



2017 PART III EXAMINATIONS

Subject Title: C2A Life Insurance

Date: Friday, 28 April 2017

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

10:15am- 1:15pm
(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 are no data linked to spreadsheets.

In your answers, include your candidate number in the header and footer on each page of the document.

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 FIVE (5) pages (including this page).

QUESTION 1
(30 Marks)

LifeCo sells yearly renewable term (YRT) business. It also sells critical illness (CI) as a rider benefit, where payment of the CI sum insured terminates the policy meaning no further payment can be made for death claims under YRT. LifeCo does not operate in the stand alone CI market.

The Head of Sales has suggested that LifeCo should expand its CI offering to pay out in the event the life insured is diagnosed with Disease A, B or C.

LifeCo's CI product does not currently cover these conditions.

The Head of Sales has suggested that this product enhancement is likely to increase sales of YRT with a CI rider by 15%. He says that, given our competitors already cover these conditions we should not increase our premium rates for this enhancement.

LifeCo's Chief Medical Officer has provided the following information about new diagnoses of these conditions based on data for the Australian population. He has also informed you that there is no treatment for Disease C and people die within one year of diagnosis.

Rates per 100,000 people in the general population

	Disease A		Disease B		Disease C	
	Male	Female	Male	Female	Male	Female
< 40 years	7.5	-	8.4	4.9	7.3	11.9
40 – 49 years	12.3	-	15.9	8.1	3.84	9.96
50 – 59 years	20.4	-	5.8	6.2	3.41	7.82
60+	25.6	-	2.1	1.4	0.72	1.93

a)

- (i) Calculate the present value of premiums and claims for YRT and CI allowing for the proposed enhancement for a male, non-smoker aged 40 years with a sum insured of \$500,000 for both YRT and CI. LifeCo's current premium rates, mortality rates, incidence rates for CI, selection factors, lapse rates, earning rate and risk discount rate assumptions are provided in C2A_S1_2017_Q1.xlsx.

You may assume that:

- premiums are paid at the beginning of the year
- claims and lapses occur at the end of the year
- the sum insured is not indexed

(10 marks)

- (ii) State any assumptions that you make in Q1a (i) in addition to those stated above.

(2 marks)

- b) Your actuarial analyst has estimated present values and loss ratios for LifeCo's current product offering assuming it sells 2,000 YRT policies with a CI rider in 2017:

	PV Premium \$	PV Claims \$	Loss ratio
YRT	5,568,972	2,235,462	40%
CI rider (current)	15,429,321	8,003,864	52%
Total	20,998,293	10,239,326	49%

- (i) Using these results and your analysis from part a) estimate the present value of premiums and claims and the loss ratio for LifeCo's portfolio of YRT with a CI rider for new business in 2017, allowing for the proposed enhancement and assuming no change to premium rates and the proposed uplift to sales.

(3 marks)

- (ii) Explain the movement in your results.

(6 marks)

You may assume the model point used in part a) is representative of the portfolio.

- c) Discuss pros and cons of offering this product enhancement without increasing premium rates.

(9 marks)

END OF QUESTION 1

QUESTION 2
(30 marks)

InvestwithUs is considering launching a new investment-linked product that guarantees the initial investment after one year. More specifically, if the account balance at the end of the policy year is less than the account balance at the start of the policy year due to poor investment performance then InvestwithUs will top up the difference.

Investors will be able to choose their investment strategy based on two options: Capital Stable and Growth. InvestwithUs's hurdle rate is 11% and the risk free rate is 4%.

Your analyst has prepared the following information for you.

	Capital Stable	Growth
Expected business mix	65%	35%
Expected return	7%	15%
Standard deviation	10%	25%
Expected capital requirement	8.3% of FuM	22.6% of FuM

FuM = Funds under management

- a) Using the 1,000 simulated values of investment returns for Capital Stable and Growth provided in C2A_S1_2017_Q2.xlsx, calculate the expected cost of the investment guarantee for the Capital Stable and Growth investment options.

The simulated values of investment returns have been derived using normally distributed random variables.

(5 marks)

- b) For this new product proposal, discuss:

(i) What the key risks are

(5 marks)

(ii) How these risks could be managed

(10 marks)

- c) The Head of Marketing has proposed that InvestwithUs charge investors the same fee regardless of the investment option that they select. To help the Appointed Actuary of InvestwithUs with her LPS 320 advice for the new product, prepare a memo to her which addresses:

(i) The appropriateness of fees

(5 marks)

(ii) Your opinion in relation to the Head of Marketing's proposal

(5 marks)
END OF QUESTION 2

QUESTION 3

(30 marks)

- a) Claim for Life Co is an Australian Life Insurer that sells individual yearly renewable term (YRT), critical illness (CI), total permanent disability (TPD) and income protection (IP) benefits. It does not operate in the group insurance market.

Claim for Life Co's Head of Claims has advised you that it is increasingly difficult to get people off claim and back to work.

- (i) Describe how Claim for Life Co could investigate this. **(6 marks)**
- (ii) Describe what action could be taken to address it. **(6 marks)**

- b) Recent adverse media coverage covering the life insurance industry has prompted the Australian Securities and Investments Commission (ASIC) in collaboration with the Australian Prudential Regulation Authority (APRA) to undertake a review of claims handling within the life insurance sector in Australia.

ASIC found that claims decline rates were highest for total and permanent disability (TPD) and critical illness (CI) and that there was considerable variation in decline rates between different insurers.

Describe what actions could be taken to address this by

- (i) The life insurance companies **(6 marks)**
- (ii) ASIC and APRA **(6 marks)**

- c)
- (i) Draw a graph to compare how stepped and level premiums for the same amount of death cover might typically look over a 10 year period for a life insured aged 40 at the commencement date of a policy. **(2 marks)**
 - (ii) Explain what implications this has for the emergence of cash flow profit. **(4 marks)**

For the purpose of this question, you may assume that the sum insured remains unchanged over time.

END OF QUESTION 3