EXAMINATION

11 November 2020 (am)

Subject F103 — *General Insurance*
Fellowship Principles

Time allowed: Three hours and fifteen minutes

Total marks: 100

INSTRUCTIONS TO THE CANDIDATE

1. *Ensure that you are logged into your ProctorU account before attempting the examination.*

2. *Questions are only available in this ASSA Examination platform and may not be printed.*

3. *You are required to submit all of your answers in the ASSA Examination platform only. No uploads of answers (handwritten or otherwise) to the ASSA Examination platform will be accepted.*

4. *You may not use any other computer program (e.g. Email, MS Word or Excel), files or open any other browsers during the examination.*

5. *You are strongly encouraged to use the first 15 minutes as reading time only, however, you may commence answering the paper whenever you are ready.*

6. *Mark allocations are shown in brackets.*

7. *Attempt all eight (8) questions.*

8. *Show calculations where this is appropriate. You may use blank paper to carry out rough work calculations. You may use a calculator from the approved list only.*

9. *You may return to your answers to review and amend during the allotted examination time. Once you are happy with your answers you need to **Finish all and Submit** your work. Once you have submitted you will not be able to make any more changes to your answers.*

10. *It is the candidate's responsibility to ensure that all work is submitted BEFORE the end of the allotted examination time. Take this into account when planning your review and submission. There will be no time announcements.*

Note: Answers will be saved automatically during the examination. However, 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.

END OF INSTRUCTIONS

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QUESTION 1

XYZ is a general insurer which has the following reinsurance treaties. The proportional treaties operate in the order given below, followed by the non-proportional treaties.

- 20% Quota Share treaty with Reinsurer A.
- Surplus with Reinsurer B, with a maximum of 4 lines.
  XYZ retains as little as possible on each risk, subject to the maximum and minimum retention limits stipulated in the treaty based on Expected Maximum Loss (EML).
- Risk Excess of Loss:
  - with Reinsurer C, providing cover of 80% of $10m in excess of $20m; and
  - with Reinsurer D, providing cover of 70% of $30m in excess of $40m.
  Both XL covers have a stability clause, with the initial value of the Stability Index being 100.

You have been provided with the following extract of claims:

Policy	Sum Insured	EML	No. of Surplus lines used	Claim	Stability Index	Reins. Recoveries from			
						A	B	C	D
1	$50m	$25m	3	$10m	105	(a)	(b)	-	-
2	$400m	$250m	(c)	$300m	110	(d)	(e)	(f)	(g)

i. Determine the amounts (a) – (g) in the above table.

[7]

ii. Explain why 3 lines of surplus cover were used for policy 1.

[2]

iii. State the main problem with the non-proportional arrangements above, and suggest how XYZ should supplement its non-proportional reinsurance arrangements to rectify this.

[2]
[Total 11]

QUESTION 2

An insurer in a particular country has been selling private motor, home and all risk insurance cover since it was established 3 years ago.

i. Describe the uncertainties faced by the insurer relating to:

   a. Business already written; and
   b. Premiums that need to be charged for future business.

[7]

ii. Outline briefly 6 sources of external data the insurer can use to supplement its internal data.

[3]

iii. Outline briefly the problems that may arise for the insurer should it decide to use external data.

[2]
[Total 12]

PLEASE TURN OVER

QUESTION 3

An insurer in a particular country provides a wide range of products, incorporating personal and commercial lines. The regulator recently introduced several restrictions on sales and underwriting which will affect all of the company's products. You have been tasked with building a model that will consider a number of future scenarios that can quantify potential impacts on the company.

    i.   Outline 4 different types of sales/underwriting restrictions that might have been introduced by the regulator, and for each type provide a possible reason for introducing the restriction.

[4]

    ii.   Discuss the modelling considerations that the company needs to bear in mind when designing the scenario tests.

[7]

    iii.   State the relative advantages of using a deterministic model as opposed to a stochastic model for the scenario testing.

[5]
[Total 16]

QUESTION 4

You work in the product development department for WayOut Insurance Limited. You are developing a comprehensive motor insurance product that will be sold exclusively via a mobile phone app. The insurance premiums will be charged (monthly) to the policyholders' debit or credit card.

    i.   Define each of the terms below:

        a.   Exposure measure;
        b.   Risk factor; and
        c.   Rating factor.

[3]

WayOut Insurance Limited wants to keep the application process as simple as possible, so as to make the sales process less painful for applicants. As such, in addition to capturing the applicant's name, ID number and debit/credit card details the following are the only questions that will be asked:

- "What is the make and model (year of manufacture) of your vehicle?"
- "Where do you live?"
- "How many years have you had your driving licence?"

    ii.   Outline briefly how the various pieces of information gathered at the application stage could assist in rating the application.

[5]
[Total 8]

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QUESTION 5

   i.   Outline the difference between "technical reserves" and "capital required".

[3]

  ii.   State 10 reasons why a general insurance company may choose to model claims, other than to calculate the risk premium.

[5]
[Total 8]

QUESTION 6

An infectious disease has started to spread across the globe. The disease was first detected in Country X six weeks ago, and there have already been many fatalities in that country. The first few cases have just been reported in Country Y. In order to curb the rate of new infections, the Government of Country Y has decided to implement the following measures which will come into effect in 1 week's time:

- Force closure of all businesses defined by the Government as being "non-essential", resulting in many employees not being paid; and
- All inhabitants of the country are to remain within their homes, and may only leave their homes for "essential" reasons such as to purchase food or to seek medical services.

You have been provided with the following information about Covered Insurance Company (CIC):

- The majority of CIC's operations are in Country Y.
- CIC is a medium-sized insurer that writes a mix of personal and commercial lines policies. Its products include:
  - ➢ Comprehensive Motor Insurance; and
  - ➢ Business Insurance (covering all property related perils as well as business interruption).
- CIC's free assets are barely sufficient to cover its statutory solvency requirement.
- CIC has decided to use the next week to set up technology aids such that its staff will be able to work from home.

   i.   Define "risk" and "uncertainty".

[1]

  ii.   Outline the uncertainties faced by CIC in respect of:

       a.   Claims experience; and
       b.   Expenses.

[8]

  iii.   Outline the business risks faced by CIC.

[4]
[Total 13]

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QUESTION 7

A local general insurer not utilising any reinsurance specialises in offering commercial property (buildings and contents) insurance to small local shop owners.

Extracts from the financial statements for the company are provided below for 2017, 2018 and 2019.

	2018	2019
Premiums written	715	770
Premiums earned	700	750
Claims incurred	620	660
Insurance profit	20	25
Dividends	6	7
Retained profits	13	16

Balance Sheet as at 31 December (R million)			
	2017	2018	2019
Fixed and current assets		150	160
Investments		850	775
Total Assets		1000	935
Unearned Premium Reserve (net of DAC)		300	330
Outstanding claims (incl. IBNR)		250	260
Total Liabilities		550	590
Share capital and premium account	100	100	100
Profit and loss account	200	213	229
Revaluation reserve	80	137	16
Total Shareholder Funds	380	450	345

i. Calculate the following ratios for 2018 and 2019:

    a. Claims ratio;
    b. Profit margin;
    c. Return on capital employed;
    d. Solvency margin.

[4]

ii. Comment on the variability of the company's solvency margin in 2018 and 2019.

[4]

A breakdown of the company's investments is provided below. All assets are local, unless indicated otherwise.

Investments held on 31 December 2018 (R million)	
Cash / money-market	350
Fixed interest stocks (short-dated)	200
Equity	150
Equity (foreign)	100
Listed Property	50

PLEASE TURN OVER

iii.   Comment on the suitability of the investments made by the insurer.

[7]
[Total 15]

QUESTION 8

You work for a niche insurer which specialises in liability insurance. Given the very soft liability market and to improve the level of diversification your company has acquired a recently-established marine underwriting managing agency which has shown promising growth.

You are calculating the year-end claims reserves. For the liability book your reserving methodology consists of a combination of the Bornhuetter-Ferguson method for the most recent accident year and the inflation-adjusted chain ladder method for the remaining accident years. For the marine book, given the poor quality of available data, you have decided to set the claims reserves using the expected loss ratio method.

i.   Outline 3 distorting effects that you should be aware of when using the expected loss ratio method and suggest how these effects could be reduced.

[4]

ii.   Calculate the net of reinsurance claims reserve for the marine book as at 31 December 2019, given the following information for the marine book (as at 31 December 2019):

Accident year	Gross earned premium (R million)	Gross claims paid to date (R million)	Benchmark ultimate loss ratio
2018	334	183	75%
2019	401	147	70%
Total	735	330	

- The claims paid to date amounts represent all claims paid until 31 December 2019 for each accident year.
- 80% of all marine claims are ceded through a quota share treaty with the net retention further protected by a catastrophe excess of loss treaty of R100m XS R5m.
- The benchmark loss ratios provided above are based on market averages using gross of reinsurance data. Your own analysis has shown that your company's premium rates are typically 10% higher than the market, however you believe that your company's claims experience is 15% higher than the market.
- As at 31 December 2019 there is an R80m outstanding reported claims reserve in respect of a recent catastrophe. No claims relating to this catastrophe were paid in 2019. There have been no other reported catastrophe claims to date.
- Your company does not hold any IBNR for catastrophes.

[7]

iii.   Outline 3 different aspects of the claims reserves that could be stress-tested, and give examples of possible stresses to test in each case.

[6]
[Total 17]

END OF PAPER