# EXAMINATION

*12 November2018 (am)*

# Subject F101 – Health and Care Fellowship Principles

*Time allowed: Three hours*

***INSTRUCTIONS TO THE CANDIDATE***

1. *Follow log in and saving instructions issued to you at the exam venue.*

2. *Save your work throughout the exam.*

3. *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 examination.*

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.*

7. *Attempt all seven (7) questions, beginning your answer to each question on a new page.*

8. *Show calculations where this is appropriate.*

9. *If answer booklets are used for any question(s) start each question IN A SEPARATE ANSWER BOOKLET, entering all candidate and examination details on EACH.*

**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*

**Check that you have saved your work as per instructions given to you.**
**Hand in your question paper with any answer booklets 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.*

 

**QUESTION 1**

ABC Health sells a wide range of health and care insurance products, including individual private medical insurance (PMI).

i. A major competitor has recently introduced a new premium rating factor into its individual PMI product: the month in which the customer was born. Before the competitor introduced this change, premium rates offered by the two companies were broadly in line with each other. Discuss what factors ABC Health should consider in deciding whether to introduce month of birth as a new premium rating factor.

[6]

ABC Health is concerned with the volatility of claims on its fast growing PMI book. The high volumes of new business sales have also caused a strain on the insurer's capital position.

ii. Describe a suitable reinsurance structure that would reduce the claims volatility.

[3]

iii. Explain how reinsurance could be used to reduce the new business strain and improve the capital position of the insurer.

[4]

[Total 13]

**QUESTION 2**

The government of the developing country of South Actuaria has announced the introduction of a tax funded National Health Insurance (NHI) scheme. Under this scheme citizens of South Actuaria will receive the following universal benefits:

- Primary health care services provided at an allocated clinic
- Chronic Medication for 25 pre-listed conditions
- Emergency medical care
- Mental Health Benefits

Discuss how the demand for the following products will be affected by the implementation of the NHI scheme in relation to the following products:

i. Private Medical Insurance
ii. Critical Illness
iii. Long Term Care

[Total 10]

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**QUESTION 3**

The owner of a small business has a staff contingent that has grown to 20 employees. Currently all employees enjoy a Group Life Assurance (GLA) death benefit equal to 3 x Annual Salary at a cost of 0.3% of monthly salary. The owner has decided to look into also offering Group Critical Illness cover to all employees on a voluntary basis.

You work as a Pricing Actuary at Group R Us Insurer and have quoted the following terms to the owner:

- Standalone Group CI cover at a cost of 0.5% of monthly salary per employee per month
- Sum assured of 2 x Annual Salary on diagnosis of any of the four core critical illnesses
- Free Cover Limit (FCL) set at a level that the three highest earning employees need to go for full medical underwriting
- Full cover from inception

i. The owner has queried why the Group CI is more expensive than the GLA when the benefit amount is lower. Outline the points you would include in your response to the owner.

[3]

ii. Explain changes to the above terms which could make the premium cheaper.

[6]

The owner has decided to accept your quote on condition the FCL is raised so that no-one has to go for medical underwriting.

iii. List additional measures, including changes to the offered terms, that the insurer could put in place to manage the risk while keeping the cost the same.

[3]

[Total 12]

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## QUESTION 4

An established health insurer with a subsidiary in Actuaria has been writing prefunded long term care insurance (LTCI) contracts for many years, both in its home country and Actuaria.

The LTCI product that the insurer sells is written on an annual premium basis. These premiums are reviewable every five years. The product provides fixed lifetime benefits increasing at 5% per annum compound. These benefits are paid directly to the care home. The policy can be surrendered at any time without any value.

The insurer has identified the operational and credit/counterparty risks that are associated with its in-force LTCI business as part of a large risk management review it is undertaking.

i. Identify operational risks that the insurer is likely to have identified.

[6]

ii. Identify credit/counterparty risks that the insurer is likely to have identified.

[2]

iii. Suggest actions that the insurer could take to manage these operational, credit/counterparty risks.

[7]

[Total 15]

## QUESTION 5

You are a marketing actuary for a health insurer. A company that offers cash-loans via text messages to cellular phones has approached your company. They would like to attach a Hospital Cash product to their cash-loans.
Once a person subscribes to the service, a monthly deduction will occur automatically from their mobile account to finance the premium.

i. Outline your considerations before using this distribution channel for this product.

[9]

ii. Discuss how the risk of potential anti-selection and fraud can be managed.

[7]

[Total 16]

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**QUESTION 6**

In a developed country (where the currency is Rand), the solvency capital requirements for PMI products are set by the regulator to equal to 20% of gross annual premiums. An insurer sells a PMI product with the following membership and pricing structure as at 31 December 2017:

| **Pricing – 2017** | **Monthly Risk premium** | **Non-risk premium loadings (Monthly)** | **Number of beneficiaries** |
|---|---|---|---|
| Adult beneficiary (age <50) | R150 | R50 | 15 550 |
| Adult beneficiary (age >=50) | R250 | R50 | 8 430 |
| Child beneficiary | R100 | R50 | 13 850 |

i. Briefly outline the main features of PMI-type products.

[4]

ii. Calculate the solvency capital requirement for this product on 31 December 2017.

[2]

iii. State the advantages and disadvantages of the current solvency capital requirements for insurers in Actuaria.

[6]

Following a lengthy industry consultation process, the regulator has decided to change the solvency requirements for PMI products to align more closely to each individual insurer's PMI risk profile. Solvency requirements for beneficiaries will now be:

| **Beneficiary type** | **Solvency capital requirement** |
|---|---|
| Adult beneficiary (age <50) | 10% of gross annual premiums |
| Adult beneficiary (age >=50) | 30% of gross annual premiums |
| Child beneficiary | 5% of gross annual premiums |

iv. Calculate the new solvency capital requirement for this insurer and comment thereon relative to the previous solvency requirement. Include general commentary on the new solvency requirements.

[5]

[Total 17]

**REMEMBER TO SAVE**

**PLEASE TURN OVER**

**QUESTION 7**

The government of South Actuaria has become increasingly concerned about the increasing cost of private healthcare services and as a result, the cost of private medical insurance (PMI). The government has decided to launch an inquiry into the drivers of private health care costs in South Actuaria.

The PMI regulator has provided the inquiry with 2 years' worth of annual costs and exposures figures, grouped by age and chronic status:

| Year | Age Group | Chronic Status | Number of Life Months | Total Annual Claims Costs |
|---|---|---|---|---|
| 2016 | 0-60 | N | 422,500 | R 84,500,000 |
| | 60+ | N | 227,500 | R 113,750,000 |
| | 0-60 | Y | 227,500 | R 84,175,000 |
| | 60+ | Y | 122,500 | R 110,250,000 |
| Totals 2016 | | | 1,000,000 | R392,675,000 |
| 2017 | 0-60 | N | 380,250 | R 79,852,500 |
| | 60+ | N | 257,052 | R 134,952,300 |
| | 0-60 | Y | 275,275 | R 106,944,338 |
| | 60+ | Y | 151,900 | R 143,545,500 |
| Total 2017 | | | 1,064,477 | R465,294,769 |

i. Outline the regulator's rationale for grouping the data by age and chronic status.

[2]

It has been suggested that a large proportion of the increase in costs can be attributed to increase in disease burden of PMI policyholders rather than increases in the cost of medical services.

ii. Calculate the case mix adjusted average annual inflation in claims costs per life per month (PLPM) between 2016 and 2017 using the case mix adjusted inflation rate using 2016 cost weights as the base weights.

[10]

iii. Calculate the unadjusted annual inflation rate PLPM and discuss the above suggestion for the increase in costs.

[5]

[Total 17]

[Grand Total 100]

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**END OF PAPER**

 