

EXAMINATIONS

8 September 2003 (am)

Subject 303 — General Insurance

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 7 questions, beginning your answer to each question on a separate sheet.*

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 Actuarial Tables and your own electronic calculator.

- 1** (i) Define the following terms:
- (a) long-tailed business
 - (b) latent claims
- [2]
- (ii) Outline the difference between these two terms. [1]
[Total 3]
- 2** You are the senior actuarial student at a large general insurance company writing mortgage indemnity guarantee business. You have been asked to undertake a review of the current premium rates for this business.
- Outline the factors you would take into account in determining an appropriate allowance for future investment return when pricing this product. [6]
- 3** Your company has been underwriting commercial property insurance for several years.
- (i) List the various delays that can occur in relation to the claims your company receives in respect of this product. [2]
- (ii) You have observed a recent unanticipated trend of increasing delays at various stages in the life cycle of a claim. Explain the possible causes of this and the likely effect upon the ultimate claims cost. [3]
[Total 5]
- 4** (i) List the 4 main types of insurance cover provided by general insurance products. [1]
- A shipping company buys an annual hull property damage policy. The policy requires that a description of the claim is first notified to the insurer at the time of the incident or when the ship reaches a major port.
- If the damage is minor the ship continues with its scheduled voyages until a convenient time when a full inspection can take place. At this point a more detailed assessment of the damage is made, the insurer is notified and the repair is planned. If the damage is minor, the ship may continue its voyages until the repair is finally carried out and the costs are finalised. If the damage is major then the ship is taken out of service immediately and if repair is possible it is carried out as soon as possible.
- (ii) Describe the specific claim characteristics of this class of business. [8]
[Total 9]

5 You are the actuary for a medium-sized general insurance company writing only personal motor business. Your Finance Director has asked you to develop a model that can be used to test the impact on profitability and solvency of changing the company's reinsurance cover. The existing reinsurance programme has for the last 5 years consisted of a small amount of quota share reinsurance and individual excess of loss cover of \$10,000,000 xs \$500,000.

- (i) Discuss the factors that should be considered when deciding upon an appropriate reinsurance programme for this company. [8]
 - (ii) Describe how you would construct your model. [10]
- [Total 18]

6 A general insurance company writes only personal lines motor business via brokers.

- (i) Describe the perils covered by personal motor insurance. [2]
 - (ii) List the data required to investigate the appropriateness of the current risk premium relativities. [9]
 - (iii)
 - (a) Define burning cost premium.
 - (b) Describe how this may be adjusted, and state all the other information that will be needed, in order to calculate the final office premium. [7]
 - (iv) The proposed final office premiums are significantly different from those currently charged. Explain the risks of implementing the new rating structure. [7]
 - (v) Discuss methods which may be used to mitigate the risks identified in (iv). [7]
- [Total 32]

- 7 You are a consulting actuary for a large general insurance company that writes commercial insurance for large multinational companies. You have been asked by the company to review the methodology and assumptions used by the company's reserving team for the motor fleet business as at 31 December 2002.

The company's reserving team has analysed "non-large" and "large" claims separately. A claim is described as large if it has exceeded \$500,000 at some point in its history. The non-large claims have been projected using both paid and notified claim chain ladder methods at a net of reinsurance level. The selected non-large reserve figures have been based on an average of the results of the two chain ladder methods. Reserves for large claims have been set to be 110% of the total large claim case estimates, net of reinsurance, as at 31 December 2002.

The extract below shows historical development factors for the non-large paid and notified claims triangles as at 31 December 2002, together with the company's selected development patterns.

"Non-large" Net Paid — development factors for cumulative amounts

<i>Accident</i>	<i>Development year</i>								
<i>Year</i>	<i>0–1</i>	<i>1–2</i>	<i>2–3</i>	<i>3–4</i>	<i>4–5</i>	<i>5–6</i>	<i>6–7</i>	<i>7–8</i>	
1994	5.076	1.673	1.357	1.286	1.189	1.161	0.997	1.031	
1995	4.408	1.775	1.495	1.294	1.176	1.065	1.057		
1996	5.396	1.768	1.456	1.416	1.082	1.110			
1997	5.201	1.694	1.411	1.217	1.223				
1998	5.409	1.621	1.430	1.369					
1999	5.354	1.772	1.426						
2000	5.899	1.689							
2001	5.238								
Selected paid idf	5.500	1.700	1.430	1.300	1.180	1.100	1.040	1.020	1.000
Selected paid cdf	23.933	4.351	2.560	1.790	1.377	1.167	1.061	1.020	1.000

"Non-large" Net Notified — development factors for cumulative amounts

<i>Accident</i>	<i>Development year</i>								
<i>Year</i>	<i>0–1</i>	<i>1–2</i>	<i>2–3</i>	<i>3–4</i>	<i>4–5</i>	<i>5–6</i>	<i>6–7</i>	<i>7–8</i>	
1994	1.139	1.009	1.085	1.031	0.937	0.992	1.001	0.998	
1995	1.169	1.010	1.089	1.004	0.980	0.992	0.999		
1996	1.357	1.076	1.116	0.979	0.990	1.008			
1997	1.471	1.053	1.083	1.066	0.991				
1998	1.418	1.015	1.023	0.991					
1999	1.309	0.973	1.045						
2000	1.132	1.022							
2001	1.318								
Selected notified idf	1.300	1.025	1.070	1.010	0.995	1.000	1.000	1.000	1.000
Selected notified cdf	1.433	1.102	1.075	1.005	0.995	1.000	1.000	1.000	1.000

idf = incremental development factor

cdf = cumulative development factor

- (i) Suggest possible reasons why there are claims development factors less than 1.000 within the above triangles. [9]
- (ii) (a) Comment on the suitability of the company's methodology and assumptions used to establish undiscounted reserves for its motor fleet account.
- (b) Suggest alternative approaches. [9]

As part of your work for the company, you have also been asked to assist with the company's discounting adjustments. The company's accounting policy is to use a discount rate of 5% per annum.

- (iii) Using the company's chain ladder selections and stating any assumptions made:
 - (a) Derive a payment pattern to apply to the 2000 accident year.
 - (b) Estimate a discount factor to convert the company's undiscounted reserves to discounted reserves for the same accident year.
 - (c) Derive the discounted mean term to settlement for this accident year. [7]
 - (iv) List the factors you would consider in selecting a discount rate for reserving purposes. [2]
- [Total 27]