2013 PART III EXAMINATIONS

Subject Title:	**C2A Life Insurance (longer answer component)**
Date:	**Monday, 14 October 2013**
Time:	**1:00 pm – 4:00 pm**
Time allowed:	Three (3) hours including reading time
Instructions:	Type your answers to the longer answer component in a Word document and ensure that there is no data linked to spreadsheets. For Question 1 you MUST submit both your Word document AND your Excel file. For Question 2 you MUST submit both your Word document AND your Excel file.

Number of Questions: **Two** (2)

Question	Marks
1	30
2	30
Total	**60**

Candidates are required to answer **ALL** questions.
This paper has **five** (5) pages (excluding this page).

COURSE 2A LIFE INSURANCE **SEMESTER 2 2013 EXAMINATIONS**

QUESTION 1 (30 MARKS)

You are an actuary at HiAndLo Ltd, responsible for conducting experience analyses. HiAndLo Ltd is an Australian Life Insurer that has been selling YRT insurance through a range of distribution channels for some time.

The key markets that HiAndLo focuses on are:

- high net wealth individuals - those with $2m or more in assets, predominantly serviced through several independent key broker groups , and
- the "low to middle market" – those with assets around $100,000, who purchase YRT insurance through a variety of distribution channels – independent brokers but also tied agents of HiAndLo and direct channels such as the internet.

All YRT products are subject to a full underwriting process that is similar to that of other insurers in the market.

HiAndLo has a 50/50 quota share reinsurance arrangement in place with several reinsurers, but it does not carry any stop loss or catastrophe reinsurance cover.

You have been given the attached data set ('HiAndLowData.xls') for the purposes of conducting an analysis of the mortality experience for the 2012 calendar year. This includes two worksheets: (1) the policy and claims data together on one sheet; and (2) the life table that represents the expected mortality experience on the other.

Please note the following:

- All birthdays are assumed to be on 31 December;
- The attached data only covers males aged 40-49 on 1 January 2012;
- The status at the end of each year is either IF ("In Force") or NIF ("Not In Force", which is due to being a claim during the year). Dates of claims are provided;
- All policies can be assumed to be in-force as at 1 January 2012;
- New business, lapses or policy cancellations throughout the 2012 calendar year can be ignored;
- Incurred-but-not-reported (IBNR) claims can be ignored.

a) Conduct and present an analysis of the mortality experience for the 2012 calendar year. (12 Marks)

b) The marketing manager has seen your analysis, but has not seen the underlying data. He has now asked you for additional commentary on the analysis, in particular:

- A description of any features of the mortality experience that you feel require additional investigation and consideration, explaining your reasons;
- A description of how you would go about those additional investigations, identifying any further data and information you would require;

- Any further investigations you would perform or data and information you would seek out, in order to give confidence that the analysis you have done is a reasonable basis for the overall mortality experience of HiAndLo.

- Draft a report that you could present to the marketing manager. (12 Marks)

c) HiAndLo is currently implementing an enterprise risk management programme. The Chief Risk Officer is conducting informal interviews with key staff to gather information on major risks that may be emerging in the business. Discuss the concerns you would raise in your interview as a result of your analysis. (6 Marks)

Attachment

C2A_Q1_Attachment_(HiAndLowData).xlsx

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QUESTION 2 **(30 MARKS)**

You recently commenced as the Appointed Actuary at LiveWell Ltd, an Australian-based life insurance company.

LiveWell promotes itself as Australia's leading insurer of living benefit 'wealth-protector' products. It has sold significant levels of Trauma, TPD and Disability Income (DI) policies (with 2-year and 5-year benefit periods only), as well as Investment-linked savings products. Approximately 25% of the TPD and Trauma policies are sold as riders to an underlying YRT policy, and approximately 75% are sold as standalone policies.

LiveWell sells mainly through its own agency sales team as well as through independent brokers. The average age of a risk policy policyholder is 37.

The management and Board have historically taken a relatively conservative approach to growing the business, and the overall volume of in-force policies across all products has built up slowly over time. LiveWell currently faces relatively tight capital constraints, and does not have access to significant extra capital.

Nevertheless, the Board is keen to explore how it can take advantage of several recent changes in the Australian financial context to grow the business further. The Board has noted that in recent times:

- The age to which Australian employees can have compulsory superannuation contributions paid by employers into their superannuation accounts has increased;
- Such compulsory superannuation contributions are increasing from 9% of wages to 12%, suggesting much higher balances for retiring workers in the future;
- There is greater appreciation amongst everyday workers of their vulnerability to losses in income, both whilst working and in retirement.

The Board has also appointed a new CEO to LiveWell. The CEO is new to life insurance, but has had significant success in sales in the pharmaceutical industry. She has instructed the sales and marketing team to consider the development and offering of two products as follows:

1) A DI product which has a benefit period that pays to age 70.
2) An inflation-linked deferred lifetime annuity, which is purchased at age 60 by individuals being able to access their superannuation balances at that time. The deferment period is 10 years, so that the first payment occurs at age 70.

The CEO and Board are seeking reinsurance support for the annuity product, as they are very concerned with the possibility of long tailed claims. Two reinsurers have responded:

Reinsurer A will reinsure 25% of all claims paid; whereas

Reinsurer B will reinsure 90% of all claim payments that are incurred beyond 120% of the life expectancy at age 70.

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Suppose both reinsurers assume the following:

- When the annuity is purchased by a single premium at age 60, the reinsurer receives a single reinsurance premium per policy;
- At this time of the policy commencing, there is a one-off expense of $500 per policy incurred by the reinsurer;
- Each reinsurer factors in a profit margin of 4.5% of the reinsurance premium;
- Expected investment returns in the foreseeable future are 11% per annum for equities, 8% for bonds, and 5% for cash.

Further assumptions for the annuity product are as follows:

- Payments are made annually from age 70, based on an average annual payment of $50,000 inflated in line with Consumer Price Inflation (CPI) from age 60;
- Expected mortality and historical CPI levels are provided in the attached spreadsheet 'LiveWell.xls'

a) Estimate the reinsurance premium per policy charged by each reinsurer, assuming the average annual benefit payment above. Show all working, stating and justifying any additional assumptions that you make. You may ignore tax. (12 Marks)

[Reminder: life expectancy at age x is given by:

$$e_x = E[K_x] = \sum_{j=1}^{\infty} {}_j p_x \text{ where } K_x \text{ is the curtate future lifetime for someone aged } x.]$$

You are also aware that Reinsurer A currently reinsures the 2-year and 5-year DI benefits for LiveWell. Reinsurer A has indicated that it would be happy to discuss terms for reinsurance support on the DI Age 70 benefit feature.

Reinsurer B has indicated it cannot support the DI product.

From her previous working experience, the CEO believes that there is benefit in enhancing business relationships with key suppliers. She prefers working with one reinsurer for both new products, rather than a different reinsurer for each.

The CEO is due to discuss options regarding reinsurance support with the Board in one hour's time and has asked you for your views on potential options with regard to reinsurance support.

b) Draft a response to the CEO, discussing these options, giving pros and cons of potential reinsurance arrangements from the point of view of LiveWell and making your preferred recommendation clear. (6 Marks)

The marketing strategy being considered is to target mature workers who are intending to work until age 70. LiveWell would promote both products concurrently to the same individual, and therefore have the benefit of regular premiums under the DI policy, as well as a significant single premium at age 60 for those who are interested in ensuring a lifetime income from age 70.

You note that this marketing strategy is merely an intended strategy, as each product will still be sold independently.

Though new to life insurance, the CEO recognizes that there are risks involved in such a product development and marketing strategy. She believes that by targeting prospective policyholders with both products, the risk of long tailed DI claims is mitigated – the main risk will be with the length of claims on the annuity policies. However she is also aware that something called a 'mortality hedge' between death and survival products can mitigate risks in some way as well, but is not sure what this means.

c) The CEO is now ready to put a proposal to the Board, to concurrently launch both products in the near future. The Board and CEO have therefore asked you for a report which discusses:

- the pros and cons of the overall strategy to launch both products, including the intended marketing strategy;
- key business risks, giving due regard to market conditions in Australia today;
- changes or alternatives to the overall approach that you would recommend, if any.

Prepare a draft report to the CEO and Board regarding these matters (ignore any issues relating to reinsurance support in this part of the question). (12 Marks)

Attachment

C2A_Q2_Attachment_(LiveWell).xlsx

END OF PAPER