THE INSTITUTE OF ACTUARIES OF AUSTRALIA

LIFE INSURANCE **2001 EXAMINATIONS**
PAPER TWO

Answer all 6 Questions

QUESTION 1 **(9 Marks)**

You are the actuary responsible for preparing the investment returns section of your company's Financial Condition Report for the period ending 31 December 2000.

(a) After discussion with the Investment department, you have extracted the information shown below. Showing the formula used, what total return on assets, net of tax, would you calculate based on this data?

(2 marks)

$m	**31/12/99**	**31/12/00**
Assets	253	304
Policy Liabilities	220	280
Other Liabilities	33	24

In addition the following results were observed during the year 2000,

Unrealised Gains	(3.1)m
Realised Gains	4.2m
Dividends and Interest	17.4m
Tax Paid – in respect of 2000	1.9m
Tax Paid – in respect of prior years	2.0m
Tax Provisioned - in respect of 2000	1.0m

(b) Comment on the result in (a) compared to market returns given the following additional information.

(7 marks)

Fund asset mix: 50% Australian equities, 50% Australian cash.

Share indices were:

	31/12/99	**31/12/00**
Price Index	1,428.5	1,492.1
Accumulation Index	2,456.3	2,652.4

Cash rates were stable over the year at 5%.

QUESTION 2 **(22 Marks)**

You are the actuary for a company, No Sales Limited, which until recently has not been successful in the single premium unit-linked superannuation product market. Given the rapid growth in this market in recent years, a new product is being developed to attempt to rectify the situation. You are a member of the project team working on the new product development and they are hoping you will assist with the following questions.

(a) "What steps should the project team include in the project plan for the product development? Please outline briefly what takes place in each step."

(4 marks)

(b) "Once we have identified the steps in the project plan, we know we are going to produce a model of the new product in order to review that it meets our profitability criteria. What assumptions are we going to need to make?"

(4 marks)

(c) "How do we expect that we will set these assumptions given the small volume of business we have in existing products? Surely our existing experience analysis is completely irrelevant!" In your response, consider each of the assumptions you outline in (b).

(8 marks)

(d) The project manager is a new employee of the company having most recently worked in the manufacturing sector. She sees the amount of time in the plan for assessing the product profitability and asks you to outline briefly for her the measures you are considering using in assessing product profitability and how they are derived.

(6 marks)

QUESTION 3 **(18 Marks)**

(a) A life insurance company sells ordinary unit linked business. It calculated the embedded value of business in force at 31 December 1999 (EV_0) using the then current basis. It has now calculated the embedded value of business in force at 31 December 2000 (EV_1) using an updated basis. The EV is calculated using the margin on services assumptions and a risk discount rate. The life insurance company holds capital at the capital adequacy level.

Set out the items, formulae and descriptions to show the movement from the opening embedded value to the closing embedded value in 2000 i.e. the movement from EV_0 to EV_1.

Define all symbols and interest rates. You can ignore the net worth components (i.e. ignore surplus above capital adequacy).

(10 Marks)

(b) The performance of the management team is assessed using the change in embedded value in the previous 12 months. Discuss the suitability of this measure, compared to margin on services profit.

(8 Marks)

QUESTION 4 **(24 Marks)**

You are an actuary appointed by the judicial manager, under section 168 of the Life Insurance Act 1995, to investigate the financial position of a small life insurance company. The life company cannot comply with the solvency standard and has no direct access to additional capital. It has one statutory fund containing participating whole of life and endowment insurance, yearly renewable term, disability income business and investment account business.

(a) Describe the main investigations you would carry out, giving reasons.
(12 Marks)

(b) Discuss the actions you would consider regarding the future of the company.
(8 Marks)

(c) Discuss the changes you could make to whole of life insurance policies to improve the company's situation.
(4 Marks)

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QUESTION 5 **(15 Marks)**

The table below sets out the claims experience for the disability portfolio of a life office. Premiums are derived to target a loss ratio (claims cost divided by premium) of 45%.

"New Claims" mean claims on which payments first commenced in the respective year.

"Claims from prior years" mean claims on which payments first commenced in years preceding the respective year. For example, Claims from prior years in year 2 includes claims that commenced payment in year 1 (Year 1 New Claims).

	$000			
Year	**1**	**2**	**3**	**4**
Revenue Premium	1,021	1,256	1,553	1,987
Claim Payments				
New Claims	68	81	106	127
Claims from prior years	90	238	364	509
Unearned Premium Reserve - Start	205	273	356	402
Unearned Premium Reserve - End	273	356	402	525
Claims in course of payment reserves – Start	181	481	742	1,043
Claims in course of payment reserves – End				
New Claims	366	437	569	681
Claims from prior years	115	305	474	671

(a) Analyse the data provided to determine the experience of the portfolio. (8 marks)

(b) Based on your analysis in part (a), comment on the experience of the portfolio and the reserving basis used by the life office. (4 marks)

(c) Outline any shortcomings of the analysis and identify the impact that this may have had on results. (3 marks)

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QUESTION 6 **(12 Marks)**

You are an actuary at one of the major writers of life risk insurance business in Australia.

The marketing manager has approached you proposing the following changes to the benefit design of the products.

(i) The removal of the three month exclusion period for certain conditions under the trauma policy. Currently, the trauma policy states that no claim will be paid in respect of certain conditions (heart attack, cancer etc) if first diagnosed within 3 months of policy commencement or reinstatement.

(ii) The removal of automatic blood tests when underwriting proposals above certain levels of cover.

(iii) Ceasing to write policies on substandard lives. All policies would either be accepted on standard rates or declined.

For each of the proposed changes:

(a) Comment on how the change will impact the company's ability to manage the risk of writing the product.

(6 marks)

(b) Propose ways that the company could reduce the adverse impact, if any, of the change.

(6 marks)

END PAPER TWO