INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

21st November 2011

Subject ST8 - General Insurance: Pricing

Time allowed: Three hours (14.45* – 18.00 Hrs)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

1. *Please read the instructions on the front page of answer booklet and instructions to examinees sent along with hall ticket carefully and follow without exception*

2. ** You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*

3. *You must not start writing your answers in the answer sheet until instructed to do so by the supervisor*

4. *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.*

5. *Attempt all questions, beginning your answer to each question on a separate sheet.*

6. *Mark allocations are shown in brackets.*

7. *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.

Q. 1) Define the following terms related to reinsurance

i. Annual Aggregate Deductible

ii. Reinstatements

iii. Indexed limits

iv. Overriding commission **[6]**

Q. 2) One of your colleagues in the actuarial department made the following comment during a discussion, "…the GLM method of pricing makes assumptions about the future experience which may not be true. Therefore, it is better to use non-parametric methods for claim analysis for pricing which do not make such assumptions."

Discuss the comment.

Hint: A non-parametric analysis is where no assumption about the distributions is made or no parameters need to be estimated. For example by creating multi-way tables or by using CHAID method to calculate the average cost per policy-year. **[6]**

Q. 3) The chief underwriter has asked you to perform actuarial investigations to find out the suitability of the existing reinsurance arrangements and to help the management decide on the appropriate reinsurance arrangements to make in the next year. Describe the various aspects of the reinsurance requirements of the company and the aspects of the current and the future proposed reinsurance arrangements which you will analyze. **[6]**

Q. 4) A large commercial general insurer wants to estimate the expected gross claim outgo due to catastrophe losses in its existing portfolio of property line of business using a CAT model.

i. Describe the inputs which are required to run the catastrophe model. (2)

ii. Describe two ways in which the catastrophe models give output for distribution of losses due to catastrophes. (3)

The insurer had not bought any Catastrophe reinsurance for the current year. However, it plans to buy Catastrophe XL reinsurance for the next year.

iii. Describe two ways in which the insurer may load for the expected cost due to catastrophes into the pure risk premium for property products? (2)

[7]

Q. 5) Questions

i. Explain, with a suitable simple example, the situation when an interaction terms should be used in GLM modelling. (3)

ii. Describe, with a suitable simple example, the two ways in which interaction between two factors can be modelled in GLM. (4)

iii. Describe the methods for simplifying the rating factors used for a GLM modelling for pure risk premium modelling. (4)

[11]

Q. 6) The regulator of an insurance industry wants to set up a central data repository for motor insurance. Discuss the factors that the regulator should consider in establishing the central data base system to support the data repository. **[10]**

Q. 7) A general insurance company commenced writing business in personal lines in a developing country with vast untapped potential two years ago. The expense loading in the premium rates was incorporated as per policy charge and commission was loaded to the full extent payable as a percentage of premiums. The company realized its business targets on number of policies and premium income in the first year of its operations but in the second year it fell short of its target for premium income by a low margin but by a significant margin for number of policies. Explain how you would apply the concept of actuarial control cycle to review and fix the expense loadings in the premium rates. **[14]**

Q. 8) **i.** Explain why an exposure curve is usually not created for casualty insurance business. (1)

ii. What are the assumptions behind creating and using ILFs for pricing casualty insurance business? (1)

Claim band	Number of claims	Total claim amount
1- 100,000	200	12,000,000
100,001 - 200,000	50	7,000,000
200,001 - 500,000	10	3,750,000
More than 500,000	2	1,500,000

iii. Construct ILF for the above claim experience at the limits 200,000 and 500,000 assuming the ILF for limit 100,000 to be 1.00. (3)

iv. The expected loss cost at the basic limit 100,000 is 2500. Calculate the expected loss cost for the layer 300,000 xs 200,000. (3)

The above losses were for the occurrence year 2010. You want to price the layer 300,000 xs 200,000 for a reinsurance arrangement which will cover losses from one year term policies sold throughout 2011. The expected loss cost applicable to these policies at the basic limit 100,000 is now 2800.

v. Calculate the expected loss cost for the layer assuming an annual inflation of 10%, stating all the assumptions you make. (7)

vi. Comment on the increase of the pure cost for the layer as compared to increase in the gross claim cost due to inflation. (2)

[17]

Q. 9) **i.** List the principal rating factors for employers' liability insurance. (2)

ii. A large industrial company with 2,000 employees is seeking quotations for the renewal of its employers' liability cover. Describe how to calculate the renewal premium using a prospective experience-rating approach. (16)

iii. It has been suggested that the company should have a modified coverage with an aggregate deductible whereby the deductible is applied to the sum of all losses occurring within the policy period. Discuss the approach you would use when quoting a premium rate for a given aggregate deductible amount and any other factors to be considered. (5)

[23]

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