INSTITUTE OF ACTUARIES OF AUSTRALIA

COURSE 2A LIFE INSURANCE **MAY 2006 EXAMINATIONS**

QUESTION 1 **(14 Marks)**

You are an actuary working for a medium sized life insurance company operating in Australia. Your company sells individual investment and lump sum risk products. Your products are currently sold as follows:

- 70% by a wholly owned financial planning subsidiary that only sells your company's products.
- 30% by independent advisers who also sell products from other companies.

The profitability of these products has reduced over the last 5 years due to market competition.

To increase sales and improve profitability, the Marketing Manager has proposed that the company introduce new individual investment and lump sum risk products that will be sold via direct marketing campaigns in magazines and newspapers. The existing distribution channels will not have access to these new products.

The direct marketing method would involve using a short form application where risk applicants are required to answer 5 basic health questions and are either granted or denied cover on the basis of their answers.

The application allows a choice from one of the following options:

OPTION	1	2	3
	Risk Business Sum Insured		
YRT	$50,000	$100,000	$250,000
TPD	$25,000	$50,000	$125,000
Trauma	$25,000	$50,000	$125,000
Single premium investment amount	$1,000	$2,000	$5,000

Applications for investment products will be automatically accepted, even if the client is declined for risk business.

As the company will receive advertising coverage through its direct marketing campaigns, the magazine and newspaper advertisements it currently uses will be discontinued.

As market research indicates that premium rates and fees for direct-marketed products are higher than for products that are not direct-marketed, the Marketing Manager expects profits from sales of direct-marketed products to increase by this difference.

(a) Explain whether the direct-marketed

(i) Investment products (3 marks)

(ii) Risk products (3 marks)

would be expected to generate the additional profit anticipated by the Marketing Manager.

(b) How would you determine the incidence (i.e. mortality, morbidity) assumptions for use in pricing the new risk products? (2 marks)

(c) What risks might arise from these changes in relation to your current distribution channels? (6 marks)

QUESTION 2 **(18 Marks)**

You are an actuary working for SureThing Mutual Life (SML), a successful Australian group life insurer. SML has built up a considerable block of business, which is now reinsured on a surplus basis with a retention of $450,000 per life insured.

The company is expanding into the Australian individual risk market to allow it to grow while taking advantage of the existing skills and structure of the company.

The Board is concerned that individual business is riskier than group due to anti-selection and the highly competitive individual market.

The business plan assumes the following:

Year	Lives in force
1	15,000
2	45,000
3	125,000

- All new business is written at the start of the year
- There are no terminations
- The average premium rate for the period is $1.580 per $'000 sum insured
- The average sum insured is $299,860 (see table below for the distribution of sums insured)
- Gross claims ratio (i.e. gross claims/gross in force annual premium) is 60% and uniformly distributed
- The distribution of the sums insured is as follows:

Band ($)	Average sum insured ($)	Proportion of lives
0 - 200,000	152,000	48%
200,001 - 500,000	285,000	34%
500,001 - 750,000	625,000	16%
750,001 plus	1,500,000	2%

You have been asked to provide your opinion on the suitability of two reinsurance tenders. The main aspects of each of the tenders are as follows:

Tender from Reinsurer A

Quota Share of 40%/60% (i.e. reinsurer takes 40% of all risks) with premium rates being those of SML. Commission payable is:

Policy year (PY) 1	100%
Policy year 2	60%
Policy year 3 onwards	20%

Tender from Reinsurer B

Surplus with retention of $200,000 per life insured. Premium rates are those of Reinsurer B, with the average premium (before applying the first year's selection discount) expected to be $1.012 per $'000 sum insured. A 100% selection discount applies in the first policy year.

(a) Calculate the expected net payment from each of the reinsurers over the first 3 years of the treaty. Your analyst has already commenced some of the calculations for the tender from Reinsurer A.

Year	Ave. Sum Insured $	No. of lives	Gross Premium (PY 1) $'000	Gross Premium (PY 2) $'000	Gross Premium (PY 3) $'000	Total gross premium $'000	R/I Prem $'000	Gross claims $'000	R/I claims $'000	R/I Comm $'000	Net R/I payt $'000
1	299,860	15,000	7,107	-	-	7,107	2,843	4,264	1,706		
2	299,860	45,000	14,213	7,107	-	21,320	8,528	12,792	5,117		
3	299,860	125,000	37,902	14,213	7,107	59,222	23,689	35,533	14,213		

(6 marks)

(b) Draft a memorandum to the Board advising them of:

(i) The suitability of each of the reinsurance tenders for the proposed business plan, taking into account the various factors that have an impact on SML's profitability. (5 marks)

(ii) A view on profitability beyond the 3-year business plan. (2 marks)

(iii) A recommendation on the tender to be accepted. (2 marks)

(c) How would your advice on reinsurance tenders be affected if the Board's main strategic priority were the stability of profits? Would stability of profits be in the interest of the company? (3 marks)

QUESTION 3 **(14 Marks)**

A friend of yours from high school, Cathy, has approached you, as an actuary, to ask if you can explain a problem that she and her aunt, Marsha, are having with their insurance arrangements.

Cathy's uncle, George, is an insurance adviser. He has sold his wife, Marsha, and your friend, Cathy, non-participating endowment policies. Both policies have a sum insured of $250,000 and provide this payment at age 60 or on prior death.

Cathy and Marsha have recently been comparing the details of their cover and have determined the following information:

	Marsha	Cathy
Age at commencement	40 years	21 years
Duration in force	12 years	4 years
Annual premium	$ 11,253	$ 5,224
Total premiums paid to date	$ 135,036	$ 20,896
Surrender value	$ 143,722	$ 14,419

Cathy has asked you the following questions. Identify the points you would make to answer Cathy's questions.

(a) Both policies provide the same sum insured and benefit coverage. We would expect that the premium would be roughly = (Sum Insured)/(policy term). When we compare the actual premium to this calculation Marsha has a ratio of 90% while I have a ratio of 81%. Why is this so? (2 marks)

(b) The surrender value is 106% of premiums paid for Marsha, but only 69% for me. Why is it so low for me? (2 marks)

(c) If I had invested these premiums in a unit linked equity trust product (where I have seen one with a return of 15% p.a. for the last year), would I be better off now? (6 marks)

(d) What advice can you give me about choosing whether to continue with the endowment policy or cash it in and invest in a unit linked equity contract? (4 marks)

QUESTION 4 **(19 Marks)**

Immaculate Life Ltd (ILL) is a medium sized company that has been very active in the yearly renewable term insurance market for many years. As ILL's market share has been falling in recent years, the valuation results have been reviewed to identify the sources of experience profit for the business. This review has indicated that expense experience has been favourable.

ILL has asked you, a consulting actuary, to perform an expense experience analysis for ILL and provide some advice on updating expense assumptions. The results of your analysis indicate that the Actual to Expected ratios for ILL are:

Expense type	A/E ratio
Initial fixed per policy costs	0.77
Initial variable per premium costs	0.68
Renewal fixed per policy costs	0.73
Renewal variable per premium costs	0.75

As a result of this ILL has decided to issue a new, competitive product using expense assumptions that reflect the actual experience of the product. This product will replace the existing product, which will be closed to new business.

The valuation experience indicates that experience other than expenses has been as expected (i.e. best estimate). Pricing incorporates a profit margin.

Additional reserves are also required to support this business. The capital required to support this business is expected to be on average 12% of premium received.

(a) Identify how the results of your expense analysis may explain the sales experience for the existing product. (3 marks)

(b) Taking the existing product in isolation, how will the release of the new product be expected to affect the experience of the existing product? (3 marks)

(c) What are the factors influencing the planned profitability of the new product relative to the old product? (3 marks)

(d) Following the launch of the new product it is apparent that sales have increased dramatically. What is the expected overall financial effect on shareholders for the combined new and old products? (10 marks)

QUESTION 5 **(18 Marks)**

As the product actuary at Star City Funds Management (SCFM) you are responsible for the non-superannuation retail unit trusts of the company.

You are currently undertaking a review of a product that includes, as one investment option, a unit linked Capital Stable fund. The following information has been published in your Product Disclosure Statement (PDS) regarding this fund:

"Investment strategy

The Capital Stable fund invests in a diversified mix of Australian and international assets with a strong bias towards defensive assets. The fund is actively managed in accordance with SCFM's investment process. Daily unit prices are not guaranteed and vary with movements in the underlying value of fund assets. Under the Capital Stable Investment strategy a negative return is expected in one in ten years."

	Benchmark %	Range %
Australian shares	15.0	10 – 20
International shares	2.5	0 – 5
Property securities	2.5	0 – 5
Aust. fixed interest	40.0	25 – 55
Internat. fixed interest	10.0	5 – 15
Cash	30.0	10 – 50
Total	100.0	

The asset allocation at the end of April 2006 was as follows:

	%
Australian shares	30
International shares	10
Property securities	10
Australian fixed interest	25
International fixed interest	15
Cash	10
Total	100

The assets of the fund (current total value of $180 million) are managed by an external asset management company. The investment management contract specifies an investment mandate that is exactly the same as in the PDS (i.e. the Investment Strategy above). This has remained unchanged since the launch of the fund some years ago.

(a) Comment on the suitability of the current asset allocation and identify the implications this raises for the company. (6 marks)

(b) Equity prices have recently fallen. The result is a 15% reduction in asset values for the fund. What liability may the fund manager (SCFM) have in this situation? (4 marks)

(c) Assuming the company decided to make a compensation payment to affected unit holders, how should compensation be determined and how should the process be managed? (8 marks)

QUESTION 6 **(17 Marks)**

You are an actuary working in the group life area of We'll Save You Life Insurance (WSY). You have been asked to re-price the death only premium for a large group life scheme that your company has had on the books for some years. Your pricing is to cover the scheme for the next 3 years.

The results of an experience analysis show the following results:

Policy year	Loss ratio
2001	92%
2002	88%
2003	87%
2004	85%
2005	81%

The loss ratio is defined as claims paid/premiums received. Premium rates have remained unchanged for the five years of data above. The size and composition of the scheme has been stable over the period of data above.

Your expense analysis indicates an Actual to Expected ratio of 105% for each of the 5 years. Expenses are currently priced as 10% of premium.

(a) What factors should you consider when determining the mortality and expense assumptions to be used in the pricing basis? (3 marks)

(b) What factors should you consider to determine the mortality trend to be allowed for in the pricing basis? (3 marks)

(c) You have been asked to consider incorporating mortality experience profits earned up until the end of policy year 2005 into your current pricing. Identify the issues this would raise. (4 marks)

(d) A representative of the group life scheme has suggested that a profit share be incorporated into the scheme for each policy year as follows:

Profit Share = Maximum[zero, 50% * (90% Premium received – Claims paid)]

Explain your views on this suggestion. (7 marks)

END OF PAPER

