Institute of Actuaries of Australia

2008 PART III EXAMINATIONS

Subject Title: **Course 2B Life Insurance**

Date: **Tuesday 29th April 2008**

Time: **1:45 pm to 5:00 pm**

Time allowed: Three (3) hours plus fifteen (15) minutes of reading time

Instructions: Each new question (but not each section of a question) must be commenced in a new answer book.

Number of Questions: Six (6)

Question	Marks
1	12
2	15
3	17
4	17
5	19
6	20
Total	**100**

Candidates are required to answer ALL questions.

This paper has 9 pages (excluding this page and the blank back page).

INSTITUTE OF ACTUARIES OF AUSTRALIA

2B LIFE INSURANCE **APRIL 2008 EXAMINATIONS**

Answer all 6 questions.

QUESTION 1 (12 Marks)

PYL Life writes individual stepped premium death insurances. All of PYL Life's products are fully underwritten. PYL Life distributes its products through a dedicated adviser network to which it pays commissions of 125% of the first year's premium and 7.5% of subsequent years' premiums. Best estimate lapse rates are 20% in year 1, 15% in year 2, and 12.5% in year 3 and onwards. Profit margins are positive but relatively low due to adverse claims experience. PYL Life uses the projection method for calculating policy liabilities.

PYL Life has just appointed a new Financial Controller (FC) who has a background in short-tail general insurance businesses.

a) The FC has noted your use of grouped policy data (model points) in the policy liability calculations. He has expressed concern that this approach will result in a less accurate valuation than would be the case using individual policy data. How would you respond to these concerns? (4 marks)

b) The FC has done some further background reading and has come across the accumulation method for determining MoS policy liabilities. What features of PYL Life's business complicate the use of the accumulation method for this business? (4 marks)

c) The FC has read your latest Financial Condition Report and has commented on an item in your analysis of profit entitled "discount rate changes". The analysis of profit table is as follows for the last three years:

Profit Analysis Item	**2006 $m**	**2007 $m**	**2008 $m**
Earnings on Shareholder's Capital	**2.0**	**2.3**	**2.6**
Planned Profits	**2.8**	**2.6**	**2.2**
Economic Assumption Changes	**1.4**	**-2.0**	**-1.7**
…			

The FC has queried why the impact of economic assumption changes is so large and almost wiped out planned profits in the last two years when, after discussion with the claims manager, "most of our claims are settled and paid within a few months of the date of death and our investments are held in matching short term fixed interest securities". What points would you make to the FC in response? (4 marks)

END OF QUESTION

QUESTION 2 **(15 Marks)**

Link Life has been in operation for just over 12 months in Australia. It specialises in investment-linked superannuation products, including deferred annuities and allocated pensions.

A single statutory fund has been established to write this business. Link Life has had a modest start to its Australian operations with new business inflows 10% lower than planned. Shareholders' capital is invested with the same asset mix as policyholders' funds, and there have not been any capital transfers since operations began.

You have just been employed as the Appointed Actuary for Link Life.

a) The policy liabilities for Link Life comprise the Life Investment Contract Liability and the Management Services Element (which Link Life calls the Deferred Acquisition Cost Asset or "DAC"). What are the key issues you will need to consider in determining the DAC for Link Life's business?

(3 marks)

b) After 12 months of operation, Link Life needs to produce its first set of annual financial statements. Your work experience student has followed the valuation procedures manual and produced a draft profit analysis based on the first version of the profit and loss statement:

	Actual $'000	Budget $'000	Variance $'000
Earnings on Capital	**70**	**80**	**-10**
Management Fees			
- Upfront	**2250**	**2500**	**-250**
- Ongoing	**405**	**500**	**-95**
	2655	**3000**	**-345**
Acquisition Expenses	**-2700**	**-3000**	**300**
Maintenance Expenses	**-200**	**-200**	**0**
Total Expenses	**-2900**	**-3200**	**300**
DAC Movement	**405**	**490**	**-85**
Shareholder Profit	**230**	**370**	**-140**

Given this analysis and what you know about Link Life's first year of operation, what are the likely causes of the DAC movement being smaller than expected?

(3 marks)

c) The profit and loss statement produced by the Finance Department shows the actual Shareholder Profit is $487,000 compared to the $230,000 shown in the draft profit analysis. Your student is puzzled by the “unexplained” profit difference. You suspect there may be an issue with the Life Investment Contract Liability component of the policy liabilities. What investigations and checks would you ask your student to perform to help them determine where a problem may have arisen with this component of the policy liabilities?

(6 marks)

d) On further investigation, your work experience student has discovered that there were some “operational issues” in unit pricing in the last week of the financial year. You discuss this further with the unit pricing team who inform you that excessive management fees were deducted from policyholders in the last 3 weeks of the financial year. Further, the policy administration team informs you that there are monies received from policyholders during the same period which have been recorded as income, but have not yet been allocated to individual policyholder accounts. How would these discoveries influence your valuation of Link Life’s policy liabilities? (3 marks)

END OF QUESTION

QUESTION 3 **(17 Marks)**

IAP Life has a statutory fund with a large block of closed participating investment account (Par IA) business, and another statutory fund where various other open non-participating term insurance products are written. In respect of the participating investment account business, policyholders and shareholders participate in profits in the ratio of 80% / 20%.

a) You have been given the following information in respect of the participating investment account business. Calculate the Value of Supporting Assets as at 31 December 2008 for this business. Assume that nil tax applies to the statutory fund in which this business is written. State any other assumptions you need to make.
(5 marks)

	Par IA $'000
31/12/2007 Valuation	
Policy Liabilities	261,574
Policyholder Retained Profits	72,111
Shareholder Retained Profits	18,028
Cost of Declared Interest	3,876
2008 Investment Earnings	30,773
2008 Cashflow Items	
Premiums	0
Death Claims	-3,214
Surrender Claims	-76,434
Maintenance Expenses	-2,990
Total Cashflow Items	-82,638
2008 Non-Investment Experience Profits / (Losses)	
Deaths	132
Surrenders	382
Maintenance Expenses	-186
Total Non-Investment Experience Profits	328
Cost of Best Estimate Interest	3,974

b) The CFO has asked you to advise on the implications of making a large one-off special interest declaration on:
   i) The Policyholder Retained Profits of the statutory fund
   ii) The policy liabilities at 31 December 2008 for the investment account business
   iii) The reported MoS profit for year ending 31 December 2009 for the participating investment account business
   iv) The capital adequacy requirement of the participating statutory fund

   What points would you make to the CFO in respect of each of the above items?
(4 marks)

c) The Risk Product General Manager has noted that the rapid growth in the term insurance portfolio is causing considerable strain on the capital resources of IAP Life. He has suggested that a far better way of utilising the policyholders' assets would be to arrange a "loan" to the non-participating statutory fund using the participating statutory fund's assets. What are the key considerations that you as the Appointed Actuary would need to make, and what other issues would the Board and management need to consider?

(8 marks)

END OF QUESTION

QUESTION 4 **(17 Marks)**

You have just been employed as the Appointed Actuary of Book Life, an Australian life insurer. Book Life has a large existing portfolio of highly profitable individual yearly renewable risk business, providing lump sum and disability covers. In force individual risk premiums currently total $100m.

In early 2007, Book Life won the tender for a large superannuation based group risk scheme for a 3 year term, which offers life cover and TPD cover for small sums insured and minimal underwriting. Book Life came on risk for this portfolio from 1 July 2007. The total annual premium for this scheme is $80m, and the premium rates are guaranteed for the 3 year term.

The tender was very competitive and Book Life won the business by offering heavily discounted premium rates for this scheme.

You are now carrying out the policy liability valuation at 30 June 2008 for Book Life’s annual financial statements. Your actuarial student has provided you with the following information and proposed best estimate assumptions regarding the scheme. She has told you that the actual claims experience for the 12 months to 30 June 2008 is in line with the pricing assumptions used in the tender for the scheme:

		2007-08 Actual	**2008-09 Assumed**	**2009-10 Assumed**
Earned Premium $m	**Life**	50	50	50
	TPD	30	30	30
Incurred Claims Ratio	**Life**	98%	98%	98%
	TPD	95%	95%	95%
Expense Ratio	**Life**	6%	6%	6%
	TPD	6%	6%	6%
IBNR & RBNA $m	**Life**	15		
	TPD	20		

a) Calculate the MoS policy liabilities for this scheme as at 30 June 2008. Assume it is in a separate Related Product Group to the existing individual risk business, that the appropriate risk free discount rate to use is 6% p.a., and that unearned premiums are included elsewhere in the balance sheet liabilities. State any other assumptions you need to make. (5 marks)

b) The CFO takes you aside to forewarn you that the CEO will be “extremely unhappy” when he sees your valuation results. He asks you why you can’t simply “reduce the liabilities” just for this year. How would you respond? (4 marks)

c) As expected, the CEO of Book Life has called you to express his "total disagreement" with your valuation results. He questions whether your assumptions regarding the group risk scheme are valid. He also questions you as to why Book Life needs to recognise a capitalised loss on the group risk scheme when the rest of Book Life's business is so profitable. He also tells you that he has a good relationship with the scheme trustees and is confident that in the repricing at the 3 year mark, Book Life can achieve a significant increase in premium rates without putting the business at risk of leaving. Draft your memo in response to the issues raised in the CEO's phone call.

(8 marks)

END OF QUESTION

QUESTION 5 **(19 Marks)**

You have recently been employed by GHJ Life as its Valuation Actuary. GHJ Life operates in Australia and is a wholly owned subsidiary of KLA Holdings. GHJ Life's two product lines are:

- Superannuation investment linked deferred annuities and allocated pensions sold through GHJ Life's financial planning network, which charge a single flat management fee of 2.0% p.a. of Funds Under Management (FUM), but which also offers a large account rebate of up to 0.1% p.a. The large account rebate was introduced to the product during the year.
- Death, TPD and trauma covers for low sums insured and with minimal underwriting, distributed through direct mailing to the customer base of KLA Holdings. The new business written during 2007 had negative profit margins because of poor response rates to GHJ Life's mailings.

GHJ Life uses the MoS valuation method for both statutory financial reporting and internal management reporting purposes. Overall, profit margins for both products are positive, but have been declining in recent years mainly due to growth in management expenses. Despite this, GHJ Life has managed to pay a dividend to KLA Holdings each year. GHJ Life has also recently started calculating its Embedded Value as an additional management reporting tool.

a) What are the two components of an Embedded Value and what are the main steps you would need to take in order to calculate them? (4 marks)

b) The Financial Controller has read your Embedded Value report as at 31 December 2007. He has noted that the Embedded Value decreased during 2007. He has asked you how this has occurred when a positive MoS profit was recorded for 2007. What features of GHJ Life's experience during the year might help to explain this result, and what other factors might be significant contributors to this result? (7 marks)

c) KLA Holdings has been approached by FBM Holdings who wishes to sell its life insurance company, SDF Life. SDF Life writes similar products to GHJ Life and also distributes its products in a similar way as GHJ Life. As part of KLA Holdings' deliberations about the approach, you have been provided with the latest appraisal value that SDF Life has calculated for its own internal management reporting purposes. The CFO of KLA Holdings has asked you to advise on the key issues that would need to be considered in using SDF Life's appraisal value as an input to the Board's considerations about the purchase price that might be offered for SDF Life. Draft your memo in response to the CFO's request. (8 marks)

END OF QUESTION

QUESTION 6 (20 Marks)

First Stage Life (FSL) is a life insurance company operating in the small Pacific Island of Jomu. FSL has just been acquired by Parent Life, a large Australian life insurer, and you have been appointed as FSL's Actuary.

FSL writes simple guaranteed investment account business, where the company guarantees to credit a fixed rate of return to policyholders' single premium deposits with policy terms varying between 1 and 5 years.

Product design in Jomu is largely driven by the availability of Jomu Reserve Bank Bonds (JRBBs), which are zero coupon bonds with interest payable on maturity, with available terms ranging from 3 months to 3 years, and guaranteed by the government of Jomu. Historically, the available yields on JRBBs have generally been far in excess of crediting rates on investment account business offered in the market, reflecting policyholders' unsophisticated approach to life insurance and a lack of competition in the market. However yields are volatile largely due to occasional bouts of political instability in the country, and the sovereign credit risk rating of Jomu is equivalent to junk bond status.

The Ministry of Finance, the local life insurance regulator, has established that life insurers in Jomu writing this sort of business need to hold capital reserves of 8% of the accumulated account balances. In addition, life insurers must hold a minimum of 30 million kopoks (the local currency) in order to obtain a life insurance license.

a) Jomu's financial reporting regime uses the same reserves as the regulatory requirements. What would you expect the reported profit of a cohort of FSL's business to look like over the expected life of the policies and why?

(4 marks)

b) Parent Life's Chief Actuary has asked for an assessment of Jomu's capital requirements against the Australian Capital Adequacy Standard. How would you apply each element of AS3.04 in deriving the overall capital adequacy reserve (capital reserves over and above the accumulated account balances) for FSL's business, and how significant do you think each element would be?

(8 marks)

c) Based on your calculations, capital of 4% of accumulated account balances would be sufficient under the Australian Capital Adequacy Standard. A local Board member, who is keen to impress FSL's new owner, has seen the results of your calculations. He has suggested to you that since the local requirements are clearly conservative, FSL should immediately repatriate all capital in excess of local regulatory requirements back to Parent Life. Draft a memo (including your recommendations) to the Board member responding to this suggestion.

(8 marks)

END OF QUESTION