

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

19 April 2022 (am)

Subject SP2 – Life Insurance Specialist Principles

Time allowed: Three hours and twenty minutes

<p>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.</p>
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If you encounter any issues during the examination please contact the Assessment Team on
T. 0044 (0) 1865 268 873.

- 1** A life insurance company sells a without-profits level term assurance product and is performing control checks around its year-end results.

The following table shows figures used in the sum assured data checks for 31 December 2020 and 31 December 2021.

	31/12/2020 (\$m)	31/12/2021 (\$m)
Sum assured in-force at start of year	5,400	5,295
Sum assured lapsed	195	210
Sum assured paid out	220	122
Sum assured from new policies	256	432

- (i) Describe the data checks that could be performed with this information. [3]
- (ii) Perform the data checks that are possible using the figures in the table above. [3]
- (iii) Suggest possible reasons for any discrepancies identified by the data checks conducted in part (ii). [3]
- [Total 9]

- 2** (i) Describe the considerations that influence a company's investment strategy. [4]

Two life insurance companies sell similar unit-linked individual pensions and without-profits immediate annuities. Company A is a large company with significant free surplus and Company B is a small company with limited free assets.

- (ii) Compare the likely investment strategy of the two companies. [6]
- [Total 10]

- 3** A life insurance company sells a conventional with-profits endowment assurance product. The asset shares at the end of the year for this business have been calculated and they are lower than the equivalent figures at the previous year end.

- (i) Suggest possible reasons why the asset shares for this business have reduced. [5]

The company uses the additions to benefits method to distribute the bonuses for its with-profits business.

- (ii) Suggest possible actions the company may take following the reduction in assets shares since the last year end. [5]
- [Total 10]

4 A life insurance company sells without-profits endowment assurance policies.

The company calculates a 'net of profit premium' using best estimate assumptions and then increases this 'net of profit premium' by a fixed percentage (the profit margin) to allow for its profit criteria. This uplifted value then forms the premium charged to the policyholder.

The surrender values are set using best estimate assumptions on a prospective method. The company also monitors the 'Profit Adjusted Earned Asset Share' (PA EAS). The PA EAS is the same as the 'Earned Asset Share' (EAS), except that the premium used in the calculation of the PA EAS is the 'net of profit premium' that excludes the profit margin.

- (i) Explain why the company monitors the contract using the PA EAS as opposed to the EAS. [2]

At 31 December 2021, for a given cohort of policies, the policy data is as follows:

<i>Item</i>	<i>Amount</i>
Sum assured on death and maturity	100,000
Annual premium	6,292

The prospective surrender value is set using the following information:

- Expected expenses (e) of 100, assumed to be payable at the beginning of the year. These annual per policy expenses include variable and overhead costs as well as all claim costs and are the same as those assumed the previous year.
- Assurance factor ($A_{\bar{a}}$) = 0.839868.
- Annuity factor ($a_{\overline{a}|}$) = 8.166749.

- (ii) Calculate, showing all workings, the surrender value at 31 December 2020. [2]

The PA EAS at 31 December 2021 was calculated as 36,127.

The company has since reviewed the expense analysis, and the actual expenses over 2021 were 30% higher than expected and are expected to remain at this level. Over 2021, the interest rate earned was 2%.

- (iii) Calculate, showing all workings, the surrender value and the PA EAS at 31 December 2021, allowing for the increase in expenses in both calculations. [2]
- (iv) Contrast the change in the surrender value and the PA EAS due to the change in expenses. [1]
- (v) Discuss why the current approach to setting the surrender value may be unsuitable. [8]

[Total 15]

5 A life insurance company uses a deterministic model to price its without-profits immediate annuity products. The pricing model uses model points, based on the key risk factors, to represent expected new business.

- (i) List possible risk factors that the company may use when setting the model points. [3]

The company conducts a full sensitivity analysis.

- (ii) Discuss possible sensitivities that are likely to show a reduction in expected profit for the annuity business. [9]

- (iii) Discuss how the company may use the results of the sensitivity analysis to help determine the pricing and design of the annuities. [6]

[Total 18]

6 A large life insurance company has a portfolio of without-profits term assurance policies.

The results of the most recent experience investigations for these policies have been summarised in the table below. The results compare the actual experience across the whole portfolio over the last year and over the last 5 years, with the equivalent assumptions used in the supervisory valuation.

	<i>Over 1 year</i> (%)	<i>Over 5 years</i> (%)
Mortality	120	95
Surrenders	120	105
Expenses	100	110
Investment return	75	85

The supervisory valuation assumptions have not been changed for this product for the past 5 years. The company is now considering whether to review the supervisory valuation assumptions, based on the information in the table above.

- (i) Discuss whether the company should consider changing any supervisory valuation assumptions, based on the information in the table. [12]

The company's board has reviewed the experience investigation results in the summary table above and is considering a proposal that the assumptions should not be changed for this supervisory valuation.

However, the board is concerned that if the assumptions are not changed it may imply that appropriate management systems and controls are not in place.

- (ii) Comment on whether the concerns expressed by the board are justified. [6]

[Total 18]

7 A life insurance company sells unit-linked endowment assurance policies. The maturity value is the value of the units at the maturity date.

On death before maturity a lump sum is paid to the dependents, with the death benefit equal to the higher of the value of the units held at the time of death, or the sum of the premiums paid by the policyholder up to the date of death.

A policy can be surrendered at any time prior to maturity. The surrender value is equal to the value of units held at the date of surrender, and a surrender penalty is applied if the surrender is made in the first 5 years of the policy.

A policy charge equal to a percentage of the fund is deducted from the policy value each month.

(i) Describe the main risks the insurance company is exposed to under this product. [6]

(ii) Describe the main risks the policyholder is exposed to under this product. [4]

New business sales have been falling over recent years and the company is considering adding a guarantee to the surrender value for new business. This guarantee would ensure that payment on surrender within the first 5 years would be at least equal to the sum of the premiums paid by the policyholder up to the date of surrender.

(iii) Comment on how the addition of the guarantee to the surrender value changes the risk profile of the contract for the insurance company, and separately the policyholder. [3]

(iv) Discuss the implications on persistency of the addition of the guaranteed surrender value. [3]

(v) Discuss the implications on the pricing terms of adding the guaranteed surrender value. [4]

[Total 20]

END OF PAPER