

INSTITUTE AND FACULTY OF ACTUARIES



EXAMINATION

18 April 2016 (pm)

Subject ST7 – General Insurance: Reserving and Capital Modelling 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 eight questions, beginning your answer to each question on a new page.*
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 from the approved list.

1 Describe the treatment of deferred acquisition costs and unearned premium under both a “going concern” and a “break-up basis”. [3]

2 The following extract has been obtained from a general insurer’s capital model:

<i>Risk Type</i>	<i>Capital (£m)</i>
Insurance	350
Market	100
Counterparty Default	75

(i) Calculate the company’s aggregate capital requirement, based on the above risk components only, under each of the following assumptions:

- (a) no diversification between risk types
- (b) risk types are fully independent

[2]

The following correlation matrix is used in the general insurer’s capital model:

<i>Risk Type</i>	<i>Insurance</i>	<i>Market</i>	<i>Counterparty Default</i>
Insurance	1	0.25	0.5
Market	0.25	1	0
Counterparty Default	0.5	0	1

(ii) Calculate, showing all your workings, the company’s overall diversified capital requirement, stating any assumptions made.

[3]

[Total 5]

3 (i) Define acquisition costs, giving an example. [1]

(ii) List the channels through which general insurers or reinsurers can acquire business. [2]

(iii) Outline what the acquisition costs may be intended to cover for each channel in (ii). [6]

[Total 9]

- 4 (i) Define the term “binding authorities”. [1]
- (ii) Outline the advantages and disadvantages to a Lloyd’s syndicate of using binding authorities. [4]

A Lloyd’s syndicate is expanding the volume of binding authority business written in its US property account.

During 2014, 30% of the £15m US property premium income was written through binding authorities. During 2015, this increased to 50% of the £18m US property premium income.

All binding authorities incept on the 1 July annually.

- (iii) Calculate, showing all your workings, the unearned premium reserve for the US property business as at 31 December 2015, stating any assumptions made. [5]
- [Total 10]

- 5 (i) Outline possible sources of distortion in claims data. [6]
- (ii) Describe the problems that can be caused by inaccurate data in a reserving exercise. [5]
- [Total 11]

- 6 The insurance regulator of a particular country has received a number of complaints about a policy that provides cover for loss of, or damage to, portable computers. The policy is sold by computer sales assistants at the same time as the computer.

The sales assistant tells the customer the key features of the policy at the point of sale using the following spoken words:

- The premium is 3% of the purchase price for each of the next 36 months, payable by regular monthly bank transfer.
- The store receives 50% of the total premium as commission, and an additional 10% of the total premium goes to the sales assistant who sells the policy.
- All claims must be received in writing within seven days of the loss or damage. Once a claim is made the insurance terminates.

- (i) Identify the features of this insurance policy that may cause concern to the insurance regulator. [4]
- (ii) (a) Suggest actions that the regulator could take in response to these concerns about this particular policy.
- (b) Outline other actions that could be taken by a regulator to protect consumers purchasing insurance policies. [9]

[Total 13]

- 7 (i) State the key characteristics of the Poisson distribution. [2]
- (ii) Outline the sources of potential volatility that should be considered when parameterising the underwriting risk component of a capital model. [4]

An insurer writes employers' liability, professional indemnity, property risk excess of loss and terrorism insurance. They use the Poisson distribution in their capital model for large loss frequency for all the classes of business they write.

- (iii) Discuss whether this statistical distribution is appropriate for simulating numbers of large losses for the insurer's business. [12]
- [Total 18]

- 8 (i) Describe the term "loss portfolio transfer". [3]
- (ii) State the advantages and disadvantages of this type of arrangement to each company involved in this transaction. [4]

A UK insurer, Mylenic, is considering receiving a loss portfolio transfer of professional indemnity insurance business from another insurer, Ulenic. As the discussions are at an early stage, only limited data is available.

Ulenic has provided Mylenic with three alternative estimates of ultimate losses:

- the initial planned ultimate losses
- a chain-ladder method estimate
- a Bornhuetter-Ferguson method estimate, which Ulenic have used in their published accounts

The chain ladder and Bornhuetter-Ferguson estimates were projected using year-end 2014 gross incurred data.

<i>Underwriting Year</i>	<i>Planned Ultimate Losses</i>	<i>Chain Ladder Ultimate Losses</i>	<i>Bornhuetter Ferguson Ultimate Losses</i>
2008	51.0	66.8	67.1
2009	92.4	109.1	108.2
2010	36.0	36.9	36.8
2011	144.5	108.6	118.8
2012	110.0	98.4	103.8
2013	101.5	92.0	98.9
2014	77.0	47.3	75.4

- (iii) Derive a formula for calculating the implied incurred development factors using the above information, stating any assumptions you make. [3]

- (iv) Calculate, showing all your workings, the IBNR element of the Bornhuetter-Ferguson ultimate estimate as at the end of 2014 by underwriting year using the implied factors calculated in (iii). [3]

Mylenic has recently been provided with the gross incurred movements during 2015 by underwriting year.

<i>Underwriting Year</i>	<i>Incurred Movements</i>
2008	4
2009	–6
2010	4
2011	16
2012	17
2013	22
2014	11

- (v) Estimate a revised Bornhuetter-Ferguson estimate of IBNR at the end of 2015 using the incurred movements in the above table, stating any assumptions you make. [5]

Mylenic would like to compare the additional claims information provided against that implied by the selected reserving basis.

- (vi) (a) Estimate the claims expected to be incurred during 2014 implied by the reserving basis, stating any assumptions you make.
- (b) Use these estimates to produce a comparison of actual and expected incurred claims for 2014. [5]

Mylenic would like an initial view on the strength of the selected reserves provided by Ulenic.

- (vii) (a) Discuss the points that would be considered in forming this view.
- (b) Outline the additional information that could be requested from the company to help Mylenic decide whether to proceed with the transfer. [8]
- [Total 31]

END OF PAPER