EXAMINATION

9 November 2011 (am)

Subject F103 — *General Insurance* Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of EACH OF your answer booklets.*

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 booklet until instructed to do so by the supervisor.*

4. *Mark allocations are shown in brackets.*

5. *Attempt all eight (8) questions, beginning your answer to each question IN A SEPARATE BOOKLET.*

6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in your answer booklets, with any additional sheets firmly attached to the correct booklet, AND this question paper.

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.

QUESTION 1

i. Define what is meant by "surplus reinsurance".

[1]

ii. Explain three key characteristics of risks which would make surplus reinsurance the most appropriate type of reinsurance for a class of business.

[3]

iii. Outline briefly how an insurer may determine the ultimate cost of surplus reinsurance cover.

[2]

SeaWorthy, a general insurer, writes marine hull insurance. It has in place reinsurance treaties with Companies Q and S, which operate in the order given below:

- 25% Quota Share treaty with Company Q.
- Individual Surplus with Company S, having 4 lines.

SeaWorthy cedes as much risk as possible under these reinsurance arrangements, subject to the following constraints:

- The proportional treaties have been negotiated such that the largest risk that SeaWorthy can write (i.e. by fully utilizing the proportional treaties) is one with a Sum Insured of R800 million.
- SeaWorthy must retain at least R50 million of the risk on any policy it reinsures with Company S.

In the year SeaWorthy wrote a total of R2 000 million in premiums and paid reinsurance premiums totalling R510 million. Some details relating to the four largest policies (by Sum Insured) written in the year by SeaWorthy follow:

Policy Number	Sum Insured (R millions)	Gross Policy Premium (R m)	Gross Claim Amount (R m)
1	60	2	0
2	400	10	0
3	200	6	50
4	Not Given	4	80

iv. Determine SeaWorthy's maximum surplus retention limit.

[1]

v. Determine the reinsurance premiums paid by SeaWorthy to Company S for each of the four policies above.

[6]

vi. Determine the recovery SeaWorthy will make from Company S in respect of the claim on policy 4.

[1]

[Total 14]

PLEASE TURN OVER

QUESTION 2

i. State the assumptions underlying the Empirical Bayes Credibility Theory (EBCT) Model 1.

[3]

ii. List the general properties that should be displayed by a credibility factor.

[3]

iii. For EBCT model 1, Z is given by:

$$Z = \frac{n}{n + \frac{E[s^2(\theta)]}{Var[m(\theta)]}}$$

Comment on the suitability of Z as a credibility factor.

[2]

iv. Below are the aggregate claims (in R'000 per annum) from three transport companies in four successive years.

Company	Year			
	1	2	3	4
A	456	503	650	475
B	608	674	602	630
C	807	513	722	617

Calculate the empirical Bayes credibility estimate of the pure premium for the coming year for Company B.

[6]
[Total 14]

QUESTION 3

A general insurance company sells private motor insurance directly to the public.

i. List the reasons why such a company may undertake actuarial investigations of premium rates.

[5]

ii. Explain why this company may find it easier to implement a new set of premium rates than would a company that sells through a network of large brokers.

[3]
[Total 8]

PLEASE TURN OVER

QUESTION 4

EasySure is a general insurance company which writes both personal and commercial lines business. The table below shows EasySure's underwriting margins (underwriting result ÷ gross written premiums) on its household insurance business over the period 2000 – 2010.

The profit profile of most, but not all, companies in this market resembled that of EasySure.

Year	Underwriting Margin
2000	4.60%
2001	7.89%
2002	9.80%
2003	4.96%
2004	- 2.96%
2005	- 5.00%
2006	- 3.03%
2007	- 1.07%
2008	3.02%
2009	5.50%
2010	7.30%

i. Define the process most likely to be responsible for a pattern of results as indicated above, identifying the phase of the process the company was in from 2004 to 2007.

[2]

ii. Discuss the possible reasons why EasySure carried on writing business from 2004 to 2007.

[5]

iii. Describe the strategies that EasySure might have adopted during the years from 2004 to 2007 and outline the possible consequences of these strategies.

[7]

[Total 14]

QUESTION 5

ProtectIT is a medium-sized general insurance company which writes commercial property and public liability insurance.

Define what is meant by "liquidity risk" and describe the liquidity risk that may be faced by ProtectIT.

[7]

PLEASE TURN OVER

QUESTION 6

Yourway is an insurance company that sells a number of different types of general insurance products, including personal and commercial motor, homeowners, commercial property, engineering, and marine insurance. Yourway's accounts (which are constructed on an accident year basis) reveal the following for the commercial property class of business. Figures are in R'millions.

	2010	**2009**	**2008**	**2007**
Net premium earned	114	108	100	87.5
Net premium written	119	112	103	90

The following run-off triangle shows the claims incurred development. Note that claims incurred here only includes the following: claims paid (including claims handling expenses) and adjustments to case estimates for reported but unsettled claims (including claims handling expenses). The origin year used is the year in which the claim event occurred.

	Development Year			
Accident Year	**0**	**1**	**2**	**3**
2007	19.49	18.59	12.58	8.20
2008	31.67	18.51	13.29	
2009	31.96	24.13		
2010	34.99			

The initial estimated ultimate incurred loss ratio for each accident year, as estimated independently by the expert underwriter in the commercial property division of Yourway, is shown in the table below. This loss ratio is estimated to apply to the accident year concerned.

	2010	**2009**	**2008**	**2007**
Initial estimated ultimate incurred loss ratio	68.2%	67%	71.4%	62.5%

i. Outline the potential causes of the movement in the estimated loss ratio over time.

[9]

ii. Calculate the outstanding reserve to be held by Yourway for the commercial property class by using the Bornhuetter-Ferguson technique. Comment on the appropriateness of this technique compared to using the simple chain-ladder method in this scenario (without actually calculating the chain-ladder reserve). You may ignore inflation and discounting.

[8]

[Total 17]

PLEASE TURN OVER

QUESTION 7

Recent changes in legislation imply that insurers in your country will no longer be allowed to use gender as a rating factor as from the start of the next calendar year.

i. Define what is meant by a "rating factor".

[2]

ii. Outline the various consequences this change may have on an insurer that writes private motor insurance.

[6]

[Total 8]

QUESTION 8

You are a consulting actuary who has been approached by a small general insurance company for advice on a new product. The company has been considering a new product for which it believes there is a large untapped market. The product will provide clients (typically banks) with cover for loans provided by the clients to individuals or companies (their debtors) against the risk of default.

i. Outline briefly the risks the insurer will face associated with the product.

[6]

ii. List six risk factors applicable to this business.

[3]

iii. Define what is meant by "subrogation", indicating its relevance to this product.

[2]

iv. Describe the ways in which the company could mitigate the risks it faces in respect of this product.

[7]

[Total 18]

END OF PAPER

