

# EXAMINATION

*10 November 2010 (am)*

## **Subject F103 — General Insurance Specialist Technical**

*Time allowed: Three hours*

### **INSTRUCTIONS TO THE CANDIDATE**

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
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 both questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

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

*Hand in BOTH your answer booklet, including any additional sheets firmly attached, 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

As the actuary for a general insurance company, you have been asked to perform a premium rating exercise for a class of personal-lines business.

- (i) List the claims data that you would need to perform this rating exercise. [4]
- (ii) Explain briefly the reasons why the introduction of new premium rates is likely to take place some time after the base period (to which the claims data relates). [2]
- (iii)
  - (a) Describe briefly the problems that may arise as a result of introducing a new premium rating basis some time after the base period used in deriving the new premiums.
  - (b) Explain how these problems may be mitigated. [8]
- (iv) State the non-claims related factors to be taken into account before deriving the final premium to be charged to the customer. [7]

**[Total 21]**

### Question 2

An insurer wishes to issue 5 000 identical one-year policies at the start of a particular year. For each policy, the number of annual aggregate claims have a Compound Poisson distribution with parameter  $\lambda = 5$ . Individual claim amounts follow a log-Normal distribution with parameters  $\mu = \sigma = 2$ .

Calculate the premium the insurer should charge for each policy in order to make a profit of at least 1 000 000 over the year with probability 0.99. You may ignore the effects of inflation and investment return.

State clearly all the assumptions that you make.

**[Total 10]**

### Question 3

A small, but well established general insurance company writes two classes of business, motor and property. The majority of the business is written in the Gauteng region.

- (i) Provide reasons why this insurance company might want to purchase reinsurance and suggest the type(s) of reinsurance it would reasonably purchase. Give reasons for each type of reinsurance suggested. [7]

This company currently has two treaties (which operate in the order given):

- a 40% quota share on both classes, and
- a stop loss treaty providing 20% cover in excess of a 110% loss ratio net of the quota share reinsurance (i.e. full reinsurance cover between 110% and 130% loss ratios). The premium rate for the stop loss cover is 4% of the gross premium net of the quota share premium. In 2009 the company wrote R80m gross premium and experienced claims of R160m.

- (ii) What is the reinsurance premium paid on the stop loss cover? [1]

PLEASE TURN OVER

- (iii) Calculate the net claims that the insurer is required to pay after reinsurance recoveries. [3]

[Total 11]

#### Question 4

An insurance company has recently built a model to determine the amount of capital it should hold. However it has made no provision in the model for any variation between the reserves provided and the ultimate outcomes. You have been tasked with the job of including such provision.

- (i) Explain how this variation might arise. [4]
- (ii) Discuss the relative advantages of using stochastic and deterministic reserving methods for the purpose of including reserving in the capital model. [5]

[Total 9]

#### Question 5

You are the actuary of a small general insurance company. The management has been asked by a large national electronic discount-retailing group to provide product warranty insurance on all the products that they sell as they have been able to negotiate a reduction in the price that is paid to the supplier by eliminating any warranty that would normally have been provided by that supplier. The insurance will provide cover for the retailer for all defective goods returned within three months of the sale, equal to the price of the goods. The retailer has maintained previous records of sales and claims that occurred which it will provide to you. Your company has not sold this product before.

- (i) Set out the risks involved in providing this particular cover. [3]
- (ii) Comment on ways in which the risks can be mitigated. [3]
- (iii) Describe the nature of the claims. [2]
- (iv) Broadly describe the manner in which you would determine the premium rate to be charged. [4]
- (v) Suggest with reasons an appropriate reinsurance strategy. [3]

[Total 15]

#### Question 6

- (i) Define what is meant by “funded accounting” and “three year accounting”. [4]
- (ii) You are a consulting actuary. A client of yours is a name in a syndicate at Lloyds that maintains its books on a three year accounting basis:
- (a) He has noticed that the number of names in his syndicate has reduced in the most recent underwriting year and has asked you to explain the implications of this to him and whether this will result in him taking more risk.
- Outline briefly the points you would make in your response to him. [3]

PLEASE TURN OVER

Two years ago the syndicate insured a large amount of liability business. The managing agent has suggested reinsurance to close placed with the same syndicate. Your client has asked how the premium for this will be determined and asked you to indicate the risks to him inherent in that calculation. Draft a reply to your client. [4]

**[Total 11]**

**Question 7**

The following facts are known about a general insurance company's last financial year that ended on 30<sup>th</sup> June 2010:

(All amounts in R million)	Current Year	Previous Year
Gross Written premiums:	264	228
Reinsurance premiums paid:	66	42
Gross claims paid	106	84
Reinsurance claims recovered	30	21
Acquisition Costs	18	12
Other Expenses and commissions	30	25
Claim reserves at the end of the year	66	43

As this company underwrites personal lines insurance, all premiums are collected monthly. The reinsurance agreement provides for an annual payment each year on the treaty anniversary of 1<sup>st</sup> September.

- (i) Determine the amount of the underwriting profit for the year, clearly stating any assumptions you make. [5]
- (ii) Describe how your answer would change if you learned that the risk on the policies written commenced at zero and increased linearly over the policy year. [6]

**[Total 11]**

**Question 8**

You are the actuary of a large general insurance company. You have been given all the past data for a particular product and you are about to calculate the outstanding claim reserves. You notice that the data appears to be quite volatile.

- (i) List the checks that you would make on the data to avoid distortions that would reduce the reliability of the projections and any actions that you might take to ensure that the data used are appropriate before determining the outstanding claim reserves. [6]
- (ii) Briefly describe the method that you would use to determine the reserves and state why you would choose that method. [2]

PLEASE TURN OVER

- (iii) List the assumptions implicit in this method. [1]
- (iv) Describe how you might backtest the method by applying it to historical data to check its applicability and any conclusions that you might draw from this test. [3]

**[Total 12]**

**[Grand Total 100]**

**END OF PAPER**