

INSTITUTE AND FACULTY OF ACTUARIES



EXAMINATION

8 April 2019 (pm)

Subject SP8 – General Insurance: Pricing Specialist Principles

Time allowed: Three hours and fifteen minutes

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
3. *Mark allocations are shown in brackets.*
4. *Attempt all questions, begin your answer to each question on a new page.*
5. *Candidates should show calculations where this is appropriate.*

Graph paper is NOT required for this paper.

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>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.</i></p>
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- 1** Country A has historically had strong economic links with its neighbouring country, Country B. The Regulator in Country A is proposing to allow insurers based in Country B to sell products in Country A while being regulated in Country B only.

Outline the factors the Regulator in Country A should consider in making such a change. [6]

- 2** A general insurance company specialises in professional indemnity insurance. Its pricing actuary undertook a pricing analysis at the end of 2017 to determine the premium rates to charge for policies sold in 2018. At the end of 2018, the actuary has been asked to review the accuracy of the 2017 analysis.

Discuss the factors the actuary should consider in their review. [7]

- 3** An actuary is using a frequency-severity approach to determine the loss cost for travel insurance claims. The actuary has noticed that the severity has changed over time.

- (i) Outline the likely drivers of severity trends for this class of business. [4]

To date, trending has been carried out by obtaining details of all claim payments over the previous five years. The average annual change over this period is then used as the severity trend for the next year of exposure.

- (ii) Explain the possible flaws with this approach. [5]

[Total 9]

- 4** A general insurance company specialising in employers' liability insurance has observed that its net profits have deteriorated sharply in recent years. It believes the profits of its competitors have also deteriorated. Premium rate increases in the market have been negligible during this period. The pricing manager believes that the situation is unsustainable and plans to increase the premium rates.

- (i) Discuss why the competitors might not increase their premium rates for employers' liability. [7]

- (ii) Discuss possible consequences for the insurer if it increases its premium rates while other insurers do not increase theirs. [3]

[Total 10]

5 The industry body for personal lines motor insurance companies operating in a territory publishes a vehicle classification. Vehicles are classified using a number of factors so that vehicles in the same group are similar in terms of insurance risk.

(i) List the likely factors that would be used to determine the vehicle classification. [3]

(ii) Set out the advantages and disadvantages to the insurance companies of using the vehicle classification determined by the industry body. [4]

The industry body is about to publish a revised vehicle classification. It wishes to demonstrate, with the help of its members, that the revised classification is more suitable for the purposes of pricing.

(iii) Describe how the industry body could demonstrate whether the revised classification is more suitable. [3]

[Total 10]

- 6 An actuarial student is analysing a class of business which has a loss ratio of 70% for the most recent underwriting year. The student decides to use this loss ratio for pricing, stating that no further credibility weighting is necessary.

(i) Comment on the student's statement. [2]

The total number of claims for an exposure period for an individual in a risk class with parameter Φ follows a binomial distribution with parameters $n = 3$ and $p = \theta$. The parameter Φ has the pdf

$$\pi(\theta) = 6\theta(1 - \theta) \text{ for } 0 < \theta < 1$$

A portfolio of insurance policies has the following number of individuals in each risk class:

<i>Year</i>	<i>Number of individuals</i>
2016	10
2017	12
2018	15
2019	20

A randomly chosen risk class is observed for three years. It is found that the aggregate claims are as follows:

<i>Year</i>	<i>Aggregate claims</i>
2016	18
2017	20
2018	27

(ii) Determine the credibility premium in 2019 for aggregate claims for this risk class using the Bühlmann-Straub model. [9]
[Total 11]

- 7 A reinsurance pricing actuary is preparing an employers' liability risk excess of loss treaty for a cedant with several years' worth of past data.

- (i) Set out the advantages and disadvantages of using a frequency-severity method, compared to the burning cost approach, for pricing this treaty. [4]
- (ii) Describe the issues to consider when trending the historical frequencies and severities for use in the frequency-severity method. [7]
- (iii) Explain two methods the actuary could use for developing individual losses to determine the ultimate amounts. [2]

[Total 13]

- 8 A large general insurance company specialising in marine insurance has been asked to price a policy for a large prospective policyholder to commence on 1 January 2019. The broker looking to place the business has provided the following historical data relating to the prospective policyholder:

<i>Underwriting Year</i>	<i>Written Premium (£m)</i>	<i>Incurred Claims (Hull, £m)</i>	<i>Incurred Claims (Liability, £m)</i>
2014	1.1	0.40	0.15
2015	1.2	0.42	0.21
2016	1.3	0.40	0.22
2017	1.2	0.30	0.11
2018	1.4	0.10	0.05

The broker has stated that the above incurred claims data excludes two exceptionally large claims: a £0.9m claim and a £1.2m claim. The broker has also stated that the exposure has not changed for the last five years, and is not expected to change in the following year.

The following benchmark incurred development patterns are available:

<i>Underwriting Year</i>	<i>Hull</i>	<i>Liability</i>
2014	100%	100%
2015	102%	94%
2016	95%	70%
2017	74%	35%
2018	10%	8%

- (i) Determine an appropriate risk premium for the policy in 2019. [11]
- (ii) Discuss the investigations a pricing actuary may want to undertake to determine whether the proposed premium is appropriate. [6]

[Total 17]

- 9** An individual is looking to buy a helicopter for leisure and has asked a broker to find suitable insurance.
- (i) Describe the insurance cover that could be provided in connection with this purchase. [4]
 - (ii) Describe how the required cover might change if the individual intended to fly the helicopter commercially. [3]
 - (iii) Suggest the likely rating factors that might be used, in respect of the:
 - (a) helicopter.
 - (b) pilot(s).[6]
 - (iv) Contrast the price of helicopter insurance against the price of insurance for a small private jet. [4]
- [Total 17]

END OF PAPER