INSTITUTE OF ACTUARIES OF AUSTRALIA

LIFE INSURANCE PART A **NOVEMBER 2005 EXAMINATIONS**

QUESTION 1 **(12 Marks)**

You are an actuary with responsibility for the unit pricing process of a large Australian life insurance company. The company offers a number of investment-linked products, with each product having a wide range of investment options. These products are all issued from the No. 2 Ordinary Statutory Fund.

You have awoken this morning to hear that the American equity market has fallen 20% in overnight trading and local analysts are forecasting a similar fall in the Australian market.

Once at work, you have re-valued the assets of the largest Australian equity only investment option allowing for the anticipated fall of the asset values and the results are:

	Assets	Deferred Income Tax Liability
	$'000	$'000
Value last night	2,565,893	56,893
Value this morning	2,052,714	?

The Chief Financial Officer (CFO) has suggested that the resulting Future Income Tax Benefit created by this market movement be used across the Statutory Fund to reduce the Deferred Income Tax Liability in other high performing investment options.

(a) Calculate the Future Income Tax Benefit for this Australian equity investment option after the fall in asset values. (2 marks)

(b) In a memorandum to the CFO:

(i) Explain the issues raised by the CFO's suggestion. (4 marks)

(ii) Indicate, giving reasons, whether you support the CFO's suggestion. (3 marks)

(c) How would you expect the future performance of the equity investment option to be affected if the CFO's suggestion was not adopted? (3 marks)

QUESTION 2 **(21 Marks)**

You are an actuary at Professional Life Insurance. For the last 5 years, Professional Life has sold a guaranteed renewable Disability Income Insurance product targeted at university degree holders working in a field related to their degree. The premium rates for this product are not guaranteed, with the company able to change the premium rates with 3 months notice. Professional Life has been successful in selling this product and now has a substantial block of this business.

This policy pays a monthly income for a maximum of 2 years for each claim if the insured is unable to work due to illness or injury. For example, a monthly claim payment may be paid for a maximum of 2 years for an illness or accident (only at the end of this claim period can another claim be paid for a different illness or accident).

You have just received the results of the morbidity experience analysis covering this 5 year period. The company's results are as follows (expected results are based on the pricing basis):

<u>Actual to expected ratios for claims incidence by main cause and occupation group</u>

	Cause of claim				
Occupation	Injuries/ accidents	Mental illness	Back / neck problems	Other causes	All causes
Medical practitioners	1.52	.95	1.25	.91	1.15
Legal	.89	1.34	1.05	.93	1.07
Other	.96	1.02	1.01	.96	.97
All occupations	1.48	1.01	1.15	.95	1.09

NB: A/E for incidence result = number of claims / number of expected claims

<u>Actual to expected ratios for claims termination by main cause and occupation group</u>

	Cause of claim				
Occupation	Injuries/ accidents	Mental illness	Back / neck problems	Other causes	All causes
Medical practitioners	.85	1.02	.88	.96	.90
Legal	1.01	.87	.92	.99	.93
Other	.98	.99	.98	1.00	.99
All occupations	.91	.95	.90	.99	.92

NB: A/E for termination result = number terminating / number expected to terminate

(a) Comment on the results of the experience analysis. (7 marks)

(b) What further investigations would you request to provide additional understanding of these results? (6 marks)

(c) Discuss what actions could be taken to improve the experience for new business. (5 marks)

(d) Recommend the action(s) the company should take to improve the overall profitability of this portfolio of business (i.e. both existing and new business). (3 marks)

QUESTION 3 **(20 Marks)**

You are an Australian actuary who has recently joined a large South African based life insurance company as a pricing actuary.

Your company wishes to develop a new individual life insurance product for release in the South African market. This product will provide a sum insured payable upon death caused specifically by AIDS, but not from any other cause.

You have been researching the situation in South Africa regarding AIDS and have found the following information, as compared with Australian experience:

	South Africa	Australia
Population (2005)	44 million	20 million
Life expectancy (at birth) – all lives (years)	43.3	80.4
Population mortality rate /1000 population	21.32	7.44
Infant mortality rate /1000 live births	61.81	4.69
Median age of population (years)	24.0	36.6
Population below poverty line	50%	<0.5%
Proportion of adults infected with HIV/AIDS	21.5%	0.1%
Number of people infected with HIV/AIDS	5.3 million	14,000
Number of deaths attributed to HIV/AIDS (in 2003)	370,000	<200
Number of people newly infected with HIV/AIDS (in 2003)	219,000	782

(a) Discuss what issues, requiring your consideration, might be expected to arise for this new product at the following times:

(i) Around commencement of a new policy; (4 marks)

(ii) Over the duration of a policy; and (2 marks)

(iii) When a claim occurs on a policy. (2 marks)

(b) Identify the rating factors that might be suggested for underwriting this new product and discuss the issues associated with each of them. (8 marks)

(c) (i) Calculate an indicative incidence rate for pricing this product. (1 mark)

(ii) What adjustments to this indicative incidence rate would you need to consider prior to finalising a rate for use in pricing this product?
(Note: This part is not numerical.) (3 marks)

QUESTION 4 **(18 Marks)**

You are a product actuary working for Great Super Solutions, an Australian life insurance company specialising in superannuation products. Your company is about to launch a new retail product onto the Australian market. This new product is known as a "Term Allocated Pension". Several other Australian companies already sell this type of product.

The key features of a Term Allocated Pension are as follows:

Term of policy	Chosen by the insured from a range set by the Government based on life expectancy.
Investment	The investor can choose from a range of investment-linked options.
Taxation status	Investments are rolled into the fund from superannuation funds. The product is treated for tax (in all respects) in the same way as a complying annuity.
Annual income payment	Determined by a formula incorporating the current value of the investment each year and a factor related to the remaining term.
Death benefit	No lump sum residual is payable upon death. However, the remaining income payments can be transferred to a nominated beneficiary of the insured.
Commutation (i.e. Surrender)	Only available in certain circumstances subject to approval by the company.

You have been asked to provide information for each of the following:

(a) The sales force has asked you to explain (including reasons), the circumstances in which the company would or would not allow a commutation of the pension. (3 marks)

(b) Identify for the administration department which pieces of information the company would require from the client at the time of commutation (assuming it was a case that is allowed). (3 marks)

(c) Specify for the customer service department, the information the company should provide to a client who requests a commutation. (3 marks)

(d) Prepare a discussion of the important considerations when setting a surrender value basis for this product. (6 marks)

(e) Advise the pricing actuary how commutations could be incorporated into the pricing model for this product. (3 marks)

QUESTION 5 **(14 Marks)**

You are the pricing actuary working for a small Australian life insurance company specialising in the risk market.

Your company is developing a new Yearly Renewable Term (YRT) policy designed to insure people who have undergone genetic testing which confirmed the presence of genes for a number of specified illnesses. For those genes being tested the applicant would be almost certain of developing an illness expected to cause death before age 60. The sum insured is paid upon death from any cause.

You have been requested to determine appropriate premium rates for this policy.

(a) What are the main considerations for each of the following areas of product development:

(i) The mortality assumptions to be used in pricing the product; (5 marks)

(ii) Pricing of the product; (3 marks)

(iii) Underwriting the product. (3 marks)

(b) Suggest three changes to the product that would make this product more viable. (3 marks)

QUESTION 6 (15 Marks)

You are an actuary employed by an Australian actuarial consulting firm. The Board of Directors of a small Australian life insurance company has asked you to attend a meeting along with one of the industry regulators. The company has only one Statutory Fund for superannuation investment-linked business and this business has only been issued under a group policy. The Statutory Fund is well capitalised with a significant buffer above the Capital Adequacy Requirement (i.e. reserves required under the Life Insurance Act 1995, "Life Act").

In this meeting you are informed that the company has failed to provide its annual reports and a copy of the financial condition report to the Regulator by the dates required under the Life Act. The reason given is that the company's Appointed Actuary (who was also the sole actuarial staff member) resigned and left after the end of the financial year prior to completing these reports. His current whereabouts is unknown. The company has tried to replace the actuary, but so far without success.

The company, with the support of the Regulator, wishes to ask your firm to provide an actuary who can act as the company's Appointed Actuary and advise them of a proper course of action. The company would like your firm to assign to you the task of performing this role.

(a) Identify the Regulator involved and briefly explain your answer. (1 mark)

(b) What provisions in the legislation could the Regulator consider invoking in these circumstances? (3 marks)

(c) Why might the Regulator initially refrain from invoking the provisions contained in the legislation, preferring to meet with the parties involved? (4 marks)

(d) You have now commenced this work and have found the <u>draft</u> Financial Condition Report. It contains the following extract:

> The transitional taxation arrangements ended on 30 June 2005.
>
> When these changes were announced, the company took the decision not to change the fee basis for our product, continuing to have large up front fees and a very competitive product. As a result we have continued to rely on the transitional tax arrangements on fees to support profitability. (These transitional arrangements resulted in only two thirds of the management fee income being assessable on any policy written prior to 1 June 2000.)
>
> As a result, from 1 July 2005 onwards, the expected underlying profitability of new business will be below the company's benchmark.

Based on this information, explain the situation to the company, including the underlying reasons. (4 marks)

(e) The company has continued to write significant levels of new business for the 4 months since the end of the financial year. What is your advice to the company?

(3 marks)

END OF PAPER