Faculty of Actuaries   **Institute of Actuaries**

EXAMINATION

14 September 2006 (pm)

Subject ST3 — General Insurance
Specialist Technical

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.

6.   Candidates should show calculations where this is appropriate.

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 the 2002 edition of the Formulae and Tables and your own electronic calculator.*

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1 Describe ways in which an insurance regulator can influence the investment policy of a general insurance company. [3]

2 Define the following terms and explain why they are used in an insurance contract

    (a)   Risk attaching basis

    (b)   First loss

    (c)   Discovery period

    [6]

3 (i) Define the term Average (as used specifically in non-marine general insurance). [1]

    (ii) Explain, with an example, why it may be used in non-marine general insurance. [2]

    (iii) Suggest alternative approaches available to a general insurance company in situations where the term "Average" might apply. [3]

    [Total 6]

4 State the criteria that are desirable for a risk to be insurable, explaining why these criteria are desirable. [8]

5 (i) Explain the general principle of experience rating systems and comment on the benefits and drawbacks of such systems to both the insurer and the insured. [6]

A bus company operates nationwide, with both local bus services and inter-city coaches. It has for some time self-insured its vehicles. The company has an established department which deals with all claims made on the bus company. The company is now seeking a quotation from an insurance company to cover the liability arising from all its fleet risks, both from its passengers and from third parties.

    (ii) Describe the statistics and other information that the insurance company would ideally like to have from the bus company in order to assess the likely future cost of insuring the fleet. [10]

    [Total 16]

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6 You are an actuarial entrepreneur in the process of setting up a new general insurance company to underwrite motor insurance only direct through the internet. You are midway through developing your IT requirements. The aspect you are currently considering relates to the data you propose to collect and hold.

    (i) Outline the data-related issues that you will need to consider in establishing your IT requirements. [10]

    (ii) Explain the problems that may occur as a result of using inaccurate data for determining the initial premium rates that you intend to charge. [6]

    [Total 16]

7 You are the reserving actuary for a small general insurance company. You are considering the claims reserve estimate produced by your team for household buildings and contents insurance, which has been calculated using purely statistical methods and paid data only.

    (i) Describe the main issues that may result in adjustments to the data being required in order to ensure maximum reliability of your final estimate. [10]

When you compare your final adjusted statistical estimate for the claims reserve with the sum of the case estimates from your loss adjusters you find that there is a significant difference between the two totals.

    (ii) Explain why this may have occurred and how you might investigate the reasons for the difference. [10]

    [Total 20]

ST3 S2006—3   **PLEASE TURN OVER**

8 A general insurance company underwrites two classes of business, personal motor and commercial property. In personal motor business it expects to write £50m of premium with expected claims of £30m and expenses of £15m. In commercial property, it also expects to write £50m of premium with expected claims of £20m and expenses of £10m.

The company has carried out an investigation to assess the aggregate claims distribution from the two classes.

(i) Describe the steps that the company may have taken in this investigation. [5]

The company concludes that claims in personal motor have a standard deviation of £10m and claims in commercial property have a standard deviation of £30m. The company also concludes that both the aggregate claim distributions can be modelled using lognormal distributions. The company also makes the assumption that claims from the two classes are statistically independent and that the total aggregate claim distribution (i.e. the sum of claims from both classes) can be approximated by another lognormal distribution.

(ii) Calculate the mean and standard deviation of the total or aggregate claim distribution for the company. [2]

(iii) Calculate the mean and standard deviations of the underlying normal distributions for each of the classes as well as the total claim distribution. [5]

The company wants to ensure that it has sufficient capital to pay its claims even if they reached the 99.5th percentile of the claim distribution.

(iv) Calculate the 99.5th percentile for claims in each class as well as the total. [5]

(v) Discuss the reasons why the assumption of independence between the two classes of business may not be appropriate. [5]

(vi) Calculate a reasonable range of minimum amounts of capital, based on different correlation assumptions, that the company needs in order to satisfy this 99.5% solvency level. Ignore taxes and investment income. [3]

[Total 25]

END OF PAPER