

## EXAMINATIONS

19 April 2004 (pm)

### Subject 403 — UK Fellowship General Insurance

#### *Paper Two*

**You must answer this subject only, you may not attempt another subject in the 400 series.**

*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 both 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** You are the general insurance actuary for a UK insurer which writes only household insurance. It writes this business by selling direct to the customer via telesales and over the internet and via a major mortgage lender. In the latter case the lender's name appears on all correspondence including policy booklets and schedules of insurance.

You have just concluded a thorough statistical analysis in order to set new premium rates for all the household business. Some of the new data available from the Environment Agency has enabled you to assess the risk of flooding at full postcode level as opposed to sector postcode level which was used at the last review. In the UK there are approximately 16,000 postcode sectors and 1.8 million full postcodes. Postcodes are used to identify geographical location.

- (i) Explain the advantages and disadvantages of rating household business at full postcode compared to sector postcode level. [15]

- (ii) The Finance Director has suggested that the theoretically correct premium rates should be implemented.

Explain why this may not be the best course of action. [9]

- (iii) Explain the investigations you would carry out to derive the office premium from the theoretically correct premium rate for both new business and renewing business. [7]

- (iv) Discuss the difficulties of implementing new rates for the mortgage lender highlighting areas where the lender may have concerns. [9]

- (v) As a compromise the mortgage lender suggests that it pays the insurer the premiums indicated by the new risk rates but the mortgage lender determines which customers can be accepted and the premiums being charged to those customers.

Discuss the advantages and disadvantages of this from the point of view of both the insurer and the lender. [10]

[Total 50]

- 2** You are an actuarial student working for a firm of consulting actuaries. You have been asked by your manager to collect benchmark claims development patterns and ultimate loss ratios for the personal motor insurance market.

You have obtained the statutory returns for five of the largest motor insurers in the UK. Using this information you have compiled total paid and notified claims amounts triangles for personal motor business at a gross of reinsurance level as at 31 December 2003. The extract below shows the historical development factors for these triangles, together with your selected development patterns.

**Paid — development factors for cumulative amounts**

<i>Accident Year</i>	<i>Development 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–ult</i>
1996	1.352	1.092	1.045	1.052	1.019	1.016	1.009	
1997	1.534	1.125	1.079	1.055	1.024	1.013		
1998	1.423	1.112	1.082	1.036	1.018			
1999	1.299	1.139	1.065	1.058				
2000	1.476	1.087	1.054					
2001	1.431	1.078						
2002	1.447							
Selected paid idf	1.450	1.100	1.060	1.050	1.020	1.015	1.010	1.020
Selected paid cdf	1.893	1.306	1.187	1.120	1.067	1.046	1.030	1.020

**Notified — development factors for cumulative amounts**

<i>Accident Year</i>	<i>Development 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–ult</i>
1996	1.210	1.039	1.025	1.010	1.010	1.001	1.000	
1997	1.339	1.057	1.032	1.025	1.002	1.012		
1998	1.257	1.042	1.051	1.009	1.004			
1999	1.184	1.058	1.047	1.012				
2000	1.221	1.055	1.043					
2001	1.293	1.042						
2002	1.218							
Selected notified idf	1.230	1.050	1.045	1.015	1.005	1.002	1.001	1.003
Selected notified cdf	1.385	1.126	1.072	1.026	1.011	1.006	1.004	1.003

idf = incremental development factor  
cdf = cumulative development factor

You have also extracted ultimate loss ratios by accident year for the motor accounts of each of these five companies:

<i>Acc Year</i>	<i>Co A</i>	<i>Co B</i>	<i>Co C</i>	<i>Co D</i>	<i>Co E</i>
1996	99%		76%	102%	
1997	97%		80%	107%	
1998	100%		80%	101%	95%
1999	101%	95%	81%	92%	89%
2000	96%	108%	73%	96%	93%
2001	84%	80%	65%	79%	81%
2002	77%	73%	61%	62%	69%
2003	88%	82%	66%	70%	72%

- (i) Discuss the claims characteristics of motor insurance business making reference as appropriate to the paid and notified claims development patterns shown above. [6]
- (ii) Suggest reasons for the variation in ultimate loss ratios between these companies and by accident year. [7]
- (iii) Your manager has asked you to adapt these benchmark claims development patterns for use in high level reserving exercises for the following companies:
  - (a) Company V, which specialises in policies for motorcycles. This reserving exercise will be based on data as at 30 June 2003.
  - (b) Company W, which specialises in motor policies for taxi drivers. These are written through a broker and provide cover for one month at a time.
  - (c) Company X, which has experienced rapid growth in its internet motor insurance account since it started writing business on 1 July 2002.
  - (d) Company Y, which writes a small motor insurance portfolio that is protected by individual excess of loss reinsurance with an attachment point of £200,000. You are required to conduct the benchmarking exercise at a net of reinsurance level.
  - (e) Company Z, which writes business in a country where cases of disputed liability are settled by the police within two months of the occurrence of an accident. This company accounts for its business on an underwriting year basis.

You may assume that unless otherwise stated, the companies write UK business and the reserving exercises will be conducted at a gross of reinsurance level as at 31 December 2003.

Explain, with reasons, how you would adapt the benchmark claims development patterns in each case. [20]

You have read that the motor insurance industry has recently started to cut its premium rates. One of your largest clients has introduced the following premium rate changes into its motor insurance book:

<i>Date of rate change</i>	<i>Increase/(decrease)</i>
1 January 2003	5.0%
1 July 2003	6.0%
1 January 2004	(8.0%)

- (iv) Estimate a market ultimate loss ratio for the 2004 accident year stating all assumptions made. [10]
- (v) One of the companies that you review is unwilling to reduce its premium rates. Discuss alternative approaches that the company could take in order to maintain business volumes. [7]

[Total 50]

**END OF PAPER**