THE INSTITUTE OF ACTUARIES OF AUSTRALIA

LIFE INSURANCE **1999 EXAMINATIONS**
PAPER ONE

Answer all 7 Questions

QUESTION 1 **(10 Marks)**

You are the actuary for a small life office that has, until now, only sold one product through direct mail distribution. The product is a guaranteed acceptance (that is, issued without underwriting) non-participating whole of life product with level premiums, which provides for the payment of the sum insured on death by accident in the first two years of the policy, and death from any cause thereafter. On non-accidental death within the first two years, premiums are returned with interest. Sums insured are generally small, and the company has so far not used reinsurance.

A new chief executive, feeling that the simplicity required of the direct mail channel hinders innovation, now wishes to expand the product range to include a number of risk products sold though other channels.

Specifically, he wishes to distribute yearly renewable term, TPD and trauma products through an agency force. He is not interested in selling disability income products because he has heard that some companies have been losing money in that market.

a) Outline the main issues that arise for their current and proposed products in determining an appropriate investment strategy. (3 Marks)

b) Contrast the investment strategy that you would recommend for each product. (4 Marks)

c) How would your answer to (b) differ if the company were planning to sell disability income products? (3 Marks)

QUESTION 2 **(18 Marks)**

For the life office outlined in Question 1 above, the new chief executive has written you a memo asking you to respond to the following questions:

a) What are the relative advantages and disadvantages of distributing products through a tied agency force versus using the multi-agent market? (10 Marks)

b) What forms of remuneration would be appropriate for each of these channels? In particular, please comment on the use of level commissions. (4 Marks)

c) Are there any other implications for the way that we manage insurance risk? Offer suggestions of how these may be addressed. (4 Marks)

QUESTION 3 **(20 Marks)**

Assume the Australian Government has announced major changes to life insurance arrangements. As a result of anti-discrimination legislation and a desire to ensure that people have adequate death cover, the following changes will be made to death cover insurance:

People will be encouraged to take out death cover of $250,000 and a small tax rebate will apply on premiums paid. Top-up cover will also be encouraged but no tax concessions will apply. The rating for top-up cover will be outside the new arrangements and will continue under existing methods. A person can only have top-up cover if they also have $250,000 cover under the community rated scheme.

A modified community rating structure will apply with unisex premium rates and no reference to smoking status. A lifetime rating structure will apply, where premium rates are level from policy commencement until death. Premium rates are set at a base level for people commencing a policy up to age 30. Above age 30, premium rates increase steadily by up to 10% p.a. for each successive age at entry, depending on each company's mortality assumptions.

Premium rates are not guaranteed and can be reduced for any reason or increased if industry experience worsens by more than 10%. Lives insured can transfer their cover between insurers and will maintain their entry level rating, through a system of transfer values. Applicants may be underwritten by insurers and can be declined or loaded.

There are no restrictions on the premium rates that Life Insurance companies can set and it is expected that competition will be healthy.

You are the appointed actuary of a medium sized life insurance company with a large portfolio of yearly renewable term business. You are now considering the implications of the legislation on your company's business. The legislation will apply to both existing and new cover.

(a) What are the premium rating issues for new business? (4 marks)

(b) Outline the premium basis for new business, giving reasons where appropriate. Ignore the transfer value elements of the premium basis. (6 marks)

(c) What are your recommendations for the conversion of the existing yearly renewable term step premium policies to the new structure? (4 marks)

(d) Describe how the transfer values can work and give a suggested basis. (4 marks)

(e) What other issues need to be considered? (2 marks)

QUESTION 4 **(10 Marks)**

You are a marketing actuary for a medium-sized life insurance company. You have just arrived at the offices of your company's key agents and intend to talk to them about the new term insurance product. Unexpectedly, they ask you about your company's existing single premium superannuation bond product and insist on exploring different fee structures.

You agree to defer the presentation on the new term insurance product and to spend a couple of hours workshopping with them and doing some preliminary calculations. You only have a calculator with you and don't have access to software or spreadsheets.

The existing single premium superannuation bond is unit linked and has an upfront fee of 5% of single premium, an asset charge of 1.5% p.a. and pays initial commission of 4%. Asset commission is 0.4% of assets p.a.. The average single premium is $30,000 and commission-related expenses are 1% of single premium. Acquisition, maintenance and investment expenses also apply and tax is at 15%.

The agents want to retain the initial commission of 4% but don't want the upfront fees.

Set out two alternate fee structures for the product such that the margin on services profit margin to the company is unchanged. Give details of your calculations, including the current profit margin, and state any assumptions you have made. (10 marks)

QUESTION 5 **(15 Marks)**

A certain large life insurance company owns another life insurance company called Old Life.

Old Life is closed to new business and only has one product line - non-participating Whole of Life business.

Usually the MoS profit and appraisal value is determined for Old Life. However, at the most recent year end (June 1999) only the MoS profit was determined. Nobody remembered to do the appraisal value.

You are a consulting actuary and have now been asked to help prepare a quick estimate for the appraisal value.

The following information is obtained from the company.

Appraisal Value at June 1998: $60m

Question 5 continues over page

Question 5 continued

Assumptions

Discount Rate: 10%
Net Investment Earning Rate = 4% of average Assets
All other Assumptions: Same as MoS best estimate assumptions
MoS Balance Sheet: ($m)

	June 1998	June 1999
MoS Liabilities	100	95
Other Liabilities	0	0
Shareholder Capital and Retained Profit	50	55
Total Liabilities and Equity	150	150
Assets (100% cash)	150	150
Total Capital Adequacy Requirement	140	140

Other Information:

The company has a policy of paying out 100% of the previous year's MoS profit as a dividend to the shareholder. Last year's MoS profit was $5m.

There were no changes in the best estimate assumptions at June 1999 compared to June 1998.

Note: Assume that all cashflows are at the end of the year.

a) What are the 3 main components of any life company appraisal value.
(1 mark)

b) Break down the appraisal value of Old Life at June 1998 into its 3 main components.
(3 marks)

c) If all the experience for the year was exactly the same as assumed in the June 1998 appraisal value, what would have been the appraisal value at June 1999?
(5 marks)

d) If:
the average assets were $150m
best estimate net expenses = 1% of average assets

best estimate net investment earning rate = 4% of average assets
actual net expenses = $2m
actual net investment earnings = $5m

What would be the impact on the appraisal value at June 1999 of the actual expenses and actual investment profit? (2 marks)

e) You have found out that the appointed actuary has decided to include $10m of target surplus above the statutory capital adequacy where previously there was no target surplus. The appointed actuary says that this target surplus will be a permanent feature (and so should be treated consistently with the rest of the capital adequacy requirement) and should be kept at this level indefinitely.

What is the impact on the appraisal value of establishing this target surplus? (4 marks)

QUESTION 6 (14 Marks)

You are the pricing actuary of an Australian life insurance company. Assume legislation is enacted so there are no age restrictions on who can be covered by life insurance.

The marketing department has suggested that your company should make the most of this new opportunity and now have life insurance policies that insure children from birth and upwards. The features should be the same as the current basic annual renewable term product that the company currently sells to people aged 16 and older.

The marketing department has asked you to come up with suggested premium rates for the new age band.

Provide a recommendation to the marketing department on:

a) the suitability of the proposed product; (4 marks)

b) any changes you would like to see to the product design, stating your reasons; and (4 marks)

c) how you would approach pricing your proposed product. (6 marks)

QUESTION 7 **(13 Marks)**

You are the appointed actuary of an Australian life insurance company. The newly appointed finance director has just read your latest Financial Condition Report and is amazed to see that some of the Margin on Services (MoS) policy liabilities are negative and is concerned for the financial security of the company.

Write a brief report to the finance director covering the following topics:

a) why the MoS policy liabilities could be negative for some blocks of business; (2 marks)

b) why negative liabilities can be appropriate for the MoS profit to be meaningful; (2 marks)

c) what types of products could have negative liabilities; and (2 marks)

d) how the Life Act 1995 still addresses the financial security of policyholders even though the policy liabilities for some policies may be negative. (3 marks)

Suppose that all of the business that has negative MoS policy liabilities has zero surrender values for policyholders and that the policyholder benefits are not impacted by the actual investment earnings.

What would be the impact for this block of business on the MoS profit in a particular year if:

e) the discontinuance rate was lower than expected? (2 marks)

f) the investment earning rates were higher than expected? (2 marks)

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