INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

23rd October 2009

Subject ST3 — General Insurance

Time allowed: Three hours (14.45* pm – 18.00 Hours)

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.*

AT THE END OF THE EXAMINATION

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

Q 1) You are an actuary employed by a medium sized general insurance company which writes motor and workers' compensation business.

(i) Discuss the points that should be considered when preparing investment guidelines for these two lines of business. (8)

The board of directors has asked you to prepare an asset liability model so that the board can monitor the asset-liability position of the company on a regular basis.

(ii) Outline the basic concepts of an asset liability model including the various inputs you would require from the company's database systems and the assumptions you would need to make. (8)

[16]

Q 2) A small general insurer sells only personal homeowners' policies. The company wants to revise the current premium rates using data based on its prior experience. The capital requirement for the company is 25% of written premium. The new premium rates will be applicable from 1st January 2010 for one year.

You may assume that the insured value of houses do not vary significantly across the portfolio. You do not need to incorporate the claim payment pattern in the calculations as you can assume that claims are reported and paid immediately after occurrence.

Past gross of reinsurance experience of the portfolio has been as follows:

Year	Exposure Houses :	Number of Claims	Amount (in Rs '000)
2005	100,000	2,000	110,000
2006	150,000	13,500	2,200,000
2007	200,000	3,500	250,000
2008	225,000	4,000	350,000

? There was a major flood in 2006 which resulted in 10,000 claims at an average of Rs 200,000 per claim. The data above includes those claims.

? The past and future inflation in property building and maintenance costs is 15% per annum.

? The loading for catastrophic events should use the following assumptions:

- o There is a one in 50 years chance of a catastrophic event
- o In the event of a catastrophe, there is a 10% chance that a house will be damaged by the catastrophe (or the catastrophe will impact 10% of the houses covered)
- o If a house is damaged in a catastrophe, the average cost of claim will be Rs 250,000.

? The loading for administrative expenses is 10% of final premium

? The loading for acquisition expenses is 15% of final premium

? The net cost of reinsurance is 5% of pure risk premium (before the catastrophe loading).

? There is a service tax of 10% of final premium to be charged to policyholders

? The profit loading is equivalent to 20% of capital required.

(i) Derive the revised premium rate to cover one house, stating any assumptions made. (9)

Instead of providing the summary table of past experience and assumptions for pricing, your chief actuary has provided you with full access to the company's database and reports and information regarding the past underwriting and claim processes in place.

(ii) Explain how your method of calculation of pure risk premium would change, outlining the actuarial investigations you would perform to decide on the loadings on pure risk premium. (8)

[17]

Q 3) **(i)** Define the following terms:

a) Surplus reinsurance including the way the limits are specified.

b) Reinstatement of an XoL layer (3)

A large general insurance company writes commercial property as one of its LOBs (lines of business). It has reinsurance arrangements in place for this LOB with the following structure:

A) Surplus reinsurance with fixed retention of Rs 50,000,000 and coverage of 2 lines of cover above the retention

B) A per risk XoL on the net account (net of surplus reinsurance) with two layer of protection::

Layer 1: 30,000,000 xs 20,000,000 with 1 reinstatement at 80% of original premium

Layer 2: 50,000,000 xs 50,000,000 with no reinstatements

The reinsurance premium for Layer 1 is Rs 1,500,000.

The following table shows three possible scenarios of sums insured and gross claim in a coverage year.

Scenario Number	Sum Insured (in Rs '000,000)	Claim Amount (in Rs '000,000)
1	120	44
2	150	75
3	300	200

(ii) Calculate the amount of claim paid by the insurer and the reinsurers, including the reinstatement premium that the insurer needs to pay, if any. (10)

[13]

Q 4) Outline the following for a Commercial Motor Fleet insurance product

(i) Rating factors (2)

(ii) (a) Coverage provided

(b) Perils covered (3)

(iii) Claim characteristics (4)

(iv) Some example of exclusions (3)

[12]

Q 5) **(i)** Suggest ratios which might be derived from the accounts of a general insurance company for assessing:

(a) claims experience
(b) total expense levels
(c) overall profitability of writing insurance
(d) financial strength
(e) rate of return on shareholders' capital (4)

(ii) Discuss the important points to be considered while deciding a reserving basis for a general insurance company. (5)

(iii) Discuss the situations under which a general insurer might use a less conservative basis for estimating its claims reserves. (2)

X and Y are two general insurance companies having similar portfolios, but company X has a stronger reserving basis than company Y.

(iv) Discuss the situations under which company Y may have a smaller profit than company X. (3)

[14]

Q 6) You are the actuary advising a general insurance company. You are about to prepare a formal actuarial report for which significant quantitative analysis has been carried out.

(i) List the main headings or topics to be included in the scope of a report on the technical provisions. (4)

(ii) If the report is to appraise management about the financial condition of the company discuss briefly the additional points you would include in your report. (4)

[8]

Q 7) A general insurance company wishes to analyse all its expenses and attribute them to individual classes of insurance.

(i) Explain how functional costing and timesheet analyses could be used for this purpose. (6)

(ii) Describe briefly how splitting the expenses between fixed amounts and variable amounts could assist in analysing the profitability of the business. (4)

[10]

Q 8) **(i)** Describe briefly the circumstances when funded accounting is used (2)

(ii) Explain in detail how the method of three-year accounting operates in practice. (8)

[10]

****