit liabilities. These excess units are referred to as the 'box'.

The company will invest a $50,000 'box' when a new fund is launched, and this will form part of the free assets of the company.

The 'box' will be redeemed by the company when the level of policyholder investments in the fund reaches $1,000,000.

(iii) Suggest reasons why the company may wish to use a box management system for new internal unit-linked funds. [4]

(iv) Describe the risks the company is exposed to in operating a box management system. [9]

[Total 26]

END OF PAPER