

INSTITUTE AND FACULTY OF ACTUARIES



EXAMINATION

11 April 2019 (am)

Subject SP7 – General Insurance Reserving and Capital Modelling 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.

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** State common purposes for carrying out a reserving exercise. [3]
- 2** Describe three ways in which diversification effects can be allowed for in a capital model for a general insurance company. [5]
- 3** Write down four reserving diagnostics, giving two examples per diagnostic of the issues that the diagnostics might highlight. [6]
- 4** (i) Define an exclusion in the context of general insurance policy wordings. [1]
- (ii) Explain, with examples, why a general insurance company might use exclusions for household insurance. [7]
- [Total 8]

- 5** A general insurance company currently meets all regulatory requirements and is considered unlikely to fail over the next year. However, the company's regulator is concerned that it has an unacceptably high risk of failing over the next three years.
- Suggest the key actions the regulator may take in this situation. [9]

- 6** (i) Explain why diversification is allowed for in capital models. [2]
- (ii) Explain why diversification will be relevant to an acquiring company when choosing another company to acquire. [4]

The table below shows the main products underwritten by six insurance companies, A–F. Company A is considering purchasing one of the other companies.

<i>Company</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
Risks insured	UK property	UK extended warranty	UK property	UK motor	US liability	Australian property

- (iii) Suggest a ranking for Companies B to F according to their likely level of correlation with Company A's business, giving your rationale for the position of each company. [7]
- [Total 13]

7 PA Insurance is a new start-up general insurance company interested in providing personal accident cover in a small Country X.

(i) Outline two key risk factors that PA Insurance needs to consider in providing this product. [2]

(ii) State, with reasons, two rating or sales-related restrictions the regulator may place on PA Insurance. [2]

PA Insurance has now written personal accident cover for two years. The Chief Actuary is assessing capital and reserve requirements for the business.

(iii) In terms of the Chief Actuary's assessment of insurance risk:

(a) Comment on the main source of parameter uncertainty.

(b) Suggest how the methodology and parameters used to assess insurance risk may have been influenced by (a). [6]

(iv) Assess possible reserving approaches the Chief Actuary might take for this business. [4]

[Total 14]

- 8 (i) List reasons why a general insurance company might choose to buy reinsurance. [3]
- (ii) Define the following terms:
- (a) Co-insurance
 - (b) Inwards reinsurance
 - (c) Retrocessionaire.

[3]

A general insurance company writes \$10m Marine & Energy gross written premium (GWP), and \$15m property GWP. It has the following reinsurance (RI) programmes:

- A quota share (QS) on its Marine & Energy portfolio (ceding 20% of their gross exposure and receiving a 15% return commission from the reinsurer plus 10% of any profits the reinsurer makes on this contract).
- A catastrophe excess of loss (XoL) programme on its property book (\$15m in excess of \$2.5m, 8% rate on line, two reinstatements at 100%, natural perils only).
- A stop loss covering the combination of the two portfolios and acting after all other reinsurance programmes – provides full risk transfer for the loss ratio band (net of other reinsurance programmes) between 150% and 250%, with net premiums being adjusted for any reinstatement premiums and commissions being paid or received.

The company experiences the following losses:

Marine & Energy

- \$6m of attritional losses
- A \$3m large loss
- A \$5m large loss.

Property

- \$3m of attritional losses
- Three large individual fire losses (\$2m, \$3m and \$5m)
- A \$15m earthquake loss
- A \$15m terrorism loss.

- (iii) Determine the expected reinsurance recoveries. [8]
- [Total 14]

- 9 (i) Define “catastrophe” and “catastrophe reinsurance” in the context of general insurance. [2]

A small Lloyd’s Syndicate writes a wide range of direct insurance and reinsurance business covering Property and Marine losses across the world. In June 2018, the Syndicate purchased annual catastrophe reinsurance cover of £50m in excess of £5m with two reinstatements.

During late November 2018, the Syndicate had exposure to two catastrophe losses in quick succession:

- A large destructive hurricane whose path included several Caribbean islands before making landfall in a heavily insured area of the US.
- A strong earthquake in the Indian Ocean triggering several tsunamis impacting heavily populated areas of Indonesia, Sri Lanka and India.

- (ii) Suggest four lines of business where the Syndicate may incur losses from these events, outlining two potential losses for each line of business. [8]

- (iii) Discuss the issues that the Syndicate is likely to have considered when determining its reserves for the catastrophe losses as at 31 December 2018, under the following headings:

- (a) Reserving data/information
- (b) Reserving methods
- (c) Reinsurance considerations
- (d) Reserve uncertainty.

[16]

On 2 January 2019, the Syndicate was exposed to another major earthquake.

- (iv) Explain how this should be accounted for as at 31 December 2018. [2]

[Total 28]

END OF PAPER