

**Actuarial Society of South Africa**  
**EXAMINATION**

18 October 2019

**Subject F201 – Health and Care**  
**Fellowship Applications**

Time allowed: Three hours

*INSTRUCTIONS TO THE CANDIDATE*

1. *You will receive instructions to log in using a password which will be issued to you at the exam centre.*
2. *You are required to submit your answers in Word format only using the template provided. You MAY NOT use any other computer program (e.g. Excel) during the exam.*
3. *Save your work throughout the exam on your computer's hard drive.*
4. *You have 15 minutes at the start of the exam 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 invigilator/supervisor.*
6. *Mark allocations are shown in brackets on exam papers.*
7. *Attempt all questions, beginning your answer to each question on a new page.*
8. *You 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.**

**Hand in your question paper with any additional sheets firmly attached.**

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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## QUESTION 1

A large insurance company sells medical aid gap cover products to individuals and groups only through independent financial advisors.

The insurer has been approached by a price comparison website to add medical aid gap cover insurance to its range of insurance products. The website aims to provide instant premium quotations for products offered by different providers to enable the customer to make a comparison. When the customer chooses a product, this links directly to the particular insurance company's systems to complete the sale.

- i. List the data that would need to be collected through the website to produce a premium quotation for a medical aid gap cover product. [3]
- ii. Discuss additional risks to the insurance company that arise from the use of the price comparison website. [6]

One year after the insurance company added the price comparison website as a distribution channel, the Board of the insurance company requested a report setting out a review of the experience. The purpose of the report is to assist the Board to decide if they should continue to use the price comparison website.

- iii. Outline the points that should be made in the report. [11]

[Total 20]

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## QUESTION 2

The Horton Group offers medical scheme benefits to current and retired employees through HortonMed, a restricted medical scheme. Horton provides a 50% contribution subsidy to all active employees participating on HortonMed (on a compulsory basis) and a post retirement subsidy of a fixed Rand amount for retired members remaining on HortonMed.

Horton Group will be listing as two separate entities in the following financial year – namely Hat Co (clothing manufacturing) and Fish Co (fishing and food production). Once Hat Co and Fish Co are listed, Horton Group will cease to exist.

The management of Hat Co and Fish Co are tasked to decide if they retain HortonMed in its current form or a revised form or move their employees to an open medical scheme. Horton Group's management believe that their employees receive good value from HortonMed.

You have been hired by Horton Group as an actuarial adviser to the management teams of Hat Co and Fish Co.

The following key statistics about Horton Group and HortonMed are available, compared to the open medical schemes that management have requested you to consider:

<b>Statistic</b>	<b>Horton Group</b>	<b>Hat Co</b>	<b>Fish Co</b>
Average age of employees	29,5	33	28
Number of active employees	7 700	2 600	5 100
Family size		2	1,5

<b>Statistic</b>	<b>HortonMed</b>	<b>Open medical schemes</b>		
		<b>Scheme 1</b>	<b>Scheme 2</b>	<b>Scheme 3</b>
Solvency ratio	87%	25%	35%	45%
Average age	29,5	32,6	33	31,5
Number of members	7 700	120 000	55 000	35 000
Monetary reserves per principal member	R40,000	R20,000	R25,000	R30,000
% of contributions spent on benefits	87%	85%	88%	87%
Number of benefit options	2	12	6	4
Income rated benefit options	1	None	1	1
Indexed contribution increases for a benchmark benefit option over the past 4 years	1,34	1,45	1,51	1,60

Describe the approach you will take to evaluate the various choices available for Hat Co and Fish Co in support of a decision by the management teams of each company.

Your answer should reflect the commercial and competitive considerations for the employers as well as the current regulatory and policy environment for medical schemes.

[Total 20]

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### QUESTION 3

You are the appointed Healthcare Actuary to a small and rapidly growing open medical scheme. The scheme is considering a reinsurance agreement as a risk mitigating strategy for the increasing adverse high cost in-hospital claims experience over the last few years.

You have the following summarised dataset at hand with respect to fully run-off high cost in-hospital claims (an in-hospital case higher than R 800 000 each year is considered a high cost case):

High Cost In-Hospital Case	2015	2016	2017	2018
#1	R 1.8 m	R 2.0 m	R 2.3 m	R 2.7 m
#2	R 1.7 m	R 1.9 m	R 2.2 m	R 2.6 m
#3	R 1.6 m	R 1.8 m	R 2.1 m	R 2.5 m
#4	R 1.4 m	R 1.7 m	R 2.0 m	R 2.4 m
#5	R 1.2 m	R 1.6 m	R 1.9 m	R 2.3 m
#6	R 1.0 m	R 1.5 m	R 1.8 m	R 2.2 m
#7	R 0.9 m	R 1.4 m	R 1.7 m	R 2.1 m
#8	R 0.8 m	R 1.3 m	R 1.6 m	R 2.0 m
#9		R 1.2 m	R 1.5 m	R 1.9 m
#10		R 1.1 m	R 1.4 m	R 1.8 m
#11		R 1.0 m	R 1.3 m	R 1.7 m
#12		R 0.9 m	R 1.2 m	R 1.6 m
#13			R 1.1 m	R 1.5 m
#14			R 1.0 m	R 1.4 m
#15			R 0.9 m	R 1.3 m
#16			R 0.8 m	R 1.2 m
#17				R 1.1 m
#18				R 1.0 m
#19				R 0.9 m
#20				R 0.8 m

Number of Scheme Beneficiaries	10 000	15 000	20 000	25 000

You have gathered the following quotations from two reinsurers for the period considered:

Quotation	Reinsurer	Attachment Point	Maximum Reinsurance Payment per Claim	Annual Premium
#1	RSA Re	R 0.8 m	R 1.0 m	R 20.0 m
#2		R 1.0 m	R 1.5 m	R 22.5 m
#3		R 1.5 m	R 1.8 m	R 25.0 m
#4	Global Re	R 0.8 m	15%	R 5.0 m
#5		R 1.0 m	18%	R 4.0 m
#6		R 1.5 m	20%	R 3.0 m

The Board of Trustees has requested you to make a recommendation as to which quotation (if any) to accept with effect from 1 January 2020.

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Describe in detail what you would consider and the investigations you would undertake, in compliance with relevant professional guidance, to reach your recommendation on whether to enter into a reinsurance arrangement and which quote, if any, to accept.

Your answer should include specific reference to:

- A retrospective analysis (i.e. an analysis to estimate the impact on the Scheme had these quoted reinsurance agreements been in place in the past) and
- A prospective analysis (i.e. an analysis to estimate the impact on the Scheme should these quoted reinsurance agreements be in place in the future),
- Other considerations when selecting a reinsurer.

[Total 30]

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#### QUESTION 4

Jupiter Geneva (JG) is a newly established health insurance company in a country with a developing financial services industry. The country has a population in excess of 100 million people and the penetration of any type of health insurance product is less than 5% of the population. The overall level of insurance penetration is steadily rising. The country's GDP growth has been 6% each year for the last 5 years and is not expected to change. JG has been in business for 2 years.

JG is in a joint venture partnership with your company, Impetus, an established health insurance company with extensive experience in administration, health insurance and other health related solutions. Impetus provides health actuarial support to JG's actuaries as skills transfer and development.

JG is considering introducing a standalone Restore Benefit product. This provides indemnity cover for specific health related claims for the insured lives under the policy for a pre-specified layer of cover. For example, the insured will be able to claim P 1,000,000 sum insured only once they have incurred claims in excess of P 2,000,000. The policyholder will be able to select from a range of cover combinations at inception.

You are an actuary working for Impetus in the solutions development team and have been asked to assist with the development of this product for JG.

- i. Describe how you would apply the actuarial control cycle to design and cost this product. [18]

As the financial services industry is still considered to be young there is only limited legislation in place. The legislation extends to aspects such as policyholder protection, expense protection, and financial controls. The Regulator is interested in ways to reinforce good governance and management of the industry. Currently the solvency of the venture relies on a simplistic Solvency Capital Requirement basis. This is the ratio of free assets to the maximum of the:

- minimum capital requirement,
- earnings, or
- expenses.

The Regulator is of the view that this is not the correct method for the industry. The Regulator has asked the industry for inputs as to the appropriateness of this method and alternative solvency measures to consider.

- ii. Discuss what you would consider in your feedback to the Regulator. Your answer should address the appropriateness of the current framework and suggest alternative frameworks, with their advantages and disadvantages. [12]

[Total: 30]

[Grand Total 100]

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**END OF EXAMINATION**