THE INSTITUTE OF ACTUARIES OF AUSTRALIA

LIFE INSURANCE **2000 EXAMINATIONS**
PAPER ONE

Answer all 7 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 **(10 Marks)**

You are a consulting actuary.

You have been approached by a life insurance company from continental Europe. This company has been very successful establishing start up life insurance companies in a number of countries around the world.

The company believes its success is due to copying a standard company structure and marketing strategy. In particular, the start up companies sell only traditional participating business through tied agents.

The company now wants to apply this successful formula to Australia.

The company has some questions for you.

Draft a response, with justifications for any judgements, to the company for each of the following questions/comments:

a) How are surpluses usually distributed to traditional policyholders in Australia? In particular, how are unrealised capital gains handled?

(2 marks)

b) We hear that Australia has many standards for valuing liabilities in respect of policies. Why so many?

(3 marks)

c) How successful do you think our standard approach will be?

(5 marks)

QUESTION 2 **(10 Marks)**

The management of a large bank and the management of a large life insurance company are discussing whether or not to merge their businesses together.

The large bank has a large network of branches across the country. It also has a small life insurance company and a retail unit trust company.

The large life insurance company sells a wide range of products through tied agents and, more recently, through multi agents.

From the point of view of the life insurance company, discuss the possible effect of the merger on

i. the short term experience (i.e. the first 2 years); and
ii. the long term experience (i.e. more than two years)

for each of the following

a) overhead expenses (3 marks)
b) sales volumes (3 marks)
c) surrender rates (2 marks)
d) mortality rates (2 marks)

In each case, give a well reasoned argument for your views.

QUESTION 3 **(17 Marks)**

You are an actuary at a life office that specialises in risk business, that is term, TPD, disability income and trauma. You have been asked to analyse the company's expenses for the 1999 calendar year.

a) Give five (5) purposes for an expense analysis and explain how it is used in each case. (5 marks)

b) What are the factors that impact the cost of managing claims, and how do these factors impact on the structure and level of your claims management expenses? (9 marks)

c) Information technology expenses showed a significant jump in 1999 over previous years. The managing director has argued that:

- the large jump was due to one-off expenses due to addressing the "year 2000 bug" and will therefore not be recurring and so IT expenditure should be assumed to be the same as in previous years; and

- the IT department took the opportunity to upgrade the computer systems at the same time as fixing the "bug" and so future unit costs should be expected to reduce below previous levels.

Comment on these two assertions with respect to your expense analysis.
(3 marks)

QUESTION 4 **(17 Marks)**

You are the appointed actuary of XYZ Life, a company with a newly appointed Managing Director brought in from outside the financial services industry. XYZ has had a history of performing poorly and the new MD is planning to make major management and product changes. She asks you to explain to her the current year's surrender result for a certain block of single premium business and sources of profit and loss, in order to better understand where to target her changes.

Lapse assumption	10%
Surrender value (start of the year)	100m
MoS Liability	99% of Surrender Value
Surrenders	30m
New Single Premium	20m
Crediting Rate	12%
Initial Fee	5%

a) Determine the surrender profit for the year, clearly stating assumptions you make, given the information above. (3 marks)

b) On noting the results calculated above, she concludes that product design, including surrender values should be reviewed, and asks that you to commence the review. Describe the areas your review of the surrender value basis will consider?

(3 marks)

c) Explain the impact of AS4.01 on the surrender value basis for this type of business?
(3 marks)

Question 4 continues over page

Question 4 continued

d) XYZ Life is considering launching a new regular premium unit-linked investment product. You are examining methods by which the office can recoup its acquisition expenses from the policies.

Recommend two (2) suitable methods that the life office could use to recoup the acquisition expenses for this product. In your recommendation:

i. Describe each method;

ii. Give the relative advantages of each method;

iii. Indicate which of the two methods you prefer and why.

(8 marks)

QUESTION 5 (18 Marks)

You are the appointed actuary for a small life insurance company in Australia. The Accounts for 1999 have been audited and signed off and show a healthy profit of $30 million for 1999. You have completed the Financial Condition Report as at 31 December 1999 and have sent copies to the Board members. The Board meeting to approve the 1999 Accounts and Financial Condition Report is next week.

Large performance bonuses are expected for the management team.

Three days before the 24 March 2000 Board Meeting, you discover that the policy liabilities were undervalued by $2 million. A block of investment account business had passed the maturity dates and the computer system showed that maturity values had been paid out but unfortunately you have now found that no payments were made to policyholders.

a) How could the error be prevented in future ? (4 marks)

b) Discuss the actions you should take as a result of the discovery of the error. (5 marks)

c) If the Accounts are changed, list the items that are affected. (5 marks)

d) What are your professional responsibilities to the Board, APRA, Auditors and the management in relation to the error ? (4 marks)

QUESTION 6 **(18 Marks)**

You are the appointed actuary of a medium sized Australian life insurance company with, among other business, a portfolio of immediate annuity business.

A board member is concerned that the company bears 100% of the investment risk and mortality risk for this annuity business.

The director, who knows Redington's theory of immunisation, is concerned to hear that the durations of the assets and liabilities are not matched.

a) Give three (3) reasons why, for annuity business in Australia, the duration of the assets and liabilities may not be perfectly matched. (3 marks)

b) Discuss the implications of deliberately mismatching the assets and liabilities on:

   i) reported annual Margins on Services profit (2 marks)

   ii) capital adequacy requirements (3 marks)

   iii) the appraisal value (4 marks)

c) Describe three (3) methods that the company could use to either reduce the mortality risk or price for mortality risk and comment on how easy it would be to implement each method in practice. (6 marks)

QUESTION 7 **(10 Marks)**

A life insurance company, closed to new business, has the following business in force at 31 December 1999:

Product	**In force annual premium**	**Policy Liabilities**	**Profit margin on new assumption basis**
Unit linked ordinary single premium bonds	Not applicable	$100 million	0.5% p.a. of assets
Immediate annuities	Not applicable	$50 million	In loss recognition
Yearly renewable term death & trauma insurance	$20 million	-$5 million	20% of claims
Unit linked regular premium superannuation	$40 million	$300 million	0.6% p.a. of assets

The margin on services (MoS) valuation basis was revised at 31 December 1999. The old and new bases and the 1999 experience for the key items are shown below:

Item	**Old MoS Basis**	**Experience in 99**	**New MoS Basis**
Maintenance expenses	$70 per policy p.a.	$77 per policy	$80 per policy p.a.
Mortality for YRT term	80% IA 90-92 ult	68% IA 90-92 ult	70% IA 90-92 ult
Mortality for annuitants	60% IM/IF80 ult	57% IM/IF80 ult	55% IM/IF80 ult
Lapses & surrenders	13% p.a.	11%	11% p.a.

For each product, discuss the MoS profit in 1999.

You are not expected to carry out detailed calculations and can ignore any changes in the basis of taxation.

END PAPER ONE