

EXAMINATION

27 September 2007 (pm)

Subject ST3 — 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 all 6 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.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator.</i></p>

- 1** A small general insurance company writes only a specialised book of business. The aggregate claims distribution is estimated to follow a compound Poisson distribution where $\lambda = 10\%$ and the claim size distribution is exponential with mean of £0.5m. The company starts with capital of £10m.

- (i) Show that the loss ratio that the general insurance company must achieve in order to ensure that its probability of ruin is less than 0.5% is 73.5%. Ignore expenses for the purposes of this calculation. [4]

The predicted loss ratio for the business next year is 90%.

- (ii) Comment on whether this is a problem for the general insurance company and list the actions the company might take. [6]
[Total 10]

- 2** You are an actuary working for a newly established general insurance company. It commences writing household contents insurance on 1 September 2006 writing annual policies only. The company sells the following number of policies per month in 2006:

<i>Month</i>	<i>Policies sold</i>
September	1,000
October	1,500
November	2,000
December	2,500

- (i) Describe the claims characteristics of household contents insurance. [3]
- (ii) Calculate the average accident date for accidents occurring during 2006 by considering the company's exposure profile. Assume that policies incept on the first day of the month in which they are sold. State any other assumptions that you use. [4]

You have obtained benchmark accident year development factors by analysing a sample of long-established general insurance companies offering similar policies and with similar business mixes as your company.

- (iii) Discuss the appropriateness of using this benchmark pattern to project the 2006 accident year to ultimate.

[4]
[Total 11]

3 You are the actuary of a large general insurance company that writes all types of property insurance. The management is reviewing the reinsurance programme, which has historically comprised facultative and treaty arrangements and has asked for your comments.

- (i) Define the terms facultative reinsurance and treaty reinsurance. [2]
- (ii) Compare the advantages and disadvantages to the insurance company of using facultative arrangements rather than treaty arrangements. [5]
- (iii) Discuss the factors that you would consider when assessing the effectiveness of the existing reinsurance programme. [6]

[Total 13]

4 You are a consulting actuary engaged by a small general insurance company which writes only motor business. The company sells its policies through a broker network and direct to customers. It has been attempting to grow its business and written premium and policy volumes have both increased in the last two years. However, its profit margin has fallen over the same period. The company has asked you to analyse its business and identify reasons for its falling profitability.

Describe the actuarial analyses that you would carry out in each of the following areas and discuss the features for which you would be looking in your analyses.

- (i) Claims [5]
- (ii) Premiums [4]
- (iii) Mix of business [5]
- (iv) Reinsurance [4]

[Total 18]

- 5** You are a pricing actuary of a general insurance company writing employers' liability for large companies. An underwriter has given you the following information on a risk that he wishes to renew in 2007. Under the proposed terms of the policy there is a limit for each and every loss of £5m and no deductible.

<i>Underwriting Year</i>	<i>Number of Employees</i>	<i>Notified claims (£000's)</i>
2003	2,100	1,200
2004	2,600	1,400
2005	2,400	1,200
2006	2,500	550
2007	2,800	

The underwriter suggests that the underwriting year incurred development pattern for similar risks is:

<i>Underwriting Year</i>	<i>% Developed</i>
2003	90%
2004	80%
2005	60%
2006	25%

- (i) Calculate the risk premium for 2007 using a burning cost methodology allowing for claims inflation of 10% per annum, indicating any assumptions that you make. [8]
- (ii) Explain why the answer that you calculated in (i) may not be an accurate indication of the "true" risk premium. [5]
- (iii) Further to the points raised in (ii), state what further information you would require to calculate your theoretical office premium for the risk. [3]

The actual office premium quoted for the risk is different to the theoretical office premium that you recommend.

- (iv) Discuss the situations that could give rise to this, other than those already raised in (ii) above, and outline the concerns you would have in each case. [5]
- [Total 21]

- 6** You are an actuary of a large general insurance company writing private motor business. You are estimating the technical reserves for this class of business as at 31 December 2006. You have been given the net paid accident year triangle for the class as a whole, from which you have calculated development factors using the basic chain ladder method, as shown below.

Net paid development factors on cumulative amounts

Accident year	Development year						
	0–1	1–2	2–3	3–4	4–5	5–6	6–7
1999	2.259	1.318	1.255	1.110	1.054	1.040	1.030
2000	2.265	1.262	1.189	1.134	1.049	1.046	
2001	2.464	1.280	1.228	1.130	1.052		
2002	2.341	1.337	1.209	1.065			
2003	2.747	1.342	1.179				
2004	2.692	1.239					
2005	2.474						
2006							
Selected idf's	2.500	1.300	1.200	1.100	1.050	1.040	1.030
Selected cdf's	4.825	1.930	1.485	1.237	1.125	1.071	1.030

idf = incremental development factor
cdf = cumulative development factor

- (i) Suggest reasons why actual ultimate claims paid may differ from those estimated using the paid chain ladder method. [5]
- (ii) Discuss other analyses and projections that you would wish to perform before selecting your undiscounted outstanding claims reserve, including IBNR. [11]
- (iii)
 - (a) Outline the arguments for and against discounting of reserves.
 - (b) State the factors that you would consider in arriving at an appropriate discount rate. [5]

The company has decided to discount its reserves for this class using an interest rate of 9% per annum.

- (iv) Calculate an appropriate discount factor to apply to the undiscounted reserves for accident year 2004 as at 31 December 2006, stating any assumptions you make.

[6]
[Total 27]

END OF PAPER