Institute of Actuaries of Australia

2009 PART III EXAMINATIONS

Subject Title: **C2A**
Life Insurance

Date: **Tuesday 28th April 2009**

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	23
2	20
3	18
4	22
5	17
Total	**100**

Candidates are required to answer ALL questions.

This paper has seven (7) pages (excluding this page and the blank back page).

INSTITUTE OF ACTUARIES OF AUSTRALIA

COURSE 2A LIFE INSURANCE APRIL 2009 EXAMINATIONS

Answer all 5 questions.

QUESTION 1 (23 Marks)

You are the Product Actuary for ZYX Life Ltd ("ZYX"). The legislative and regulatory framework that ZYX is subject to is identical to that found in Australia, other than the calculation of tax on life insurance products.

For all life insurance companies, tax on any life insurance policy is calculated on an "Income minus claims minus expenses excluding commission" basis. That is, all claims and expenses other than commission are deductible when determining taxable income. Movements in policy liabilities are considered as an income/expense (whichever applies in any particular year).

The exclusion of commission as a tax-deductible expense was put in place to prevent companies from paying high commissions to agents, and then being able to reduce their tax burden accordingly. Despite this however, initial commissions have still remained relatively high, and trail / renewal commissions have remained anywhere in the region of 2% - 10% per annum, depending on the particular company.

The life insurance company tax rate is 30%.

The cashflows below give the new business projections for a typical long term life insurance product for ZYX (figures are in $000's):

	Policy Year 1	Policy Year 2
Premium	824	850
Commission	1,236	70
Non-commission Expenses	420	85
Claims	240	415
Investment Income	-63	22
Policy Liabilities at start of year	0	353
Policy Liabilities at end of year	353	326

(a) Calculate the tax payable for each of the first 2 policy years and hence the net profit after tax for each of those 2 years. For the sake of simplicity you may ignore the contribution of future commission to the level of policy liabilities and its associated tax treatment, i.e. just treat the full movement in policy liabilities as taxable income or a tax-deductible expense in each year. State any other assumptions you make. [4 Marks]

(b) Various lobby groups have now forced the tax authorities to consider changing the taxation basis to include commission as a tax-deductible expense. However it is also proposed to raise the life insurance company tax rate to 45%.

(i) Recalculate the tax payable for each of the first 2 policy years on the new taxation basis and also the net profit after tax for each of those 2 years. [3 Marks]

(ii) Discuss whether the combined effect of these tax changes is likely to be favourable to ZYX. State any assumptions you make. [4 Marks]

(c) The decision has been made that the only change to the tax system is to raise the life insurance company tax rate to 45%, i.e. commission expenses will not be tax deductible. Explain what actions ZYX could now take to effectively manage their life insurance business. [6 Marks]

(d) Discuss the advantages and disadvantages of each of your actions in (c) above. [6 Marks]

QUESTION 2 (20 Marks)

You are the Product Actuary for Too Much Pressure Life Ltd ("TMP"), an Australian life insurance company. You report to the Head of Product and Pricing who is out of the office for a couple of days, so the new CEO has come straight to you for your advice. He wants to boost sales of the Trauma product and thinks that sales of this product are far lower than they should be, both for TMP and for the industry as a whole.

He has been reading up on obesity, and thinks that including obesity as a condition for Trauma would generate massive interest in the market. As the first company to offer Trauma cover for this condition in the market, sales could be spectacular.

He has found some research which forecasts obesity to rise from a prevalence rate of 25% of the population to 40% of the population within 5 years. As such he cannot see that a price rise of more than 15% on the existing product would be necessary.

He does realise however that simply listing "obesity" as a condition could be quite vague or imprecise, but nevertheless is keen to proceed with significant enhancements as soon as possible.

He wants your recommendation on the matter within 2 working days.

Draft a response to the CEO, outlining your thoughts about his proposal. You should cover:

(a) the appropriateness of including obesity as a trauma condition; [4 Marks]

(b) possible pricing approaches for a new condition such as obesity and the CEO's suggested price rise; [6 Marks]

(c) other matters you consider relevant; [5 Marks]

(d) any recommendations you wish to make. [5 Marks]

QUESTION 3 (18 Marks)

No More Mistakes Ltd ("NMM") is an Australian life insurance company that has sold a considerable amount of unit-linked business over the past 10 years. However it has had a range of problems developing for some time, among them:

- **An exodus of key experienced staff over the last 24 months and difficulty in finding suitable replacements with relevant experience;**
- **There are a large number of different unit-linked products on sale and in force, supported by an even larger number of relatively outdated IT systems which are becoming expensive to maintain;**
- **A subsequent loss of knowledge within the company of the features of each existing product and associated IT system(s);**
- **A history of unintentionally underpaying customers who voluntarily surrender their policy, often by several thousands of dollars. This has resulted in high legal costs and associated reputational damage.**

A new CEO has been recently appointed but is new to the life insurance industry. He has turned to you for advice on various matters as you are an external consultant whom the CEO feels may give a more independent view.

(a) The new CEO is concerned about the number and types of risks facing the company, and how to start addressing them. He wants you to brief him on the types of risk that NMM faces or will face shortly, with a brief description of each, and for each risk one action he can consider taking in the short term to begin mitigating that risk. Prepare the key points you would raise with him about these matters. [10 Marks]

(b) The CEO indicates to you that the Board has suggested outsourcing the policy administration and unit pricing of all existing business to an external third-party provider, in order that his and their focus can be on growing the business. What would you say to him with regards to this suggestion?
[3 Marks]

(c) Regardless of decisions to do with the existing business, the Board and CEO wish to simplify the sales and new business side of the company. They wish to launch a new product which will be the only NMM product for sale in the market, which will be managed off a single new administration/IT system.

They believe that with a new marketing campaign, sales can be strong and profits on this business can help offset any emerging losses or expenses associated with the existing business. They want to build in very high surrender charges in the first 10 years of the policy (the industry standard is moderate charges only on the first 3-5 years of the policy), so that policies which surrender early can help offset looming losses on existing business.

Provide your comments to the CEO on this proposal. [5 Marks]

QUESTION 4 (22 Marks)

As a consulting actuary to Get-A-Life Ltd, you are assisting the Appointed Actuary carry out the annual mortality investigation as part of the Financial Condition Report (FCR). Previous FCRs have indicated that mortality experience has been in line with pricing assumptions.

Get-A-Life Ltd sells a mix of individual life insurance policies. Its underwriting management standards were considered to be relatively relaxed up until about 3 years ago, at which time a new CEO was appointed. The incoming CEO quickly focused on improving the underwriting area, primarily through the immediate recruitment of a new Chief Underwriter as well as a number of other experienced underwriting staff.

You have the following data available (all sum insured figures are gross of reinsurance recoveries):

Policies in force for 3 years or less:

Age band	Average number of policies in force over last year	Number of actual deaths over last year	Average Sum Insured per policy in force over last year	Average Sum Insured of death claimant over last year
16-35	2,214	3	154,000	148,000
36-55	8,456	69	250,000	240,000
56+	1,751	40	125,000	245,000

Policies in force for greater than 3 years:

Age band	Average number of policies in force over last year	Number of actual deaths over last year	Average Sum Insured per policy in force over last year	Average Sum Insured of death claimant over last year
16-35	5,214	9	165,000	149,000
36-55	11,456	134	261,000	270,000
56+	3,654	106	126,000	301,000

Mortality Pricing Assumption:

Age band	Average Annual mortality rate
16-35	0.00124
36-54	0.00875
56+	0.02491

The mortality pricing assumption was established from industry experience that was based on claim numbers rather than Sum Insured. The mortality pricing assumption has not changed for several years but is considered in line with current industry levels. Selection effects in early years of a policy can be ignored for the purposes of this analysis, as can any incurred-but-not-reported (IBNR) claims.

(a)

(i) Calculate the actual to expected mortality ratios using claim numbers and claim amounts. [6 Marks]

(ii) Comment on your results, identifying what aspects of the mortality experience you would raise as being of concern. [6 Marks]

(b) Discuss any further information or analysis you would investigate regarding the mortality experience and history of underwriting standards. [3 Marks]

(c) You are now aware that there are significant amounts of yearly renewable term policies, comprising approximately equal proportions of annually stepped premiums and level term premiums. For the purposes of the FCR and assessing the profitability of the business, what other investigations besides mortality would you recommend be undertaken? In your answer briefly describe the investigation, what you would be looking for and why you think it should be undertaken. [7 Marks]

QUESTION 5 **(17 Marks)**

You are the Appointed Actuary for a medium-sized Australian life insurance company. The company has a large book of traditional participating business, and a smaller book of annuities whose payments are linked to inflation.

The traditional business was offered with an option that provides a guaranteed minimum cash bonus rate of 0.5% per year. 90% of traditional policyholders took out this option and so have this ongoing annual guarantee in place.

Your company has been hit hard by the global financial crisis over the last 12 months. Equity returns and values have dropped dramatically, and in an effort to stimulate the flagging economy the central bank has dropped interest rates from 7% to 4%.

The company had a new Board recently appointed and as the Appointed Actuary, they have come to you with various questions.

(a) One Board member, Mr Gung Ho, has stated that he is not too concerned about the whole "crisis thing". The company has a relatively large (40-50%) exposure to bonds of all durations and as he notes, a decrease in interest rates means an increase in bond prices. He says that this should give a positive and significant return for these assets, for those that are sold in the coming 12 months. What are the main points you would raise in response? [4 Marks]

(b) Another Board member, Mrs Inter National, suggests that the risks the company faces can be mitigated by a variety of tools. She suggests that holding significantly more cash would alleviate some of the credit risks, and also investing in some overseas equities rather than just solely local equities would help diversify the investment exposure. Provide your comments on her suggestions. [4 Marks]

(c) Yet another Board member, Mr Con Servative, has concerns specific to inflation risks. He is concerned that Government interventions to stimulate the economy (such as via lower interest rates) may succeed 'too well', and give rise to significant levels of inflation. In what ways would increased inflation be a risk to the company? [4 Marks]

(d) The Board as a whole has directed the CEO to investigate options around the bonus rate on the participating traditional business as a way of managing the current situation. Historically the company has declared cash bonuses of 3-4% per annum. The Board and CEO believe that with the cut in interest rates, the expectations of any reasonable policyholder would be low and so the company should consider not paying a bonus at all. What would you say to the Board and CEO in terms of the main considerations of this matter, including any additional options open to them? [5 Marks]

END OF PAPER