EXAMINATION

6 June 2014 (am)

Subject F103 — *General Insurance* Fellowship Principles

Time allowed: 3 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 six (6) 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 a solvency margin.

[1]

ii. Outline the ways in which reinsurance can be used to improve an insurer's solvency position.

[5]

iii. Name and describe two types of "run-off reinsurance" which can be used to reinsure a closed book of business.

[7]

[Total 13]

QUESTION 2

You are the actuary to a large established insurance company selling only personal lines business through independent brokers. The company sells two products:

- A comprehensive motor policy covering property damage and third party liability; and
- A residential property damage policy.

The company has a substantial market share in both classes of business. However, its market share for the motor policy has decreased substantially in the last few years as a result of a new competitor selling directly to the public and offering lower premium rates.

i. Explain how selling through independent brokers may increase liquidity risk for the company.

[2]

ii. Outline the relative advantages and disadvantages to the insurer of changing its strategy from selling business through independent brokers to selling directly to the public.

[6]

Management is concerned that there may be expense cross-subsidies between the two products that are causing their motor policies to be more expensive than their competitors'. You have been asked to conduct an investigation to help determine whether such cross-subsidies exist.

iii. Explain the problem that is posed by expense cross-subsidies.

[1]

iv. Describe the steps you would follow in conducting such an investigation.

[7]

[Total 16]

PLEASE TURN OVER

QUESTION 3

An insurance company needs to price an insurance policy for the business car insurance portfolio of ABC Car Rental which has just come up for tender. The broker has provided aggregated experience data on claims, premiums and sums assured on the policy originating from the last five years up until 1/1/2014:

Duration		**Policy Details**			**Motor Claims**	
Start Date	**Months**	**Total Premium**	**No. of Cars**	**Total Sums Assured**	**No.**	**Amounts**
01/05/2009	12	R 24 216 218	7 647	R 9 009 825 239	1 984	R 27 066 562
01/05/2010	12	R 33 299 435	7 989	R 10 360 016 178	2 112	R 25 846 461
01/05/2011	12	R 35 485 748	8 393	R 11 819 897 534	2 439	R 59 766 377
01/05/2012	12	R 36 398 910	8 733	R 13 210 385 434	2 240	R 31 683 226
01/05/2013	8	R 28 961 662	8 466	R 13 337 486 361	924	R 13 599 029
Total	**56**	**R 158 361 973**	**41 228**	**R 57 737 610 746**	**9 699**	**R 157 961 655**

In addition, you have been informed that the new total sum assured for 2014 will be R14 270 209 240 and the total number of cars to be insured will be 8 546. Based on the claims information provided by the broker a member in your team has determined that the IBNR on the portfolio is R10 879 223 and the current claims inflation rate is 6% per annum effective.

i. Explain the difference between the effective burning cost premium and indexed burning cost premium and hence calculate the effective and indexed burning cost premiums.

[6]

ii. State the advantages and disadvantages of using the burning cost approach relative to the frequency-severity approach.

[4]

iii. Suggest a formula that incorporates the burning cost premium rate to calculate the office premium to charge, defining any notation you use.

[1]

iv. Discuss additional factors, including those relating to historical data, that would need to be considered before finalising the actual premium to charge ABC Car Rental on their book.

[5]

[Total 16]

PLEASE TURN OVER

QUESTION 4

i. Define what is meant by "funded accounting" and explain, with examples, why it is used.

[4]

You have been given information relating to the first three financial years of a newly-established general insurance company below. The insurer has decided to differentiate itself from all other insurers by offering only six-monthly term policies (instead of the usual 12-monthly), funded by a single premium paid at inception of the policy. Within each financial year the premiums written were the same in all months and premiums were written on the first day of each month.

	Year 1	**Year 2**	**Year 3**
	R millions	**R millions**	**R millions**
Written premiums	120.0	144.0	192.0
Claims paid	62.0	82.0	103.0
Claims carried forward	18.0	29.0	37.0
Commission paid	6.0	7.2	9.6
Other expenses paid	5.0	8.0	12.0
Investment income	2.0	6.0	10.0

ii. Calculate the insurance profit for this insurer for each of the three years. The accounts are to be prepared on an accident year basis. State any assumptions you make.

[7]

iii. A student actuary suggests that the unearned premium reserves could be calculated by assuming that policies are written evenly over each month.

Showing the formula that would be used, recalculate the profits for each of the three years assuming the insurer uses the method suggested by the student actuary.

[6]

iv. Suggest with reasons whether the method suggested in part (iii) for calculating the unearned premium reserves is suitable for this insurer.

[2]

[Total 19]

PLEASE TURN OVER

QUESTION 5

You are the actuary responsible for setting reserves for a large short-term insurance company selling a diverse range of insurance products. You are currently busy with the year-end valuation of actuarial reserves. The following are key points from your valuation:

- Discussion with the claims team has shown an increase in hail-related claims which appears to be out of the norm.
- The courts are currently deciding whether employer's liability insurance should provide compensation for stress-related illnesses arising from the work environment, despite this not being included in the original policy wordings.
- You have assumed that the total claims reserves for the company follow a normal distribution with a mean of R1 billion and variance of R1.5 billion.

i. Describe the term "best-estimate reserves" and describe key characteristics of "best-estimate reserves" in the context of actuarial reserves.

[3]

ii. Determine the range of possible best-estimate claim reserves lying between the 40^{th} and 60^{th} percentiles of the claim reserve distribution described above. You can assume that the 60^{th} percentile of a standard normal distribution is 0.253 and work in units of billions of Rands rounded to two decimal places.

[3]

iii. Outline briefly four types of uncertainty and potential errors in your range of best-estimate claims reserves and give an example of each.

[4]

iv. The Finance Director has requested that you prepare a presentation for the next risk committee meeting to present your best-estimate claim reserve and the uncertainty around this.

Outline the issues you would discuss and highlight in your presentation to enable the audience to appreciate the level of uncertainty in your best-estimate claim reserve.

[4]

[Total 14]

PLEASE TURN OVER

QUESTION 6

Transure is a South African short-term insurance company that specialises in providing insurance to public transport vehicles, including buses and taxis. It has sold policies in five Southern African countries and is now planning to introduce a new product in a developing country in South America to insure taxi drivers. Taxis fall into two main categories: standard five-seat taxis and 12-20 seat mini-buses.

The insurer plans to introduce a trial product for one year to at most 1000 taxi drivers and then withdraw from the market to analyse the experience. The product will cover property damage subject to an excess, third party liability, and a personal accident benefit for passengers equal to a specified amount depending on the type of injury. The premium for the product will be calculated simply as a fixed premium rate per kilometer travelled. No other factors will be taken into account.

i. Discuss the advantages and disadvantages of calculating premiums as a percentage of distance travelled, where the same percentage applies regardless of taxi size. Include three examples of how the premium may be inaccurate in the above scenario.
[4]

ii. Suggest, with reasons, two possible approaches to distributing the product.
[3]

iii. List, with brief explanations, six claim risks (i.e. risks which could result in claims experience being higher than expected) faced by the insurer in offering this product.
[3]

iv. Discuss the advantages and disadvantages to the insurer of offering a trial product for a limited period to at most 1000 taxi drivers as opposed to selling the product without these restrictions.
[3]

v. Suggest three possible reasons for the insurer choosing a duration of one year for the trial period.
[3]

vi. Discuss the importance of collecting more data than is necessary to calculate the premium.
[2]

vii. Suggest, with brief justification, a suitable exposure measure for this product and suggest six additional items of data that the insurer should collect on the proposal form for each taxi to be insured.
[4]

[Total 22]

END OF PAPER