2016 PART III EXAMINATIONS

Subject Title: **C2A Life Insurance**

Date: **Friday, 14 October 2016**

Time: **10:00 am – 10:15 am**
(Planning Time)

10:15 am- 1:15 pm
(Examination)

Time allowed: Three (3) hours and fifteen (15) minutes including planning time.

Instructions: Type your answers to the questions using Microsoft Word and ensure that there is no data linked to spreadsheets.

You must submit your Excel answer file(s).

Number of Questions: Three (3)

Question	Marks
1	30
2	30
3	30
Total	90

Candidates are required to answer **ALL** questions. This paper has **nine** (9) pages (including this page)

AS AT

QUESTION 1 (30 Marks)

Risky Business Life is a fast growing Australian life insurer that has been operating in the individual protection market for 3 years. Being a relatively new player, its CEO is focused on revenue generation and establishing market share.

The Head of Sales has proposed relaxing medical limits for yearly renewable term (YRT) business as a way to increase sales. He suggests this could result in a 20% increase in applications.

Current and proposed medical limits are outlined below.

Current and proposed medical limits

Medical exams and blood tests are required when exceeding limits as set out in the table below.

Sum Insured band	Current	Proposed
≤ 750K	None	None
751K to 1,000K	Required	**None**
≥ 1,001K	Required	Required

a) As Head of Individual Protection Pricing you have been tasked with investigating this proposal.

To assist you, your actuarial analyst has prepared some additional information, which is provided at the end of Question 1 on pages 4 and 5.

(i) Explain what impact changing medical limits may have on expenses and propose new unit cost assumptions. Show calculations to support your proposal. **(4 marks)**

Current unit cost assumptions are outlined below.

Category	Assumption
Acquisition $ per policy	$556
Acquisition % of premium	15%
Renewal $ per policy	$50
Renewal % of premium	10%

(ii) When modelling new business, Risky Business applies an aggregate health loading assumption of +33% across the portfolio, based on the current mix of standard and sub-standard lives.

Explain what impact changing underwriting requirements may have on this assumption and propose an updated health loading assumption for new business. Show calculations to support your proposal. **(5 marks)**

AS AT

(iii) Your analyst has started developing a cashflow model (in C2A_2016_S2_Q1a.xlsx) based on current assumptions. She is unsure how to apply the current (+33%) health loading and has asked for your help.

Finish developing this cashflow model by applying the health loading and populate the table below based on the expected cashflows for a 40 year old male non-smoker with a sum insured of $1m. **(10 marks)**

M40NS, $1m sum insured	**Present Value of Premiums & Policy Fees**	**Present Value of Claims**	**Present Value of Acquisition Expenses**	**Present Value of Renewal Expenses**	**Internal Rate of Return**
Current UW requirements					
Proposed UW requirements					
Difference					

(Total 19 marks)

b) You are currently preparing a report for Risky Business Life's Appointed Actuary which will form the basis of her LPS 320 advice in relation to the proposed changes to underwriting.

In advance of receiving your report, she has requested an overview of the sections of your report which cover the following questions.

- Describe the impact of the proposed change on profitability and discuss the implications of this for the adequacy of premium rates. **(4 marks)**
- Identify key areas of uncertainty and discuss how these may impact future experience. **(3 marks)**
- Outline what you would do next as part of your analysis to address any issues that you raise. **(4 marks)**

Prepare a memo for the Appointed Actuary which addresses these questions.

(Total 11 marks)

AS AT

Additional information for Question 1a)

Unit cost basis

- Unit cost assumptions are based on estimated expenses for 2016 and an estimated in force volume of 5,500 policies.
- Fixed overheads are estimated as $50 per policy.
- All other expenses vary with volumes.

Cost of medical tests

- $400 per medical exam
- $150 per blood test

Cost includes $ expense for the test and time taken by an underwriter to review the results.

New business information

- The number of applications expected to be received in 2017 = 2,000.
- The expected completion rate for applications is 80% regardless of sum insured.

Underwriting decisions based on medical exams and blood tests

- Of the 80% of applications that are completed:
  - 40% of applications are accepted as standard
  - 60% are loaded with an average health loading of +75%
- Of the remaining 20% of applications that do not complete:
  - 10% are declined or deferred. These applicants have a health loading of +300%
  - 10% of people withdraw their application
- Discretionary medical screening (medical exams and blood tests) occurs when requested by an underwriter due to disclosures in the personal statement. For these applications the sum insured is lower than the medical limit. Currently, discretionary medical screening is ordered for around 20% of applications below medical limits.

Competitor analysis

- These proposed changes would make Risky Business a market leader in respect of underwriting limits. Its competitors require medical screening for sums insured lower than the proposed changes. Competitors also vary limits by sex and age.

AS AT

Other

- Risky Business' hurdle rate is 12%.
- Underwriting outcome (ie 40% standard, 60% loaded) applies to policies that are subject to medical requirements (blood tests or medical exams). Without medical screening lives are accepted as standard.
- You can assume the uplift in sales will be through an increase in applications. The completion rate will remain at 80% of applications after the proposed changes.
- You can assume premiums are payable at the start of the year and claims are payable at the end of the year.
- You can assume business mix is the same for all ages and is the same for applications and in force.
- Business mix information is provided in C2A_2016_S2_Q1a.xlsx.

END OF QUESTION 1

AS AT

QUESTION 2 (30 Marks)

Small Life Co, a small Australian life insurer, has issued an invitation to tender to the reinsurance market for its yearly renewable term (YRT) new business. Reinsurance arrangements for in force business are unchanged.

Quotes have been received from a range of reinsurers and the following two have been shortlisted.

ABC Re

- Mid size global reinsurer which recently received its licence to write business in Australia
- Credit rating BBB
- Quota share
- Original terms
- Cession rate = 70%
- Reinsurance commission = 100% in year 1, 45% in year 2, 25% thereafter

XYZ Re

- Large global reinsurer which writes both life and general reinsurance business and is well established in the Australian market
- Credit rating AA
- Surplus
- Risk premiums defined as 60% of office premiums
- Retention: 1,000,000
- Selection discount = 60% in year 1, 30% in year 2, 0% thereafter

a) An actuarial analyst in your team is collating responses from the reinsurers to Small Life Co's invitation to tender. Being new to reinsurance he has asked for your help with a few questions.

(i) Small Life Co's invitation for tender did not cover non-proportional reinsurance. What is non-proportional reinsurance and what are some reasons why Small Life Co may not be seeking this type of cover? **(4 marks)**

(ii) How do you determine if there is a financial benefit to Small Life Co of entering into a reinsurance agreement and what are some of the other reasons we may choose to reinsure? **(2 marks)**

(iii) How do reinsurers make a profit if there's a financial benefit to us of reinsuring the business rather than retaining it? **(2 marks)**

(Total 8 marks)

AS AT

b) You have been tasked with developing a three year reinsurance cashflow projection to compare quotes from ABC Re and XYZ Re.

Complete the table below for ABC Re and XYZ Re's respective quotes.

Year	Reinsurance premiums	Reinsurance commission / discount	Reinsurance claims	Total reinsurance cashflow
1				
2				
3				

To assist you, your actuarial analyst has collated the following information.

In force volumes

Band	Average sum insured	Proportion by sum insured	Proportion by lives
≤ 250,000	125,000	5%	10%
250,001 to 500,000	400,000	29%	37%
500,001 to 750,000	600,000	35%	32%
750,001 to 1,000,000	850,000	17%	12%
1,000,001 to 2,000,000	1,250,000	8%	6%
2,000,001 to 5,000,000	2,500,000	5%	2%
5,000,001+	5,750,000	1%	1%

You can assume new business will have a similar profile to existing business and that the sum insured distribution will remain unchanged over the three year period.

Expected total premium revenue and gross claims for new business written over the next three years

Year	Total premium revenue	Gross claims
1	856,245	428,123
2	1,922,270	961,135
3	4,315,496	2,157,748

You can assume there are no large sum insured discounts on the office or reinsurance premiums. **(7 marks)**

AS AT

c) Evaluate and compare ABC Re and XYZ Re's quotes in respect of:

- Profit **(4 marks)**
- Risk management **(3 marks)**
- Capital management and **(3 marks)**
- Any other factors **(5 marks)**

(Total 15 marks)

END OF QUESTION 2

AS AT

QUESTION 3 **(30 Marks)**

Larger than Life (LTL) Co is a large Australian life insurer that operates in the individual protection market.

It sells YRT, TPD, trauma and income protection business.

a) LTL's CEO has informed Senior Management that he is retiring at the end of the year and wants his successor to inherit a 'healthy portfolio' which he defines as one that delivers relatively stable, sustainable returns to shareholders and at a rate that meets their hurdle requirements.

Explain why the following are important for a 'healthy portfolio' and suggest how you would assess current practices:

- Data **(3 marks)**
- Underwriting **(3 marks)**
- Claims **(4 marks)**
- Product design **(3 marks)**
- Risk appetite statement **(3 marks)**

(Total 16 marks)

b) You are LTL's Product Development Actuary and have been consulting with various departments on ways to improve LTL's current product offering.

(i) LTL's individual YRT insurance policies pay out the sum insured if the life insured is diagnosed with a terminal illness, by a registered Australian medical practitioner who specialises in that illness or condition, from which the life insured is expected to die within the next 12 months.

A Marketing Manager suggests extending this definition from 1 to 2 years.

Discuss what impact this change may have on premiums, claims and investment income. **(7 marks)**

(ii) A newly appointed Underwriting Manager has said

"Definitions relating to heart attacks are out of date which has resulted in us paying more claims than we ought to. We should consider tightening terms and conditions so we pay less claims."

Discuss this proposal. **(7 marks)**

(Total 14 marks)

END OF QUESTION 3

AS AT