EXAMINATIONS

April 1999

Subject 303 — General Insurance

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 11 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 A small general insurance company underwrites only a single class of business, which is long tailed. Describe briefly the factors it should consider when deciding upon its investment policy. [7]

2 An insurance company intends to offer a product to the motion picture industry. The product will provide cover should the cost of producing a finalised, distributable product exceed a pre-agreed budget. List the major perils that could be included in the cover. [4]

3 (i) Describe the assumptions behind the Bornhuetter-Ferguson method of estimating the ultimate cost of claims of a book of business. [2]

(ii) You have been given the following information about a particular class of business.

Underwriting Year	*Initial Expected Loss ratio*	*Premium*	*Reported claims cost as at 31 December 1998*
1995	70%	1,000,000	500,000
1996	75%	1,500,000	500,000
1997	80%	2,000,000	1,000,000
1998	85%	2,500,000	400,000

Expected reported claims development pattern:

Development year	0	1	2	3	4
Expected proportion developed	10%	50%	80%	90%	100%

Calculate the expected ultimate claims as at 31 December 1998 according to the Bornhuetter-Ferguson method. [3]

(iii) Comment briefly on the reliability of the results in part (ii). [3]

[Total 8]

4 List, and state the purposes of, the major actuarial investigations undertaken by general insurers in relation to investment. [5]

5 (i) List the reasons why a general insurer models claims. [4]

(ii) List the steps involved in applying a deterministic modelling method. [3]

[Total 7]

6 Two general insurance companies both have a solvency margin equal to 50% of written premiums. Explain why the underlying financial strengths of the two companies may differ. You may ignore the question of the adequacy of the technical reserves. [5]

7 List the main regulatory restrictions that may be encountered by a general insurance company when transacting insurance business. [4]

8 List the reasons why general insurance claims experience may vary from that assumed in the premium basis. [6]

9 (i) Explain the terms "reinstatements" and "reinstatement premiums" in the context of catastrophe excess of loss reinsurance. [4]

(ii) Define the term "rate on line". [1]

A property catastrophe reinsurance layer with unlimited reinstatements would have a theoretical rate on line, given a detailed actuarial assessment of the risk, of 5%. A prospective reinsured has asked for two quotations for cover on this layer – one with no reinstatements, and one with a single reinstatement at 100% additional premium.

(iii) State with reasons which of the two alternative structures you would expect to require the higher rate on line. [4]

[Total 9]

10 (i) List the factors that a general insurance company writing many different classes of business would consider in determining appropriate reinsurance arrangements. [5]

A general insurance company A writes only commercial property business. One risk which it coinsures with three other insurers B, C and D has a sum insured of $10 million, but an expected maximum loss (EML) of $500,000. Company A accepts 40% of this risk, with B, C and D accepting 20% each.

Company A reinsures with company X 5% of every risk under a quota share treaty. It is agreed that A will not write business for which its gross share of the EML exceeds $250,000.

Company A also has a three line surplus treaty with companies Y and Z, each taking 50%, which operates after the quota share, and is based on company X taking 5% of company A's gross business. The surplus treaty has a maximum EML retention of $50,000.

A single large claim gives rise to a loss of $750,000.

(ii) Calculate the amount of the claim which Company A will pay, net of all reinsurance recoveries due. State any assumptions you make. [4]

(iii) Explain how your answer to (ii) would differ if, immediately prior to this claim, companies B and Y were declared insolvent. [3]

(iv) State the information you would expect Company A to provide to Company Z during the handling of this claim. [3]

[Total 15]

11 You are the actuary of a general insurance company with two Private Motor products, A and B. The monthly Gross Written Premium (GWP) of products A and B has been £10m split equally between the two products for many years up to and including December 1998. You have been asked by the Finance Director to evaluate the adequacy of the Unearned Premium Reserve (UPR) of £60m in Private Motor at 30 June 1999. The UPR has been calculated gross of Deferred Acquisition Costs (DAC) and on a 24ths basis.

In your testing of the adequacy of the Claim Reserves as at 31 December 1998, you determined an expected ultimate loss ratio for Accident Year 1997 for Private Motor of 90%, split 75% for product A and 105% for product B.

In the light of the emerging poor performance of Product B during 1998, the company imposed two rate increases to Product B's rates, each of 6%, which were applied at 1 January and 1 April 1999. This had the effect of reducing Product B's share of the monthly GWP to 20% by June 1999. This reduction occurred evenly over the business written in the first 6 months of 1999. Most customers switched to Product A, and the total monthly GWP remained at £10M in each month. No other rate increases had been applied for a number of years.

Claim cost inflation has been 0.5% per month for many years. DAC is 15% of UPR. Claims handling expenses are 2.5% of the outstanding claim amount. The present value of investment return at 30th June 1999 is 10% of the outstanding claim amount. You may ignore reinsurance.

(i) Define the following terms:

(a) Unearned Premium Reserve
(b) Deferred Acquisition Cost
(c) Unexpired Risk Reserve
(d) Additional Reserve for Unexpired Risks (AURR) [4]

(ii) Calculate the expected ultimate loss ratio for the total Private Motor business written in July 1999. State clearly any assumptions you make in your calculation. [8]

(iii) Calculate the expected ultimate claim cost of the unexpired risks as at 30 June 1999. State any additional assumptions made. [10]

(iv) Determine whether or not an AURR is required in respect of Private Motor business as at 30 June 1999. [4]

(v) Explain why the AURR calculated for Product A alone might differ from that calculated for Product B alone. [4]

[Total 30]