INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

6th December 2022

Subject SP7 – General Insurance Reserving and Capital Modelling

Time allowed: 3 Hours 15 Minutes (14.45 – 18.00 Hours)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions inside the cover page of answer booklet and 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. *Attempt all questions beginning your answer to each question on a separate sheet.*
4. *Mark allocations are shown in brackets.*
5. *Please check if you have received complete Question Paper and no page is missing. If so, kindly get new set of Question Paper from the Invigilator.*

AT THE END OF THE EXAMINATION

Please return your answer book and this question paper to the supervisor separately. You are not allowed to carry the question paper in any form with you.

Q. 1) ABC is a large Insurance company writing large commercial policies including Engineering project policies. Currently Reinsurance market is hard and therefore, it has entered into agreements with 3 insurers in which each insurer provides 80 crores support on PML (Probable Maximum Loss) basis to other insurer which is known as an Inter Group Treaty (IGT). Therefore, each company has support of 240 crores in the form of IGT.

ABC Reinsurance Cession pattern for the Engineering policies on PML basis:

Quota Share	5%
Net Retention	INR 200 crs. (PML)
IGT	INR 240 crs. (PML)
Surplus Treaty	INR 300 crs. (PML)
Facultative	Balance
Total	100%

Company has underwritten a mega Erection All Risk policy of 2450 crores which is having PML of 35%. Please provide:

i) Cession of this risk on PML basis and underwriting cession in percentage terms. (5)

ii) Claim apportionment and recovery from reinsurance in 2 scenarios

a) Claim of 62 crores

b) Claim of 890 crores

(7)

iii) Recovery from XL & Surplus Treaty in both claim scenarios. (3)

iv) Net to Insurer after all recoveries. (2)

[17]

Q. 2) Written premium of an Insurance Company in FY 2021-22 is 200 crores and is expected to remain same in FY 2022-23. It is assumed that, in each financial year, the premium is received uniformly and that expenses and commission are 20% of written premium. Company has assets of 400 crores at end of FY 2021-22. Investment income is 20% of written premium.

Loss ratio of FY 2021-22 is 65% and next year loss ratio is expected to be 110%.

For calculation of PDR, inflation and claim expenses can be ignored, if any. Outstanding claims reserves are 100% of premium written in the previous 12 months.

Calculate the assets at end of FY 2022-23. **[13]**

Q. 3)

i) What are the aims of Regulations? (2)

ii) A country's Insurance regulatory body has decided to move from detailed, prescriptive rules based approach to principles-based approach. Discuss advantages and disadvantages of these regulatory regimes. (10)

[12]

Q. 4) A large Insurance company has identified its Motor OD loss ratio is higher than in comparison to a major competitor. Board has directed to stop writing business if loss ratios don't improve. Your Appointed Actuary has asked you to investigate the reasons for high loss ratios. Suggest what type of analysis you would carry and the possible reasons for higher loss ratios. **[8]**

Q. 5) The regulator of a densely populated Country A has made it mandatory to include climate risk while modelling the capital requirements. An insurance company B based in Country A writes Motor, liability, business interruption and trade credit policies.

i) Describe how the different lines of business written by Company B will be impacted by the climate risk. (8)

ii) What challenges the Company B might face while assessing the capital required for this risk. (2)

iii) Company B did not consider climate risk previously. It now wants to have a separate model to assess capital requirements for this risk. Describe the stages to be considered by Company B to model this risk using the capital model. (15)
[25]

Q. 6) A company has supplied the following data to a Consulting Actuary for a class for which data is available only at the dates given below.

u/w year	Cumulative claims paid as at				
	30/11/2017	31/05/2019	31/12/2019	31/03/2021	31/12/2021
2017	2040	3267	3789	3980	4070
2018		2502	3187	3889	4789
2019		678	1789	4789	4980
2020				3039	3789
2021				310	2890

i) The Company has requested the Actuary to adapt the data for use in chain ladder method. You need to construct a standardized annualized triangle of claims data and hence calculate future claims as at 31/12/2021, making any adjustments that you consider necessary and stating any assumptions made with justification. (15)

ii) You are also requested by the Company to advise on what changes can be made to data, approach, methodology and how it would improve the reserve estimation using chain ladder method. (5)

iii) Discuss how the business environment might impact the basis and method for estimating the reserve. (5)
[25]

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