INSTITUTE AND FACULTY OF ACTUARIES

‖‖‖‖‖‖‖‖‖‖

EXAMINATION

30 April 2020 (am)

Subject SP7 – General Insurance Reserving and Capital Modelling Specialist Principles

Time allowed: Three hours and fifteen minutes

1 A general insurance company that has historically written only short-tail property damage classes of business is considering whether to write longer tail lines of business.

Discuss how this change could impact the company's capital model. [4]

2 A company is considering building a Market Risk module in its internal capital model.

(i) Describe two different methods that could be used to model Market Risk. [4]

(ii) Suggest when each of the methods from part (i) may be appropriate. [2]
[Total 6]

3 A new insurance company writes only marine and energy business. At the start of the company's first year of writing business the price of oil falls dramatically.

(i) Describe how this may impact the performance of these lines of business. [6]

(ii) Suggest, with reasons, how the answer to (i) would change if the company had written the business for many years rather than being a new company. [2]
[Total 8]

4 An actuarial manager works in the capital team for a Lloyd's syndicate focussed on writing political risk and terrorism business. The actuarial manager has been asked to compare the actual financial results at year end for the syndicate to the equivalent financial results produced by the syndicate's capital model.

(i) Outline how this exercise could be completed. [4]

The actuarial manager carries out the exercise and it results in the table shown below.

Business unit	Measure	Expectation (%)	Result (%)	Return period
Trade credit	Gross loss ratio	55	50	1-in-10 years
Trade credit	Net loss ratio	60	56	1-in-8 years
Trade credit	Net combined ratio	90	91	1-in-2 years
Kidnap and ransom	Gross loss ratio	52	48	1-in-5 years
Kidnap and ransom	Net loss ratio	55	48	1-in-5 years
Kidnap and ransom	Net combined ratio	82	63	1-in-30 years
Terrorism	Gross loss ratio	35	350	1-in-150 years
Terrorism	Net loss ratio	45	105	1-in-100 years
Terrorism	Net combined ratio	75	137	1-in-110 years
Loss of attraction	Gross loss ratio	50	54	1-in-8 years
Loss of attraction	Net loss ratio	53	35	1-in-50 years
Loss of attraction	Net combined ratio	83	68	1-in-45 years

(ii) (a) Comment on the results of this exercise for each business unit.

(b) Suggest whether the results of this exercise invalidate any areas of the capital model, based on your answer to (a). [6]

[Total 10]

5   As a medium-sized general insurance company, Company A's management believes in co-insuring risks with other larger general insurance companies in the market. The country in which Company A is licensed has an industry-wide central system where all the insurance policies that are written on a co-insurance basis are registered by the lead insurer.

(i)   Define the terms:

(a)   Co-insurance

(b)   Lead insurer.

[2]

An actuarial manager has recently joined Company A, and they have observed some late reported premiums and claims information that might impact reserve estimation. The actuarial manager brings this to the attention of the Chief Actuary, who explains how the central system works:

- that there can sometimes be delays in the lead insurers inputting the policy and claims details into this system
- as a following insurer, Company A has little insight into any settlement negotiations between the lead insurer and the claimant; and as a result
- writing business on a co-insurance basis as the following insurer adds uncertainty to the reserve estimates.

(ii)   Suggest possible ways in which this uncertainty can be incorporated in a claims reserving exercise.   [4]

(iii)   Discuss the advantages and disadvantages of writing business as a following insurer compared to a lead insurer.   [6]

[Total 12]

6 A reinsurer is writing business in a soft market.

(i) Define a soft market. [1]

The reinsurer has quoted two different excess of loss programmes to a direct insurer. The reinsurance programmes are:

Programme A: An excess of loss programme that is £400m xs £100m with a 5% rate on line. It has two reinstatements at 100% cost. In addition, it has a 'Top or Drop' layer at a 1.5% rate on line (applicable to the higher layer) whereby the insured can claim recoveries from either:

- an £150m xs £500m layer with no reinstatement; or
- an £75m xs £25m layer with one free reinstatement, but this layer cannot be recovered against until a second loss has occurred.

Programme B: An excess of loss programme that is £450m xs £75m with a 5% rate on line. It has two reinstatements at 100% cost.

(ii) Determine when each programme is more beneficial to the insured than the other for one large loss. [8]

The insured chooses to buy Programme A from the reinsurer. In the next year there are the following losses: £600m, £75m, £60m and £50m.

(iii) Calculate the amount that the reinsurer will recover from the 'Top or Drop' layer, stating which of the two 'Top or Drop' layers is more beneficial. [3]

[Total 12]

7 A new regulator has been established in Country Z. The regulator is considering how to regulate the insurance market that it is responsible for.

(i) Outline reasons for Country Z wanting to regulate its insurance market. [2]

Country Z would like to become a place where insurers choose to have their head offices.

(ii) List possible regulatory regimes the new regulator could choose to implement. [2]

(iii) Discuss whether each of the regulatory regimes identified in (ii) are likely to encourage insurers to want to move their head offices to Country Z. [6]

Country Z is considering copying the regime of another country.

(iv) Discuss the advantages and disadvantages of copying the regime of another country. [3]

[Total 13]

8   Company B is a large general insurance company writing property insurance in and around the hurricane-prone East coast of the USA for the past 5 years. While it has so far relied on traditional reinsurance providers for its reinsurance programs, Company B's management is keen on exploring alternative options, such as the insurance-linked securities (ILS).

Company B's management have hired an independent consultancy to provide a subject-matter expert report around the possibility of using ILS focussing on catastrophe bonds, a very popular form of ILS.

(i)   Describe catastrophe bonds, commenting on how they work in practice.   [4]

(ii)   Discuss the advantages and disadvantages associated with the use of catastrophe bonds.   [4]

Company B provided the independent consultancy with 5 years of historical claims data and also asked them to set up a stochastic claims reserve model to come up with future projections for the catastrophe losses to be able to price the catastrophe bond accurately.

(iii)   Discuss the factors that need to be considered while setting up this model.   [6]
[Total 14]

9 Company C has written construction (engineering) insurance business for the past 8 years, starting in 2012. While historically the loss ratio experience in this business has been favourable, Company C has experienced higher loss ratios in the more recent accident years.

Since Company C does not have an in-house actuary, the Chief Financial Officer (CFO) of Company C has hired a consulting actuary to try to explain the reasons behind the increasing trend in accident year loss ratios. The CFO has provided the following premiums and incurred claims information as at 31 December 2019:

Underwriting year	Gross written premium	2012	2013	2014	2015	2016	2017	2018	2019
					Cumulative claims incurred				
2012	400,000	13,000	39,000	78,000	182,000	260,000	264,000	264,000	264,000
2013	500,000		15,750	47,250	94,500	220,500	315,000	320,000	320,000
2014	400,000			12,800	38,400	76,800	179,200	256,000	256,000
2015	300,000				9,300	27,900	55,800	130,200	186,000
2016	200,000					6,300	18,900	37,800	88,200
2017	200,000						6,000	18,000	36,000
2018	150,000							4,800	9,600
2019	150,000								4,950
Total claims incurred		13,000	54,750	138,050	324,200	591,500	838,900	1,030,800	1,164,750
Claims incurred by accident year		13,000	41,750	83,300	186,150	267,300	247,400	191,900	133,950

The CFO has further advised that the finance team has been earning premiums assuming the risk is spread evenly over the period of cover and all projects were written on 1 January of the respective underwriting year.

The Chief Underwriting Officer (CUO) has explained that all projects written to date are 5-year projects.

(i) Calculate the loss ratios for the 2012–2019 accident years, stating any assumptions made. [7]

The CUO has also stated that there has been no change to the underlying portfolio or to the loss trends in the market.

(ii) Verify whether the CUO's statement around loss trends holds true for Company C using the data provided. [6]

(iii) Discuss why the accident year loss ratios may be trending upwards. [3]

(iv) Explain alternative premium earning assumptions Company C might consider. [4]

(v) State the accounting principle that the CFO may be concerned about when considering such changes. [1]

[Total 21]

END OF PAPER