THE INSTITUTE OF ACTUARIES OF AUSTRALIA

LIFE INSURANCE **2000 EXAMINATIONS**
PAPER TWO

Answer All 5 Questions

Note to Students

For all questions, assume the tax legislation that was applicable in Australia on January 1, 2000, unless explicitly directed otherwise.

QUESTION 1 (16 Marks)

You have been asked to design a death and trauma product for a client. This product will be distributed using the life insurance company's internet web site. It is intended to have minimal underwriting.

a) Describe the anti-selection problems that the company may face for this product. (2 marks)

b) Describe ways that the product design can limit the problem of possible anti-selection. (5 marks)

c) The company wants you to calculate a value of the sales through the web-site and they have given you the forecast sales volumes.

   Identify, with reasons, the additional information you would need to verify the planned sales volumes. (3 marks)

d) The company has decided to establish a new life insurance company for this business in preference to writing the business from an existing statutory fund. What are the additional requirements that must be met under the Life Insurance Act, 1995? (6 marks)

QUESTION 2 (20 Marks)

As a consulting actuary, you have been engaged by a life company to review the appropriateness of the premium rates of a new yearly renewable term product for the Australian market. The product will be sold through independent agents. You have been provided with some of the assumptions underlying the company's profit testing.

a) Discuss the appropriateness of each of the assumptions. In each case, specify any additional information that you would seek to confirm your assessment.

Assumptions:

Mortality:	Males – 100% IA90-92M Females – 100% IA90-92F Reduced by 90% in the first year and by 25% in the second year to allow for underwriting.
Commission:	60% of annual premium in year 1 (with a "clawback" of commission for surrenders in the first year) 5% of annual premium in subsequent years Average Bonus of 50% of first year commission
Expenses:	Acquisition - $250 per policy Maintenance - $80 per policy Sales related – 20% of first year premium
Interest:	8% p.a.
Lapses:	Nil in year 1, then 10% thereafter
Reserves:	Policy liabilities using same assumptions as above

(15 marks)

b) How would your assumptions change if the product was to be offered through the mail to the company's existing policyholder base?

(5 marks)

QUESTION 3 **(23 Marks)**

A medium sized Australian life insurance company writes a broad range of products, including capital guaranteed and unit linked superannuation, immediate annuities, allocated pensions and all risk business. You are a consulting actuary and the managing director has asked you to carry out a strategic review of the business. The company has limited capital and the managing director would like you to focus on the company's use of capital and return on capital. He also requested you to assess the relative performance of the products.

a) Give, with reasons, two (2) measures of profitability you would recommend for a block of new business containing the following two (2) product groups:

   i. Single premium unit linked superannuation
   ii. Yearly renewable term insurance

How would you advise the managing director to interpret the two measures used for each product group. (4 marks)

b) What other information might you seek to determine the appropriateness of the premium rates and fees the company charges on the products that it sells? (4 marks)

c) When looking at the “return on capital” of a product, what are the components the “capital”? (3 marks)

d) The company has detailed revenue accounts by product group, (on a margin on services basis), and adequate actuarial projection models. Explain how you would review the profitability of products and the return on capital invested in the products for the existing business. (5 marks)

e) What actions can be taken to improve the company’s return on its capital? (7 marks)

QUESTION 4 **(29 Marks)**

You are a consulting actuary who has been approached by overseas investment bankers, who represent an investor interested in buying a certain Australian Life Insurance company.

They have a series of questions for you:

a) Write a response to them for each of the following three (3) questions:

i. “We have heard of this appraisal value concept – is it used in Australia and what is it used for?” (2 marks)

ii. “How do actuaries calculate appraisal values?” (2 marks)

iii. “How do appraisal values compare to actual sales prices for life insurance companies?" (2 marks)

After some further investigations, the investment bankers ask you to prepare for them an estimate of the appraisal value of the Australian life insurance company based on publicly available data. The company is not listed on the stock exchange and does not publish appraisal value information.

b) What material could you use to prepare this estimate? Explain how you would use each piece of data. (4 marks)

c) Assume that you can ask for information from the appointed actuary of the Australian company. What are the key additional reports or pieces of information you would request from the company on receiving access to the appointed actuary?

In addition you must prioritise the information requested and provide a justification for your priority.

(5 marks)

d) The Investment Bank is interested in the regulatory approach to setting capital requirements in Australia.

Give a brief explanation to the investment bankers outlining the conceptual basis behind the regulatory approach to capital requirements for Australian life insurers as required by the Life Insurance Act 1995.

You should also note issues that could impact future regulatory capital requirements for potential purchasers of this company given the following information:

Historic New Business Growth Rate	10%
Banker's Expected New Business Growth Rate	Year One 40%, thereafter 10%

(4 Marks)

e) You are given the following information for the company.

Calculate your estimate of the appraisal value based on the information provided. Clearly state any assumptions that you make.

$m	31/12/00
Total Assets	100
Capital Adequacy Requirement	85
MoS Policy Liabilities	75
Best Estimate Liabilities	55

Other information:

	Present Value if Discounted at the net earning rate	Present Value if Discounted at the risk discount rate
Present value of projected cashflows	X	75% of X
Value of One Year's Sales	7m	4m

Present Value of Future Sales	100m	50m

The MoS policy liabilities for all business are valued using the projection methodology.

(10 marks)

QUESTION 5 (12 Marks)

The Australian life insurance industry is in the process of adopting a new life insurance taxation basis. Risk Only Ltd, which sells only risk business, is reviewing the effect these changes will have on its policy liabilities.

The company is looking at the impact of the tax changes on its MoS policy liabilities.

The following table gives a breakdown of the assets and policy liabilities of the company.

	31 December 1999 (old tax basis)	**31 December 2000 (old tax basis)**
	$m	**$m**
Assets	100	110
Non Policy Liabilities	10	0
Policy Liabilities Indiv	-5	-10
Present Value of Future Profit Margins-Indiv	5	8
Policy Liabilities –Group	15	16
Present Value of Future Profit Margins-Group	0	0

Other information at 31 December 2000:
The company has two Related Product Groups:

- Individual Term Insurance (= “Indiv”)
- Group Life (= “Group”)

Present Value of effect of total additional tax: Indiv = 5m increase in payments
Present Value of effect of total additional tax: Group = 5m increase in payments

a) The results above have been prepared from projections that use model points to represent the business. Outline the steps that need to be taken to ensure that the model points are appropriate? (3 marks)

b) How does the new tax basis affect the calculation of policy liabilities, solvency requirements and capital adequacy requirements at 31 December 2000?

(3 marks)

c) Using the results as at 31 December 2000, comment on the main features of the components for each of the product groups. (3 marks)

d) Using the new tax basis calculate, at 31 December 2000:

i. The best estimate liabilities for each Related Product Group?

ii. The present value of future profit margins for each Related Product Group?

iii. The effect on MoS net assets of the company.

(You do not need to discuss the specifics of the tax changes. Assume that the tax changes do not impact the assumed net earning rate.)

(3 marks)

END PAPER TWO