

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

6 October 2020 (am)

Subject SP8 – General Insurance: Pricing Specialist Principles

Time allowed: Three hours and fifteen minutes

<p>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.</p>

If you encounter any issues during the examination please contact the Examination Team on T. 0044 (0) 1865 268 873.

- 1** Describe how the catastrophe loading required for pricing a class of business may be estimated. [3]
- 2** A reinsurance company wishes to price a \$2m xs \$1m excess of loss treaty. It has asked the cedant to provide historical loss data in excess of \$1m.
- Describe the potential disadvantages of this approach when pricing the treaty. [5]
- 3** In a particular country, technological advances in the manufacture of cars over the last two years have led to safer and more secure cars. A recent article written in a motor car magazine shows insurance premiums for new cars over the last two years have increased at a rate in excess of the national rate of price inflation.
- Suggest possible reasons for the continued rise in premiums despite the technological advances. [6]
- 4** A proprietary insurance company writes a number of lines of business. For several years the professional indemnity cover has been loss-making, and the insurance company is considering closing the line of business.
- Explain why the insurance company may choose to use Adverse Development Cover to manage the run-off of the professional indemnity cover. [6]
- 5** An insurance company has employed a consultant to review the pricing of its portfolio of marine hull and cargo risks. The consultant has suggested using benchmark data provided by his firm based on the firm's work with other insurance companies.
- (i) Outline the reasons why the consultant may have made this suggestion. [5]
- (ii) Suggest four concerns the insurance company might have about the benchmark data. [2]
- [Total 7]

6 A general insurance company writes crop insurance for farms located in the USA.

- (i) List the perils likely to be covered by crop insurance. [3]
- (ii) Suggest rating factors the insurance company is likely to use to determine the risk premium. [2]

The pricing actuary has built a model to estimate the risk premium. The model has been built using claims and exposure data the insurance company has collected over the last 30 years. The insurance company sells policies via brokers and handles all claims itself.

- (iii) Explain the risks and uncertainties that may arise with the use of this data. [3]
[Total 8]

7 In a country with an established personal lines insurance market, the media has highlighted how premiums quoted for new business can be significantly different to premiums charged to existing customers on renewal, for equivalent cover.

- (i) Suggest reasons for the difference between new business and renewal pricing. [5]

The regulatory body in the country has expressed concern with this practice. It has proposed that premiums quoted at renewal should be no greater than the premium payable for the same cover in respect of a new policy. The regulator has asked insurance companies for feedback on its proposal. An insurance company has asked one of its actuaries to draft a response.

- (ii) Set out the points the actuary is likely to include in their response. [4]
[Total 9]

- 8 A medium-sized general insurance company writes a variety of products. To price its liability book, increased limit factors (ILFs) are used. The current ILFs are based on a benchmark, but the company is considering changing these based on its own experience. The following information is given:

<i>Limit of liability (\$)</i>	<i>Current ILF</i>	<i>Indicated ILF</i>
100,000	1.00	1.00
250,000	2.20	2.20
500,000	2.50	2.75
750,000	2.75	3.00
1,000,000	2.90	3.00

- The indicated ILFs are based on the company's own experience.
 - Losses limited to \$100,000 have been consistent over time.
 - The expected value of losses limited to \$100,000 = \$500,000.
- (i) Compare the expected losses for the layer between \$500,000 and \$1,000,000 based on the current ILFs and the indicated ILFs. [3]
- (ii) Assess the suitability of the indicated ILFs. [2]

The company wishes to offer policy limits greater than \$1,000,000 in the future.

- (iii) Suggest approaches to calculating the ILFs for the higher limits. [2]
- (iv) Describe briefly the challenges the company may encounter when implementing the new ILFs. [2]
- [Total 9]

- 9 (i) State six benefits to an insurance company of monitoring written business. [3]
- (ii) Describe the interaction between rate change and the insurance cycle. [2]

The underwriting manager at an insurance company wants to monitor, on an annual basis, how rates are shifting for a portfolio of aviation policies. An underwriter has calculated the rate change using the following formula:

$$\text{Rate Change}_{t_1 \rightarrow t_2} = \frac{\text{Premium Rate}_{t_2}}{\text{Premium Rate}_{t_1}} - 1$$

where: t_1 = Previous Underwriting Year
 t_2 = Current Underwriting Year

- (iii) Comment on the underwriter's formula. [8]
- [Total 13]

- 10 (i) Write down the advantages and disadvantages of the burning cost approach compared to the frequency-severity approach for pricing. [2]

A pricing actuary is using the burning cost approach to calculate the risk premium for policies offering product guarantee cover. The policies will be bought by manufacturing companies to protect them against the cost of repairing or replacing faulty products they have made. Cover does not include costs arising during extended warranty periods.

- (ii) Suggest conditions the insurance company could place on the policies to reduce the expected cost of claims. [3]

The actuary has received the following information relating to the historical experience of the product guarantee cover for a manufacturer of washing machines.

<i>Policy year</i>	<i>Washing machines sold</i>	<i>Amount paid in repairs/replacements (£)</i>
1	235,583	2,493,458
2	247,362	2,779,469
3	257,257	2,520,225
4	272,692	2,889,005
5	280,873	2,626,803

<i>Years since claim</i>	<i>Proportion of paid to ultimate</i>
1	0.8
2	0.87
3	0.93
4	0.96
5	0.98

The cost of claims has inflated on average at 3% per annum.

The number of washing machines expected to be sold in policy year 6 is 300,000.

- (iii) Determine the risk premium for policy year 6 using a burning cost approach and the information above, stating all assumptions. [8]
- (iv) Outline the additional information required, given the risk premium in part (iii), to determine the actual premium charged to the manufacturer. [4]

[Total 17]

11 A large insurance company has recently launched an insurance product to provide cover for space satellites. The product is being sold through brokers.

- (i) Describe the cover that could be provided under this product. [4]

The insurance company has decided to purchase an excess of loss (XoL) reinsurance program to cover the satellite insurance portfolio.

- (ii) Discuss how the reinsurance company would model the expected liabilities from this XoL program. [11]

- (iii) Suggest four ways in which the reinsurer could manage these liabilities. [2]
[Total 17]

END OF PAPER