

# EXAMINATION

24 October 2016

## Subject F203 — General Insurance Fellowship Applications

*Time allowed: Three hours*

### ***INSTRUCTIONS TO THE CANDIDATE***

- 1. Candidates will be issued with instructions to log-in using a password (which you will be provided with at the exam center).*
- 2. Candidates are required to submit their answers in Word format only using the template provided. You MAY NOT use any other computer program (e.g. Excel) during the examination.*
- 3. Save your work continuously throughout the exam, on your computer's hard drive that you have been provided.*
- 4. 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.*
- 5. You must not start typing your answers until instructed to do so by the invigilator/supervisor.*
- 6. Mark allocations are shown in brackets on exam papers.*
- 7. Attempt all questions, beginning your answer to each question on a new page.*
- 8. Candidates should show calculations where this is appropriate.*

**Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.**

### ***AT THE END OF THE EXAMINATION***

**Save your answers on the hard drive.**

**Hand in your question paper with any additional sheets firmly attached.**

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
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## QUESTION 1

You are a senior actuary working for a large audit firm in South Africa. You have been approached by the audit team to review the proposed reserves of LiabSure, a registered short term insurance company in the South African Market, for the financial year ending 30 June 2016. The scope of the actuarial assistance covers reviewing the gross reserves including an allowance for any expenses.

### Additional Information

- LiabSure is a specialised insurer writing all types of liability (Product, Employers and Public) business as well as Professional Indemnity business.
- LiabSure has been operating for 10 years in the South African market.
- LiabSure has 2 main liability portfolios:
  1. On-platform liability business - this means they have direct access to the data and thus the ability to create granular claim triangles.
  2. Off-platform business – this means they need to extract data from the supplied bordereaux so as to create the management information. LiabSure have been struggling to tie up the individual claims data to the bordereau provided, hence have decided to use the interim measures to calculate the provisions for this tranche of business.
- From discussions you have had with the audit team, there are no material differences in business selection or underwriting guidelines being followed between on and off platform business.
- This is the first year in which your audit firm is performing the audit review.
- LiabSure has in place a corporate actuarial function performing the reserve exercise.
- Additionally, LiabSure has a Head of Actuarial Control (HAC) function in place.

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You have been provided with the following information from the audit team:

**Cumulative Development triangle (Based on Incurred Claims of On-platform business)**

	12	24	36	48	60	72	84	96	108	120
2007	88	137	140	136	170	217	230	238	238	238
2008	116	189	178	170	180	171	174	175	186	
2009	122	181	162	169	180	182	207	211		
2010	146	245	227	230	218	239	264			
2011	201	271	237	231	300	339				
2012	280	526	495	595	583					
2013	322	625	684	766						
2014	368	729	671							
2015	410	836								
2016	580									

**Analysis and comparison of IBNR estimates (On-Platform Business)**

Accident Year	Earned Premium	Latest Incurred	LiabSure Estimate	CL Data	BF Method	Max Selection	Minimum Selection	Exclude Min/Max selection	Independent Estimate
2007	300	238	0	0	0	0	0	0	0
2008	330	186	0	0	0	0	0	0	0
2009	365	211	0	6	6	13	0	0	6
2010	400	264	6	13	13	26	2	6	13
2011	440	339	36	46	42	83	9	36	44
2012	550	583	120	142	118	344	(14)	120	130
2013	630	766	195	249	201	818	(56)	195	225
2014	700	671	218	291	233	995	(75)	218	262
2015	770	836	230	317	254	1 439	(188)	197	286
2016	835	580	418	877	603	2 638	27	729	740
<b>Total</b>	<b>5 320</b>	<b>4 675</b>	<b>1 223</b>	<b>1 941</b>	<b>1 470</b>	<b>6 357</b>	<b>(297)</b>	<b>1 501</b>	<b>1 705</b>

**Notes:**

- LiabSure Estimate: This is the estimate provided by LiabSure. This is the amount that is currently in the financial statements.
- CL Data: refers to a chain ladder method applied to the data without excluding any of the development factors.
- BF method: refers to the Bornheutter Ferguson method applied to the CL data ultimate.
- Max selection: refers to the ultimate value derived by using only the maximum development factors in each development cohort.
- Min selection: refers to the ultimate value derived by using only the minimum development factors in each development cohort.

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- Exclude Min/Max: refers to the ultimate value derived by excluding the minimum and maximum development factors in each development cohort.
- Independent estimate: This is the estimate you have derived by considering the various development factors and methods.
- All amounts shown are in R'000.
- All calculations may be assumed to be correct.

### IBNR - Off Platform Business

Development Period	Interim Measure Factors					
	0	1	2	3	4	5
Liability Factors	12.49%	4.47%	1.65%	0.66%	0.31%	0.19%
Premium	500	480	470	450	400	320
Off Platform IBNR	62.45	21.46	7.76	2.97	1.24	0.61

**Total**                      **96.5**

Total Reserve = On Platform (R1,223m) + Off Platform (R97m) = R1,320m

### Questions:

- i. Discuss the likelihood of large individual claims occurring for each of the liability classes that LiabSure writes, providing examples of how these claims may arise. [8]
- ii. Explain why it may be necessary for this company to adjust claims data for reserving in respect of large individual claims. [5]
- iii.
  - a. Describe different ways of defining and treating large individual claims when considering the extraction or removal of large claims from the claim triangles for the purposes of establishing reserve requirements.
  - b. Set out the advantages and disadvantages of each approach.[13]

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iv. Describe the use of the interim measures factors applied to the off-platform business in order to derive the best estimate reserve for the year-end financial statements. Your answer should be structured around the following key themes:

- The appropriateness of applying interim measures to the off-platform business.
- The level at which interim measures have been calibrated.
- The current IFRS 4 requirement stating that reserves be set at a best estimate level.
- The appropriateness of this approach given that the regulations are changing to a SAM basis in the near future.

[7]

v. In addition to your answer for part iv., discuss the points you would raise in your audit report, including the effects of inadequate reserving as well as providing any recommendations to LiabSure based on the results of your independent assessment.

[12]

Following your review the audit team has raised a finding outlining the imprudent reserve estimates. The HAC function at LiabSure is not satisfied with this finding and has sent you a note outlining their dissatisfaction.

vi. Outline your reply to the HAC incorporating the following points:

- a. How you have assessed your conclusion to be reasonable.
- b. How you would approach advising the HAC on the appropriateness of the results.

[5]

[Total 50]

## QUESTION 2

You are the chief actuary of a long-established, medium sized South African short-term insurer writing mainly personal lines of business via an intermediated model consisting of both pure commission earning non-mandated brokers and binder holders fulfilling up to the five binding functions.

Two years ago you performed a full review of the adequacy of your rates using Generalised Linear Modelling techniques. The rates have been built into a Black Box and all your intermediaries are required to quote using the Black Box rates. You have reviewed and updated your Black Box rates twice since your initial review to ensure that the pricing is adequate and adjusted for inflation.

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Despite the rating improvements outlined above, the loss ratio of the motor comprehensive portfolio has remained around 80%. The target of your board is to run at a loss ratio of 70% or below.

The board has asked you to review the motor comprehensive class of business thoroughly to determine why the loss ratio has remained so high and what needs to be done to improve it. Currently the return on equity (ROE) of the insurer is below what the shareholders are expecting and the insurer has not paid a dividend in the last two years.

- i. Explain what data are required to perform a Generalised Linear Modelling exercise, which perils you would consider for a motor comprehensive GLM and the type of models you are likely to fit.

[10]

- ii. Explain the difference between risk factors and rating factors.

[2]

- iii. Describe how you would collect, verify and prepare the data required for the GLM exercise from both your non-mandated brokers and the binder holders.

[6]

- iv. Describe how you would check that your brokers have applied the Black Box appropriately when writing new business and renewing existing business and how you would address departures from the Black Box rates.

[5]

Your analysis revealed that the loss ratio for new business is significantly higher than for existing business (60% for existing business versus 100% for new business) and that lapse rates for existing business is higher than expected at policy renewal as well as a monthly level.

- v. Discuss the advice you would give to the chief operating officer as well as the marketing director of your company.

[8]

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The average cost per claim of the binder holders are significantly higher than the non-mandated brokers.

- vi. a) Explain what you would investigate to find the reasons for this difference.
- b) Discuss how the insurer can improve the average cost per claim of the binder holders without risking losing support and hence business from these brokers.

[5]

One of the non-executive members of your board has recommended that you implement an immediate premium increase of 14.2% to all policies and further adjust this increase by inflation for the next 12 months.

- vii. Discuss the following:
  - a) The pros of this approach and why you would advocate against this approach.
  - b) If an increase were to be implemented, how this should be approached, considering both the company's relationships with its brokers and the retention and fair treatment of its policyholders.

[8]

The results of your analysis and changes implemented have been successful and at the end of the next financial year the motor comprehensive portfolio is running at a loss ratio of less than 70%. The board is pleased with the performance and the insurer is in a position to declare a dividend. The insurer does not have a dividend policy and the board has asked you to prepare one.

- viii. a) List the items that a dividend policy should contain.
- b) Discuss the factors you advise the board to take into consideration when declaring this year's dividend.

[6]

[Total 50]

TOTAL 100

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**END OF EXAMINATION**