INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

3rd November 2015

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) A dual-line general insurance company in India that writes only Fire and Health is preparing for estimating its Economic Capital requirements as per IRDAI guidelines, as on 31st March X.

i) Define VaR with specific reference to IRDAI EC guidelines. How is VaR different from Tail VaR? (4)

ii) The following information is provided regarding the general insurer:

Amounts in INR Crore

Measure/LoB	**Fire**	**Health**
NWP for year ended 31st March X	100	200
NEP Projected for year ending 31st March X+1	130	240
NEP Projected for year ending 31st March X+2	150	300
Net UPR as on 31st March X	30	60
Net IBNR + Outstanding as on 31st March X	65	40
NIC for year ended 31st March X	95	125

Standard Deviation	**Fire**	**Health**
Premium Risk	12%	4%
Reserve Risk	12%	10%

Correlation Matrix	**Premium Risk**	**Reserve Risk**
Premium Risk	1	0.5
Reserve Risk	0.5	1

Correlation Matrix Inter- LoB	**Fire**	**Health**
Fire	1	0.25
Health	0.25	1

a) Write down the VaR formula for estimating EC for Combined Premium and reserve risks as given in the IRDAI EC technical note stating the underlying distribution assumption. (4)

b) Based on the above given information, estimate Economic Capital for Combined Premium and Reserve risks for the said general insurer as on 31st March X. (10)

c) "VaR is *not* a coherent risk measure". Discuss this statement in general and with specific reference to the case of the above general insurer through numerical demonstration. (8)

d) List at least four methods of capital allocation amongst these two lines of business that you would recommend. (2)

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Q. 2) A reinsurance company is evaluating its treaty pricing requirements for the coming year.

i) Discuss the general process for the reinsurer in pricing a reinsurance treaty. (15)

ii) Outline other specific considerations for the reinsurer in pricing the treaty. (3)

[18]

Q. 3) You are responsible for the estimation of the outstanding claim and unexpired risk reserves for a general insurance company in Spacejam, a country with similar road conditions and experience to India.

i) Your team has performed an Average Cost Per Claim Incurred (ACPC) analysis on the motor insurance portfolio and have provided you with the following information by claim occurrence quarter. The amounts shown have been inflated to current values (quarters in the table below are calendar quarters)

Accident quarter	**Development quarter**								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
2013Q1	1050	310	190	105	76	60	32	10	8
2013Q2	990	400	220	90	85	75	40	20	
2013Q3	1000	350	190	110	65	50	35		
2013Q4	995	270	190	70	70	60			
2014Q1	750	200	100	60	30				
2014Q2	900	210	110	160					
2014Q3	700	220	270						
2014Q4	730	340							
2015Q1	890								

Amounts shown are in Spacejam's local currency

Stating the basis for your selection, calculate the projected ultimate total average claim size for 2015Q1 in current values (you can ignore future inflation for this part of the question). (5)

ii) Subsequent to the initial choice of factors, you have undertaken a lengthy discussion with the claims manager for the portfolio and have been informed of the following facts:

a) The local currency has strengthened considerably over the past quarter. In particular it has strengthened by approximately 20% against the currency of Risingsun, a country which supplies around half of all replacement parts for the repair of motor vehicles in Spacejam. Economic forecasters expect the Spacejam currency to remain strong over the medium – long term.

b) The first quarter of 2014 was notable for particularly favourable weather. As a result, the claims in the motor portfolio in that quarter were regarded by the claims manager as being atypical when compared with other quarters.

c) Due to a lengthy illness, the claims manager was absent for the last six months of 2014 (returning to work approximately 3 months ago). In the manager's opinion, his absence led to greater delays in claim payments for the portfolio.

Discuss how this information would impact your factor selection and estimate the adjustments you would make (if any). (6)

iii) What additional analysis and information would you consider to further improve your valuation? (6)

[17]

Q. 4) DHV Insurance is a medium-sized general insurer in India writing a variety of short and long-tailed insurance lines in both the domestic and commercial markets. You are the Appointed Actuary (AA) for DHV and have just completed your Appointed Actuary's Report and are now drafting a Financial Condition Report (FCR).

You are aware that the company wishes to grow in the Indian market. In particular, DHV recently decided to target high market share in Karnataka in both commercial and domestic insurance. Furthermore, DHV has entered into an exclusive distribution arrangement with one of the most dominant broking firms in Karnataka, though DHV has never distributed its products through brokers previously.

i) Identify the key issues that will need to be raised within DHV's FCR with regards to the planned expansion in Karnataka and its arrangement with one of the most dominant broking firms. (8)

You have been provided a copy of DHV's Board approved Risk Management Strategy document. You think it is a comprehensive, well-written document but have some questions for its author, the Head of Risk Management. You have been informed that the Head of Risk Management resigned from DHV and there is no one available to answer your questions.

ii) Based on the information given in the above paragraphs, what risk management issues would you raise in your FCR? (4)

iii) As per the current practise at DHV, an external peer review actuary (EPR) reviews the estimated claims provisions at the end of every financial year. The EPR actuary has performed his own projections of the outstanding claims provisions and has estimated a figure about 5 per cent higher than the amount (net of reinsurance) in the Appointed Actuary' Report. How should the EPR actuary deal with this issue? (6)

[18]

Q. 5) You are a consulting actuary performing the outstanding claims valuation of a public liability portfolio in a small country where the legal profession is very active. Court delays are a significant feature of the environment and hence claims typically take many years to settle. There are no legislative constraints on benefits.

The company has been underwriting business in this country for seven years. The portfolio covers shopping centres and clubs and claims are primarily of a personal injury nature.

Despite an industry trend of an increasing incidence of large court awards (well in excess of Rs 1 million) the company points out that due to its superior underwriting controls, it is yet to pay out a claim greater than Rs 1 million.

i) One of your actuarial students has prepared the following analysis. Comment on the apparent trends in experience and the adopted model assumptions. (7)

Chain Ladder Factors on Cumulative Claim Numbers

Accident year	**Development year**							
	0	1	2	3	4	5	6	7
2009		1.625	1.154	1.067	1.063	1.059	1.056	
2010		1.667	1.200	1.167	1.071	1.033		
2011		1.722	1.194	1.108	1.049			
2012		1.720	1.209	1.135				
2013		1.769	1.159					
2014		1.661						
Average		1.703	1.182	1.125	1.059	1.043	1.056	
Selected		1.700	1.185	1.125	1.060	1.040	1.020	1.00

Finalisation rates: Number of claims finalised per claim handled

Accident year	**Development year**							
	0	1	2	3	4	5	6	7
2009	0.125	0.167	0.250	0.400	0.429	0.600	0.667	
2010	0.167	0.222	0.278	0.412	0.500	0.571		
2011	0.167	0.214	0.357	0.545	0.667			
2012	0.120	0.325	0.500	0.520				
2013	0.231	0.417	0.543					
2014	0.339	0.432						
2015	0.397							
Average	0.283	0.353	0.436	0.486	0.548	0.583	0.667	
Selected	0.285	0.350	0.435	0.485	0.550	0.585	0.667	1.00

Claims handled is defined as number outstanding at the start of the period plus number reported during the period

Gross payments per claim incurred (INR)

Accident year	**Development year**							
	0	1	2	3	4	5	6	**Total**
2009	1144	2784	5373	9584	12386	12191	10684	54147
2010	1327	3293	5340	10352	13341	12246		45900
2011	1293	3236	7134	13895	13585			39143
2012	1135	6076	10253	11244				28709
2013	2767	8931	10242					21940
2014	3978	8050						12028
2015	4930							4930
Average	3304	6786	8743	11608	13262	12225	10684	
Selected	3300	6900	8750	11500	13500	12250	10700	

Gross payments per claim finalised (INR)

Accident year	**Development year**						
	0	1	2	3	4	5	6
2009	21742	26451	34030	45526	78422	77209	11503
2010	20573	25522	33110	45843	68930	94905	
2011	18906	23654	31291	50786	74477		
2012	23913	29535	35993	54655			
2013	29630	34433	39491				
2014	29477	35421					
2015	31954						
Average	29388	32624	36323	50638	73219	87321	101503
Selected	29500	32650	36250	50175	70000	87500	100000

ii) What additional information would you request from the company to enhance the above analysis and what questions would you ask the company to help explain some of the trends apparent? (6)

iii) What enhancements and/or additional analysis would you perform prior to finalising your valuation results? (6)

[19]

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