Institute of Actuaries of Australia

2010 PART III EXAMINATIONS

Subject Title: **C2A**
Life Insurance

Date: **Wednesday 28th April 2010**

Time**: 9:15 am – 12:30 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	22
3	21
4	18
5	19
Total	**100**

Candidates are required to answer ALL questions.

This paper has eight (8) pages (excluding this page and the blank back page).

INSTITUTE OF ACTUARIES OF AUSTRALIA

COURSE 2A LIFE INSURANCE **APRIL 2010 EXAMINATIONS**

Answer all 5 questions.

QUESTION 1 **(20 Marks)**

Life Insurer Morby Ltd. specializes in selling a range of products such as stand alone Trauma, Total and Permanent Disability (TPD) and Disability Income.

You are the Pricing Actuary.

You are reviewing the current assumptions used in the pricing of these products.

This review will include an analysis of the lump sum claims experience for stand alone Trauma and TPD over the past 12 months.

You have been provided with the following information:

Current ultimate incidence rate pricing assumptions for Trauma and TPD (weighted by ages as anticipated by the profile used for pricing) are:

Gender	Trauma	TPD
Male	0.0200	0.0025
Female	0.0225	0.0015

The expected decrease in incidence rates arising from selection effects in the first two years for each product are:

Year	Trauma	TPD
1	60%	90%
2	20%	50%

Exposures measured in policy years, categorized by policy duration, are:

Year	Trauma male	Trauma female	TPD male	TPD female
1	6,526	5,675	1,519	1,235
2	15,602	13,567	3,195	2,598
3+	71,696	62,345	15,991	13,001

Information about average sums insured is:

	Trauma male	Trauma female	TPD male	TPD female
Average Sum insured	$65,000	$49,000	$125,000	$56,000

Claims data for the past 12 months is:

	Trauma male	Trauma female	TPD male	TPD female
Number of claims	**1,600**	**1,325**	**30**	**45**
Average claim size	**$58,000**	**$45,000**	**$123,000**	**$55,000**

(a) Based on this data, carry out appropriate analyses of the lump sum experience over the past 12 months. Present your findings in terms of actual to expected ratios for trauma males, trauma females, TPD males and TPD females. Show all workings in your answer. (7 Marks)

(b) Provide a commentary on your experience analysis. (4 Marks)

(c) In determining the pricing assumptions, describe any further analyses you would carry out and why? (3 Marks)

(d) The marketing manager has raised concerns with you about the impact of a predicted recession on the individual disability business. Describe the impact a recession is likely to have on the following:

i) lapses
ii) incidence rates
iii) termination rates

for individual disability business. (3 Marks)

(e) The CEO of Morby Ltd. wants to launch an enhanced TPD product in the market. The CEO notes that there have not been many TPD claims compared to trauma claims, so thinks that making the TPD product slightly more attractive is reasonable. He has proposed that restructuring TPD with a 3-month waiting period, instead of the standard 6-month waiting period, would be a clever and low-risk innovation. Comment on the CEO's proposal. (3 Marks)

QUESTION 2 (22 Marks)

You are the pricing actuary of a publicly listed medium sized Australian life insurance company, Growth Ltd.

Growth's risk business is held in Statutory Fund No.1. The total risk premium is \$600m per annum and includes group and individual risk business covering life, Total and Permanent Disablement (TPD), Trauma and Income Protection insurance products.

A very large industry superannuation fund, for which Growth Ltd. is not the incumbent insurance provider, conducts a tender every three years for the group insurance cover offered by the fund. The premium for this cover is expected to be at least \$100m per annum, with premium rates to be guaranteed for three years. Cover available includes life, TPD and group salary continuance insurance. The tender has just come to market.

Experience data for the fund's last 6 years is available to interested tenderers. The experience data covers life and TPD insurance. It also covers group salary continuance insurance, but only for 1 and 2 year benefit periods. At the request of the trustees of the superannuation fund, the available group salary continuance cover options are to be expanded to include a 'to age 65' benefit period.

(a) Describe the main considerations in pricing for the group insurance cover associated with this fund. (7 Marks)

(b) Discuss the main issues to be considered with offering the new 'to age 65' feature compared to the existing 1 and 2 year only benefit periods? (4 Marks)

(c) You have been told that the business will be put to tender again in three years. Discuss the impact on pricing and how Growth Ltd manages the business? (3 Marks)

(d) Given the size of the potential new business relative to Growth Ltd's existing risk business, it has been suggested that the underwriting and claims management functions should be outsourced. The outsourced work would be provided by just one company.

Discuss the issues to be considered in outsourcing these functions. (3 Marks)

(e) Describe the major strategic and operational risks associated with this large block of business. (5 Marks)

QUESTION 3 (21 Marks)

You are an Actuary working in the marketing department for a large life insurer that has been operating for 30 years in a well developed south-east Asian country. The insurer sells a range of products but its major sales come from traditional participating products as well as allocated pensions. The allocated pensions have the same features and government regulations as for allocated pensions in Australia.

Up to this point in time, it has used a cash dividend approach to distribute profits to its participating policyholders. The Board and CEO now want you to investigate a change in the way that policyholder profits are distributed. In particular they want you to consider the issues involved with moving to a reversionary and terminal bonus system for new and existing policies.

(a) Describe the three main types of reversionary bonuses. (2 Marks)

(b) Describe the major advantages and disadvantages for:

i) an individual policyholder (3 Marks)
ii) the insurer (3 Marks)

in moving from a cash distribution of profit to a reversionary and terminal distribution of profit.

(c) Describe the product features of an allocated pension. (3 Marks)

The marketing manager of the retirement income products is looking to introduce a new product called a "5 star annuity" with the following features:

- **Upfront investment is placed in an account for the policyholder.**
- **Investment choice of the account is up to the policyholder.**
- **Annuity payments and fees are deduced from the account, investment income is added to the account.**
- **If the account balance is positive on death, then the balance is paid to the estate of the annuitant.**
- **A minimum death benefit.**
- **A fixed annuity payment of x% of the starting account balance.**
- **A guarantee that, even if the balance of the account is $0, an annuity payment of x% of the starting account balance will continue until the death of the annuitant.**
- **In return for this guarantee, an additional fee is charged on the account balance.**

They are hopeful that they will capture a large part of the market and leap ahead of the other participants in the market.

(d) What are the advantages of the "5 star annuity" product over an allocated pension? (2 Marks)

(e) Describe the factors that impact the cost of the guarantee? (3 Marks)

(f) Discuss the aspects, other than those outlined in your answer to (e), that you will need to consider when selling the "5 star annuity" product. (5 Marks)

QUESTION 4 **(18 Marks)**

MMM is a long established Australian Insurance Company, which has a substantial inforce block of YRT products and sales continue to be strong.

MMM is proposing to launch a new YRT death only product.

You are the product actuary for the YRT products.

You have been asked to recommend an appropriate reinsurance arrangement for the new YRT death only product.

You have the choice of recommending one of the following two reinsurance options:

Option 1 with Reinsurance Company A
Surplus with retention per policy = $300,000.
The applicable risk rate, in the first year, is $0.60 per $1000 of reinsured cover.
A selection discount of 100% applies in year 1.

Option 2 with Reinsurance Company B
Quota share, with 70% retained by the insurer.
Reinsurance commission = 25%.
A selection discount of 50% applies in year 1 and 25% in year 2.

You should assume that:

- **Distribution of Gross Sums Insured is:**

Gross Sum insured	% of policies
$180,000	40%
$500,000	35%
$812,000	25%

- **Number of YRT policies expected to be sold is 24,000 per annum with all new business sold on the first day of the year.**
- **Average office premium for YRT policies is $660 per annum.**
- **Death claim rate is 0.0003 for year 1, 0.0004 for year 2 and 0.0005 for year 3.**
- **Lapses of 10% occur each year and are on the last day of the year.**
- **Office premiums increase by 5% per year.**
- **Reinsurer's risk premium increase by 4% per year for Option 1 Surplus Reinsurance with Reinsurance Company A.**
- **Gross Sums Insured remain fixed from year to year.**

(a) Calculate the expected reinsurance cashflows (showing all workings) in years 1, 2 and 3 for a 1 year tranche of new business for:

i) Option 1:
Surplus Reinsurance with Reinsurance Company A (4 Marks)

ii) Option 2:
Quota Share Reinsurance with Reinsurance Company B (5 Marks)

(b) Based only on your calculations in part (a) recommend which reinsurance option you favour and why? (1 Mark)

(c) Specify, with reasons, any other calculations you would perform in determining which reinsurance arrangement you would recommend. (2 Marks)

(d) Besides the calculations performed, describe other factors you would consider in recommending the reinsurance option. (6 marks)

QUESTION 5 **(19 Marks)**

You are the Appointed Actuary for InsureCo Ltd, an Australian life insurer that has a large book of participating Whole of Life (WOL) business. The WOL has been profitable to date, but is getting more expensive to maintain as the supporting IT and policy administration systems begin to age.

InsureCo Ltd distributes reversionary bonuses and terminal bonuses to the WOL business.

The WOL business has been exclusively sold by tied agents. InsureCo is now looking to diversify both its product lines and its distribution channels, with plans in place to build relationships with independent life risk brokers and to develop yearly renewable term (YRT) products. The YRT product will provide insurance cover for death, total and permanent disablement (TPD) and trauma.

The CEO of InsureCo has been analysing the business and accounts of a competitor, Gotcha Ltd. Gotcha Ltd concentrates on selling a range of direct to consumer life insurance products, with business characterised by high volumes and low sums insured.

(a) Through her own analysis, your CEO has identified that the level of expenses in InsureCo appear noticeably higher compared to Gotcha Ltd. She would like you to comment on why this might be the case. Describe the issues that you would raise in addressing the CEO's concerns. (5 Marks)

(b) InsureCo has invested in a major new IT system with the intent to enhance its efficiency across the company, particularly the WOL business. The CEO wants to know how this investment will be reflected in bonus declarations on the participating WOL business. Discuss the implications for bonus declarations. (3 Marks)

(c) The CEO wants to move quickly to establish and build a distribution channel with independent life risk brokers to advise and sell the YRT product. Describe the costs that would be incurred in setting up the new distribution channel. (4 Marks)

(d) Alternatively, the CEO has mentioned that if offering YRT via brokers is too difficult then she would consider offering direct to consumer term products, thus competing with Gotcha Ltd.

Prepare a memo for the management team describing:

i) the product design and
ii) marketing approaches

that should be considered if the direct distribution channel is pursued.

(7 marks)

END OF PAPER