2017 PART III EXAMINATIONS

Subject Title: C2B Life Insurance

Date: Thursday, 12 October 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 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	29
2	31
3	30
Total	**90**

Candidates are required to answer **ALL** questions. This paper has SEVEN (7) pages (including this page).

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QUESTION 1 **(29 Marks)**

You are the Valuation Actuary for an Australian Life Insurer called Invest4Life which has been operating for 30 years. The company has only ever written regular premium investment-linked business with no upfront fees, and as a result has Deferred Acquisition Costs that are run-off over time.

In recent years, Invest4Life has acquired numerous run-off books of similarly-structured regular premium investment-linked business from other insurers as a means to combat higher than expected fund outflows as policyholders seek lower fee investment options elsewhere. In total, Invest4Life now has 10 different policy administration and unit pricing systems.

On 1 January 2017, there was a unit pricing error identified in a number of the legacy products relating to an incorrect allowance for deferred tax. A decision was made to cease writing new policies with immediate effect from that date, albeit the company is considering writing new policies again from mid-2018.

A unit price remediation project is now well progressed which is expected to cost $5m in external fees with a further $2m provision set up for restitution to be paid to policyholders (which is planned for 2018). The project has been especially expensive due to issues extracting reliable transactional data from the affected systems, as well as the retirement of a long-serving team member who was very familiar with all of the legacy systems.

It is now January 2018 and you are about to commence the valuation process for the year to 31 December 2017 (Invest4Life's year-end).

a) Briefly outline two conditions under which the following formula holds for **life investment contracts**:

Policy liability = Termination Value (per LPS 360) minus Deferred Acquisition Costs

(2 marks)

b) You have been provided with the accompanying spreadsheet, which comprises three worksheets:

- The "Mortality Table" worksheet which contains a mortality basis.
- The "CF" worksheet, which contains:
  - Details of the inforce business at 31 December 2017.
  - The assumptions used for the previous year-end valuation (i.e. at 31 December 2016).
  - A partially completed cash flow projection.
- The "AOP" worksheet, which contains:
  - Additional information.
  - A partially completed Analysis of Profit (AOP).

Complete the cash flow projection in the "CF" worksheet to calculate the **present value of expected future fees less expenses** as at 31 December 2017, assuming the 31 December 2016 assumptions remain unchanged. **(6 marks)**

Note: *ensure your final result is contained in the Word document.*

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c) Calculate the following as at 31 December 2017, using **revised expense assumptions** of $50 per policy and 0.7% of account balance (AUM) per annum:

i) The present value of expected future fees less expenses. **(1 mark)**

Note: you may create/copy worksheets for this. Ensure your final result is contained in the Word document.

ii) The policy liability of the investment-linked business of Invest4Life. **(2 marks)**

Note: you should assume the $2m provision for the unit pricing restitution is held outside the policy liability.

d) Based on part c) and the additional information supplied, complete the AOP of Invest4Life for 2017 in the "AOP" worksheet (including **identifying each experience variance component**). **(7 marks)**

Note: fill in the cells shaded in yellow. Ensure your final AOP is contained in the Word document.

e) The CFO of Invest4Life is now looking for ways to rapidly improve the expected profitability of the company for the 2018-20 planning period.

She has explored raising fees on the inforce business, but has been advised these are already at the maximum level allowable under product disclosures. Given this, she has decided that the easiest way is to launch a new product for future new business such that there is:

- An introduction of an upfront fee of 10% of the first year's premium; and
- A reduction in the ongoing fee (i.e. from year 2 onwards) applied to account balances from 0.75% pa to 0.5% pa.

The sales team have advised that they expect new business sales of around 20,000 policies for 2018 (irrespective of the fee structure). Note that:

- The annual premium per policy is expected to be $5,000 on average.
- The upfront commission paid to advisors is 5% of the first-year premium.

Draft a memo for the CFO setting out:

i) An explanation of whether you feel the change to the fee structure will help the CFO achieve her goal of increasing profit for 2018-20. You should include in your explanation illustrations of the present value of expected fees less expenses for new business written under the proposed fee structure. **(5 Marks)**

Note: you may create/copy worksheets to assist with this.

ii) **Two** alternative strategies to improve expected profitability, describing why each may be beneficial for 2018-20 profitability. **(6 marks)**

END OF QUESTION 1

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QUESTION 2 (31 Marks)

You are the Head of Valuation at ABC Life, a subsidiary (and business unit) of a large Australian Bank, ABC Bank (which is listed on the local securities exchange). ABC Life has three insurance portfolios split across two statutory funds covering Individual Insurance, Group Insurance and Wealth Management (comprising of ordinary and superannuation investment-linked contracts). All of ABC Life's business is non-participating.

ABC Life values its Individual insurance business using the projection method, and its group and wealth management business using the accumulation method.

Over the past 5 years, ABC Life has grown strongly in Individual Insurance and Wealth Management but its Group Insurance portfolio has contracted (but is still open to new business). In this time, ABC Life's return on capital has fallen and has been below ABC Bank's expectations for each of its business units. As a result, the Chief Financial Officer (CFO) of ABC Bank has been asked to lead a strategic review of the insurance business.

The CFO has raised concerns that the current Margin on Services (MoS) profit reporting does not provide a complete view of the financial condition of the life company and wishes to understand what additional metrics could supplement the current level of management reporting. He has noticed that other life insurance companies in the market report traditional **Embedded Value** (EV) and the **Value of one years New Business** (VNB).

a) The CFO would like to understand EV and VNB further, including how the measures differ from MoS profit reporting and the practical considerations in order to implement them. The Appointed Actuary of ABC Life will address his queries via a memo, and has asked you to assist in drafting the memo. Provide a draft of this memo to the CFO that:

i) Identifies **four** areas of difference between MoS reporting and EV/VNB reporting. **(5 Marks)**

ii) Briefly outlines, with reasons, **three** areas of judgment that will be required when calculating the EV for ABC Life (i.e. areas of judgement not already addressed under MoS reporting). **(6 Marks)**

iii) Identifies **three** practical considerations that ABC Life needs to address prior to implementing EV and VNB reporting. **(3 Marks)**

b) The actuarial team has now made the necessary modelling changes to implement EV and VNB, and ABC Life have just determined their EV and VNB for the first time (but has not yet disclosed this to the market). The process can be used to produce an EV and VNB every 6 months (where the VNB is the value of the new business over the **year-to-date**).

The CFO is now keen to track on a monthly basis the VNB (value of new business year-to-date) of **key product lines <u>within the Individual Insurance portfolio</u>**, in order to measure their performance.

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The CFO would like the VNB to be available at the same time as the monthly profit result, and determined individually for **each product line** as:

YTD Sales x Multiplier

where YTD Sales is the **year-to-date product line sales in Annual Premium terms**.

i) Describe one approach you could use to determine the Multipliers. You may assume that the VNB at the end of the previous financial year (for each product line) is available. **(3 Marks)**

ii) Identify **two advantages** and **three disadvantages** of the CFO's suggested approach to calculating the VNB on a monthly basis. **(5 Marks)**

iii) The CFO has asked you about the usefulness of introducing more regular EV reporting to supplement the more frequent VNB reporting for the Individual Insurance portfolio. You believe that this is not worthwhile. Outline **two reasons** why you would have this view. **(3 Marks)**

c) The table below shows the movement in the EV of each portfolio over the last 12 months.

$million	**Individual Insurance**	**Group Insurance**	**Wealth Management**	***Total***
Opening EV	**1,000**	**500**	**3,000**	***4,500***
Expected Return	80	40	240	***360***
Experience Variance	(3)	(10)	(8)	***(21)***
Assumption Changes	(40)	(30)	30	***(40)***
VNB	80	-	200	***280***
Discount Rate Change	30	10	50	***90***
Closing EV	**1,147**	**510**	**3,512**	***5,169***

Note that:

- This will be ABC Bank's first publication of ABC Life's EV results to the market.
- ABC Life has paid no dividend over the last 12 months.

i) The CFO is reviewing the performance of each business line based on these results and believes that the Group Insurance portfolio has underperformed over the last 12 months. Identify **two** reasons why he would have this view. **(2 Marks)**

ii) In addition to the analysis of movement in EV and VNB over the year, outline **two** other key pieces of information that would be useful to disclose to the market to enable a better comparison of ABC Life's EV and VNB with its competitors. **(4 Marks)**

END OF QUESTION 2

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QUESTION 3 (30 Marks)

Teen Life is an Australian life insurer with its parent company, a global life insurer, domiciled overseas. Teen Life has two statutory funds:

- Statutory Fund 1 (SF1) contains Australian traditional/conventional participating business that has been closed to new business for some time. For this business, Teen Life declares compound reversionary bonuses annually with a terminal bonus payable on surrender, death or maturity in line with its disclosed bonus philosophy.
- Statutory Fund 2 (SF2) contains non-participating retail and group insurance business which is open to new business. This business is reinsured with one local reinsurer.

The assets of SF1 are a mix of equities, property and fixed interest securities whereas the assets of SF2 are entirely Australian Government fixed interest securities. At present, there is an underdeveloped asset-liability framework in place at Teen Life.

The table below shows the Capital Base, components of the Prescribed Capital Amount (PCA) and the PCA Coverage Ratio (defined as the Capital Base divided by the PCA) for each Statutory Fund at the current year-end (31 December 2017) and the prior year-end (31 December 2016).

$million	SF1		SF2	
	Dec-2016	Dec-2017	Dec-2016	Dec-2017
Capital Base	**1,000**	**800**	**550**	**500**
Insurance Risk Charge	-	-	300	330
Asset Risk Charge	250	300	20	30
Aggregation Benefit	-	-	(15)	(23)
Operational Risk Charge	50	45	40	45
Asset Concentration Risk Charge	-	-	30	35
Combined Stress Scenario Adjustment	10	15	20	25
PCA	**310**	**360**	**395**	**442**
PCA Coverage Ratio	**3.23**	**2.22**	**1.39**	**1.13**

a) The newly appointed Chief Risk Officer (CRO) of Teen Life has noticed the reduction in the Capital Base in both SF1 and SF2. She is new to the financial services industry and is currently reviewing the risk register of Teen Life. She wants to understand what can cause a reduction in the Capital Base for Teen Life (specifically), and has asked you to provide specific examples on this.

Draft an e-mail to the CRO in which you briefly outline **two specific examples** of reasons for a reduction in the capital base for **each Statutory Fund** of Teen Life. **(7 Marks)**

Note: *you should have four examples in total. Each example should be distinct.*

b) In advance of the next Board Meeting, the Chief Executive Officer (CEO) has met with the Appointed Actuary and requested that all of the surplus assets (i.e. assets in excess of regulatory capital requirements) in SF1 be paid as a dividend to its parent company overseas.

He has asked the Appointed Actuary if there are any impediments or considerations prior to approving such a dividend.

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i) Discuss **four** aspects the Appointed Actuary would need to consider in advance of any distribution of this surplus to the shareholder. Your response should include any constraints faced by Teen Life, including regulatory constraints. **(6 Marks)**

ii) The CEO has also asked the Appointed Actuary to consider another option. Since the current year-end valuation, the claims experience in SF2 has deteriorated. The CEO wants to consider whether some of the surplus in SF1 could be transferred into SF2 to help support its capital position.

Outline **two** key differences in the considerations and constraints that apply to this option compared to your answer to part i). **(3 Marks)**

c) Following the release of its current year-end results, Teen Life's parent company has raised concerns about the volatility of its capital position. They have asked Teen Life to consider options aimed at reducing the volatility of its PCA Coverage Ratio. One option raised by the Appointed Actuary is to combine SF1 and SF2 into a single statutory fund.

i) Outline **two** alternative options Teen Life could consider in order to reduce the volatility of its PCA Coverage Ratio. **(4 Marks)**

ii) By considering each component, explain with reasons whether the PCA after combining the Statutory Funds would be expected to be higher or lower than the sum of the PCA for each individual Statutory Fund (using the 31 December 2017 position as a reference). **(6 Marks)**

Note: *you may assume that there is no change to the asset risk charge.*

d) The Policyholder's Retained Profits (PRP) make up a material part of Teen Life's Balance Sheet. There is a large proportion of equities and property backing these liabilities. The Risk Free Best Estimate Liabilities (RFBEL) in SF1 are backed by fixed interest securities. Explain why it is reasonable for the RFBEL and PRP in SF1 to have a different mix of assets. **(4 Marks)**

END OF QUESTION 3

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