EXAMINATIONS

11 September 2003 (am)

Subject 403 — UK Fellowship General Insurance

Paper One

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 all 8 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 have taken over responsibility for a poorly designed and administered claims database. State the types of errors or distortions that you may find in that database, and give examples of how they might have arisen. [7]

2 (i) Define facultative and treaty reinsurance, and state any contractual differences. [3]

(ii) Compare their advantages and disadvantages. [4]
[Total 7]

3 (i) Define reciprocity. [1]

(ii) Outline its effect on the parties involved. [6]
[Total 7]

4 You work for a general insurance company that uses a system of risk-based capital.

(i) Define risk-based capital. [1]

(ii) Discuss the factors that affect the level of risk-based capital required to underwrite a new class of business. [8]
[Total 9]

5 (i) Describe the following four statistical methods of calculating claims reserves, indicating conditions when each method may be suitable.

(a) chain ladder
(b) average cost per claim
(c) loss ratio
(d) Bornheutter-Ferguson

[10]

(ii) (a) Describe an exposure based method for calculating the reserve requirements in respect of claims arising from Product Liability contracts.

(b) Set out the elements of this approach that may be subject to the greatest uncertainty. [5]
[Total 15]

6 A general insurance company writing only direct motor business started writing business 6 years ago and has just recruited you as their actuary. The company now has 400,000 policies in force.

The finance director has concerns as the company is growing faster than expected and is experiencing worse than expected claims run-off in respect of the older accident years.

The company has not previously undertaken any actuarial reviews.

Previously reserves have been set purely for reported claims and late reported claims; there has been no specific reserve for adverse development of reported claims.

You have been asked to make recommendations on the level of the total claims reserve that is being held.

Explain what investigations you would carry out in order to produce your recommendations. [14]

7 You are the Chief Actuary to a wholly owned general insurance subsidiary of a large car manufacturer. The parent company wishes to offer a 10 year extended warranty (with a 200,000 miles limit) on a new model of car that it has planned to introduce to the market later in the year. The warranty is to be offered at the time of purchase for a single "up front" premium. The company expects most purchasers of the new vehicle to average less than 20,000 miles a year. The subsidiary currently underwrites this cover on existing models for a term of 5 years.

The country in which you work and in which this product will be offered has experienced the following inflation levels:

- Historically (until 25 years ago) inflation was below 5% per annum.
- The next 5 years saw inflation levels rise rapidly to and fluctuate between 15% and 20%.
- The next 10 years saw inflation levels fall rapidly to and fluctuate between 5% and 10%.
- The last 10 years have seen inflation levels fall back to and remain below 5%.

For much of the period of high inflation, real returns on cash and fixed interest assets were nil or negative, with other asset categories providing small positive real returns. The current expected rate of inflation (implied by comparing respective yields on Government fixed interest and index-linked bonds) is about 4% per annum, with expected rates of return on the various asset categories all between 5% and 10% per annum — similar to the historic period of low inflation.

An executive steering group is concerned with the possible risks of high future inflation on the profitability of this new warranty product and the company as a whole. The steering group has requested a report from you in relation to your approach to pricing for this product.

Set out the points that you would make in the section of this report on allowances for future inflation and investment returns. [20]

8 You are the actuary for a small general insurance company that writes only comprehensive motor insurance. You have been asked to undertake a review of the damage component of the premium for this business. The company has been writing this business for just four years. For this review you have only the following information available.

Cost of Damage Claims Paid at 2003 Prices (£m)

YEAR OF INCEPTION	*DEVELOPMENT YEAR*			
	0	*1*	*2*	*3*
1999	70	100	42.5	12.75
2000	80	80	40	
2001	100	60		
2002	150			

Number of damage claims paid (,000)

YEAR OF INCEPTION	*DEVELOPMENT YEAR*			
	0	*1*	*2*	*3*
1999	80	75	12.5	3.35
2000	80	50	16	
2001	90	30		
2002	100			

YEAR OF INCEPTION	*NO. OF POLICIES WRITTEN (,000)*
1999	450
2000	420
2001	400
2002	375

The current risk premium being charged for the damage component is £500.

You have been requested to compare the current risk premium with that suggested by the above data, stating any additional assumption made.

(i) Describe the observations which you can make from the raw data [3]

(ii) Comment on the appropriateness of the current risk premium, for business written in 2003, by carrying out the following analyses:

(a) claim frequency
(b) cost per claim
(c) claim cost per policy

[18]
[Total 21]