

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

15 April 2024 (am)

Subject SP8 – General Insurance Pricing Specialist Principles

Time allowed: Three hours and twenty minutes

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.

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

- 1** A pricing actuary is setting the average cost per claim for contents theft for household insurance. They have claims data from over a number of years.

Write down the typical adjustments needed to make the past history ‘on-level’ with today. [5]

- 2** (i) Explain why Probable Maximum Loss (PML) is used in commercial property insurance. [3]

A general insurance company has written a policy on a medium-sized office building. The underwriter has estimated the PML to be \$500,000. The policy has a deductible of \$50,000 and premium of \$90,000. The policy is due for renewal, and the building’s owner wishes to increase the deductible to \$100,000.

The insurance company’s pricing actuary uses the following exposure curve:

<i>Limit as % of PML</i>	<i>Exposure curve (%)</i>
10	35
20	50
50	75
75	93
90	97
100	100

- (ii) Calculate the premium that should be charged for the new policy if the insurance company is also increasing its rate by +10% on this contract. [2]
- (iii) Suggest reasons why the underwriter may believe that the calculated premium is not appropriate for this contract. [4]

[Total 9]

- 3** A general insurance company specialises in writing commercial property insurance. Instead of renewing its catastrophe excess of loss treaty, the company is considering issuing an Insurance-Linked Security (ILS).

- (i) Outline the advantages, to the insurance company, of using an ILS. [5]
- (ii) Outline the disadvantages, to the insurance company, of using an ILS. [6]

[Total 11]

4 A general insurance company sells public liability insurance policies to medium-sized manufacturing companies.

(i) State the benefits that are likely to be provided under this policy. [3]

The pricing actuary uses the following Increased Limit Factors (ILF) table for policies incepting on 1 July 2022:

<i>Limit</i> <i>(\$)</i>	<i>ILF</i>
250,000	0.80
500,000	1.00
1,000,000	1.35
5,000,000	2.10
10,000,000	2.75

The risk premium for a policy with a limit of \$500,000 is \$4,000. Annual inflation for the past few years has been 5% on average.

(ii) Calculate the risk premium for a policy that incepts on 1 January 2024 with a limit of \$10,000,000 and a deductible of \$1,000,000, stating any assumptions. [8]
[Total 11]

5 A price comparison website provides quotes for motor insurance premiums from participating insurance companies. The website has a tool that enables each participating company to submit a batch of up to 1,000 quote requests each month, and receive quotes from the other participating companies in return.

(i) Suggest how this tool may be useful to the participating companies' pricing actuaries. [5]

(ii) Outline the issues that may arise with using the quoted competitor premiums. [4]

A pricing actuary who works for one of the participating insurance companies is considering whether to submit the same batch of 1,000 quote requests each month, or whether to submit a totally different batch of 1,000 quote requests each month.

(iii) Assess the implications and suitability of the two approaches. [4]
[Total 13]

- 6 (i) Suggest, with examples, possible reasons why a particular product may not be offered by an established general insurance company. [4]

Company T is a new insurance company operating in a particular country, and is using technology in an inventive way. Company T decides to offer a general insurance product targeted at independent yoga teachers who work on an hourly-contract basis, providing classes from their own home.

- (ii) Describe the cover that this insurance product could offer. [6]
- (iii) Suggest reasons why Company T may be more appropriate than an established general insurance company to offer this product. [5]
- [Total 15]

- 7 A general insurance company writes business in a number of states in the United States (US). It offers products to farmers, providing cover against damage to buildings and machinery.

- (i) List other insurance products that a farmer may need. [2]

The general insurance company has been writing business for the last 10 years in US states prone to hurricanes and tornadoes. To determine an appropriate risk premium for hurricanes and tornadoes, the pricing actuary adds up the losses to its portfolio from hurricanes and tornadoes over the last 10 years, and divides the sum of the losses by the number of farms it has insured over the last 10 years.

- (ii) Explain the flaws in the pricing actuary's approach. [5]
- (iii) Describe how the pricing actuary could use a proprietary catastrophe model to determine the risk premium for hurricanes and tornadoes. [5]
- (iv) Suggest how each of the modules in the proprietary catastrophe model would need to be adjusted to allow for the impact of climate change. [6]
- [Total 18]

8 A pricing actuary is building models to predict the risk premiums for motor policies.

- (i) Write down the decisions that need to be agreed before the models are built. [5]

The pricing actuary has agreed the decisions and has started to prepare the data for modelling.

- (ii) Outline the checks that should be undertaken on the data. [5]

Having built the models to derive the risk premium, the pricing actuary now needs to load for direct costs and overheads.

- (iii) State the difference between direct costs and overheads. [2]

- (iv) Describe a typical approach that could be used to determine these expense loadings. [6]

[Total 18]

END OF PAPER