INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

19th November, 2013

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 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 are 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 have carried out an outstanding claims valuation for a large public liability portfolio at 31st March 2013. You carried out analysis of the experience and projections of outstanding claims liabilities using both the average cost per claim incurred (ACPC) method and the projected case estimate (PCE) method. The two valuation methods gave similar results and you selected the ACPC results in recommending an appropriate level of outstanding claims liabilities at the valuation date.

Tables 1 and 2 below show some of the assumptions selected for the valuation.

Table 1 – Numbers of claims reported – Actual and Projected

Accident year ending 31st March	Development year							Ultimate
	1	2	3	4	5	6	7	
2007	2,490	505	105	21	6	2	0	3,130
2008	2,505	500	102	20	5	2	**0**	3,134
2009	2,500	495	104	20	5	**3**	**0**	3,127
2010	2,750	520	110	22	**7**	**3**	**0**	3,412
2011	2,690	550	118	**24**	**7**	**3**	**0**	3,392
2012	2,800	585	**118**	**25**	**7**	**4**	**0**	3,539
2013	2,830	**580**	**119**	**25**	**7**	**4**	**0**	3,565

*Projected numbers are the bold, highlighted numbers in the table above

Table 2: Selected ACPC and Case Estimate Development Factors

Development year	ACPC	Development year	Case Estimate Development factor
1	3,000	2:1	2.00
2	1,500	3:2	1.50
3	1,000	4:3	1.40
4	500	5:4	1.30
5	250	6:5	1.10
6	100	7:6	1.05
7	50	8:7	1.00

Some other elements of the valuation basis were:

- future claim inflation 10% per annum (4% wages inflation, 6% superimposed inflation ACPC only)
- zero reinsurance recoveries (ACPC and PCE)

For internal management purposes, the company holds inflated undiscounted outstanding claims liabilities with no allowance for claims handling expenses or prudential margins.

Table 3 shows the outstanding claims liabilities held in the internal management accounts at 31st March 2013 and compares these with case estimates and earned premiums.

Table 3: Outstanding Claims and Loss Ratios

Accident year ending 31st March	Inflated/ Undiscounted O/S claim liabilities Rs '000s	Case estimates Rs '000s	Earned premium Rs '000s	Undiscounted loss ratio%*
2007 & earlier	104**	104	n/a	n/a
2008	172	163	19,283	81
2009	533	516	24,040	75
2010	1,578	1,167	24,359	78
2011	3,591	2,939	26,681	76
2012	8,014	4,872	27,998	83
2013	14,763	5,711	28,624	89

* Calculated as payments to date for accident year plus outstanding claim liabilities at 31st March 2013 divided by earned premium.

** Case estimates.

i) The CEO has asked you to recommend a method of establishing the amount of outstanding claims liabilities to be held in the internal management accounts at the end of each month of financial year 2013/14. Describe your recommended method. Explain the implications of your recommendation for the internal management accounts underwriting results. (5)

ii) At the same time as doing the March valuation, the CFO has asked you to provide her with the expected level of outstanding claims liabilities for the portfolio at 30th September 2013 by rolling forward your valuation result. You have been advised that the product manager anticipates a small growth in the size of the portfolio of around 2% in 2013/14. The product manager also expects a continuation of the soft market conditions which have prevailed recently. Estimate the expected outstanding claims liabilities at 30th September 2013, laying out carefully all your workings and assumptions. (10)

iii) The actual experience for the first half of 2013/14 is shown in Table 4. Earned premium for the first six months of 2013/14 has been Rs. 13.9 million.

Table 4: Actual Experience for Six Months to 30th September 2013

Accident year ending 31st March	Claims reported	Claim payments Rs '000s	Case estimates Rs '000s
2007 & earlier	0	62	36
2008	1	91	67
2009	3	197	340
2010	2	499	726
2011	13	2,084	1,355
2012	64	2,098	3,748
2013	483	3,230	5,522
2014	862	2,707	4,214
Total	**1,428**	**10,968**	**16,008**

Analyse the portfolio's performance for the six months against your expectations. What conclusions would you draw? (13)

iv) Outline further information you would seek and further analysis you would carry out before finalising your estimate of the outstanding claims liabilities at 30th September 2013. (2)

[30]

Q. 2) You are the Appointed Actuary for a general insurance company that specialises in writing domestic motor and household business. The insurer is adequately capitalised, the following being the latest returns to the regulator:

	Rs.millions
Capital Base	800
Premiums and Claims Liabilities	600
"Excess Capital"	200
Minimum Capital Requirement (MCR)	100

The Board has agreed that

- The company will target excess capital at 150% of MCR.
- The company will not risk having excess capital at less than 100% of MCR.
- The risk profile of the company is such that the excess capital must have an 80% likelihood of being greater than 120% of the MCR at the end of the year.

The Board has just received the following proposals:

- The Board pay a dividend of Rs 50 million
- The company change its catastrophe reinsurance cover from the current Rs 120 million xs Rs 30 million per event, to one providing Rs 100 million xs Rs 50 million per event. Both covers have two free reinstatements.

You are required to advise the Board on these proposals.

You have constructed a Dynamic Financial Analysis (DFA) model that shows the following output that is the expected net of reinsurance loss ratio on earned premium over the next 12 months:

Statistic	**Net of Reinsurance Loss Ratio on Earned Premium / Scenario 1 - Cat Rs 120mill xs Rs 30mill**	**Net of Reinsurance Loss Ratio on Earned Premium / Scenario 2 – Cat Rs 100mill xs Rs 50mill**
Minimum	41.6%	9.1%
Maximum	113.4%	476.7%
Mean	70.2%	68.1%
Std Deviation	9.9%	35.1%
Variance	1.0%	12.3%
Skewness	41.7%	183.4%
Kurtosis	319.9%	1,071.1%
Mode	61.7%	42.3%

Statistic	Net of Reinsurance Loss Ratio on Earned Premium / Scenario 1 - Cat Rs 120mill xs Rs 30mill	Net of Reinsurance Loss Ratio on Earned Premium / Scenario 2 – Cat Rs 100mill xs Rs 50mill
5%	55.3%	27.3%
10%	58.1%	32.4%
15%	60.2%	36.6%
20%	61.8%	40.2%
25%	63.2%	43.6%
30%	64.5%	46.8%
35%	65.8%	50.1%
40%	67.0%	53.7%
45%	68.2%	57.1%
50%	69.5%	60.8%
55%	70.6%	64.5%
60%	71.9%	68.9%
65%	73.2%	73.7%
70%	74.8%	78.6%
75%	76.5%	84.3%
80%	78.3%	91.2%
85%	80.5%	100.0%
90%	83.5%	112.0%
95%	87.7%	132.5%

The net earned premium volume is estimated to be Rs 500 million. The insurer incurs expenses of 25% of net earned premium.

Using the above information, evaluate both the current arrangements and the proposed changes in light of the Board's requirements. Provide a recommendation to the Board given the results of your analysis. Include any calculations you have made and any limitations of your analysis.

For your analysis you may assume that the MCR will not change over the next 12 months other than due to reinsurance changes. For the purpose of this question you may ignore investment income and the effect of taxation **[20]**

Q. 3) The newly formed Indian Football Premier League has invited tenders from insurance companies operating in India to provide insurance cover for the organisers of Premier League Football games to be held at a number of venues across India in 2014. Football Premier League is in the process of constructing and refurbishing the stadiums; currently only about two-thirds of the stadiums are ready and the remaining stadiums will be ready by end of 2013. To promote the sport and raise monies, the Football Premier League is also planning to host a series of musical concerts featuring top musicians, film stars and sports legends all over the country prior to the Premier Leagues games from April 2014.

The proposed cover will be a multi-year policy agreement commencing on 1st January 2014 with the premium payable in three equal annual instalments. The insurance cover will be on an "all risks" basis that will meet the organisers' insurance needs.

The CEO of ABC general insurance company would like to participate in the tender process. You are the pricing actuary of ABC general insurance company and you need to write a report covering the following:

i) Describe the types of insurance cover requirements of the organisers of games/concerts. (8)

ii) Describe how you could determine a price for the insurance cover mentioned in part (i). (15)

iii) Propose your reinsurance requirements if your company would be successful at the tender to provide the insurance covers described in part (i). (7)

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Q. 4)

i) The claims experience for a particular commercial motor fleet comprised of vehicles of both local and foreign brands insured by Company XYZ has been:

Year	***Vehicle years***	***Claims cost (Rs. In Lakhs)***
2012	500	121.6
2011	450	126.0
2010	350	93.4
2009	340	115.4
2008	330	94.4

In addition, you have been given the following information.

- Approximately over 98% of the claims are below Rs.1,00,000; the underwriters separate claims in excess of Rs.1,00,000 as large claims.
- Claims in excess of Rs.100,000 included in the above table are:
  - One claim expected to be settled for Rs.1,75,000 in respect of 2011
- Two claims in respect of 2009 in excess of Rs.1,00,000 each and settled for a total of Rs.5,00,000.
- The expected number of vehicle years for the policy year commencing in 2013 is 600.
- It is expected that the average office premium for risks based on all fleet and non-fleet of this kind of vehicles business written by the insurance company XYZ will be Rs.40,000.
- Claims cost inflation has been constant at 6% per year throughout this period, and is expected to remain at this level in the future. An inflation factor of 6% per year is applied to all capped claims.
- Using the capped reserving triangles development, the insurer applies a grossing-up factors of 1.5, 1.4, 1.3, 1.2 and 1.1 for years to developments of 1 to 5 respectively.
- For fleet business the insurer adds a 15% to the risk premium for expenses and profit.

Calculate the total premium payable for the renewal in 2013, assuming that the insurer gives 65% credibility to the fleet's own experience. (8)

ii) At the beginning of 2013, the underwriting director suggests that the company's fleet rates are competitive and that during 2013 the company should write twice as much gross written premium as was written during 2013. You have been given the following information:

- Current solvency margin = 30% of premium written in the year
- Dividend distribution = 20% of the net insurance profit after tax
- Investment income on free reserves = 8% per annum
- Tax = 35%
- Profitability achieved during 2012 = 10% of gross written premium

The directors wish to maintain the solvency margin at the current level of 30%. Calculate the required gross insurance profit for 2013 as a percentage of the gross written premium in 2013, defining the terms in any formula that you use. (3)

iii) The managing director of the company would like to analyse further before putting a growth plan together. The company would like to increase the market share and suggests the following:

- Assume profitability of 8% and premium growth of 100%;
- Assume profitability of 7% and premium growth of 120%; and
- Assume profitability of 12% and premium growth of 40%.

The company expects to maintain the dividend distribution and anticipates no changes to the level of investment income on its free reserves as well as to the tax rates. Calculate the solvency ratio in all three scenarios above.

Due to the current account deficit concerns from the market, there are strong views in the press of the introduction of reduction of subsidies on fuel, import controls of foreign goods, increase in excise duties and introducing austerity measures by the finance minister of the country. Under these circumstances, make your recommendation to the Board describing the pros and cons of each of the scenarios on the financial condition of the company. (9)

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