EXAMINATION

20 October 2014

Subject F203 — General Insurance
Specialist 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.*

3. *Save your work continuously throughout the exam, on your computers' 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 both 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.

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

You are an actuary working at a South African insurance company with a large commercial and agricultural insurance division.

You have been asked by the agricultural underwriters to act as a second pair of eyes over the rates and reinsurance placement for "hail only" crop insurance policies. You have been given industry data on local hail crop claims over the past 65 years. You now wish to build a gross of reinsurance risk claims cost model for a "hail only" crop insurance product. At the launch of this product the company will accept up to R30 million of net risk on each individual policy.

i) Discuss the role of agricultural crop insurance in South Africa to mitigate the main risks and uncertainties to farmers involved in agricultural crop production. **[8]**

ii) Outline the typical features and perils, in addition to hail, that will be included in a South African agricultural crop insurance product. **[3]**

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Assume that you have decided to use a Generalised Pareto Distribution (GPD) to model the tail of the claim amount distribution.

iii) Explain the technical considerations in parameterising the claims cost model including data preparation for modelling. **[16]**

You are reviewing the Catastrophe XL reinsurance treaty on the agriculture portfolio. Currently, the company has an Estimated Maximum Loss (EML) on the portfolio of R280 million. The current Catastrophe XL treaty comprises six layers of R40 million cover each, up to the EML, with a bottom layer deductible of R40 million. The treaty has not changed in the last three years.

You have calculated the current net of reinsurance risk premium on the agricultural portfolio at R5.5 million. It has been suggested that the reinsurance programme is not cost effective and that some of the lower layers of the treaty could be dropped.

The reinsurance broker has provided you with quotes on the various lines of cover. You have estimated the return periods and the expected average claims severity for each line if breached and the marginal cost of capital that will be required to retain each line of risk. The table below provides a summary of this information.

Reinsurance Layer	Return Period: Exposure Years per 1 Expected Breach	Cost of Capital	Reinsurance Rate on Line	Expected Severity
R40 million XS R240 million	400	3.8%	1.6%	39,500,000
R40 million XS R200 million	200	3.1%	2.1%	35,000,000
R40 million XS R160 million	125	2.4%	2.6%	34,500,000
R40 million XS R120 million	80	2.0%	3.0%	33,500,000
R40 million XS R80 million	40	1.4%	4.2%	31,250,000
R40 million XS R40 million	25	1.0%	5.5%	30,000,000

iv) Estimate the required capital that the company needs to hold for the various options of reinsurance deductibles, stating all assumptions made and showing all calculations. Follow SAM guidelines for the capital calculation and ignore any diversification benefit. **[4]**

v) By using the information above suggest, with a reason, an appropriate level of deductible for the Cat XL treaty, stating all assumptions made and showing all calculations. Ignore the cost of reinstatements. **[11]**

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The head of a well-known agricultural industry body made the following statement in the aftermath of recent devastating droughts and equally devastating floods that hit various parts of the country.

"A totally new look at disaster management in South Africa is needed because it seems that the current ways of operating no longer meets the requirements of the time. A state supported insurance fund especially for the agricultural sector is needed. "

vi) Explain how a government-supported insurance fund may operate and what benefits it may offer to participants in the agricultural sector as an alternative to traditional agricultural insurance. **[8]**

[Total 50]

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QUESTION 2

Innovation Ltd is a large South African short-term insurance company that has recently appointed you as the chief actuary.

The following two product classes account for the bulk of the Innovation portfolio of business:

- domestic householder contents only insurance; and
- all risk commercial and corporate insurance with a significant focus in the energy sector.

Following your appointment, one of your first tasks is to review the existing Innovation technical provisioning practices and procedures.

i) Outline how the reserving basis under Solvency Assessment and Management (SAM) will differ from the current statutory basis. **[5]**

ii) Discuss the appropriate technique for calculating the types of technical provisions as required under SAM for each of Innovation's two main product classes. **[15]**

iii) Explain to the managing director what is meant by conducting an Own Risk and Solvency Assessment (ORSA) and provide a generic high-level index of what could be included in an ORSA report. **[10]**

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You are reviewing the ORSA report prepared by your team of actuaries before it is tabled at the next Board meeting.

As part of Innovation's business projections in the ORSA, a newly developed cradle to grave wind turbine insurance product is being launched next year. In exchange for an upfront policy premium, it provides 25 years of all risk cover attaching to an imported and erected wind turbine. Projections estimate this product to account for 5% of next year's total gross written premium.

From the projection of future technical provisions estimated within the ORSA you notice that 10% of all technical provisions relate to the household contents product, 70% relate to the commercial and corporate all risk product and 20% relate to the newly launched wind turbine product.

Also within the ORSA report you notice Innovation's existing approach to asset management is as follows:

Instrument	**Allocation**	**Restrictions**
Money market	Mandate minimum 95% of total assets at all times	Portfolio duration less than 90 days at all times
Short term bonds	Mandate maximum of 5% of total assets at all times	Portfolio duration less than 2 years to maturity at all times Yield enhancement through credit risk not allowed for assets worse than A national credit rating

iv) Discuss the suitability of the existing investment portfolio's risk profile. **[14]**

v) Explain changes you would recommend to the investment strategy and your considerations associated with these changes **[6]**

[Total 50]

TOTAL 100

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END OF EXAMINATION