INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

24 September 2012 (pm)

Subject ST7 – General Insurance: Reserving and Capital Modelling 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 all eight 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, with 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.

1 List, giving examples, sources of uncertainty in modelling future expense levels. [7]

2 Explain when it would be suitable to use the Bornhuetter-Ferguson method to estimate ultimate claim costs and any problems with its use. [4]

3 List the disadvantages associated with the restrictions and regulations that a regulatory authority might put in place. [4]

4 (i) Give examples of accumulations of risk that could arise from writing the following classes of business:

(a) Motor fleet
(b) Professional indemnity

[3]

(iii) Suggest methods of mitigating accumulation risk for the above classes. [3]

[Total 6]

5 (i) Describe components of market risk that an insurer should consider when developing a capital model. [5]

A personal lines insurance company writes motor, household and creditor insurance business in two different territories.

(ii) Describe potential sources of correlation between these lines of business. [5]

(iii) Describe potential sources of correlation between insurance and market risk for each of these lines of business. [5]

(iv) Give examples of applications of the output that could demonstrate that a capital model satisfies a “use test”. [5]

[Total 20]

6 (i) List the criteria that risk and risk events should satisfy to be insurable. [4]

A general insurance company is considering the insurability of the following two proposed insurance or reinsurance arrangements, details of which are summarised below.

Proposal A: Insurance for a school fundraising game

- The school requires insurance cover for a game to be held at their annual fundraising event. The game involves a competitor paying an entrance fee of £10 to roll six dice. If he rolls six sixes, he wins a prize of £25,000. If he rolls any other combination, he wins nothing.
- The school wishes the insurance cover to indemnify it for the £25,000 prize if there are any winners.

- The head teacher is confident that there will be at least 100 competitors on the day.

Proposal B: Utility price increase cover

- The product development department has proposed a new type of insurance cover.. Policyholders will be protected in the event of significantly increased household bills for electricity, gas and water.

- The insurer will pay policyholders if increases in any of their monthly bills exceed the current monthly rate of retail price inflation. The insurer will pay the excess over that level up to a specified limit.

(ii) Discuss the extent to which each of Proposals A and B satisfies each of the criteria in (i). [6]

(iii) Suggest amendments to each proposal to improve the insurability of the risks. [4]

[Total 14]

7 (i) Outline the following approaches for allowing for outwards reinsurance in reserving calculations, stating the advantages and disadvantages of each:

(a) Separate projections of gross and net of reinsurance triangles.
(b) Using net/gross ratios.

[9]

The following table is an extract of information relating to one class of business of a large insurer. The data is as at 30 June 2012.

Underwriting Year		*Net/Gross Ratios*	
	Premium	*Paid claims*	*Outstanding claims*
2007	60%	70%	70%
2008	62%	80%	70%
2009	55%	45%	10%
2010	80%	90%	65%
2011	70%	100%	95%
2012	–14%	100%	100%

A full gross of reinsurance reserving analysis is also available.

(ii) Explain how this information can be used to estimate net of reinsurance IBNR. [3]

(iii) Suggest a reason why the net/gross premium ratio is negative for the 2012 underwriting year. [1]

The only reinsurance programme in place for the 2005 underwriting year was a 20% quota share.

The 2006 reinsurance programme comprised a 25% quota share with a profit commission that was payable by the reinsurer defined as 20% of the difference between the gross loss ratio and 70% when the gross loss ratio is less than 70%. The current expected gross loss ratio for 2006 is 50%.

(iv) Calculate the three net-to-gross ratios for the 2005 and 2006 underwriting years, stating any assumptions. [3]

The company is attempting to reduce its future reinsurance cost and is considering purchasing, for the 2013 underwriting year, excess of loss cover with significant reinstatement costs, rather than free reinstatements as is currently the case.

(v) Describe how the net/gross ratio analysis could be amended to allow for reinstatement premiums. [3]

(vi) Explain whether it would be appropriate to use net/gross ratios to transform a gross-of-reinsurance reserve range into a net-of-reinsurance range, suggesting an alternative approach. [4]

[Total 23]

8 The following data have been supplied to a consulting actuary as part of a peer review of the projections made by the reserving department of a general insurance company using an automated chain ladder programme.

Claims Paid:

	Development Year						
Underwriting Year	*1*	*2*	*3*	*4*	*5*	*Ultimate Claims*	*Future Claims*
2007	3,198	4,718	5,641	6,112	6,125	6,125	0
2008	3,405	5,111	6,140	6,610		6,624	14
2009	3,395	5,196	6,182			6,690	508
2010	3,723	5,798				7,501	1,703
2011	3,803					7,467	3,664
							5,889

Development Factors:

	1–2	*2–3*	*3–4*	*4–5*	*5–ult*
Year-on-Year	1.5176	1.1955	1.0799	1.0021	1.0000
Cumulative	1.9634	1.2938	1.0822	1.0021	1.0000

(i) Outline the changes that the consulting actuary might make to the chain ladder development factors used and hence recalculate future claims. [8]

The company has also supplied the following data for a class for which development data are only available as at the dates given and has requested advice on how to adapt the data for use in the chain ladder method.

	Cumulative Claims Paid as at				
Underwriting Year	*30/11/07*	*31/05/09*	*31/12/09*	*31/03/11*	*31/12/11*
2007	1,757	3,267	3,595	3,936	3,940
2008		2,502	3,187	3,889	4,201
2009		950	2,405	4,061	4,578
2010				3,039	3,865
2011				307	2,810

(ii) Construct a standard annualised triangle of claims data and hence calculate future claims as at 31 December 2011, making any adjustments that you consider necessary and stating any assumptions made. [14]

[Total 22]

END OF PAPER