INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

21st November 2012

Subject ST7 – General Insurance: Reserving & Capital Modelling

Time allowed: Three Hours (14.45 – 18.00)

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. *Mark allocations are shown in brackets.*
3. *Attempt all questions, beginning your answer to each question on a separate sheet.*

AT THE END OF THE EXAMINATION

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

Q. 1) Briefly describe the different types of inflation that affect claim payment amount. Explain how inflation influences the investment strategy of a company.

[5]

Q. 2) Explain the term medical malpractice insurance and its key risk features.

[5]

Q. 3) Your company is considering buying a reinsurance cover for its Fire portfolio. It has two risk XOL options from the same reinsurer:

(a) Rs 4 million xs Rs 2 million for a premium of Rs X

(b) Rs 5 million xs Rs 1 million for a premium of Rs Y

You, as the actuary, have been requested to perform a modelling exercise to decide on which cover to buy. Discuss what data you should ask for and outline the modelling exercise you would undertake to decide between these two reinsurance options

[5]

Q. 4) NewLine, a general insurance company, is starting to write a new line of business. Since it does not have its own data, it has procured the following paid development patterns:

- Data from NewLine's reinsurer for its own portfolio for the same line of business:

Development Months			
12	**24**	**36**	**48**
50%	25%	15%	10%

- Data on an aggregate industry basis for the same line of business

Development Months			
12	24	36	48
60%	25%	15%	0%

Discuss possible reasons for the difference between the two patterns. Evaluate the pros and cons of NewLine using one of them for its own reserve estimation.

[5]

Q. 5) ABC, a general insurance company has the following reinsurance structure for its Liability portfolio:

- 10% QS with reinsurer GDD up to a limit of Rs 1 cr.;
- an XOL agreement with reinsurer BRE of Rs 1.5 cr. excess of Rs. 1 cr. with a premium of Rs. 3 lakhs and one reinstatement at 130% additional premium; the reinstatement premium is paid based on the proportion of cover burnt through, ignoring other factors.

ABC incurs a claim of Rs. 3 Cr. on its Liability portfolio.

i) Calculate the loss amounts paid by ABC, GDD, and BRE for this claim. (2)

ii) Calculate the reinstatement premium, if any, paid by ABC to BRE. (3)
[5]

Q. 6) One of the big mobile phone company is thinking of setting up a captive insurance company to buy insurance for various risks the company and its customer face.

i) What is a captive insurance company and how is it different from the open market captive insurance company? (2)

ii) Suggest why such a big company wants to set up a captive insurance company rather than focusing on its key business objective of selling mobile phones (7)
[9]

Q. 7) You have been approached by large multinational general insurance company to investigate the appropriateness of the reserves of the company it is acquiring. The target company specializes in the Motor and liability business.

Prepare a note to the management explaining reserve uncertainty and outline the sources of the uncertainty with respect to the business it aims to acquire.
[10]

Q. 8) The following table provide the relevant information (in Rs. Crores) for NewBlood , a General Insurance company which started writing business from 1/4/11 with free reserves of Rs. 100 Cr.:

	1/4/11 - 31/3/12	1/4/12 - 31/3/13
Written Premium	270	360
Claims Paid	72	180
Outstanding + IBNR at EOY	36	84
Expenses	30	36
Investment Income	20	25

Assumptions:

- Premiums are written uniformly over the year.
- There are no taxes or dividends.
- Capital gains / losses need not be considered.
- Deferred Acquisition Cost need not be considered.

i) Prepare the revenue accounts for the two financial years. (5)

ii) Calculate the claim and expense ratios for these two years. (2)

iii) Calculate the free reserves as of 31/3/12 and 31/3/13. (3)

iv) Recalculate the free reserves as of 31/3/12 and 31/3/13 under the following stress scenarios: WP: 10% less than expected, loss and expense ratios: 25% higher than expected. (5)
[15]

Q. 9) Fixit is a general insurance company which has provided you with the following information for a specific line of business:

Paid Losses – Cumulative

Accident Year	12	24	36
2010	3,000	4,800	5,400
2011	6,000	9,600	
2012	9,000		

Incurred Losses – Cumulative

Accident Year	12	24	36
2010	5,500	6,200	5,400
2011	10,000	13,800	
2012	27,000		

Open counts

Accident Year	12	24	36
2010	5	2	-
2011	8	2	
2012	12		

i) Calculate the ultimate losses using both paid and incurred loss chain ladder method, assuming that there is no development after 36 months (4)

ii) State the possible reasons for the discrepancy between the two ultimate loss estimates calculated above. (3)

iii) Use the additional data provided to calculate an appropriate loss diagnostic to narrow down on one reason for this discrepancy. (6)

iv) Briefly describe a method to adjust for the issue mentioned in (c). (3)

v) Fixit's CFO has suggested that the above problem can be better addressed by using an appropriate stochastic method, as the main issue here is the variability in reserve estimates. Discuss the appropriateness of this suggestion. (4)

[20]

Q. 10) Table below gives the capital required using a deterministic model for overall company and each portfolio for "India Insure Co. Ltd.". The actuarial team of the company has suggested that overall capital requirement should be reduced to allow for the diversification benefit.

Class of Business	**Capital Required (INR'M)**
Motor	50
Property	150
Marine	25
Total	225

i) What do you understand by diversification benefit and why it arises?

Class Of Business	**Motor**	**Property**	**Marine**	**Total**
Motor	100%	70%	20%	50%
Property	70%	100%	50%	30%
Marine	20%	50%	100%	30%
Total	50%	30%	30%	100%

(3)

ii) Using the correlation matrix provided above and appropriate statistical approach, calculate the diversification benefit and also comment on the approach you might have used. (6)

iii) In the light of recent developments in regulatory environment company management has decided to use stochastic model to assess the capital requirements. Describe the process of the stochastic capital model and areas where it will have significant benefits compared to deterministic approach. (7)

iv) Based on the recent solvency assessment, the Board has realized that significant amount of solvency capital, as required for regulatory purposes, is driven by catastrophic risk on property portfolio and its correlation with other risks. Illustrate with example for management meeting and understanding. (5)

[21]

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