INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

26th March 2021

Subject SP8 – General Insurance: Pricing

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) An insurance company wants to launch a product a Professional Indemnity Cover for Solicitors and Barristers. Outline the following for the product

a) Policy coverage

b) Claims Profile

c) Risk and rating factors

[10]

Q. 2) **i)** State the properties of XL scales along with the reasons for the same. (2)

ii) A Company currently uses Age of the vehicle and Cubic capacity of the vehicle to determine price of Motor OD cover for Private Car. The UW team has recommended Age, driving experience, marital Status and Credit rating of the Driver as additional rating factors for pricing. The pricing actuary is concerned that the new rating factors are correlated. Explain the analysis that may be undertaken to ascertain whether the rating factors are correlated or not. (4)

iii) You are assisting pricing actuary of a reinsurer in constructing ILF curves for Professional Liability product, capped at Rs 15 lakhs, Rs 20 lakhs … Rs 1 crore. State the steps involved in construction of ILF curves along with assumptions made. (4)

[10]

Q. 3) Define different types of claim inflations. Discuss the drivers and impact of high super imposed inflations within liability class of business. **[8]**

Q. 4) **i)** Using a suitable example explain the difference between one way and two way analysis of data. (3)

ii) You as Pricing Actuary looking to build a new GLM model for motor insurance book. List down the policy and claim data details which will be required for modelling. (8)

iii) As per internal analysis by the Actuarial team, Distribution Channel is a key rating factor wherein business sourced via a broker channel has a higher relativity in comparison to direct sales / agent. However, the management is not in favour of using distribution channel as a rating factor. Explain how this can be incorporated in pricing using GLM model. (3)

iv) The following is the hat matrix:

$$\begin{matrix} 0.5 & & \\ & 0.2 & \\ & & 0.3 \end{matrix}$$

Given that Y1 = 25; E(Y1) = 17.2 ; variance (Y1) = 15000

Determine the Cook's distance for the 1st data point and list the conclusions basis the same. (4)

[18]

Q. 5) Discuss the Individual risk model and Collective risk model of aggregate claim distributions highlighting the underlying assumptions and real scenarios in which these models can be used. **[8]**

Q. 6) **i)** Give two examples of Silent cyber risks. (2)

ii) You are a pricing Actuary working for a Company offering both Insurance and reinsurance cover. Outline the concerns pertaining to Silent Cyber risks affecting the Company. (4)
[6]

Q. 7) **i)** List the coverage that could be offered under Remotely Piloted Aircraft System (RPAS) / Drones Insurance product. (2)

ii) Explain the pricing considerations and challenges in pricing these covers. (8)

iii) Explain how the pricing challenges stated above can be addressed. (5)
[15]

Q. 8) **i)** State the assumptions in arriving at premium using Bulmann-Straub model. (3)

ii) An Insurance company offers benefit based Travel cancellation policy and the pricing actuary wishes to use Bulmann-Straub credibility model to arrive at the risk premium. The following has been observed during the previous year:

- The proportion of claims across North and South part of the country are 3:1 but the insurer wishes to charge unit rate across the country.
- Over the last 3 years there are 10,000 claims amounting to Rs. 2,50,00,000 and variance of claims over last year is Rs. 65,00,000.
- Additionally the following data has been observed for the previous year:

Claim count for the North and South part of the country:

	North		**South**	
No. of claims	0	1	0	1
Number of policies	9,000	1,000	8,190	810

Claim Amount distribution for North part of the country:

Claim amount	10,000	20,000	30,000
Number of Claims	200	300	500

Claim Amount distribution for South part of the country:

Claim amount	35,000	45,000
Number of Claims	567	243

Determine the Bulmann-Straub credibility premium for the above cover, Mention any other assumptions made.

(7)
[10]

Q. 9) **i)** A direct insurer has 20% quota share reinsurance treaty with a reinsurer. The direct insurer incurs 15% operating expenses and 15% as commission to intermediaries. The insurer also earns 5% as investment income. Suppose that the reinsurer provides 15% as return commission and 5% override commission, estimate the maximum loss ratio that the direct insurer can incur, so that the insurer achieves a target profit margin of 3%. State the assumptions made in the estimation. (3)

ii) You are building a catastrophic model for modelling floods. List 4 events which you will consider in the events module. (2)
[5]

Q. 10) A general insurance company underwrites Fire portfolio across residential, commercial and industrial risk segments. The company intends to gain market share in Fire line of business through acquisition of smaller companies writing these types of risk.

Outline the major actuarial investigations the Company needs to undertake to assess the fire portfolios as part of acquistions. **[10]**

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