INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

17^{th} March 2022

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) The Government of a country has planned investment worth many trillions for infrastructure projects. The regulator has unveiled the final guidelines, facilitating the launch of various types of surety bonds in the country.

i) Describe Surety Bond. (3)

ii) Discuss difference Between a Surety Bond & Insurance Contract. (8)
[11]

Q. 2) A country's financial market has been recently impacted by the COVID-19. Solvency has reduced for all General Insurance companies. Outline Key drivers which might have impacted assets and liabilities. **[5]**

Q. 3) **i)** State Key Objectives of Insurance Regulations. (4)

ii) The spread of COVID-19 and the measures implemented to reduce its transmission had significant impacts on the insurance sector. The regulators and supervisors had taken some exceptional measures to respond to COVID-19 by providing support to policyholders that have been adversely affected by the COVID-19 public health emergency. Outline a few of measures taken by Regulators of various countries to protect policyholders. (5)
[9]

Q. 4) An insurance company has Free reserve of 1000 crores on 31st March 2019 with following information for next 2 years:

- Has an Excess of loss treaty for Gross Net Premium Income of 750 crores with Adjustment rate of 2% and Minimum and Deposit premium paid in 2 instalments
- Written premium for FY 2019-20 is 500 crores with no growth from previous year and next year premium growth is 40%
- Loss ratio of 85%, Commission Ratio of 5% and Expense Ratio of 15%
- All assets are invested in stock and Equity value is 5000 crores on 31st March 2019. Dividend yield is 3% and 10% of change in value of equity is realised by the company every year. Stock Market of country has grown by 10% in First year and decreased by 10% in next year.

Prepare the revenue account for 2 years and provide free reserve at the end of 2 years. **[12]**

Q. 5) Your Company is one of the largest General Insurance companies in India and Motor Portfolio constitutes around 40% of total written premium. You have been asked by your Appointed Actuary to carry out performance analysis of Motor Portfolio as part of continuous monitoring. Describe briefly the areas which you will cover as part of monitoring Exercise. **[15]**

Q. 6) You are working with a large Indian insurer having a wide geographical reach within India and writing several lines of business. As part of the Internal Model application team based in headquarters, you have been asked to categorize Operational Risk. Explain Operational Risk and highlight some examples of the same. **[18]**

Q. 7) You work as an Actuary in a small private limited insurance company. Due to a recent change in the accounting standards, your company has moved to Underwriting Quarter cohorts (Origin Period).

i) What does it mean when an Actuary is referring to Underwriting Year cohorts? How is it different from Accident Year cohorts? (1)

ii) In a typical triangle analysis, what components (UPR, PDR, OCR, IBNR) of the reserves will be included in each of the following scenarios:

a) Development period is based on Reporting Date; If Loss Ratio (LR) < 1 and If LR > 1

b) Development period is based on Paid Date; If LR < 1 and If LR > 1

(2)

Please Note: UPR: Unexpired Premium Reserve, PDR: Premium Deficiency Reserve, OCR: Outstanding Claims Reserve, IBNR: Incurred But Not Reported.

You are given the following Gross (of Reinsurance) cumulative triangle for analysis.

Origin Periods are based on Underwriting Quarter cohorts, while Development periods are based on Paid Date.

	1	***2***	***3***	***4***	***5***
2020Q1	400	480	528	570	600
2020Q2	500	600	660	1200	
2020Q3	600	720	1400		
2020Q4	720	1500			
2021Q1	1000				

iii) As an Actuary, you noticed something unusual in the triangle provided. List a few possible reasons that could be driving these. (6)

You had enquired with the claims team the reason for this anomaly. The response from the team is still pending. However, you have to submit the reserves for the quarter by tomorrow. As such, for the time being, you have made a certain assumption.

iv) List the assumption that you have made. (1)

v) Calculate the appropriate reserves using Basic Chain Ladder and/or BF method, adjusting for trends wherever required based on your assumptions. (Hint: Assume Q-o-Q growth rate of 20%) (8)

Upon further investigation, it was found that this unusual trend is not really a one-off event, but is likely to be a fairly accurate representation of the Q1 claims that can be expected to be reported in the future years.

vi) Discuss the trend and how it can be allowed for.
(Note: you can write the Origin Period Development Period of the Development triangle, if easier). (4)

vii) You have been provided with the 2021Q2 cumulative paid amounts below.

	1	2	3	4	5	6
2020Q1						600
2020Q2					1237.5	
2020Q3				1463		
2020Q4			1586.4			
2021Q1		1150				
2021Q2	1000					

Calculate the bottom right of the paid triangle in light of the new information. (8)

[30]

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