2017 PART III EXAMINATIONS

Subject Title: C2B Life Insurance

Date: Tuesday, 2 May 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	29
2	33
3	28
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 AUSLIFE, a medium-sized Australian life insurer. AUSLIFE has an existing inforce book made up of retail and participating business, and has recently decided to grow in the area of group business.

AUSLIFE has now won its first group arrangement, having been successful in a tender to provide insurance coverage to a large group employee scheme called BIGCO. The insurance provides Death and Group Salary Continuance (GSC) covers only (the GSC cover has a one month waiting period and two year benefit period).

Key dates for the BIGCO group scheme are as follows:

- The tender was **submitted on 31 December 2015** and **won on 31 March 2016**.
- Insurance coverage **commenced on 1 January 2017**.
- The **premium rate is guaranteed for 3 years (i.e. up to 31 December 2019)**.

The premium for the scheme is fixed at $25m p.a. paid annually in advance, split 50/50 between Death and GSC. (The contract allows for deviations to this if there are significant movements in the number of scheme members, however, this is unlikely.)

Some key information from the pricing work is shown below:

- **Expected Death claims incurred:** $10m p.a., 90% of which are expected to be paid out in the year of claim event with 10% reported and paid the following year.
- **Expected GSC claims incurred:** $10m p.a., with claims incidence expected to be uniform throughout the year and with an average claim duration of 12 months. No claim reporting delays were assumed, in line with BIGCO's past experience.
- **Acquisition expenses:** $1.5m, split 50/50 between Death and GSC.
- **Maintenance expenses:** $3m p.a., split 50/50 between Death and GSC.
- **Claims handling expenses**: 5% of claim payments for GSC only.
- **Investment earnings:** Nil.

For valuation purposes you should assume:

- Two entirely new Related Product Groups (RPGs) are created, namely ***Group – Lump Sum*** and ***Group – GSC*** (which **include any respective claim reserves**).
- Expenses were in line with the pricing, and acquisition expenses are to be deferred.

It is now approaching 31 December 2017, AUSLIFE's first year-end valuation date with the BIGCO scheme inforce.

a) The Chief Financial Officer (CFO) of AUSLIFE is aware the company has always used the projection method to calculate the risk policy liabilities, but has heard that in certain cases the accumulation method can also be appropriate.

   i) Draft an e-mail to the CFO, stating and justifying your preferred approach for the calculation of the policy liability for the BIGCO group scheme. **(4 Marks)**

   ii) Assuming the accumulation approach was chosen, what would the policy liability at the commencement of the BIGCO scheme (1 January 2017) have been **for each RPG**, **immediately after** the first premium was received. **(2 Marks)**

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b) An internal analysis has just been completed covering the first 9 months of claims experience for the BIGCO scheme. The key findings were that:

– GSC claims experience is showing 30% higher incidence than the original pricing assumed, whilst it is too early to draw conclusions on the termination experience.

– Death claims are consistent with the original pricing.

In addition, a GSC claims industry experience investigation for the 24 months to 30 June 2017 has just been released, showing:

– An adverse trend in incidence experience across the entire industry.

– Termination rates for the industry have remained stable.

As at **31 December 2017**:

i) State and briefly justify what best estimate GSC claim assumptions you would recommend if you needed to project future claim cash flows. **(2 marks)**

ii) Using your answer to part b) i), calculate the expected future (i.e. projected) cash outflows **(excluding payments on claims incurred in the past)** less inflows in respect of the ***Group – GSC* RPG only**. Ignore any discounting. **(2 Marks)**

iii) Calculate the policy liability for the **entire BIGCO book using the accumulation method**, including any adjustment needed based on part b) ii). **(6 marks)**

c) The CFO is under extreme pressure to hit the AUSLIFE profit target for 2017 (which did not include any allowance for winning the BIGCO tender), and has a reputation for "hating late surprises". A partially filled table giving some actual and target profit numbers for 2017 is shown below:

2017	Group – Lump sum RPG	Group – GSC RPG	Other RPGs
Target profit	Nil	Nil	$50m
Actual profit	?	?	$48m

The CFO is hopeful that the BIGCO scheme will help her beat the target, and has asked for a meeting to discuss the full implications on her profit number of including this BIGCO new business.

i) Based on your answers to part b), calculate the actual profit for each of the two Group RPGs for 2017 and hence the total profit for AUSLIFE. **(4 marks)**

ii) The CFO is curious as to why there needs to be two separate RPGs for the Group business. Briefly explain why this is appropriate, and provide one argument that could be used for having a single RPG. **(2 marks)**

d) The Appointed Actuary of AUSLIFE wants to include a section within the Financial Condition Report (FCR) on group schemes. Draft a section of the FCR setting out:

i) **Two** recommendations in relation to improving the profitability of the BIGCO scheme. **(4 Marks)**

ii) **Two** recommendations in relation to the group scheme tender process which should be enacted during 2018. **(3 Marks)**

END OF QUESTION 1

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QUESTION 2 (33 marks)

You are one of the Principals of a small actuarial consulting firm. It is early 2016 and you have recently won the engagement to become the external Appointed Actuary of (and provide actuarial services to) ABC Life, a wholly-owned subsidiary of global insurance company PQR Insurance. ABC Life writes retail investment-linked superannuation business into its only Statutory Fund, with these products open to new members.

PQR Insurance is keen to grow its Australian business and is exploring entering the retail risk insurance market via ABC Life's existing retail superannuation business. As a result, ABC Life has decided to develop a fully underwritten retail life insurance offering. To begin with, ABC Life plans to:

- Only provide death benefits, with no coverage for disability benefits.
- Enter into a 20% quota share reinsurance arrangement.

ABC Life has a small internal actuarial function, so has asked for your assistance in projecting the amount of capital required to support the new death benefit offering.

Your key contact at ABC Life is the newly appointed Chief Financial and Operating Officer (CFOO), who has an extensive finance background at a major bank but has never worked in insurance. The CFOO has mentioned that he recently attended a 2 day life insurance conference organised by the life insurance and wealth management industry body, where he heard a range of presentations including one titled *An Introduction to Life Insurance Prudential Capital Standards*.

a) One of your first deliverables was to provide the CFOO with the proposed **random and future** stress margins for the Insurance Risk Charge (IRC). After reviewing your recommendation, the CFOO noted that the proposed margins for ABC Life are higher than other companies in the industry of a size comparable to the volume of business ABC Life initially would like to write. He cited industry stress margin survey results contained in a slide from the recent presentation he attended.

   Outline to the CFOO why your proposed margins are reasonable. **(5 Marks)**

b) After several deliverables, you have now provided the CFOO with a projection of the IRC related to the planned offering. This shows that ABC Life expects to have a non-zero IRC.

   The CFOO understands the Prudential Standards make an explicit allowance for diversification between asset and insurance risks. He has suggested the net capital impact on ABC Life will be reduced due to an aggregation benefit between the IRC for the insurance business and the Asset Risk Charge for the investment-linked business.

   Address the CFOO's suggestion by explaining whether this is correct, and why. **(3 Marks)**

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It is now April 2017, a few months **after** ABC Life successfully launched the retail risk insurance product on 1 January 2017. As planned, ABC Life has only offered death benefit coverage and has a binding 20% quota share reinsurance arrangement with a local Australian reinsurer (AussieRe). You are still the Appointed Actuary of ABC Life.

c) You are now required to calculate the IRC of ABC Life as at 31 March 2017.

You have previously developed the **accompanying spreadsheet,** which was used to calculate the policy liability for ABC Life at 31 March 2017. This spreadsheet has been peer reviewed by another Principal at your consulting firm with no issues noted.

Using the information in the accompanying spreadsheet, calculate the following as at 31 March 2017:

i) The Regulatory Adjustment to net assets to obtain the Capital Base. **(1 mark)**
ii) The individual impact of each of the random, future and event stresses. **(8 marks)**
iii) The diversification factor. **(2 marks)**
iv) The IRC. **(10 marks)**

You may assume the following in your calculations:

– The Event Stress is calculated in line with the parameters in the Prudential Standards.

– The random, future, expense and lapse stresses are as per the "Assumptions" tab of the accompanying spreadsheet.

– ABC Life can take management actions (namely repricing) to fully offset the stresses 3 years after the adverse experience commences.

– The 'Lapse-Up' scenario dominates.

Note: *You may create/copy worksheets for this purpose. Ensure you submit your spreadsheet calculations, and that your final results are contained in the Word document.*

d) PQR Insurance is considering increasing the level of quota share reinsurance ABC Life has in place with AussieRe.

The executives at PQR Insurance understand the impact this will have on expected profitability as well as the capital efficiencies likely to be gained. However, they are unaware of any potential capital downside of this under Australian capital requirements. The CFOO of ABC Life has passed this question on to you.

Write a Memo to the Chief Financial Officer of PQR Insurance in which you:

– Identify **one potential issue/disadvantage from a capital viewpoint** of increasing the level of quota share reinsurance ABC Life has with AussieRe; and

– Outline how this potential issue/disadvantage can be mitigated.

(4 Marks)

END OF QUESTION 2

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QUESTION 3 (28 marks)

You are a Valuation Actuary for MEDLIFE, a medium-sized Australian life insurer. MEDLIFE has two portfolios of business:

- An old portfolio of **participating endowment business** which has been closed to new business for 15 years.
- A portfolio of **stepped Yearly Renewable Term** (YRT) business that is open to new business, where MEDLIFE pays upfront commission of 120% of first year premiums.

The surplus from the participating business is distributed to policyholders through annual reversionary bonuses (note: there is no terminal bonus) with a 20% shareholder entitlement. Declarations of bonuses have been relatively stable over the past decade at around 6% to 7%, even during the Global Financial Crisis of 2007 and 2008.

In addition:

- MEDLIFE reviews the underlying experience of its portfolios annually.
- For the participating business, Best Estimate Liabilities (BEL) at 30 September 2016 were 95% of the Value of Supporting Assets (VSA).
- MEDLIFE adopts a conservative surrender and paid up basis (i.e. the surrender value is less than the BEL).

It is now January 2017, with the valuation of the participating business for the 31 December 2016 position (MEDLIFE's year-end) now occurring. In the last three months of 2016, the yield curve has significantly shifted upwards (by around 100 basis points), in particular at longer durations.

The assets backing the participating business have in the past been well matched to the liabilities, with a large proportion of assets invested in long term fixed interest securities. However, due to the recent yield movements, it was noted the duration of the assets supporting the participating portfolio is now much longer than the duration of the participating business liabilities.

a) A graduate actuarial analyst has recently commenced in your team, and will be performing the valuation of participating business for the first time.

   In an e-mail to the graduate:

   i) Describe what you anticipate to see in the 31 December 2016 valuation results for the participating business due to the noted asset-liability mismatch.

      In particular, describe with reasons your expectation of the impact on the following components at 31 December 2016:

      – The VSA.
      – The BEL.
      – The best estimate supportable bonus rate. **(5 marks)**

   ii) Describe what next steps are likely to be needed by MEDLIFE in addressing the asset-liability mismatch. **(2 marks)**

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b) As part of the annual valuation, the surrender assumption for the participating endowment business will also be reviewed. The current surrender assumption has been kept at 8% p.a. over the last couple of years despite an emerging downward trend (the graduate has determined the experience was recently as low as 3.5% p.a.).

i) Outline what considerations you will take into account when setting the new surrender assumption for the 31 December 2016 valuation. **(3 marks)**

ii) Explain how the recent surrender experience would have been reflected in the Analysis of Profit (AOP) for the past few years. **(2 marks)**

c) After reviewing the surrender assumption, the new graduate has looked into the remaining categories of items that make up the AOP. She understands that there are four main categories of items:

– Claim decrement experience.

– Non-claim decrement experience.

– Expense experience.

– Investment experience.

Describe to the new graduate:

i) For the participating endowment business, what each of the four categories of experience items above relate to (indicating which item the surrender experience falls under). **(5 marks)**

ii) How each of the experience items differ for the participating business compared to the YRT business (in the direction of impact and in how they are determined). **(6 marks)**

d) In relation to MEDLIFE's **participating endowment business**, briefly describe what matters you would recommend the Appointed Actuary consider if a large experience loss related to expenses had emerged. **(5 marks)**

END OF QUESTION 3

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