Faculty of Actuaries **Institute of Actuaries**

EXAMINATIONS

20 September 2004 (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 are the actuary for a large well capitalised UK general insurance company.

Discuss the following statements:

(a) Where the mean term of the assets is less than the mean term of the liabilities a general increase in interest rates will adversely affect the solvency of the insurance company.

(b) Capital values of UK equities are more volatile than the capital values of short term index-linked gilts.

(c) The assets backing the free reserves should all be invested in short dated gilts.

(d) Investment income from an equity portfolio will grow faster than the investment income from a portfolio of index-linked gilts.

[8]

2 Guidance Notes 18 and 33 have each been produced to assist actuaries in providing opinions required by the International Insurers Department and the New York Insurance Department in respect of business written in the United States of America.

List the main differences between the two Guidance Notes in terms of purpose and content. [4]

3 In many countries insurers are required by law to maintain a minimum amount of capital in order to satisfy minimum solvency requirements.

(i) Describe the following methods for determining minimum capital requirements:

(a) Required Minimum Margin for a UK insurance company
(b) risk based capital [3]

(ii) Explain the advantages of the risk based capital method over the Required Minimum Margin method in (i) above. [3]

[Total 6]

4 A private school, which charges its students school fees, would like to introduce a “money back” guarantee. Currently 100 pupils per year study for university entrance examinations with 80% achieving three or more top grades. The school would like to start an arrangement whereby if this level of three top grades isn’t achieved by a pupil then the school fees are repaid in respect of that individual.

Describe the risk factors which are likely to be relevant for such a portfolio of business. [6]

5 Company A has written 1 and 2 year commercial property policies. The premium for each policy is paid in full at the commencement of the policy. The amount of premium written in each month of 2003 was as follows:

Type	*Jan*	*Feb*	*Mar*	*April*	*May*	*June*	*July*	*Aug*	*Sept*	*Oct*	*Nov*	*Dec*
1 year	48			24			36			12		
2 year	48		24			24		12		12		

(i) Calculate the UPR as at 31 December 2003, stating any assumptions that you make. [5]

(ii) The company buys two reinsurance policies to protect the account, both incepting on 1 January 2003. One is a risk attaching policy costing £100. The second is a losses occurring during policy bought for £50.

Determine the unearned proportion of each as at 31 December 2003 stating any further assumptions that you make. [3]

(iii) State, with reasons, how your answer would differ if the reinsurance covered only windstorm damage. [1]
[Total 9]

6 You are an actuarial consultant who has been asked to review the premium rating calculations for a large household contents book of business.

Suggest appropriate checks that should be undertaken to ensure that the risk premiums have been calculated correctly. [12]

7 A large general insurance company writes a number of lines of business. For the past 30 years business written has included employers’ liability and public / product liability. It has been decided to cease writing these liability classes of business as at the end of next month.

(i) Describe the risks the insurer might face from this liability book of business that could affect its profitability over the next 30 years. [15]

(ii) It has been suggested that the insurer can mitigate some of these risks from this liability book of business by:

(a) transfer of portfolio to a third party
(b) adverse development cover

Give a description of both the above solutions and state their advantages and disadvantages for the two main parties involved in each case. [12]
[Total 27]

8 You are a consulting actuary for the principal shareholders of a small reinsurance company that stopped writing business in 1994. This company wrote international casualty, marine and aviation risks through brokers. Company management has recently sought to commute some of its portfolio in order to run the business off more quickly. The shareholders now wish to sell the business and have asked you to advise them on a suitable sale price.

The company's balance sheet as at 31 December 2003 is set out below. The company discounts the reserves held against asbestos and pollution liabilities only and uses a discount rate of 5% per annum. Assets are valued at market value.

Assets	**£ms**	**Liabilities**	**£ms**
Investments		*Capital & reserves*	
Cash	24.1	Share capital	35.0
Land & Buildings	6.2	Share premium account	10.0
Government fixed interest bonds	101.4	P&L account	47.8
Equities	52.8		
Reinsurers share of technical provisions		*Technical provisions*	
Reinsurance undiscounted claims outstanding	24.4	Gross undiscounted claims outstanding	90.3
Reinsurance undiscounted IBNR	9.2	Gross undiscounted IBNR	54.2
Discount adjustment (reinsurance claims)	–2.8	Discount adjustment (gross claims)	–18.7
Bad debt on outstanding	1.0	Claims handling reserve	8.2
Bad debt on IBNR	0.9		
Debtors		*Creditors*	
Debtors arising out of reinsurance operations	21.4	Arising out of reinsurance operations	5.3
Bad debt on outwards balances	–7.6	Other creditors	2.2
Other debtors	0.7		
Prepayments and accrued income	3.0	*Accruals and deferred income*	0.4
Total Assets	234.7	**Total Liabilities**	234.7

(i) Define solvency margin. [1]

(ii) Calculate the company's solvency margin both on an undiscounted basis and on the discounted basis used by the company. [2]

(iii) Explain why a potential purchaser is unlikely to pay the latter figure. [9]

(iv) Describe the particular areas of risk and uncertainty that might threaten the company's future solvency levels. [10]

(v) Assume that claims experience moves in line with the company's reserve assessment and that the company does not change its accounting policy with regard to discounting.

Explain how you would expect the company's solvency margin to move over time. [6]

[Total 28]

END OF PAPER