2015 PART III EXAMINATIONS

Subject Title:	**C2A Life Insurance** (longer answer component)
Date:	**Tuesday, 13 October 2015**
Time:	**1:00 pm – 1:15 pm** (Reading Time) **1:15 pm- 4:15 pm** (Examination)
Time allowed:	Three (3) hours and fifteen (15) minutes including reading 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	20
2	20
3	20
Total	60

Candidates are required to answer ALL questions. This paper has four (4) pages (including this page).

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QUESTION 1 **(20 Marks)**

Cover It Ltd is an Australian life insurance company which offers a decreasing term insurance product. The decreasing term insurance pays an amount upon death of the policyholder, with that amount equal to the principal outstanding on a home loan that is also held by the policyholder.

(a) Given the following assumptions, estimate the expected present value of claims (net of reinsurance) under this policy.

(8 marks)

Age of policyholder at inception of policy and home loan	30 years exact
Term of home loan	25 years
Size of home loan at commencement	$500,000
Loan payments	$3,221.51 per month, with first payment due in exactly 1 month after policy / loan inception
Loan interest rate	A fixed rate of 0.50% per month (effective) applies for the duration of the loan.
Fees on home loan	Assume no fees are payable.
Mortality of policyholder	Given in the attached spreadsheet, tab 'decreasing term'
Mortality selection effect	A reduction in standard mortality of 75% in year 1, 25% in year 2, 0% thereafter
Reinsurance	A reinsurance arrangement is in place whereby the reinsurer will pay 40% of any death claim, subject to a maximum reinsurance payment of $50,000 on any one claim
Interest rate for expected present value calculations	5% per annum (effective)
Policy cancellation	Upon death, or upon loan being paid off

You may also assume that a reasonable approximation is that the monthly mortality is equal to 1/12 of the annual mortality.

(b) Describe the additional assumptions you need to make in order to estimate a reasonable single premium for the policy described in (a) above.

(4 marks)

(c) Now consider an individual, regular-premium YRT policy of sum insured $500,000.

For each assumption you have made in (b) above, state whether its magnitude is likely be to larger, equal to, or smaller for the YRT product compared to the decreasing term product.

Justify each statement that you make.

You may assume that the volume of in force business and new business sales is the same for both the decreasing term and YRT product.

(8 marks)

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COURSE 2A LIFE INSURANCE **SEMESTER 2 2015 EXAMINATIONS**

QUESTION 2 **(20 marks)**

An Australian life insurer sells two types of annuities: immediate lifetime, and deferred lifetime.

The immediate lifetime annuities have the following features:

- Annuities can be purchased by individuals between the ages of 60 and 100.
- Each annuity pays out a constant monthly amount (i.e. it is not adjusted for inflation) until the policyholder dies.
- The monthly payments are limited to a maximum of $10,000.
- The first monthly payment is made one month after the start date of the policy.

The deferred lifetime annuities have the following features:

- Annuities can be purchased by individuals between the ages of 50 and 60.
- Each annuity pays out a constant monthly amount (i.e. it is not adjusted for inflation) from age 65 exact until the policyholder dies.
- The monthly payments are limited to a maximum of $10,000.

In the attached spreadsheet there is a tab named 'annuity data'. This gives the list of all annuities that are currently receiving monthly payments.

(a) Describe the checks you would make when verifying the accuracy of the data provided in the attached spreadsheet. For each check that you describe:

- Carry out that check; and
- List the policy number of each policy with a particular error.

(7 marks)

(b) Suppose that this life insurer now plans to sell both types of annuities above with the additional policy feature that payments increase over time, at a constant rate of 4% per annum. Describe in detail:

- the major, specific risk(s) that this additional feature introduces for the insurer;
- the specific actions you would recommend that a life insurer should take to manage these risks;
- why your suggested action(s) above are reasonable, including a discussion of the downside or disadvantage of each action you suggest.

(13 marks)

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QUESTION 3 **(20 marks)**

You are the Appointed Actuary for Live Life Ltd (LLL), a large and long-standing Australian life insurance company.

LLL sells a range of risk products and has also has large volumes of whole of life and investment account policies in force.

LLL reinsures its YRT policies under an obligatory treaty arrangement. All policies under the obligatory treaty are reinsured on a 40%/60% quota-share basis (40% ceded, 60% retained by LLL), with original terms premium rates applying. The reinsurance commission payable to LLL is 25% in all years of the policy. No selection discount applies.

The reinsurer has also agreed to accept YRT policies that fall outside the underwriting terms of the obligatory treaty, on a facultative basis. For any such policies insured facultatively, the reinsurer will take on 90% of the total risk on that particular policy and reinsurance premiums will be based on the reinsurer's risk rates (with both reinsurance commission and selection discount = 0%).

The CEO of LLL is new to life insurance and she has sent you an email with four questions. Draft your answer to each of these questions.

(a) I note that the current arrangements with the reinsurer do not include a selection discount. Does this mean it is appropriate for LLL to consider looking for another reinsurer that might offer more favourable reinsurance terms for LLL?

(6 marks)

(b) I am aware that, in addition to the current quota share agreement, there is a Catastrophe reinsurance cover in place. Why is Catastrophe reinsurance needed? I think a similar level of protection could be obtained by increasing the amount ceded under the quota share agreement, without having a Catastrophe cover at all. Isn't this a better approach to pursue?

(6 marks)

(c) The whole of life and investment account business that LLL has in-force appears to have no reinsurance support in place at all. I am surprised as I thought reinsurance support would be a part of all life insurance products, such as it is with YRT. For each of the two products whole of life and investment account, I would like to know:

- A short description of what (if any) reinsurance arrangements could be feasible; and
- Any probable reasons why there is no reinsurance support in place for each.

(5 marks)

(d) Lastly, in regards to the facultative arrangement, I am not sure what is meant by "the underwriting terms of the obligatory treaty". Can you describe an example of these underwriting terms that might typically apply in the Australian context?

(3 marks)

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