

**INSTITUTE OF ACTUARIES OF INDIA**

**EXAMINATIONS**

**26th November 2012**

**Subject SA1 – Health and Care Insurance**

**Time allowed: Three hours (9.45\* - 13.00 Hrs)**

**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 same 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 a senior actuary working with XYZ Company. The CEO has asked you to explain the board of directors in the next board meeting relevance of reinsurance and to recommend the best re-insurance program available with reasons of choice.

[i] What factors will determine insurer's appetite for offsetting its risk by using reinsurance (2)

[ii] Describe the use of reinsurance. (8)

[iii] Describe the key considerations a health insurance company should think about in selecting a re-insurer. (5)

[iv] The company's projected financials for the next fiscal year are projected as follows:  
Total company premium of Rs 10 crores. Expected Medical Loss Ratio (MLR) is 80%

Expected High Value Claims are as follows:

Claim #1 – Rs 30 Lakhs

Claim #2 – Rs 50 Lakhs

Claim #3 – Rs 1.10 crores

Claim #4 – Rs 1.50 crores

Claim #5 – Rs 1.00 crores

The company has Rs 20 crores of capital including regulatory capital that is calculated as 10% of premium after reinsurance.

The company is concerned about the effect that recent unfavorable large claims volatility has had on its capital available net of regulatory capital.

Reinsurer ABC has offered two reinsurance quotes to carrier XYZ:

- Quote #1: 50/50 Quota Share with 10% expense allowance
- Quote #2: Reinsurer takes 80% of risk on all claims for an individual from Rs 25 Lakhs upto Rs 1.00 crores

Reinsurance Premium = Rs 2.50 crores

Calculate the effect of the proposed reinsurance on carrier XYZ's income statement and regulatory capital assuming that claims come in as projected. Show detailed workings. (6)

[v] Recommend the best quote to your insurance company with justifications (4) [25]

**Q.2)**

You are a valuation actuary working for a Health Insurance Company. You are given the following paid claim run-out information.

Assume claims are 100% complete after six months.

Cumulative Paid Claims (in thousands):

**Month of Claim Payment**

Month of Claim Incurred	Apr	May	Jun	Jul	Aug	Sep
Apr	1,100					
May	2,100	1,800				
Jun	2,300	2,800	700			
Jul	2,400	3,100	2,500	1,600		
Aug	2,450	3,200	3,000	2,100	1,800	
Sep	2,500	3,250	3,200	2,500	2,500	1,100

- [i] List and briefly describe two methods for calculating health claim reserves. (1)
- [ii] Calculate completion factors for each of the six monthly lags using the mean factor method. Show detailed workings. (3)
- [iii] Calculate a reserve as of 30<sup>th</sup> Sep based on workings in part (b). Show detailed workings. (3)
- [iv] Describe adjustments that might improve the reliability of the completion factors developed in part (b). (2)
- [v] Identify reasons why the development factor approach might misrepresent emerging experience. (2) **[11]**

**Q.3)**

You are the group health pricing actuary of a leading health insurance company and developing an annually renewable inpatient indemnity product which has an element of cost sharing in it.

You have the information available on claims amount along with discrete cumulative probability distribution.

<u>Annual Claims</u>	<u>Cumulative Probability Distribution</u>
Rs. 0	0.20
Rs. 2,000	0.55
Rs. 8,500	0.90
Rs. 20,000	1.00

Proposed inpatient indemnity plan (IIP) and current group health plan (GHP) has the following features:

	<u>IIP</u>	<u>GHP</u>
Deductible	Rs. 1,000	Rs. 200
Co-insurance	0%	20%
Member out of pocket expenses (excluding deductible)	Rs. 0	Rs. 750
Members Own Contribution	Rs. 700	Rs. 0

On which claims amounts and what is the probability that an employee paying more in cost sharing in one year under the proposed IIP design compared with the current GHP.

Show detailed workings.

[7]

Q.4)

You are working as an actuary in an insurance company in India having significant portfolio of Group Health Insurance. Your company has recently acquired a client for Group Health Insurance with 50, 000 employees for their health insurance coverage. A person in charge of Group Health operations has suggested to run a pilot project covering various wellness activities for this corporate and has contacted a vendor who has expertise in running such programs. The proposal has gone for approval to management committee where CFO has expressed his opinion that any such initiative should be evaluated based on data and asked to perform a Cost-Benefit-Analysis. The following data has been gathered based on the inputs received from the vendor:

Health Category	No. of Employees	Annual Incidence Rate			Average Claim Size		
		Historical	Expected for coming year		Historical	Expected for coming year	
			No intervention	With intervention		No intervention	With intervention
A	16,000	2.50%	2.50%	2.50%	24,000	25,200	25,200
B	30,000	3.50%	3.60%	3.50%	30,000	31,800	31,500
C	4,000	5.00%	5.50%	4.50%	40,000	43,200	42,000
Total	50,000	3.30%	3.40%	3.26%	28,880	30,600	30,324
Claim processing cost is 5%.							

Following is the fee structure of wellness vendor:

- One time registration fee of Rs. 2,50,000/- per annum for each corporate customer.
- Monthly charges of Rs. 75,000/- per month.
- Enrolment fee of Rs. 10/-, 20/- and 50/- for category A, B and C employees (fee will be charged for everyone).

Besides above, company feels it will be better to depute one coordinator who will monitor the performance of the wellness vendor. Coordinator will also take services of 4 nursing staff (one for each of the four zones) on part time basis. The cost-to-company of wellness coordinator will be Rs. 5 Lac p. a. and part time nursing staff will cost Rs. 2 Lac each.

- [i] What do you understand by wellness initiatives in the context of Group Health Insurance? (4)
- [ii] How some of these could be of help to Insurance Companies? (4)
- [iii] Prepare the analysis as suggested by CFO and give your comments, suggestions and recommendations to be put before the management committee for evaluating the wellness proposal. (10)

[18]

**Q.5)** You are working as an Actuary for an Indian Insurance Company with sizeable portion of Retail and Group Health Insurance Products. The Company is not happy with the existing Claims Management System and wants to replace it with more advanced system which can fulfil requirements of various stakeholders. You are member of the committee which has been entrusted task of technical evaluation of Claims Management System being offered by various vendors. One option which has also been tabled is development of in house Claims Management System.

- [i] Why it is so important to have an appropriate Claims Management System for actuarial department? (4)
- [ii] What are your expectations from proposed Claims Management System? (3)
- [iii] What are the various criteria that you will consider in technical evaluation of Claims Management System? (5) [12]

- Q.6)**
- [i] How Trend in Health Care Cost of insured population is divided in different parts to measure it appropriately? (3)
  - [ii] What are the factors that can influence overall Trend in Health Care Cost of insured population? (3)
  - [iii] Why is it important to measure and monitor trend in Health Care Cost of insured population? (2)
  - [iv] What are the different methods of measuring trends? (2)
  - [v] What are the challenges faced in measure and application of trend? (2) **[12]**

**Q.7)** You are working for a mid-size Insurance Company in India which is dealing in Group Health Insurance among other things. An expat is taking over the responsibility of CEO of your Company shortly. He is very excited about Group Health Insurance and its future potentials. You are required to write a detailed note to be presented to him on Group Health Insurance Product in India covering, inter alia, historical background, trends, channels, product structure, pricing, etc. Please include as many aspects as you feel are relevant for him to know. Also please provide list of important points that you feel industry should take into account for long term sustainability of this product. **[15]**

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