2019 PART III EXAMINATIONS

Subject Title: C2B Life Insurance

Date: Friday, 11th October 2019

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 links 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) and save your work regularly.

Number of Questions: Three (3)

Question	Marks
1	35
2	29
3	26
Total	90

Candidates are required to answer ALL questions.

This paper has **EIGHT** (8) pages (including this page).

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QUESTION 1 (35 Marks)

APLIFE is an Australian company which currently only sells allocated pensions and has only one statutory fund. Key cash flow information for the allocated pension product is:

- Legislation specifies minimum rates at which policyholders are required to withdraw from their account balance (or "Funds Under Management", FUM) each year as pension payments. Policyholders may also make additional withdrawals at any time. APLIFE's past experience shows that majority of its policyholders withdraw above the legislated minimum rates.
- Policyholders earn investment income on the account balance, based on the investment option chosen and the underlying returns of these assets. A large group of APLIFE's policyholders have chosen to allocate part of their FUM in share investments.
- APLIFE charges management fees on account balances, part of which is expected to cover the expenses of managing and administering the product.

You have just recently joined APLIFE as a reporting actuary whose responsibilities include the reporting on the Embedded Value and Appraisal Value of APLIFE.

Note: The accompanying workbook is titled "C2B_Sem_2_2019_Q1.xlsx".

a) You are currently preparing the Embedded Value of APLIFE as at 31 December 2019 for investor reporting. Determine the Embedded Value by completing the cells highlighted in yellow (in columns C to Q) in sheet "Embedded Value 31 Dec 2019" of the accompanying spreadsheet. You have been provided with relevant assumptions and balance sheet information in sheet "Key Information". **(12 marks)**

b) It is now 1 January 2021, and you are preparing the Analysis of Movement for the Embedded Value of APLIFE for the twelve months to 31 December 2020, during which the following key events have occurred:

Event	Event Description
1	APLIFE made a dividend payment of $10 million at 31 December 2020.
2	Fraud relating to the management of allocated pension products of a competitor was discovered. This event received wide media coverage, which resulted in loss of policyholder trust and an additional $100 million of withdrawals compared to expected for the year ending 31 December 2020. This impact is expected to be one-off.
3	A stock market correction occurred resulting in significantly lower investment returns for the fund than expected. The market has not recovered since then, with returns expected to be below long-term averages for the upcoming year.

Prepare the analysis of movement by completing the cells highlighted in yellow in sheet "Analysis of Movement 2020" of the accompanying workbook. You are provided with relevant assumptions and information in sheet "Key Information". For the purposes of the analysis of movement, assume Events 1 to 3 occurred at the end of calendar year 2020.

Hint: *You may make copies of the sheet completed in part (a) and make the relevant changes to reflect the impact of the key events outlined above.* **(9 marks)**

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c) Discuss potential impacts on the Embedded Value of APLIFE resulting from:

i. the investment returns on APLIFE's policyholder account balances being significantly lower than APLIFE's competitors over the next three years due to underperformance by APLIFE's asset management team. **(3 marks)**

ii. a proposed change in legislation that removes the minimum rates of policyholder withdrawal from their account balance each year as pension payments. **(3 marks)**

Note: *You are not expected to perform calculations for part (c).*

d) You are currently preparing the Appraisal Value of APLIFE.

i. You are aware of two methods of calculating the Value of New Business (VNB) component of the Appraisal Value:

- Method 1 is estimating future sales and performing projections of the cashflows and capital required for the new business similar to part (a) to determine the VNB.
- Method 2 is determining the Value of One Year New Business (VOYNB) using last year's sales levels (with projections similar to part (a) performed for the one year of business), then multiplying this by a capitalisation factor to determine the VNB.

APLIFE is currently using Method 1 and has done so for a number of years, however, will be switching to Method 2 for the Appraisal Value calculation.

Outline **two** possible reasons for the change in methodology, from management's perspective. Ignore any impacts from Events 1 to 3 in part b). **(2 marks)**

ii. APLIFE is looking to improve its market share in the allocated pension market. To achieve this, management has decided to further invest in marketing and product development. They have agreed on a five-year roadmap which includes targeted releases of new products.

As a result of this initiative, the Chief Financial Officer (CFO) expects that sales levels will rapidly grow, with the total sales level to triple compared to the assumed sales levels when determining the VNB last year (in total over future years). As such, the CFO has suggested taking the VNB determined last year then multiply it by three to determine the VNB under the new initiative. This VNB figure will then be published in the shareholders' report.

Draft a memo to the CFO to explain why you may disagree with the CFO's suggestion in determining the latest view of the VNB for the shareholders' report. You should outline your key considerations in updating the VNB, including how you would expect the VNB capitalisation factor to change as new business growth increases.

(6 marks)

END OF QUESTION 1

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QUESTION 2 (29 Marks)

You are the Capital Management Actuary of ABC Life Pty Ltd ("ABC"). ABC is a growing Australian life insurer, which was launched 5 years ago. Since then its market share in retail new business has grown to 40% of Income Protection and 20% of Lump Sum sales.

ABC writes the following business:

- Yearly Renewable Term ("YRT") lump sum business (death, TPD and critical illness) and income protection ("IP") business. All of this business is classified as Ordinary business and is written into ABC's Statutory Fund 1 ("SF1").
- The products are fully underwritten and are sold through independent financial advisers with market rates of initial and renewal commission.

The IP benefit is ABC's "flagship" offering and it is priced to be in the lowest quartile across all market participants. This is a key strategic objective for ABC, along with providing market leading product features to ensure the product is near the top of all rating lists.

Since its launch, ABC has not distributed any excess capital to its parent company. At the previous year-end valuation, the PCA Coverage Ratio (Excess of the Capital Base over the PCA) indicated that the company is well capitalised.

ABC also has a Target Surplus policy. Currently it is calculated as 50% of the PCA.

ABC uses reinsurance to assist with both its risk and capital management. Currently, the business is 60% reinsured with a local reinsurer, XYZ Re Life Pty Ltd ("XYZ") on a risk premium basis (with 100% commission in year 1 and 10% thereafter.)

Note: There is no accompanying spreadsheet for this question.

a) The results of the updated IP experience investigation have indicated a significant deterioration in claim incidence, terminations and an increase in the claim notification period compared to the assumptions used to price the product. You have estimated the impact of the proposed assumption changes on the capital position and have determined that the PCA Coverage Ratio would decrease significantly.

You have been asked to draft a memo to the Chief Financial Officer ("CFO") which covers the following points:

i. Explain how strengthening the incidence, termination and claim delay assumptions would impact the PCA. You may assume that ABC's adjusted policy liability and stressed policy liability are on a Termination Value basis. **(4 marks)**

ii. One action ABC could take to improve its **current** capital position and three actions ABC could take to improve its **future** capital position with an explanation as to how each action would help. **(4 marks)**

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b) The CFO has taken excerpts from the Appointed Actuary's memo in his most recent report to the Board, including the following additional risks to the level of capital:

- Given the deterioration in experience over the most recent period, XYZ may advise ABC that it is increasing its reinsurance premiums.
- The stress margins have not been reviewed since the launch of ABC. Given the recent experience of the company, a review may lead to higher margins.

Following the Board Meeting, the Appointed Actuary has asked you to draft a short document which covers the following in respect of its **IP business**:

i. Three reasons why the stress margins (as applied to claims) that ABC currently use in its PCA calculation could be higher than the industry average **(3 marks)**

ii. How you would assess the size of the event stress ABC should use in the PCA calculation and whether the prescribed minimum should apply **(2 marks)**

iii. Within its PCA calculation, ABC currently assumes that it can increase premium rates 12 months after the valuation date. Explain:

- Two reasons why this assumption may be unreasonable
- Suggest, giving a reason, an alternative assumption
- The maximum level of re-pricing ABC could allow for in its PCA calculation and what, if any, constraints may there be on this re-pricing allowance **(5 marks)**

c) Following the review of the stress margins in b), both the future stress margins and the time at which premium rate changes can occur have increased. This has led the Target Surplus Coverage Ratio, defined as: (Capital Base – PCA) / Target Surplus, to decrease to 30%.

Under ABC's ICAAP, ABC must inform the prudential regulator if the Target Surplus Coverage Ratio falls below 40%. In preparation for meeting with the regulator, the Chief Risk Officer ("CRO") has requested your advice on the following matters. Document your key talking points for your discussion with the CRO.

i. Describe two concerns the prudential regulator may have with our current Target Surplus methodology and suggest an alternative methodology. **(3 marks)**

ii. Describe three actions that the prudential regulator could take with respect to ABC's IP business along with a description of how each change could impact the current and future capital position of ABC. **(6 marks)**

iii. The CRO has asked for examples of lead indicators (i.e. a metric that would be a sign that the profitability and capital position was deteriorating prior to calculating the positions) that could help pick up a deterioration in the IP experience earlier. Give one example of a lead indicator with an explanation of how it could allow the early identification of deterioration in the experience. **(2 marks)**

END OF QUESTION 2

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QUESTION 3 (26 Marks)

AUSLIFE is an Australian company which was established 20 years ago. The only products sold have been:

- Death products, which act as "loss leaders" for AUSLIFE, i.e. priced at low or zero profit margins to attract customers with the intention of marketing other products sold by AUSLIFE to the same customers.
- Disability Income products, which are priced at higher profit margins than the Death products and have a level premium structure. The claims experience for the Disability income products has been stable over the past few years.

AUSLIFE uses **expected claims** as the profit carrier under the Margin on Services (MoS) basis.

AUSLIFE has recently been wholly acquired by 2BRICH, an overseas insurer group. As a result, AUSLIFE is required to report its policy liability under the basis required by 2BRICH, in addition to reporting under the Australian MoS basis.

Key differences of 2BRICH's basis from the MoS basis are as follows:

- **Difference 1**: Policy Liability (PL) = Best Estimate Liability (BEL) + Risk Margin. The Risk Margin at a particular point in time is determined such that the Policy Liability has a 75% likelihood to cover the insurance liabilities over the following twelve months within the grouping in which the Policy Liability is calculated. There is no profit margin in this basis. This methodology applies over the life of the business starting from commencement and for when assumption changes are made. Assumptions adopted to determine the Risk Margin are re-assessed annually.
- **Difference 2**: For the purposes of policy liability valuation calculations, policies need to be grouped and calculated separately by the calendar year in which they were sold.
- **Difference 3**: Discount rate adopted in the policy liability valuation is determined as the risk-free rate plus an illiquidity premium that is dependent on the duration of the policy liabilities for the product group being valued.

For the purposes of this question, assume BEL = PV Claims + PV Expense – PV Premium.

Note: The accompanying workbook is titled "C2B_Sem_2_2019_Q3_Appendix.xlsx".

a) Considering **Difference 1 only** of the overseas basis (i.e. suppose that Differences 2 & 3 do not apply to the overseas basis):

i. Outline two key differences between the Risk Margin compared to the Random Stress calculated in the Insurance Risk Charge under LPS 115. **(2 marks)**

ii. To determine the Risk Margin, you have adopted a simple method where:

Risk Margin = Risk Margin Percentage * PV Claims.

- Consider the example in **Table 1** in the **Appendix.** Project the reported profit (at new business commencement and over each of the five years after commencement) for the two bases, using Risk Margin Percentages of **10%** and **15%** for the 2BRICH basis. Complete the template provided in **Table 2** of the

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Appendix with your calculations. To simplify your calculations, ignore tax and assume the discount rate is zero. **(4 marks)**

- Discuss how the profit reporting pattern for new business is different under MoS when compared to the 2BRICH basis. **(3 marks)**
- Discuss how you would expect assumption changes to affect the reported profit under both bases at the time of an assumption change and in future reporting periods. Consider separately the situation where the business goes into loss recognition (under the MoS basis) due to adverse assumption changes. **(2 marks)**

b) Considering **Difference 2 only** of the overseas basis (i.e. suppose that Differences 1 & 3 do not apply to the overseas basis):

i. Outline one potential rationale for Difference 2 of the overseas basis. **(1 mark)**

ii. Outline three operational challenges due to Difference 2 that you would expect in moving to reporting on the overseas basis. **(3 marks)**

c) Considering **Difference 3 only** of the overseas basis (i.e. suppose that Differences 1 & 2 do not apply to the overseas basis):

i. Explain, with reasons, whether you would expect the BEL under the overseas basis for inforce **Disability Income products only** to be higher, the same, or lower than under the MoS basis. **(4 marks)**

ii. AUSLIFE's asset allocation strategy has always been to minimise the volatility of reported profit resulting from investment experience. Discuss how AUSLIFE should revise the allocation of assets backing policy liabilities when moving from MoS basis to the overseas basis. **(3 marks)**

d) Considering all the three **Differences** under the overseas basis:

Being wholly owned by 2BRICH, AUSLIFE will be measuring its profit performance under the overseas basis (as opposed to under MoS basis). Given this change in focus, discuss:

i. The potential changes to business operations of claims management and underwriting teams **(2 marks)**

ii. Additional considerations AUSLIFE need to make in making dividend payments to 2BRICH. **(2 marks)**

END OF QUESTION 3

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APPENDIX FOR QUESTION 3

Note: The following tables can be found in the spreadsheet titled "*C2B_Sem_2_2019_Q3_Appendix.xlsx*"

Table 1: Expected PV for new business for a particular product group of AUSLIFE

$ million	At New Business Commencement	At End of Year 1	At End of Year 2	At End of Year 3	At End of Year 4	At End of Year 5
PV Premium	100.0	90.0	81.0	73.0	66.0	59.0
PV Claims	60.0	55.0	50.0	46.0	42.0	38.0
PV Expense	32.0	29.0	26.0	23.0	21.0	19.0

Table 2: Template for Question 3 a ii) response

$ million	At New Business Commencement	At End of Year 1	At End of Year 2	At End of Year 3	At End of Year 4	At End of Year 5
Best Estimate Liability						
Under MoS						
Row 1						
Row 2						
Reported Profit						
Under Difference 1 (Risk Margin Percentage 10%)						
Row 1						
Row 2						
Reported Profit						
Under Difference 1 (Risk Margin Percentage 15%)						
Row 1						
Row 2						
Reported Profit						

Note: "Row 1" and "Row 2" should be replaced with headings relevant to the intermediate calculations required to obtain the Reported Profit.

END OF EXAMINATION

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