EXAMINATIONS

April 1999

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. *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.*
2. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
3. *Write your surname in full, the initials of your other names and your Candidate's Number on the front of the answer booklet.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all 6 questions, beginning your answer to each question on a separate sheet.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet and this question paper.

In addition to this paper you should have available Actuarial Tables and an electronic calculator.

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1 You are the actuary of a general insurance company, and have been asked to model the economic value of an insurance product using net present value techniques.

(a) List the key assumptions in the modelling process. [3]

(b) Describe the considerations involved in choosing values for these assumptions. [9]
[Total 12]

2 (i) Outline the basis of taxation of a United Kingdom proprietary general insurance company. [4]

(ii) Describe the extent to which each reserve can be offset against tax. [4]
[Total 8]

3 (i) Define the terms exposure measure, risk factor and rating factor. [4]

(ii) State an appropriate exposure measure and list the risk factors and rating factors for each of the following classes of business:

(a) Employers' Liability
(b) Marine Hull [10]
[Total 14]

4 (i) Define the following terms:

(a) excess of loss reinsurance
(b) experience rating [3]

A reinsurer has been asked to quote for a 500,000 excess of 500,000, unindexed, each and every loss cover, on a portfolio of 1000 identical risks, all written with a sum insured of 2 million, for the 1999 underwriting year. The following information has been provided:

Accident year	*Number of policies*	*Ground-up loss development factor*
1996	700	1.3
1997	800	1.4
1998	900	1.5

Claims inflation has been at a level of 3% per year compound throughout this period and will continue to be at that level. Pure IBNR is negligible, but reported claims may be expected to increase in line with the appropriate ground-up loss development factor. The following is a list of the paid amounts plus outstanding reserve on all claims exceeding 250,000.

Accident year				
1996	300,000	600,000	900,000	
1997	400,000	700,000	800,000	500,000
1998	350,000	800,000	400,000	650,000

(ii) Calculate an experience rated pure loss cost for the layer, for the 1999 accident year. [5]

An alternative method has been suggested to determine the pure loss cost, based on the limited expected value (LEV) curve shown below. This curve shows, for example that if claim payments were limited to 25% of the sum insured then total loss costs would be 80% of the level they would otherwise be.

Percentage of sum insured	25	50	80	90	100
Percentage of total loss cost	80	90	95	98	100

The insurer is able to write to a 70% loss ratio, and charges 20,000 per risk.

(iii) Calculate the pure loss cost under the new proposed method. [4]

(iv) List the factors to take into consideration when deciding which method to use. [3]

It has been decided to adopt a pure loss cost of 1.4 million. The company uses a concept known as “leverage ratio” in its capital allocation, which is defined as the ratio of premium to capital allocated. The following information is available.

Commission/brokerage	10%
Internal variable expense	5%
Internal fixed expense	5,000
Leverage Ratio	2.0
Required Return on Capital	15%
Investment income/tax	ignore

The reinsurer will write 50% of the layer.

(v) (a) Calculate the office premium that should be charged.

(b) Calculate the return on capital the reinsurer may expect to achieve if the contract is, in fact, placed for a premium of 2 million in total. [5]

[Total 20]

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5 A large proprietary general insurance company writes household, creditor, domestic mortgage indemnity guarantee, motor and commercial business, and it currently has a solvency margin of 80% of annual premium.

(i) Discuss the reasons why this insurer may want to purchase reinsurance. [7]

(ii) Describe appropriate reinsurance arrangements for each class of business. [10]
[Total 17]

6 The Insure Kwik Company is an insurance company whose only classes of business are private motor and household insurance, sold direct to the public. All quotation requests are handled by a telephone call centre that is part of the head office. The profit and loss account for the 1998 financial year is shown below, with all items in thousands of pounds.

	Total	*Motor*	*Household*
Premium earned	30,000	20,000	10,000
Investment income	3,000		
Total income	**33,000**		
Claims incurred	26,000	17,000	9,000
Management expenses	5,000		
Gross profit	**2,000**		
Taxation	500		
Dividend	500		
Retained profit	**1,000**		

Investment income has been achieved at a rate of 7% per year on invested funds. The company does not use reinsurance.

The Board has considered the financial figures, and considers that the present return on capital is not satisfactory. The marketing department has conducted research that has led to the following conclusions.

- The proportion of policies that renew rather than lapse is affected by the premium rates. Each change of 1% in premium rates is likely to be followed by a change in the proportion that renew, in the opposite direction, of 1½% in the case of motor policies and 2/3% in the case of household policies.

- The number of enquiries handled at the call centre is likely to change by 1% for every 1% change in the amount the company spends on advertising, the two changes being in the same direction.

- The conversion rate of enquiries into new policies is likely to change by 2½% for motor and 2% for household, for each 1% change in premium rates, the changes being in opposite directions.

(In the above, a 10% rise in a 50% renewal rate, for example, should be interpreted as raising it from 50% to 50% × 1.1 = 55%.)

The actuarial department has suggested that rating structures are now optimal, in that an across-the-board premium rate change would not have any effect on the average amount of claims per policy. It also confirms that claim reserves are considered to be good estimates of ultimate payments.

The number of policies has remained constant for a number of years, and the movement statistics during 1998 were:

	Motor	*Household*
Policies at start of year	60,000	40,000
Lapses at renewal	20,000	8,000
New policies	20,000	8,000
Policies at end of year	60,000	40,000
Endorsements	3,500	7,500
Number of claims	12,500	3,500

(The number of claims has been constant for a number of years. The number shown is the number of new claims received in the year.)

The company is organised in the following departments:

Management	Includes functions such as accounting, general management, actuarial, and marketing. It also includes supervisors in other departments.
Quotations	The staff who receive telephone calls asking for quotations, and provide them through an on-line computer system.
New business	The handling of accepted quotations, producing policy documents, and initiating collection of the first premium.
Policy servicing	Processing renewals, premium collection, endorsements.
Claims	Receiving, handling and paying claims.

The total expenses in 1998 were broken down as follows. (Thousands of pounds)

Premises costs	300
Staff costs	2,850
Depreciation	350
Call centre phone system running cost	700
Postage, stationery, other ‘phone	300
Advertising	500

Staff costs were broken down as follows.

Management	500
Call centre (quotations)	800
New business	250
Policy servicing	700
Claims	600

Management has determined that the cost of running the call centre is proportional to the number of requests received for quotations. Premises costs and depreciation will not vary with any likely changes in business levels. Postage, stationery and other 'phone costs may all be allocated to the three servicing departments, in proportion to staff costs on each of their transactions. Advertising costs may be varied at the discretion of the Board.

(i) You have conducted a time-and-motions study to assess the amount of time each transaction takes up, weighting them by the salary levels of the staff involved. The results are as follows:.

	Motor	*Household*
Processing a new proposal	4	3
Inviting a policy renewal	1	1
Processing a renewal	3	2
Processing an endorsement	6	8
Processing a claim	14	7

Allocate the staff costs of the new business, policy servicing and claims departments between the two lines of business, using functional costing based on these weights. [5]

The Board has decided to increase premium rates by 10% for motor and 18% for household, in order to improve profitability, to take effect from 1 January 1999. However, recognising that this will depress the amount of business written, it has decided to increase advertising spending by £200,000 in the coming year. You should assume that expenses and claims are not affected by inflation.

(ii) Estimate the level of management expenses for the 1999 financial year, justifying any assumptions you make. [12]

(iii) Estimate the profit and loss account for the 1999 financial year, stating any further assumptions you make. [5]

(iv) Comment on your results. [7]

[Total 29]