INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

3rd May 2016

Subject SA3 – General Insurance

Time allowed: Three hours (14.45* - 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 you are required 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 expected to be India Specific application for the syllabus and corresponding core reading. However, substantially the core reading material is still taken from material supplied by Actuarial Education Company which is meant for UK Fellowship examination. The core reading also contains some material which is India Specific, mostly the IRDA regulation. In view of this, it should be noted that focal point of answers is expected to be India Specific application. However if application specific to any other country is quoted in the answer the candidate should answer the question with reference to Indian environment.***
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) You are an actuary working for a large general insurer. You have been asked to build a model for the earning and matching approach to calculate the estimated premium liabilities for the travel insurance business in your company's insurance portfolio. The business mainly consists of individual trip policies.

i) Describe the methodology you would use to calculate unearned premium, taking account of various risks and their likely patterns of exposure. Note that the company prices each risk separately in determining the total premium for each policy. (4)

ii) You have been asked to build a model for monitoring premium volumes, exposure and profitability. List the data that you would require from the policy database and provide a broad description of the monitoring model. (4)

iii) A small proportion of the business in the portfolio consists of annual policies for regular travellers. How would you adjust your model to allow for this business? (3)

iv) What are the advantages and disadvantages to the general insurer of incorporating annual travel coverage into the range of optional covers that may be included in the company's domestic insurance policies? (4)

[15]

Q. 2) You are the Senior Actuary of Moimoi Insurance, a small insurance company specialising in personal insurance products including home and contents, motor and personal accident insurance. The company's current capital level is 140% of the Minimum Capital Requirement as required by IRDA. The company's medium term target asset structure is 50% cash, 45% short-term government bonds and the remaining 5% in growth assets. Whilst the historical performance of the company has been stable, profit after tax has been consistently below the board's expectation.

Management is now looking to improve profitability by acquiring Tautai Insurance. Tautai Insurance is a niche motor insurer. Tautai's asset mix is similar to Moimoi except for a higher proportion invested in equities.

i) You have been asked to recommend the feasibility of acquiring Tautai Insurance. What issues would you consider when making your recommendation and why? (3)

ii) Moimoi has now formally acquired Tautai Insurance. Management feels that there are new risks emerging from the integrated portfolio. Identify three additional potential risks from the information given and recommend your risk management strategy for each risk. (3)

After the acquisition, the company is endeavouring to harmonise the two different motor insurance products into one. The companies currently use two different mainframes. Your investigation reveals that Tautai premium rating structure may not be sufficient to meet Moimoi's profit targets. You have been invited by management to provide your advice on an appropriate premium rating structure.

iii) Identify and briefly describe four key factors you would consider in deriving the harmonised premium rate. (4)

Your analyst has reviewed Tautai's domestic motor insurance book and recommends an increase of premiums for all ex-Tautai policies of 8% in order to reduce the portfolio loss ratio from its current level of 70% to Moimoi's target level of 65%. The analyst has provided the following information.

Region	**Vehicle**	**Year to December 30, 2014**			**Renewed in year to December 30, 2015**
		Number of Policies	**Total Premium Rs**	**Loss Ratio**	
Metro	Small	4,266	1,813,050	83%	3,627
Metro	Medium	3,130	1,392,850	67%	2,505
Metro	Large	2,551	1,186,215	62%	1,913
Country	Small	2,042	827,010	67%	1,613
Country	Medium	1,958	832,150	68%	1,566
Country	Large	1,919	853,955	67%	1,612

Lapses in year to September 30, 2015

Region	**Vehicle**	**Percentage change in renewal premium from last premium**[1]					
		< -10%	-5% to -10%	0% to -5%	0% to 5%	5% to 10%	>10%
Metro	Small	6	19	32	102	128	352
Metro	Medium	6	19	31	50	175	344
Metro	Large	6	19	32	38	191	351
Country	Small	56	60	64	64	99	86
Country	Medium	51	55	59	59	90	78
Country	Large	40	43	46	46	71	61

[1] Assume policies were distributed evenly across the premium movement groups

iv) Comment on your analyst's recommendations and set out further analysis which might be undertaken. (7)

[17]

Q. 3) You work for Gaz Co., a large insurer, which has provided coverage to a large government property portfolio since July 2008. The business is written on one annual policy and Gaz Co. determines policy premium based on actual experience of the government's whole portfolio. Coverage since policy inception has been Rs 3 million per claim, with a deductible of Rs 3 million applying to each loss. It is April 2015 and you are working on the upcoming July 1 policy renewal.

The government has allocated comparable property portfolios to departmental 'cost units'. Each cost unit has the option of opting in to the policy, with coverage commencing at any date during the year and will be charged a premium based on the policy premium applying for that policy year, adjusted for price indexation.

The following table shows the number of participating cost units at the beginning of each policy year:

Participating cost units

Date	Number of participating cost units
July 1, 2008	10
July 1, 2009	16
July 1, 2010	24
July 1, 2011	28
July 1, 2012	30
July 1, 2013	35
July 1, 2014	38
July 1, 2015	38*

*As at April '15

The following table summarises loss history since policy inception.

Loss number	Month cost unit incepted or renewed	Date of loss	Loss Rs	Status
1	Nov 2009	Apr 2010	4,000,000	Paid
2	Nov 2010	Aug 2011	2,500,000	Paid
3	Mar 2011	Dec 2011	5,800,000	Paid
4	Oct 2011	Jul 2012	4,000,000	Paid
5	May 2013	Jun 2013	5,000,000	Reported
6	July 2013	Jun 2014	5,000,000	Reported

i) Allocate each of the six losses to the appropriate policy year and determine indexed loss and loss to policy to assist in the upcoming July 1 policy renewal. Assume that the following price indexation applies:

Date	Index
June 30, 2008	141.3
June 30, 2009	144.8
June 30, 2010	148.4
June 30, 2011	154.3
June 30, 2012	157.5
June 30, 2013	164.6
June 30, 2014	167.9

State any simplifying assumptions you make. (6)

ii) Adjusting for exposure to identify any trends in claim experience, calculate the claims cost arising in each year, and use this to determine a premium for the upcoming July 1 policy renewal. Use a profit loading of 12% and reasonable assumptions for expenses and any other relevant factors. Assume that 50% of ultimate claims arising in any year are paid out in that year and 50% in the following year. State any simplifying assumptions you make. (10)

Gaz Co. has an outwards excess of loss (XOL) reinsurance treaty with Ablett Re covering its commercial property insurance portfolio, which includes the above policy. The one year treaty with Ablett Re expires June 30, 2015. For the most recent year, treaty premium was Rs 500,000, and coverage was Rs 2,500,000 excess Rs 2,500,000. Two reinstatements apply, each at 100% of the original premium for any coverage used. Recoveries were made under the treaty for four losses in the most recent year, these four losses being Rs 5 million, Rs 3 million, Rs 10 million and Rs 6 million.

iii) For each of the four losses and in total, calculate Gaz Co.'s net loss, recoveries and reinstatement premium under the treaty with Ablett Re. (4)

[20]

Q. 4) Internet of Things (IoT) is the new buzz word in the market circles. An article in one of the leading journals goes on to say "The Internet of Things: Revolutionizing the retail industry. Retailers are experimenting with the Internet of Things (IoT) to offer new services, reshape the customer experience and enter new markets".

i) What do you understand of The Internet of Things? List at least four areas in which you see potential opportunities arising from IoT for the General Insurance industry. (6)

A large general insurer is keen to take an early mover advantage in this area in India. Globally insurers have already begun to consider usage based information in providing customised insurance products at tailor made premiums to the end customer.

The Board of this particular insurer has therefore advised its management to seriously consider venturing into usage based insurance in the Health insurance market. The CEO has approached her Chief Actuary to make a preliminary study of the aspects of product design and pricing.

ii) **a)** As an actuary what specific aspects would you consider in pricing such a product? You are expected to describe initial and ongoing data requirements, product design, pricing approach and general operation, servicing and administration of the product. (8)

b) List other generic considerations the Actuary should keep in mind while designing and pricing such a product. (2)

iii) Discuss the potential supply side and demand side advantages arising from underwriting a usage based health insurance product as compared with a traditional health product, and the potential challenges in general and in the Indian context. (20)

[36]

Q. 5) A large insurance company had established a captive insurance company to take care of its D&O liability insurance of its employees. Having operated the captive for over five years, the firm has taken a decision to exit/close the captive vehicle.

i) List out the reasons that could have prompted the company's management to decide to close the captive insurance vehicle. (4)

ii) Discuss the potential benefits that could ensue to the insurer by exiting the captive. (8)

[12]

****