INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

19th November 2010

Subject ST8 - General Insurance: Pricing

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

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

(i) ***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***

(ii) **** 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.***

(iii) ***You must not start writing your answers in the answer sheet until instructed to do so by the supervisor***

(iv) ***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.***

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

(vi) ***Mark allocations are shown in brackets.***

AT THE END OF THE EXAMINATION

Please return your answer book and this question paper to the supervisor separately.

Q. 1) (i) Explain briefly uncertainty and risk. (3)

(ii) Describe the major areas of risk and uncertainty in general insurance business with respect to data in a GLM pricing exercise. (5)

[8]

Q. 2) (i) Describe the market cycle and the different phases in it. (4)

(ii) How would the prices charged in the market be influenced by the phase in the market cycle that the general insurance business is in. (3)

[7]

Q. 3) Over the last 3 years a general insurance company has been writing household contents insurance in a developing country. A recent market review estimates a high growth potential for the market in this type of business. The company has hitherto based its premiums for this business on 4 bands of sum insured and 3 categories of contents.

The company is now proposing to introduce age of policyholder as a new rating factor.

(i) Discuss this proposal. (5)

(ii) Describe further aspects of the proposal that the company may have to consider before implementing the same. (8)

[13]

Q. 4) A general insurance company is considering a proposal to increase its retention limits with the main objective of saving cash outflow on reinsurance.

Describe briefly the factors the company should consider in an assessment of this proposal.

[10]

Q. 5) (i) Describe briefly how spatial smoothing methods help in the classification of risks by postcode in general insurance. (2)

(ii) State two main forms of spatial smoothing typically employed and discuss how the methods work in practice. (7)

(iii) Explain briefly the importance of choosing an appropriate degree of smoothing while employing the methods (2)

[11]

Q. 6) A general insurance company has been successfully operating in a developing country mainly in personal lines business over the last 7 years. At the beginning of the last financial year, the company initiated steps to attain a higher growth rate in its motor portfolio by introducing additional benefits under its comprehensive policy as well as new additional rating factors of

- sex of driver
- geographical area of use of vehicle

Against the earlier rating factors of

- model of vehicle,
- cubic capacity of vehicle and
- age of driver only.

The company has now decided to form a team comprising you as the pricing actuary, the chief financial officer, the chief risk officer and the head of marketing to propose a structure for monitoring

a) the business written by the company in general and

b) the success of the steps initiated a little more than a year ago.

Describe the features of the structure for monitoring you would propose, indicating any analytical reviews to be undertaken by the company.

[13]

Q. 7) You are an actuary working for a reinsurance company.

The marketing director has approached you with the historical data of a short tailed portfolio which is subject to a quota share treaty and is coming up for renewal. The portfolio is currently reinsured with another reinsurer and your marketing director is keen to acquire this business.

The ceding company expects the loss ratio for the year 2010 to be 80% and the marketing director is happy to quote a reinsurance premium based on the 80% expected loss ratio.

However, just before sending the quote, the data has been referred to you for your views on the loss ratio for 2010 based on the following available information.

(Rs lakhs)

Year	Written Premium	Incurred Loss	Rate Change
2005	350	280	NA
2006	378	416	50%
2007	416	333	10%
2008	403	323	5%
2009	464	417	0%

The above data

a) is based on Underwriting year; and

b) rate change figures indicate the percentage change in premium (+ increase / - decrease) from an identical risk year on year

You are also provided with the following additional information:

a) Claims inflation is running at 5% throughout this period

b) The expected rate decrease in 2010 is 5%

(i) Calculate the loss ratio that can be expected for 2010 for this class based on all of the historical experience and the rate change and inflation assumptions given above, stating any assumptions you make. (6)

(ii) State other information that you would require in order to determine if this quota share contract is expected to be profitable for 2010. (5)

(iii) Suggest reasons why the ceding company's expected loss ratio for this contract might be different from the value calculated in part (i). (5)

[16]

Q. 8) (i) Outline the basic structure of catastrophe modules

The meteorological department of a country prone to earthquakes, periodically publish seismological maps of the country showing classifications by intensity of risk proneness of different areas in the country, with suitable notes. In the most recent publication the department revised its classification by increasing the number of areas in the country from 12 to 20. The classifications by intensity were also increased from 3 to 5. Consequently some areas have a higher intensity level than under the earlier classification system and no area has a lower intensity level.

You are the pricing actuary of a general insurance company operating in this country and have been maintaining a catastrophe model for the last 3 years. (5)

(ii) Discuss briefly how the revised information published by the department would affect your model, outlining the approach you would use to revise your model for its continued use in your company. (8)

[13]

Q. 9) A direct insurance company is planning to purchase XOL reinsurance coverage for home owner's property losses covering buildings. The coverage sought is Rs 50,00,000 in excess of Rs 50,00,000 for fire loss for buildings.

The coverage limit for Buildings and the direct premium is as per the table below:

Building Coverage Limit (Rs)	**Direct Premium (Rs)**
1250000	10000000
2500000	10000000
3750000	10000000
5000000	10000000
10000000	10000000

The direct insurer targets a loss ratio of 60%. The reinsurer targets a loss ratio of 80%. The reinsurer shares 10% of the direct insurer's expenses. The rates charged by the direct insurer for this line of business are considered to be adequate.

The cumulative loss cost distribution by percentage of insured value for the insured risk is as follows:

Loss as a percentage of Insured Value	Cumulative Loss cost distribution by percent of insured value
5%	42.8%
10%	54.2%
20%	67.4%
30%	76.8%
40%	83.9%
50%	89.0%
60%	92.7%
70%	95.5%
80%	97.6%
90%	99.1%
100%	100.0%

Calculate the exposure premium rate to be charged by the reinsurer for the XOL cover. **[9]**

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