

EXAMINATION

19 April 2010 (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 before 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 nine 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 the functions typically undertaken by each of the following managers:
- (a) Underwriting Manager
 - (b) Claims' Manager
 - (c) Reserving Manager
- [6]
- 2**
- (i) Define the term RITC, describing how the process works in practice. [2]
 - (ii) Explain why the RITC process is the established practice in the Lloyd's Market. [2]
 - (iii) Describe the three funds that are available to protect policyholders of Lloyd's market participants. [3]
- [Total 7]
- 3** A small general insurance company is developing its first capital model following a change in the insurance legislation of the territory in which it operates. The company writes mainly liability business and is in its third year of trading. The capital model has been built on a new software platform and the results are based on 1,000 simulations.
- Describe the main areas of uncertainty in the model. [7]
- 4**
- (i) List external factors that may influence the investment strategy of a general insurance company. [4]
- As a result of a takeover, a large general insurance company has taken control of a small insurer that has been in run-off for some time. It is known that the small insurer wrote significant amounts of liability business in the USA and has exposure to asbestos and other industrial disease claims.
- (ii) Outline the key factors, internal to the group, that need to be considered when setting an investment strategy for this new subsidiary. It is not necessary to recommend a particular investment strategy. [5]
- [Total 9]

- 5** A general insurance company XYZ has conducted an intra-group reinsurance transaction with its off-shore subsidiary, ceding 100% of business underwritten in the 2009 year of account. XYZ has performed an analysis and concluded that the return on capital (RoC) for this contract is 15%.

In order to demonstrate to the tax authorities that the price paid for this reinsurance transaction and hence the profit ceded to its off-shore subsidiary is reasonable for tax treatment purposes, an actuary has been asked to perform a benchmarking analysis. This analysis will look at 20 off-shore reinsurers and attempt to establish whether a RoC of 15% is within a reasonable range.

An example of the publically available accounting data for one of these 20 off-shore reinsurers, as at the end of 2009, is shown below:

	2009	2010 <i>estimated</i>
Market Capitalisation (£m)	20.4	
Shareholders' Equity (£m)	16.7	
Earnings Per Share (£)	7.68	7.55
Dividends Per Share (£)	1.06	
Debt (£m)	2.5	
Debt interest (£m)	0.175	

The shareholders' equity at the start of 2009 is £16.2m and the share price as at the end of 2009 is £61.78.

$$\text{RoC} = \frac{\text{Return on Equity} + \text{Return on Debt}}{\text{Total Equity} + \text{Total Debt}}$$

- (i) Using the formula above, show that the RoC for the 2009 calendar year for this particular company is 14.3%. [2]
- (ii) Estimate the RoC for the 2010 calendar year by projecting the earnings and the shareholders' equity for the 2010 calendar year, assuming that all other items are unchanged. [3]
- (iii) Estimate the RoC for the 2009 underwriting year stating the implicit assumption that you are making. [1]

After performing a similar exercise for each of the 20 off-shore reinsurers the actuary concludes that the inter-quartile range for the RoC is 13% to 17%, which would imply that the RoC for this reinsurance contract is reasonable.

- (iv) List the items that would need to be checked to ensure that this inter-quartile range is calculated on a consistent basis with XYZ's estimate of 15%. [4]
- [Total 10]

- 6** (i) List examples of the data requirements for claims records that you would expect the IT systems to include. [3]
- (ii) (a) Give examples of errors that might be made when entering claims data into a computer system.
- (b) Suggest automated checks that could be coded into the system to reduce the likelihood of these occurring. [8]
- [Total 11]
- 7** (i) List key reasons that may cause an insurance company to fail. [4]
- (ii) Give examples of requirements that the regulatory authority could impose in order to reduce the risks that would lead to failure. [8]
- [Total 12]
- 8** (i) Describe the effect of, and the stress and scenario tests that can be used to understand and assess the impact of, each of the following events on a portfolio of insured motor, property and creditor business in a particular country:
- (a) An unusually large windstorm and flood event which impacts an entire country.
- (b) A deep recession which impacts a country's economy. [14]
- (ii) List, with a supporting reason, four actions that management could take to mitigate materially the financial impact faced in the natural catastrophe scenario described in part (i)(a). [4]
- [Total 18]
- 9** (i) For each of the following approaches to claims cohorts:
- Accident year
 - Underwriting year
 - Reporting year
- (a) Define the term.
- (b) State its advantages and disadvantages. [9]

The annual triangle below shows the cumulative incurred claim amounts for a particular class of business.

<i>Year of Accident</i>	<i>Development Year</i>		
	<i>1</i>	<i>2</i>	<i>3</i>
2007	C_{11}	C_{12}	C_{13}
2008	C_{21}	C_{22}	
2009	C_{31}		

- (ii) State what the figure in “ C_{22} ” represents. [1]
- (iii) List the points to consider when deciding whether to use quarterly or annual development and claims cohort periods. [5]

The triangle below shows cumulative incurred claims data by quarterly development and exposure periods for a class of business. It has been decided to project this on an annualised basis.

	<i>Development month</i>										
	<i>3</i>	<i>6</i>	<i>9</i>	<i>12</i>	<i>15</i>	<i>18</i>	<i>21</i>	<i>24</i>	<i>27</i>	<i>30</i>	<i>33</i>
<i>Q1 – 2007</i>	1,265	7,563	12,658	18,793	23,617	26,987	22,303	33,401	35,002	35,838	35,504
<i>Q2 – 2007</i>	1,350	8,106	14,256	19,403	24,666	27,488	29,102	29,594	30,369	30,701	
<i>Q3 – 2007</i>	873	6,235	11,033	14,707	18,096	20,505	22,345	23,977	24,912		
<i>Q4 – 2007</i>	695	4,857	9,687	14,698	18,455	21,003	23,277	25,096			
<i>Q1 – 2008</i>	985	6,975	11,666	15,630	17,495	21,192	23,206				
<i>Q2 – 2008</i>	635	5,322	9,877	14,923	18,505	20,508					
<i>Q3 – 2008</i>	493	3,997	6,703	9,606	11,668						
<i>Q4 – 2008</i>	513	4,762	8,433	12,105							
<i>Q1 – 2009</i>	571	4,265	10,177								
<i>Q2 – 2009</i>	451	3,215									
<i>Q3 – 2009</i>	297										

- (iv) State the main advantage and main disadvantage of each of the following two approaches for projecting an annualised version of this data, given that the leading diagonal is as at 30 September 2009.
- (a) Project the triangle of September diagonals as normal.
- (b) Project chain ladders based on the triangle to 31 December 2008 only. Compare the expected 12 month development that this produces for the 2009 accident year with the actual 9 months’ experience shown in the data and adjust the ultimate if necessary. [2]
- (v) Collapse the triangle data into an annual triangle as shown at the start of this question using approach (a) above. [3]
- [Total 20]

END OF PAPER