Actuaries Institute

2013 PART III EXAMINATIONS

Subject Title:	**C2B Life Insurance (longer answer component)**
Date:	**Friday, 3 May 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.

A separate Word document must be submitted for each question. ONLY your Word document will be marked. Your Excel file should also be saved as a backup.

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

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

Candidates are required to answer **ALL** questions.
This paper has **six** (6) pages (excluding this page).

COURSE 2B LIFE INSURANCE **MAY 2013 EXAMINATIONS**

Answer two questions.

QUESTION 1 **(30 MARKS)**

You are the Valuation Actuary for a life insurance company located overseas. The company has been established for 5 years and during that time the only business written has been a participating limited payment endowment policy which pays a maturity benefit after 8 years and has 5 years of premium payments. Details of the policy are:

- The payment of a Guaranteed Maturity Benefit equal to the accumulation of 96% of premiums at 2% interest.
- A bonus is declared each policy year and added to the previous bonuses declared. The latest bonus was 4% of the annual premium and this has not changed since the company started. The bonus is paid on maturity or death before maturity and is declared by the company after consideration of actuarial advice.
- There is no regulation of commissions but your company pays total distributor compensation of 10% of the first premium, much of which is rebated by the distributor to the policyholder.
- The death benefit is equal to the Guaranteed Maturity Benefit plus any bonuses already declared.
- The policy is defined as life insurance for IFRS and there is no tax payable by life insurance companies.
- Premiums are paid annually and for personal income tax reasons policies are only issued on 1 January each year. There are no withdrawal benefits available and, due to cultural values, all polices are renewed as they are regarded as a personal promise.

The country's financial markets are limited and only government debt is available. Government debt is offered for a term of 3 years only and only issued to financial institutions. The issued yield on government investments has always been, and is currently, 3.5%. The limited market between institutions reflects a 3.5% yield for all outstanding durations up to 3 years. The country follows Australian regulations for profit reporting and all earnings are allocated 80/20 to policyholders and shareholders respectively. Transfers into the fund are also allocated 80/20 regardless of their source. Transfers to shareholders must be made ensuring that the 80/20 policyholder/shareholder ratio is maintained after transfer. The currency is dollars ($).

Minimum capital requirements mean that a company must, at the end of each calendar year, have assets at least equal to 102% of the Minimum Amount which is calculated as the accumulation of premiums less charges (currently premiums less charges is 96% of premium) using the guaranteed interest rate.

The end of the calendar year is less than 2 weeks away and you are preparing the year end forecasts. You have been provided with the following data:

	Liability Movements	Actual Statistics
Policies at End of Previous Year	39,779	39,779
New Policies	10,000	10,000
Deaths	122	109
Policies at End of Current Year	49,657	49,670
Premium ($m)	99.559	99.559
Interest ($m)	10.199	10.452
Expense and Commission ($m)	3.854	3.969
Mortality Claims ($m)	1.335	1.202
S/H Dividend ($m)	0.840	0.840
Expected Cost of Bonus ($m)	3.360	
Liability at the end of the previous year after the declared Bonuses have been added ($m)	195.701	

Other Items

Minimum Amount at End of Previous Year ($m)	199.020
Minimum Amount at End of Current Year ($m)	300.980
Assets at End of Previous Year ($m)	203.000
Assets at End of Current Year after Transfer ($m)	307.000
Assets on expected movements ($m)	308.064
Assets on actual movements ($m)	307.000

a) Using the above data, calculate the forecast policy liability (excluding cost of bonus) at the end of the year and the total earnings (before cost of bonus and dividend) for the year. You should present your results in a file note showing all relevant calculations. (12 Marks)

b) Because of the short term of assets available, your company rebalances the portfolio just before the end of each year so that all assets have 3 years until maturity. Immediately after this rebalancing the yield on government bonds has dropped to 2%. For all other items, the actual result has been equal to forecast.

You do not have time to run extra numbers as the board meeting is tomorrow at 8am. However you do know that:

- the current value of assets has increased to \$320m.
- the present value of future benefits (including the current year bonus and future bonuses and shareholder transfers) less premiums at a 2% discount rate has increased to \$327.9m at the current bonus rate or \$315.6m if there is no current or future bonus.
- the value of existing bonuses (excluding bonuses for the current year end) is \$6.9m at 3.5% interest and \$7.3m at 2.0% interest.
- the current product has a profit margin of 0.5% of premiums if there is no commission and no bonus and the earnings assumption is 2%. However transfers are required to finance the product in each policy year except for the final policy year. The sales for the latest year are \$20m of annual premium.

The Chief Actuary has asked you to prepare a briefing note which will be used by the Chief Actuary to prepare for the Board discussion tomorrow morning. The briefing note should:

i) outline the key issues arising from the current situation. (10 marks)

ii) give your advice, with reasons, for the current end of year bonus rate assuming that no new capital is available to the fund. Your advice should include the actual bonus rate recommended and describe what will happen to future bonus rates if the situation remains unchanged. (8 marks)

Draft your briefing note. All documentation should be contained within the note as the Chief Actuary will only be referring to a printed copy of your note.

QUESTION 2 **(30 MARKS)**

You are the valuation actuary for **SafeGuard** Life Insurance which specialises in life, accident and critical illness cover. As preparation for the 31 December 2012 valuation, the Research Actuary has performed an accident claim experience study for the first time in three years. The results are set out below:

Actual to Expected Accident Claims

Age	2009	2010	2011	2012
20	184%	243%	279%	303%
30	143%	181%	207%	225%
40	98%	110%	120%	127%
50	80%	80%	80%	80%
60	80%	80%	80%	80%
Total	107%	126%	140%	151%

Based upon this study, the Research Actuary has recommended that the accident claim assumption be increased to 150% of the previous assumption. No other assumptions have been changed.

Gross present values of accident product cash flows (in $m) on the old assumptions as at 31 December 2012 are set out below:

PV Premium	51.2
PV Claims	23.1
PV Expenses	12.8
PV Commission	10.2

The portfolio is reinsured on a quota share arrangement with 60% of the risk being reinsured and 40% of the risk retained by **SafeGuard.** Life Reinsurance rates are 55% of **SafeGuard** Life's gross premium rates.

The accident product policy liability at 31 December 2012 after reinsurance and using the old assumptions is $(1.5)m i.e. a negative amount. Tax can be ignored.

a) Estimate the impact on the accident product policy liability of the proposed change in assumptions. (4 Marks)

In response to the deterioration in experience, you have sought out the sales experience by agent. You have found that a growing part of the accident cover portfolio is the clients of Road Warriors Insurance Agency. This agency specialises in selling to the insurance needs of motor cycle riders. The sales results for the last four years are set out below:

In Force Policies	2009	2010	2011	2012
Road Warriors Insurance Agency	1,000	2,000	3,000	4,000
Other Agents	10,000	11,000	12,100	13,310
Total	11,000	13,000	15,100	17,310

Further investigations into the experience have produced the following results:

- The experience for RoadWarriors Insurance Agency is far worse than expected due to accidents involving motorcycle riders, whereas the actual to expected rate for other agents has been 80% consistently over the past four years.
- The overall lapse rate has been line with expected at 7.3%, however, lapse rates for policies sold by Road Warrior Insurance Agency have been consistently running at 15% per annum, whereas lapse rates for policies sold by other agents have been running at 5% per annum.

As a result, management has decided to revoke the sales arrangement with Road Warriors and introduce an exclusion for motorcycle accidents for future new business. The marketing manager has confirmed that **SafeGuard** was previously the only company in this market without such an exclusion.

b) Based upon these experience investigation results, describe the changes you would make to the valuation basis and approach. Explain the impact you would expect relative to the policy liabilities calculated in question a) (7 Marks)

c) In the Insurance Risk Charge component of the Prescribed Capital Amount (PCA), you previously allowed for insurance risk margins, including a +50% margin for accident business for 3 years. Given the recent experience for this product the Chief Risk Officer has queried whether this margin was adequate. Draft your response. In your draft explain the following:

i) What was the justification for the risk margin (4 Marks)

ii) The appropriateness, in hindsight, of the risk margin (5 Marks)

iii) What changes, if any, you will be recommending to the risk margin for the future, and the impact these changes will have on the PCA (4 Marks)

d) You had been having discussions with the reinsurer leading up to the valuation date about the experience, explaining the source of the variation in experience. Through these discussions the reinsurer indicated that they were likely to exercise their option to increase reinsurance rates on the existing accident portfolio. In early January 2013, before you have finalised the valuation results as at 31 December 2012, you received written notice from the reinsurer that reinsurance rates will increase by 20% with effect from 30 September 2013.

i) Explain how, if at all, this notice from the reinsurer will affect the reported profit for 2012. (3 Marks)

ii) How would you expect reinsurance arrangements, including the option for the reinsurer to increase reinsurance premium rates, to be reflected in the PCA? (3 Marks)

END OF PAPER