Actuarial Society of South Africa

EXAMINATION

19 May 2016

Subject F201 – Health and Care

Fellowship Applications

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Candidates will be issued with instructions to log-in using a password (which you will be provided with at the exam centre).*

2. *Candidates are required to submit their 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 continuously throughout the exam, on your computer's hard drive that you have been provided.*

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 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. *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.
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.

QUESTION 1

The following hypothetical solvency requirement for South African medical schemes has been suggested:

Requirement 1

A projection of the operational result for the scheme's income statement is made under the assumption that the scheme is closed to new members. Assumptions regarding membership, contributions and claims are made on a best estimate basis. The total capital requirement is the present value of the projected operational results until the last beneficiary leaves the scheme.

(i) Discuss the appropriateness of Requirement 1 in the context of the current medical schemes environment in South Africa. [10]

A second proposal has also been suggested, as follows:

Requirement 2

Requirement 2 is a nominal value of T calculated at the beginning of the year as

$$T = B + \sqrt{A^2 + C^2 + M^2}$$

with the following components:

Base level capital (denoted by B)

The base level capital amount B is calculated as the net present value of any operating deficits over the next two (2) years. Projected annual operating surpluses contribute zero to this amount. This projection is based on:

- Deterministic projections of operating results on a best-estimate basis.
- The discount rate is prescribed and includes margins for uncertainty.

Asset risk capital requirement (denoted by A)

The scheme's assets are allocated to the following three asset classes: "cash", "bonds" and "equity or other assets". This asset portfolio is then subjected to a drop in asset values based on the historic asset prices. If the value of resulting portfolio is less than amount B then A is calculated as the difference between B and the value of the reduced-value portfolio.

Claims risk capital requirement (denoted by C)

For the purposes of calculating the claim risk capital requirement multiple projections of the net present value of the scheme's claims expenditure over the next two years are generated. These projections are based on:

- The size of the scheme.
- Prescribed distributions for both claim incidence and claim amounts.
- Parameters for the distributions based on the historic claims experience of the entire industry.

C is then calculated as the difference between the 95^{th} percentile of the stochastically generated claims and the net present value of claims deterministically projected when B was calculated.

Membership risk capital requirement (denoted by M)

Membership risk is assessed by running the deterministic base scenario projection used for B, but adding two years to the age of every beneficiary. The difference between the present values of claims under this scenario and the base scenario gives the membership risk capital requirement.

(ii) Briefly discuss the use of the covariance adjustment in the formula for T and whether it is appropriate in this case. [4]

Endeavour Health is a large open medical scheme. It has a stable product range – no new options are planned and no options are expected to be closed within the foreseeable future.

(iii) Explain how you would calculate the base level capital amount (B) under Requirement 2. State which assumptions are necessary and explain how you would derive each assumption. [25]

(iv) Discuss the factors the Board of Trustees of Endeavour Health would need to consider if the current solvency requirement for medical schemes was changed to Requirement 2 above. [6]

[Total 45]

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QUESTION 2

Private healthcare funding in the country of Cativa has, to date, been unregulated.

The government of Cativa has decided that indemnity coverage for private healthcare costs will be reserved for not-for-profit entities called "Medical Assistance Societies" (or MASs). It is currently in the process of drafting the relevant legislation and regulations.

(i) List the relevant aspects of Medical Assistance Society business which may be addressed by legislation and regulation. [10]

You are part of a consultative task team which is assisting the government of Cativa in the process of drafting the relevant legislation.

The task team wishes to create an environment that enables consumers to make informed decisions regarding the value for money of different MAS products.

(ii) List the ways benefits can differ between South African medical scheme benefit options. [3]

(iii) Discuss the reasons why consumers may struggle to compare the value-for-money of different benefit options in the South African environment. [5]

The task team has identified two proposals aimed at creating the environment described above.

A. **Prescribed benefit structure proposal**: The regulator will design a limited number of benefit option templates with prescribed benefit structures which a MAS may choose from when developing a benefit option.

B. **Actuarial value proposal:** Benefit options will be rated according to their *actuarial value*. Actuarial value is defined as "The percentage of total costs for covered benefits that a plan will cover on average." For example, if a plan has an actuarial value of 70%, the average beneficiary can expect that 70% of his/her medical costs will be paid by the medical assistance society. All benefits within a specified list of benefit categories must have an actuarial value of at least x%.

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Under the actuarial value proposal benefit options must fall into one of the following plan types:

Benefit option type	Mandated actuarial value
Jade	60%
Amber	70%
Topaz	80%
Diamond	90%

(iv) Discuss the advantages and disadvantages of each of these two proposals. [5]

The task team is debating how the calculation of actuarial value should be performed. A choice needs to be made between two proposed methodologies:

The **statistical methodology** involves independently fitting statistical distributions to the claims in each of the different benefit categories (such as medicine, GP consultations, hospitalisation and so forth) taken from each MAS's own claims data. The distributions will then be used to estimate the actuarial value based on the benefit design parameters. In the case of a MAS with less than one year's claims history default statistical parameters are to be used.

The **virtual administration system methodology** is based on a standardised data set containing information on members and their dependants as well as their claims/claiming history. This data set would be drawn from real-world historical claims data from all MASs, collected by the regulator, one year after the industry has been in operation. The results are then calculated by applying the benefit structure to these claims to determine the amount the MAS will pay out.

(v) Discuss the merits of the two methodologies for calculating the actuarial value described above. [8]

(vi) State, with reasons, which approach you would recommend [2]

[Total 33]

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QUESTION 3

FoxHealth is a medium sized medical scheme with around 80,000 members. Two years ago FoxHealth successfully made the relevant application to the CMS and implemented efficiency discounted versions for three of their mid-range benefit options. At the end of 2015 these benefit options account for 40,000 members, of which 11,000 qualify for the efficiency discounts.

(i) Explain what an efficiency discounted option (EDO) is. [2]

The efficiency discounts are based on a hospital network and the efficiencies are gained by means of negotiated discounts. The current arrangements with each of the major hospital groups are summarized in the table below:

Hospital group	**Remuneration**	**Discount for patients on the EDO options**	**Additional information**
Alpha	Fee for service	17.5%	All of this group's hospitals are on the network. It accounts for 78% of the hospitals on the network.
Beta	Fee for service	10%	Only selected Beta hospitals are on the network.
Gamma	Per diem	No discount	These facilities are only included where the other groups do not have geographic coverage.
Delta	Global fees	Variable percentage based on number of procedures performed.	Only for selected day-clinic procedures.

Alpha Group, which has served as the anchor to the network, has indicated that it will not renew the discount agreement for 2017 and that the discounts will therefore fall away.

The EDO options are strategically important to the scheme and it has resolved to retain these options.

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(ii) Discuss the implications of retaining the EDO options, with their current hospital network, in the absence of the discounts currently offered by Alpha group. [5]

The scheme has decided that, rather than being dependant on negotiated discounts, its EDO networks should be based on a selection of the most efficient hospitals.

An efficient hospital in this case is defined as a hospital that can be expected to treat a particular type of admission at a lower cost than the average hospital.

You are an actuary working for FoxHealth's administrator. You have been given the task of measuring the relative efficiency of every hospital in South Africa. You are to use 2015 data for this purpose.

(iii) Describe what data you would use for the analysis and what adjustments are necessary. You may assume that the 2015 data is fully run-off for the purposes of this exercise. [10]

You have now been tasked with performing an exercise to choose a network of efficient hospitals using a risk adjusted cost per admission basis.

(iv) State what type of clinical grouper should be used for risk adjustment in this exercise. [1]

(v) Briefly describe the potential problems, from a member's perspective, that may arise due to the change from the existing network to the one based on the most efficient hospitals, as defined above. [4]

[Total 22]

[GRAND TOTAL 100]

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END OF EXAMINATION

