INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

27 April 2022 (am)

Subject SP7 – General Insurance Reserving and Capital Modelling 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 Describe the key product features that should be considered when determining claims reserves for Fidelity Guarantee insurance. [3]

2 A new general insurance company, Company A, has been set up with the objective of providing parametric crop insurance. The weather conditions in the area, as measured by a pre-agreed weather index, will determine what percentage of the sum insured will be paid to the farm owners.

(i) Outline, with examples, sources of operational risk for Company A. [5]

(ii) Suggest possible actions Company A may take to mitigate against operational risk. [3]

[Total 8]

3 (i) Describe how binding authorities could work for an insurance company writing personal lines insurance. [3]

(ii) Discuss the advantages and disadvantages of writing business through binding authorities. [4]

A new Chief Underwriting Officer (CUO) has recently joined a general insurance company and has started to write large volumes of new business through binding authorities.

A few quarters after the CUO joined, the Chief Actuary has noticed an increase in the incurred claims ratio for the lines of business underwritten using binding authorities.

(iii) Suggest possible reasons for the increase in the incurred claims ratio. [4]

[Total 11]

4 (i) Discuss how both stress testing and scenario testing add value to a business planning process for an insurance company. [3]

A global pandemic has arisen in recent months. The disease is transferable by close human contact. In the last fortnight it has spread to Country C. Residents of Country C are now required by the Government to stay at home, leaving the house only for essential shopping and work for those who cannot work from home. These restrictions are expected to last a minimum of 3 months.

Insurance company B, based in Country C, writes only Motor, Trade Credit and Business Interruption insurance policies in Country C.

(ii) Describe the impacts of this pandemic event for each of Company B's lines of business, in both the short term and the long term. [6]

(iii) Suggest possible stress and scenario tests that may be used by Company B to understand and assess the effects of this pandemic on its portfolio. [4]

(iv) Suggest possible actions that could be taken to mitigate against the financial impact of this pandemic on the company. [3]

[Total 16]

5 (i) Contrast the impact of the underwriting cycle on direct insurers and reinsurers. [3]

(ii) Define the reserving cycle. [1]

Company C is a large commercial insurance company. Construction and Engineering are the largest lines of business it writes, with around 60% of the total business written under these lines of business each year coming from new business.

(iii) Explain how the Construction and Engineering lines of business could be affected by the reserving cycle. [3]

A Junior Actuary who works in Company C is trying to incorporate the impact of the underwriting cycle in the reserving process. The Chief Actuary has suggested that they use Company C's own rate indices for this purpose.

(iv) Discuss the possible reasons for the Junior Actuary's concern about using the rate indices as a proxy for the underwriting cycle when calculating Company C's reserves. [4]

[Total 11]

6 Company P is a specialist property catastrophe insurer that has been writing business in a number of different countries for the last 10 years. Company P's accounts as at 31 December 2021 have just been prepared under the 'Going Concern' accounting concept.

Company P's Profit & Loss (P&L) account for the past 3 years is as follows:

P&L	**2021**	**2020**	**2019**
Technical account			
Earned premiums, net of reinsurance			
Premiums written:			
Gross premiums written	463,000	385,000	352,000
Outward reinsurance premiums	(203,000)	(176,000)	(138,000)
Net premiums written	260,000	209,000	214,000
Change in the provision for unearned premiums:			
Gross amount	(25,000)	(13,000)	(28,000)
Reinsurers' share	15,000	15,000	14,000
Change in the net provision for unearned premiums	(10,000)	2,000	(14,000)
Earned premiums, net of reinsurance	**250,000**	**211,000**	**200,000**
Allocated investment return transferred from the non-technical account	**6,000**	**6,000**	**8,000**
Claims incurred, net of reinsurance			
Claims paid:			
Gross amount	(145,000)	(194,000)	(118,000)
Reinsurers' share	35,000	55,000	28,000
Net claims paid	(110,000)	(139,000)	(90,000)
Change in the provision for claims:			
Gross amount	(55,000)	(158,000)	(27,000)
Reinsurers' share	40,000	165,000	27,000
Change in the net provision for claims	(15,000)	7,000	0
Claims incurred, net reinsurance	**(125,000)**	**(132,000)**	**(90,000)**
Net operating expenses	**(100,000)**	**(86,000)**	**(91,000)**
Balance on the technical account for general business	**31,000**	**(1,000)**	**27,000**
Profit			
Profit and loss on foreign exchange	**1,000**	**2,000**	**22,000**
Profit for the financial year	**32,000**	**1,000**	**49,000**

(i) Verify that Company P's combined ratio for the 2021 year is 90%. [2]

(ii) Comment on Company P's performance, using the following:

(a) Business volume diagnostics

(b) Claims and expense ratio diagnostics.

[9]
[Total 11]

7 Company Z has just begun to offer Extended Warranty Insurance (EWI) cover to a mobile phone company. The prices of the phones sold by the phone company range from $100 to $500. At present, the phones' manufacturers' warranty runs for 2 years, and the EWI cover will provide insurance for an additional 3 years, once the manufacturers' warranty has expired. The EWI must be purchased at the same time as purchasing the mobile phone.

The EWI provides a pre-specified payment in the following two scenarios:

- the screen requiring replacement
- a manufacturing fault occurring.

Company Z has no prior experience of offering EWI.

(i) Describe how the unearned premium reserve will be calculated over the duration of the EWI contract for mobile phones. [2]

(ii) Contrast the factors that need to be considered when setting up the claims reserves for the screen replacement component of the cover versus the manufacturing fault component. [4]

(iii) Recommend, with reasons, suitable reserving techniques that can be used to calculate the IBNR in the first few years of operation. [3]

(iv) Comment on the possible impact on the profitability for this product if it were automatically included for free by Company Z, rather than the customer having to opt in for the cover by paying a premium. [3]

[Total 12]

8 (i) Describe the features of insurance liabilities that are likely to influence the asset selection of an insurance company. [4]

A large general insurance company writes a diversified book of worldwide Property Catastrophe, domestic Mortgage Indemnity Guarantee and domestic Personal Accident risks.

(ii) Outline the key claim characteristics related to each type of insurance written by the company. [6]

(iii) Comment on how liquid this company's assets need to be. [2]

[Total 12]

9 Company H is a general insurance company, writing business for the last 3 years. It is currently considering using a stochastic model to determine its regulatory capital.

(i) Suggest possible reasons why the general insurance company may be considering a stochastic model rather than a deterministic model to determine its capital. [5]

(ii) Describe how Company H's Capital Modelling Actuary would model the capital requirement for underwriting risk when modelling:

(a) attritional claims.

(b) large claims.

(c) catastrophe claims.

[6]

A high proportion of Company H's premiums comes from Marine Cargo insurance cover. The Actuary at Company H has commented that it is important for the company to have accurate information related to premiums.

(iii) Outline the key considerations in relation to the following items to allow the Actuary to accurately estimate the underwriting risk:

(a) Timing of premium payment [2]

(b) Premium adjustments. [3]

[Total 16]

END OF PAPER