

# EXAMINATION

*2 June 2017 (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. You MAY NOT use any other computer program (e.g. Excel) during the examination.*
3. *Save your work regularly throughout the examination on the supplied computer's 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>
--

## QUESTION 1

- i. List the objectives of state healthcare provisions [2]

The country of MineSide provides healthcare to all its citizens. Due to high levels of inequality and a comprehensive minimum mandated state benefits package, only 16% of the population voluntarily make use of private healthcare insurance and private care. State facilities (funded from tax revenue) cover the rest of the population providing the same benefits available in the private sector, albeit with considerably longer waiting times.

The state has commissioned the government actuary to investigate the funding of the healthcare system in response to rising costs.

- ii. Describe ways in which the state can reduce the financial burden of healthcare provision overall. [7]

[Total 9]

## QUESTION 2

GreenMed is a health insurer that offers annually renewable medical expense products covering in and out of hospital benefits. The three products they sell are:

- Plan A – In hospital benefits only
- Plan B – Cover for hospital events and limited cover for out of hospital expenses
- Plan C – Cover for hospital events and comprehensive cover for out of hospital expenses

A high escalation in the cost of physiotherapy benefits has been observed on plan A. Plan C has also started operating at a deficit.

- i. Describe the investigations that you would suggest are conducted to analyse the adverse experience noted on Plans A and C. [6]
- ii. Suggest and describe some risk management measures that could be considered to address the escalations. [6]
- iii. Suggest and describe some alternative benefit design measures that can be used to manage the insurer's costs. [6]

[Total 18]

**REMEMBER TO SAVE**

**PLEASE TURN OVER**

### QUESTION 3

You are the marketing actuary for ABC Life, a life insurer offering life and lump sum disability benefits sold exclusively through its banking partner, ABC Bank. You are tasked with expanding your product range to include critical illness (CI) cover.

- i. Describe the advantages and disadvantages of offering a tiered benefit structure for the CI benefit. [5]

A simple non-tiered benefit offering the 4 core illnesses has been approved. The product will be sold inside the ABC Bank branches to walk-in customers and via a screen prompt on ATM machines outside the bank to banking customers.

- ii. Outline the pros and cons of using these methods of distribution. [5]
- iii. Outline briefly measures that could be used to manage the potential anti-selection that can arise from these methods of distribution. [3]

[Total 13]

### QUESTION 4

A PMI insurer, selling individual products only, is the first to collaborate with a technology company whose main business is in developing a fitness tracking wearable device, *MoveIT*.

These wearable devices provide sensory and scanning features, such as bio-feedback and tracking of physiological function.

The collaboration involves using the data collected on the *MoveIT* wearable device. The insurer will not cover the cost of the wearable device, but will accept the fitness tracking data where the members using *MoveIT* share this with the insurer through an online platform. Using the data recorded, the insurer provides a discount on the next month's premium if certain levels of activity are achieved. The level of discount is set out on a scorecard, and there are 5 possible levels of discounts available.

- i. Outline the advantages and disadvantages to the insurer of offering incentives linked to wearable devices. [6]

The insurer has changed the incentive system, making the requirements more stringent to achieve the same claims discount levels. There are several unhappy members as a result.

- ii. Outline the risks to the insurer of changing their discount scorecard. [6]

[Total 12]

**REMEMBER TO SAVE**

**PLEASE TURN OVER**

## QUESTION 5

MajorMed is a large life insurer with a book of critical illness cover sold on a stand-alone basis and as a rider to other life insurance products. Market research has identified that the critical illness product could be improved by the addition of the lump sum benefit being paid on the insured being diagnosed with Alzheimers.

- i. Discuss the advantages and disadvantages of adding Alzheimers to the list of covered conditions. [8]
- ii. You have been asked to develop the key morbidity and mortality assumptions to set a premium basis for this suggested addition. Indicate the likely key sources of data available and the adjustments that would be suitable to the data for this purpose. [5]

[Total 13]

## QUESTION 6

In South Actuarial, Long term care insurance has not sold successfully.

- i. Outline the needs that a LTCI product aims to meet. [3]
- ii. Explain why potential policyholders may not be buying this product. [3]

Several care companies have recently started developing luxury retirement facilities for retirees needing long-term care. Retirees that require care buy entry into the retirement village with a lump sum. In exchange, they receive housing plus long-term care (commensurate with their care needs) for life. Upon their death the home becomes vacant and all rights thereto return to the care company. Another retiree requiring long-term care can then buy into that home for a lump sum.

You are the marketing actuary in an insurance company. The head of the marketing department has seen an opportunity to develop a new product that will cover the lump sum cost of buying entry into such a luxury retirement village at the stage when a policyholder requires long-term care.

- iii. Briefly describe the likely design of such a product and discuss the factors that you should consider when assessing whether it is likely to be profitably marketed in South Actuarial. [13]

[Total 19]

**REMEMBER TO SAVE**

**PLEASE TURN OVER**

## QUESTION 7

You are the pricing actuary for a health insurer selling Critical Illness (CI) cover to employer groups. You have been asked to prepare a quote for a prospective client. The following information was provided by the prospective client:

- Number of employees: 1000
- Desired benefit is 3x annual salary on diagnosis of a covered critical illness
- No prior cover

Distribution of employees:

Age (x)	Number of employees	Avg annual salary (R)
23	154	100 000
29	225	150 000
35	300	200 000
42	156	250 000
58	120	300 000
61	38	350 000
68	7	600 000
<b>Total</b>	<b>1000</b>	

You may assume all employees are age x, exactly.

Your company's book rates of the annual CI incidence rate per life (aggregate of covered conditions) at age x is:

x	Incidence rate
20-39	0.002
40-49	0.004
50-59	0.006
60+	0.01

- Calculate the total theoretical monthly risk premium for this employer to cover all of its employees and the average risk premium per employee for this benefit. [4]
- Define what is meant by a 'Free cover limit'. [2]
- Explain the factors the insurer needs to consider in setting the free cover limit. [6]
- Describe the factors that will influence the final quote you give this employer group. [4]

[Total 16]  
[Grand Total 100]

**REMEMBER TO SAVE**

**END OF EXAMINATION**