INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

2 May 2014 (pm)

Subject ST7 – General Insurance: Reserving and Capital Modelling Special 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 five 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.

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1 A general insurance company determines its capital requirements using a stochastic model that it develops itself.

Discuss the two approaches that it might take for the treatment of its outwards reinsurance programme within this model, including:

- the advantages and disadvantages of each such approach.
- the implications for the development of other parts of the model.

[12]

2 In a certain country, general insurance companies are not allowed to merge unless they have commissioned a report for the country's insurance regulator from an independent actuary that concludes that the merger will not significantly disadvantage the policyholders of either company. All insurance companies in the country concerned are proprietary companies owned by shareholders.

An actuary is in the process of investigating a merger in order to decide whether he is able to provide such a report.

Discuss the matters that the actuary should consider and the investigations that should be undertaken. [12]

3 A consortium of billionaires has decided to form a company to mine asteroids. Investigations have shown that the Earth's resources of precious minerals are being depleted and that the asteroids contain immense amounts of such minerals. The proposal is to use space-going rocket-ships to make very large profits by mining these resources and bringing them back to Earth.

The consortium has employed experts to plan the project and has concluded that the return on capital would be higher than any alternative projects, subject to any insurance considerations.

Discuss the risks for the company and the types of general insurance cover that it might require. [22]

4 A large multi-national insurance group is intending to create a subsidiary insurance company, Stop Loss Re, to write solely whole account stop loss reinsurance business of world-wide general insurance and reinsurance companies.

It has been a widely held belief that stop loss reinsurance is either unobtainable or over-priced. The rationale for Stop Loss Re is that by writing just stop loss it will be the expert in the field and therefore will be able to make stop loss insurable at a reasonable price while making a worthwhile return on the capital invested.

(i) (a) List the risks that should be considered for assessing the capital requirements of an insurance company.

(b) Highlight which of these risks are of particular relevance to Stop Loss Re. [15]

(ii) Describe the outwards reinsurance that Stop Loss Re should seek to purchase and the difficulties involved. [6]

[Total 21]

5 (i) Define the three types of reserve a general insurance company may hold in respect of an unexpired period of cover. [3]

A general insurance company writes personal lines home insurance business. For the most recent four years it has written part of its book of home contents insurance with a return of premium guarantee.

When a policyholder has purchased this contents insurance from the company for ten consecutive years, at the end of the ten year period the company will repay 100% of the premiums paid by the policyholder less any claims paid, if this calculation is positive.

The premium for the first-year policy is at the company's standard rates for contents insurance plus a loading of 10%, this amount being the company's estimate of the loading required to cover the premium return guarantee. Renewal premiums and sums insured are guaranteed to increase at the same rate as the local retail prices index (RPI) as long as no claims have been incurred.

The following data for this class of business have been supplied by the company as at 31 December 2013:

Claims Paid (000s)

Uwyr\Dyr	*1*	*2*	*3*	*4*
2010	1,210	2,625	2,756	2,756
2011	1,817	3,938	4,121	
2012	2,121	4,321		
2013	2,075			

Uwyr = underwriting year
Dyr = development year

Premiums (000s)

Uwyr	*Written Premium: Total*	*Written Premium for Policies Still Being Renewed from Previous Years*
2010	2,675	1,375
2011	4,075	2,175
2012	4,335	3,127
2013	3,174	3,174

For example, for underwriting year 2010, of the 2,675 premium written in that year 1,375 of that amount is for policies that will have been renewed in each of 2011, 2012 and 2013. For underwriting year 2011, of the 4,075 premium written in that year 2,175 of that amount is for policies originally started in 2010 and 2011 that will have been renewed in each of 2012 and 2013. Similarly for 2012 and 2013.

The claims paid for policies that have been renewed from previous years were all zero at the 2013 renewal date.

RPI

Uwyr From-To	*Increase in RPI*
2010–11	5.72%
2011–12	6.17%
2012–13	1.50%

The lapse rate for the company's standard contents insurance business has been 20% per annum over recent years.

(ii) Calculate the outstanding claims reserve, unearned premium reserve and additional unexpired risk reserve as at 31 December 2013 for this book of business, stating the assumptions you make. [20]

(iii) Outline reasons why the assumptions made in part (ii) may not be correct and any other problems with the estimation of reserves for this business. [10]
[Total 33]

END OF PAPER