

Institute of Actuaries of India

EXAMINATIONS

01st November 2007

Subject ST3 – General Insurance

Time allowed: Three Hours (02.15* - 05.30 pm)

INSTRUCTIONS TO THE CANDIDATE

- 1. Enter all the candidate and examination details as requested on the front of the answer sheet/s.*
- 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 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. Mark allocations are shown in brackets.*
- 6. Attempt all questions, beginning your answer to each question on a separate sheet.*
- 7. Candidates should show calculations where this is appropriate.*
- 8. Fasten your answer sheets together in numerical order of questions. This, you may complete immediately after expiry of the examination time.*

Professional Conduct:

“It is brought to your notice that in accordance with provisions contained in the Professional Conduct Standards, If any candidate is found copying or involved in any other form of malpractice, during or in connection with the examination, Disciplinary action will be taken against the candidate which may include expulsion or suspension from the membership of IAI.”

Candidates are advised that a reasonable standard of handwriting legibility is expected by the examiners and that candidates may be penalized if undue effort is required by the examiners to interpret scripts.

AT THE END OF THE EXAMINATION
Hand in BOTH your answer script and this question paper to the supervisor.

- Q. 1)** Describe briefly the areas of risk and uncertainty for a general insurance company writing a small heterogeneous block of business. [10]
- Q. 2)**
- i)** Explain what is meant by EML. (2)
 - ii)** Write down the maximum EML that can be insured, and not go beyond the maximum reinsurance cover, if the only reinsurance that the company has available is a surplus treaty with N lines of cover and a maximum retention of R. (1)
 - iii)** An insurer (C) takes on a risk with EML of INR 100m. Company C has a risk excess of loss contract 50m xs 10m with reinsurer A which applies before a surplus treaty with reinsurer B. The surplus treaty provides a maximum retention of 30m and 4 lines with minimum always being ceded. Determine how much each A, B and C pay if a claim for 90m occurs. (4)
 - iv)** Explain what is stop loss cover and state why reinsurers are often not prepared to provide stop loss cover. (3)
- [10]
- Q. 3)**
- i)** List 12 main rating factors that may be used in pricing personal motor insurance. (3)
 - ii)** State four risk factors that are not normally used in pricing this type of business, describing the link between these factors and the rating factors that are actually used. (4)
 - iii)** Explain why the rating factors are used in preference to the corresponding risk factors. (1)
- [8]
- Q. 4)** You are an actuary working for a general insurance company in a developed economy which does not currently write motor insurance business. The Marketing department of your company has proposed issuing a special annual policy to low mileage drivers for private use only. Only the policy holder is insured and at the start of the policy year he pays a policy administration charge. During that year he then pays for the insurance cover as needed on a daily basis by giving 24 hours notice and having the appropriate cost being deducted from his bank account. You have been asked to identify the difference between this policy compared to standard annual policy.
- i)** Describe the advantages and disadvantages for the policyholder and the insurance company. (7)
 - ii)** Describe the issues you will face in initially in rating such a policy. (3)
 - iii)** State four data items that are likely to be collected by insurer which would not normally be collected for a standard annual policy. Explain why these are likely to be required. (4)
- [14]

Q. 5) You are an actuary working for a general insurance company operating in a developing market. The senior management of your company is concerned about lower than expected top line growth of the company.

- i) State the ways in which a general insurance company can increase its gross written premium. (5)
- ii) State the constraints that it faces in doing so. (5)
- iii) State what is meant by a soft market and explain how it occurs and persists. (4)
- iv) Describe the risk that a general insurance company faces if it under-estimates the softness in the market. (6)

[20]

Q. 6) You have been provided following financial information in respect of a general insurance company.

	2002	2003	2004	2005	2006	Total
Gross Earned Premium	99	107	281	248	330	1,065
Reinsurance Earned Premium	18	29	155	108	114	424
Net Earned Premium	81	78	126	140	216	641
Gross Claims Incurred	44	77	315	374	222	1,032
Reinsurance Claims Recoverable	2	47	233	207	21	510
Net Claims Incurred	42	30	83	167	201	523
Net Commission (net of reinsurance)	15	17	48	44	53	177
Net Assets	80	48	137	168	182	615
Management Expenses	8	6	18	21	17	70

- i) Define the term gross loss ratio, net loss ratio, expense ratio, combined ratio and solvency ratio. (2)
- ii) Calculate these ratios for each of the five years of the data (5)
- iii) Describe the changes in the company finances from year to year in the following areas calculating any additional statistics which support your analysis
 - (a) The efficiency of the management in controlling the expenses
 - (b) Growth
 - (c) Reinsurance purchasing
 - (d) Underwriting profitability (10)

- iv) Suggest where the management focus should be in the coming year 2007 (3)

[20]

- Q. 7)** You are a student actuary working for a reinsurance company that writes a block of catastrophe reinsurance contracts to an expected combined ratio of 60%. Your managers estimates that its aggregate claim distribution is compound Poisson with $\lambda = 20\%$ and claim size distribution is exponential with mean INR 1 million.
- i) Calculates the minimum amount of capital required by your company to ensure that its ultimate probability of ruin stays below 0.5%. (6)
- ii) Ignoring investment income, calculate the return on capital (ROC) that the reinsurer would generate if it held the amount of capital that you calculated in (i) above (2)
- Q. 8)** You are an actuary for a general insurance company that writes a wide range of products. The reserve estimates for each homogeneous portfolio are calculated using the Bornheutter-Fergusson method. Company procedure dictates that the initial estimate of the ultimate loss ratio is not changed once selected. [8]

You are responsible for setting the reserves for stable portfolio of short tailed business. You are reviewing the historical data for a fully developed year. In this year 100m of premium were written in a soft market. The portfolio is reserved using Bornheutter-Fergusson method based on reported claims and at the time of writing the business, the expected cost was underestimated. The initially selected estimate of the ultimate loss ratio was 100% and the difference between initial and actual ultimate claim ratio is 20%.

The expected run off pattern of the portfolio is given below:

End of Year	1	2	3
Paid Claims	30%	90%	100%
Reported Claims	50%	105%	100%

- i) Explain why reported claims at the end of year 2 might exceed the ultimate claims. (5)
- ii) Calculate the impact that the difference between the initial and actual ultimate loss ratio has on declared profits of the company at the end of each of the three years, stating any assumptions you make. (5)
- [10]
