INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

9th September 2021

Subject SP7 – General Insurance Reserving and Capital Modelling

Time allowed: 3 Hours 30 Minutes (14.30 – 18.00 Hours)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions to examinees sent along with hall ticket carefully and follow without exception.*

2. *The answers are not expected to be any country or jurisdiction specific. However, if Examples/illustrations are required for any answer, the country or jurisdiction from which they are drawn should be mentioned.*

3. *Mark allocations are shown in brackets.*

Q. 1) **i)** Describe fidelity guarantee insurance and directors' and officers' liability insurance and list the main differences between these products. (2)

ii) Describe the characteristics of liability claims. (4)

iii) Discuss the challenges insurers are likely to face by changing the basis on which liability insurance is underwritten from losses occurring basis to claims made basis. (8)

iv) Define superimposed inflation and explain the key drivers of superimposed inflation in many lines of liability insurance. (6)

[20]

Q. 2) You are leading the Reserving team of an established General Insurance company. However, due to a change in data systems, you only have the following paid claims data extract available:

(Rs. Crores)	*Development period (years)*			
Accident year	**1**	**2**	**3**	**4**
2017	50	200	250	300
2018	125	200	250	
2019	75	100		
2020	100			

i) Calculate the reserves as at 31/12/2020. List any assumptions you make (3)

Due to a foreseeable change in accounting requirements, the Appointed Actuary has asked you to calculate discounted reserves to check the P&L impact. You are given the following additional information:

- Risk-free interest rate: 6%
- Illiquidity premium: 4%

ii) Calculate the discounted reserves as at 31/12/2020. Explain the total expected impact on the balance sheet and P&L due to this change. (6)

You are given following additional premium information:

Accident year	Net earned premium (Rs crores)
2017	500
2018	500
2019	500
2020	500

iii) Calculate the expected Ultimate Loss Ratio for each Accident Year. List any assumptions you make. (2)

iv) Discuss how your response to (i) would change in light of the new accounting standard and additional premium information made available and discuss the appropriateness of the reserves estimated under each approach. (7)

v) The new accounting standard also requires you to hold an additional risk margin above the best estimate. The Appointed Actuary is considering using the percentile-based method and has asked you to come up with a distribution of reserves by bootstrapping a Generalised Linear Model. List the steps involved in the process. (3)

You are given following additional information as at 31/12/2020:

- Shareholder's fund: Rs. 200 crores
- Assets: Rs. 700 crores
- Expected net written premium from 1/1/2021 to 31/12/2021: Rs. 600 crores

vi) Calculate the premium reserves as at 31/12/2020. List any assumptions you make. (3)

vii) Construct the balance sheet as at

a) 31/12/2020 and (1)

b) 31/12/2021 (8)

viii) Construct the expected P&L for the year ending 31/12/2021 and calculate the expected underwriting profits for the year. (4)

[37]

Q. 3) You are a consulting actuary in a country whose insurance regulator mandates that as part of the process for obtaining regulatory approval of a merger of general insurance companies, a report be commissioned from an independent actuary that specifically focuses on the protection of interests of policyholders impacted by the merger. All general insurance companies in this country are proprietary companies owned by shareholders.

As part of a planned merger of two general insurance companies in this country, you have been approached to commission such a report as part of the regulatory approval process. Discuss the issues that you should consider in providing this report and the investigations that you should undertake.

[15]

Q. 4) A general insurance company has produced the following summary showing the amount of economic capital allocated to each major line of business as at 31st March 2021.

Line of business	Capital Allocation (Rs crores)	2021-22 Expected Premium (Rs crores)	No. of years for which business has been written
Property CAT Reinsurance	120	140	6
Medical Malpractice	90	60	8
General Liability	70	120	2
Motor Insurance	120	200	12
Livestock Insurance	20	80	13

i) Discuss the company's capital allocation with suitable reference to the types of associated risks for different lines of business. (10)

ii) The company's CEO is of the view that capital allocation is generally too high, as the impact of negative correlation between lines of business exists in the portfolio. Discuss this statement. (5)

[15]

Q. 5) **i)** Insurer A commenced operations in 2018 and focuses on household insurance. List reasons why it would want to purchase reinsurance. (10)

ii) Outline the factors an insurer should consider when purchasing reinsurance. (3)

[13]

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