Institute of Actuaries of Australia

2010 PART III EXAMINATIONS

Subject Title: **C2B**
Life Insurance

Date: **Wednesday 20th October 2010**

Time**: 1:45 pm – 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: **Five** (5)

Question	**Marks**
1	20
2	21
3	20
4	20
5	19
Total	**100**

Candidates are required to answer ALL questions.

This paper has ten (10) pages (excluding this page).

INSTITUTE OF ACTUARIES OF AUSTRALIA

COURSE 2B LIFE INSURANCE **OCTOBER 2010 EXAMINATIONS**

Answer all 5 questions

QUESTION 1 **(20 Marks)**

You are working for a long established medium sized Australian life office that sells mainly individual risk products which pay a 100% up front commission. You have been recently been appointed as the project actuary to redesign the financial planning process. Previously, the business plan was done using crude ratios and the method is now considered to be unsatisfactory by management Your role is to develop a business plan for the next 3 years for presentation to the Board.

a) Identify the detailed information that you require in order to construct the business plan. (3 Marks)

b) You are given the following information as at the end of the last year:

Balance Sheet	
Assets	$m
Fixed Interest Investment	300
Liabilities	
Projected Policy Liabilities	-890
IBNR (Undiscounted)	300
Outstanding Claims (Discounted)	100
Surplus	790
Details of Projected Policy Liabilities	$m
PV Claims	3,000
PV Future Commission	500
PV Future Expense	250
PV Future Premium	5,000
Best Estimate Liability	-1,250
PV Profit Margins	360
Projected Policy Liabilities	-890
Other information/assumptions	$m
In force Annual Premium	600
Expected New Business Annual Premium next year	100
Expected Claims next year from in force	300
Expected claims in a full year for next year's new business	50
Earned interest rate	5%
Tax Rate	30%
Profit Carrier is claims	

Assumptions:

- **New business enters half way through the year.**
- **The profitability of the new business is the same as that for the inforce business.**
- **Budgeted expenses are the same as those included in the projection model.**

Based on the above information, calculate the expected IFRS profit (net of tax) for next year's business plan, showing the detail of all calculations. (7 Marks)

c) You have provided the first draft of the plan to the marketing manager showing the projected IFRS profits for the next 3 years. The marketing manager has asked why the IFRS profit is only projected to increase marginally, despite a significant increase in new business volumes (about 50% p.a. for the next 3 years). Outline your reply. (3 Marks)

d) The CFO has noticed that another company has changed their business plan to be based on Appraisal Value Earnings rather than IFRS profit. Discuss the differences between Appraisal Value Earnings and IFRS profit as used for business planning. Amongst other issues, in particular address new business profitability, changes in assumptions and the treatment of expenses. (7 Marks)

QUESTION 2 **(21 Marks)**

Internationally owned Australian Life Insurer BLY Australia Limited specializes in selling Yearly Renewable risk business including Term, Rider and Stand Alone Trauma, Rider and Stand Alone Total and Permanent Disability (TPD) and Disability Income/Income Protection business. BLY does not use any reinsurance on its risk business.

You are the Senior Financial Reporting Actuary performing the 2010 valuation. You are currently looking at the Analysis of Profit for the Disability Income business. The key components of the analysis of profit (ignoring new business during the year) are set out in the following table. There has been no change to the valuation basis.

ANALYSIS OF PROFIT	**$m**
Planned Profit	**20.5**
Expected less Actual Morbidity Impact on in force business	**(1.4)**
Expected Impact of Morbidity on in force business	**1.6**
Expected gross morbidity claims	1.4
less Expected gross reserve release on claims terminating/continuing	(1.0)
plus expected gross CICP reserve set up on expected new claims	1.2
Actual Impact of Morbidity on in force business	**3.0**
Actual gross morbidity claims	1.9
DII Gross Reserve Released on Continuing Claims	1.5
DII Gross Reserve Released on Claim Terminations	(2.8)
DII Gross Reserve Created on New Claims	1.6
plus increase / decrease in IBNR Reserve Over Period	0.8
Expected less Actual Lapse Impact on in force business	**0.8**
Expected release of policy liability on lapse	7.8
Actual release of policy liability on lapse	7.0
Expected less Actual Maintenance Expenses on in force business	**(0.4)**
Expected maintenance expenses	2.1
Actual maintenance expenses	2.5
Actual less Expected Interest Incurred on in force business	**0.0**
Actual interest incurred on beginning policy reserve	(15.4)
Expected interest incurred on beginning policy reserve	(15.4)
Actual less Expected premiums received on in force business	**(0.5)**
Expected Premiums paid on in force Business	45.6
Actual Premiums paid on in force Business	45.1
Unexplained Profit	**(0.4)**
ACTUAL PROFIT	**18.6**

a) Explain why an analysis of profit is performed. **(3 Marks)**

b) Based on the above analysis, you have been asked to write a commentary to the Head of Life Risk on the profit of the DII business, with a particular reference to the morbidity and lapse experience profit. He would also like to understand what the drivers are for these components of the profit with an overview of how the reserving impacts on the profit. Draft your commentary. (5 Marks)

c) Suggest possible reasons for

- **the difference between actual and expected premiums, and**
- **the unexplained profit.**

What investigations could you perform to identify the reasons for the unexplained profit? (6 Marks)

d) The Head of Life Risk has raised the concern that lapse experience is different from the discontinuance reporting he is receiving from his team. Suggest reasons why they may be different. (3 Marks)

e) The number of disability income claims in payment has actually fallen from 362 to 350 claimants over the course of the year, yet your analysis of profit shows a morbidity loss during the year. Suggest reasons why this might be the case. (4 Marks)

QUESTION 3 **(20 Marks)**

You work for an international financial services company which operates on a regional basis across life insurance, superannuation/pensions, fund management and banking. Having had a successful career across a variety of actuarial and business areas within the Australian life insurance operations you have recently accepted an actuarial role in another region of the company working in establishing a new line of business.

Upon taking up your new role your initial assignment is to support the establishment of a traditional with-profits/participating line of business. This is one of the growth areas in your region, although your company does not currently have any substantial business in this product line. Being a developing area there is no uniform product design, however most providers offer a stable terminal bonus and look to distribute profits via an annual bonus.

You are working in a multi-disciplined team looking at developing this product line in your region.

a) **For the purposes of developing and establishing this new line of business, what areas would you investigate/research to familiarise yourself with this region, including the internal business areas you would consult? (5 Marks)**

b) **Being a developing line of business, the Regional Finance Director wishes to understand more fully the derivation of profits for internal management purposes, which is done on a Margin on Services basis. Noting your previous experience in Australia, he has asked you to outline the key features of the Margin on Services method of profit reporting in respect to this line of business.**

   Outline the purpose and characteristics (including benefits and limitations) of the MoS method. Also specify, with reasons, an appropriate profit carrier for the participating business line. (3 Marks)

c) **The initial investment policy established and managed by the regional fund management operations has the following benchmark asset allocation:**

Regional Shares	**25%**
International Shares	**15%**
Property	**10%**
Regional Government Bonds	**30%**
Regional Corporate Bonds	**10%**
Cash & Deposits	**10%**

   The Regional Finance director has suggested that using market value as the basis for the asset valuation for the purpose of the annual statutory financial reporting would be appropriate and not cause significant profit distortions. In general, what assumptions are the Finance Director making and what reservations might you express including specific suggestions in respect of each asset class above? (3 Marks)

d) In formulating the overall product design, you have been asked to set out the bonus policy for this new class of business.

(i) What are the key principles for the establishment of a bonus policy for this line of business? (2 Marks)

(ii) The regional Sales & Marketing Director for the company wishes to maintain constant bonus levels for the first 5 years, as a point of differentiation which he believes will establish the product in a growing market.

Outline the likely pros and cons of this approach. What further consequences may arise for the company in adopting this bonus structure? (7 Marks)

QUESTION 4 **(20 Marks)**

You are the Chief Valuation Actuary for a medium sized Australian Life Insurance Company which launched a new unitised investment product 12 months ago, and has had a successful year of sales. The product specifications are as follows:

- **Product is single premium**
- **There is only one investment strategy available to the customer being "Balanced"**
- **Customer has option of having a minimum guarantee of initial investment at any time in the future. The investment strategy is the same regardless of the option taken**
- **Fees are 4% pa (of unit value) for the capital guaranteed option and 1% pa for the non-guaranteed option and are deducted evenly throughout the year**
- **There is an up front commission of 2% for both options payable by the company to the financial advisor**
- **No surrender penalties apply**

It is now 30 June 2010 and this book of business needs to be considered for valuation purposes for the first time.

a)

i) List the accounting and actuarial standards which are relevant in calculating policy liabilities for these products (with and without the guarantee) and briefly explain why the information contained in each standard is important to the calculation. **(3 Marks)**

ii) Should the guaranteed business be treated as an insurance contract or an investment contract for accounting purposes? Give reasons for your answer. **(1 Mark)**

Suppose that $1 billion of single premium deposits for the non-guaranteed option were received evenly throughout the year, and investment returns were 10%, also spread evenly throughout the year, and no one has yet surrendered.

b) Describe and calculate the Policy Liability for the non guaranteed business as at 30 June 2010 under LPS 1.04? **(4 Marks)**

c) Describe (in words) the steps you would take to perform a stochastic calculation of the capital required to support the guaranteed option business. **(5 Marks)**

Suppose that the policy liabilities for the non guaranteed business were to instead be calculated using a best estimate projection methodology (without any profit margins) and the following assumptions.

- **Risk discount rate of 10% and expected earnings of 10% pa**
- **Maintenance expenses (including commissions) of 0.5% of FUM**
- **All surrenders occur at the end of each financial year and according to the table below**

Year of Surrender (from inception)	**Assumed Surrenders**
1st	**0%**
2nd	**20%**
3rd	**20%**
4th	**100%**

d)

i) Calculate the best estimate liability using the projection methodology and state any assumptions made. (4 Marks)

ii) Compare your calculation to your answer to part b). What does the difference between the two figures represent? (3 Marks)

QUESTION 5 (19 Marks)

You are the Appointed Actuary for the Australian subsidiary of a specialist reinsurer based in Luxemburg which operates in 20 countries globally with a combination of branches and subsidiaries.

Two years ago, following the Global Financial Crisis (GFC), the CEO of the global organisation saw an opportunity to focus on business with investment guarantees and recommended that all operations pursue such a strategy.

This strategy has been very successful and the company has gained significant market share in the post GFC environment.

The Australian subsidiary has been successful in the reinsurance of business with investment guarantees and has reinsured $500 million of assets and liabilities of business with investment guarantees. This has been retroceded to the parent company with a recapture clause (and was approved under LPS230).

Details regarding the Australian subsidiary :

Total Assets	**$1,000 million**
Excess Assets over solvency requirement	**$150 million (being $50m of retained earnings and $100m of capital)**
Excess Assets over capital adequacy requirement	**$100 million (being $50m of retained earnings and $50m of capital)**
Liabilities retroceded to parent	**$500 million**
Retained earnings	**$50 million (all held within the statutory fund)**

A second crisis has hit the European Union and rumours begin to circulate in the press that the parent company is in financial difficulties, with speculation that the parent company will be downgraded by Standards and Poor's from A to BBB+.

The parent company has asked all local operations globally to remit all available retained earnings as a special dividend.

Given the relatively large size of the Australian operation and the relatively strong levels of cash ($100m), the parent company have asked if the Australian company can purchase their Polish funds management company for $200m. The Polish company has net assets of $50m, so the transaction would result in goodwill of $150m.

The required capital requirement in Poland of $30m is met by the net assets.

a) **The Australian regulator and the auditor have both asked for an update on the finances of the parent company. Set out the information required and questions to head office to help you prepare a response to the regulator and auditor. (5 Marks)**

b) **The CEO of the Australian business has asked you to consider recapturing the asset intensive retrocession. List the factors you would need to consider and the investigations that you would need to undertake. (5 Marks)**

c) **Draft your advice to board on the suitability of paying the proposed dividend, including what factors you would consider in setting an appropriate level of target surplus. (4 Marks)**

d) **The CEO of the Australian business has asked for your input in relation to the suitability of the purchase of the Polish funds management company. Discuss the points you would include in your advice, and make a clear recommendation on the proposal. Note that this purchase would be concluded after the payment of the proposed dividend. (5 Marks)**

(LPS 3.04 Capital Adequacy Standard sections 5.1.2 and 10.5.2 are relevant).

END OF PAPER