

EXAMINATION

1 June 2015 (am)

Subject F101 — *Health & Care* Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Use the instructions and password provided at the examination center to log in.*
2. *Submit your answers in Word format only using the template provided.*
3. *Save your work regularly throughout the examination on the supplied computers' hard drive.*
4. *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.*
5. *You must not start typing your answers until instructed to do so by the supervisor.*
6. *Mark allocations are shown in brackets on exam papers.*
7. *Attempt all seven (7) questions, beginning your answer to each question on a new page.*
8. *Candidates should show calculations where this is appropriate.*

Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.

AT THE END OF THE EXAMINATION

Save your answers on the hard drive AND hand in this question paper.

<p><i>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.</i></p>
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QUESTION 1

A large life office has been writing without profit immediate needs long term care cover for a number of years. The cover is indexed to inflation.

- (i) Describe the factors governing the investment policy that the life office is likely to have in place for the reserves associated with this policy. [4]
- (ii) Discuss the merits for a policy holder of purchasing this product as compared to investing in a fixed interest security. [4]

[8 marks]

QUESTION 2

You are a products actuary working for Apex, a large health and care insurer well established in the critical illness (CI) market.

Apex's flagship CI product covers 26 conditions including the following four core conditions:

- Heart Attack,
- Stroke,
- Coronary Artery Bypass Graft, and
- Cancer,

These conditions combined, make up about 90% of the CI claims on this product. Claim definitions for these four core conditions are in line with the local standard industry definitions, with all claims being payable at 100% of the sum assured if it meets the required definition.

The executive management of Apex has proposed to launch a new CI product. The new product will be more comprehensive than the existing flagship product, as it is to include all the same conditions as well as cover for a list of less severe types of cancer, which do not currently have standard industry definitions available.

Discuss the considerations that need to be made before launching the new CI product.

[12 marks]

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QUESTION 3

The country of Actuarialia is implementing a national health insurance scheme (ActHealth) whereby citizens can receive medical services from private health care providers. ActHealth will cover 90% of the medical expenses incurred. ActHealth is to be funded by collecting an additional 5% of personal income tax payable per individual where personal income tax is calculated on a scale with rates that increases with income level.

- (i) Describe the risks to individuals associated with the proposed benefit structure. [4]
- (ii) Discuss the merits of the proposed funding basis for ActHealth. [4]
- (iii) Describe what additional measures ActHealth could put in place to manage the costs. [6]

[14 marks]

QUESTION 4

- (i) Outline the factors that affect a health insurer's appetite for offsetting their risk with individual excess of loss reinsurance [3]

InternationalRe, a health reinsurance company, has received a request to quote for individual excess of loss (XoL) cover on a book of PMI business. The XoL cover will have an attachment point of ZAR 500,000 and a reinsurance limit, in excess of the attachment point, of ZAR 1,000,000.

- (ii) Describe how this XoL cover could be priced [6]
- (iii) InternationalRe is considering opening its own insurance company. Discuss why InternationalRe might be considering this. [5]

[14 marks]

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QUESTION 5

- (i) Define experience rating and describe briefly the various approaches to experience rating. [3]
- (ii) A group medical expense scheme is being reviewed prior to renewal. The renewal is due on 1 July 2015 and the following data are available as at 31st March 2015:

Renewal year	Number of employees	Reported claims (R)	Large claims	
			Number	Amount (R)
2011	875	871 000	0	0
2012	900	1 301 300	1	270 000
2013	950	1 655 000	1	390 000
2014	1000	1 195 000	0	0

The large claims have been included in the reported claim amounts. It should be assumed that inflation is constant at 10% per annum throughout and that there are expected to be 1000 employees in the scheme at the renewal date. The insurer is using experience rating.

- (a) Describe the steps of the calculation of the renewal premium. Use the information above to illustrate your description. [8]
- (b) Describe how to determine the parameters required in (a). [2]
- (iii) State any specific conditions that the insurer might apply to a group medical expenses scheme. [2]

[15 marks]

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QUESTION 6

You are a consulting actuary who has been hired by Blue Health to review their risk adjustment practices. You have been given the following table of risk adjustment factors that Blue Health is currently using (HC = health condition):

Characteristic	Factor
Male under 40	0.35
Male 40-60	0.57
Male 60-80	1.03
Male 80+	0.87
Female under 40	0.61
Female 40-60	0.63
Female 60-80	0.94
Female 80+	0.83
HC1	0.20
HC2	0.28
HC3	0.41
HC4	0.07
2 conditions	0.08
3+ conditions	0.12

Risk factor = age/gender + HC + multiple condition factor

- (i) Compare risk adjustment to: [3]
 - a. Risk prediction
 - b. Case mix adjustment

- (ii) List two applications where Blue Health is likely to be using the factors noted above. [1]
- (iii) Calculate the relative risk of a male age 48 with health conditions 1 and 4 with a female aged 68. [4]

- (iv) Blue Health have asked your advice on the factors they are using. Describe the investigations you would undertake and suggest four additional factors you would consider. [6]

[14 marks]

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QUESTION 7

You are an actuary working for a large health insurer selling PMI business in a developed market. The insurer is looking to enter a less developed market.

- (i) Outline why the insurer will have uncertainty in estimating the claims cost for PMI business in the new market using their current data, using examples where relevant.

[5]

The large insurer has been successful in their market largely due to the use of an electronic patient record.

This electronic patient record is an internet based tool that manages the exchange of data between healthcare providers and the insurer, where the insurer data originates from claims and policy data, and the provider data originates from services provided to patients. Providers use the electronic record to submit claims and clinical data gathered during the consultation; the record is also a reference, using the data stored by the insurer, of the member's past claims history, test results, benefit availability etc.

The insurer plans to introduce this into the less developed market, where currently only one other small insurer has launched their version of an electronic patient record.

- (ii) Discuss the advantages and disadvantages to the insurer and other stakeholders of introducing an electronic patient record.

[10]

- (iii) The insurer entered the less developed market and at the first price review a year later you have found that the product is less profitable than assumed in the pricing basis. Suggest, giving examples, corrective actions that can be taken to improve future performance.

[8]

[23 marks]

END OF PAPER