THE INSTITUTE OF ACTUARIES OF AUSTRALIA

LIFE INSURANCE **1998 EXAMINATIONS**
SPECIALIST LEVEL PAPER ONE

Answer all 7 Questions

QUESTION 1 **8 MARKS**

A new type of epidemic has emerged. It is generally fatal within 3 years of the first symptoms, generally a mild rash on the back of the neck for about a week and a slight stiffness in the joints. The rash recurs sometime later and does not go away; the stiffness and headaches become severe. Medical research has not yet identified how it is spread. It is believed that about 10% of the population are carriers of the condition but only 5% of carriers succumb. However no-one who was known to have been vaccinated against measles before the age of nine months has yet died from the disease.

(a) What underwriting measures would you take to minimize the extra insurance risk from this cause?

Your answer should comment on any practical difficulties which may be encountered. (6 marks)

(b) What would be your view if genetic testing was able to identify carriers?

(2 marks)

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QUESTION 2 **12 MARKS**

You are an actuary engaged in reviewing the pricing of a term life product and have presented a report to your Board on the result of your review. The new Chief Financial Officer (CFO) of your Life Office (not an actuary) has read your report. The Sales Manager has advised her that sales of the term life product will be strong. As the CFO is currently reviewing the business plan for the coming year, she has asked you to prepare a presentation to explain the following topics to her. Set out your response appropriately.

(a) The desirable characteristics of transfers generated by a product.

(2 marks)

(b) The concept of 'yield on transfer'.

(2 marks)

(c) Why a profitable line of business may have a limitation on its rate of growth, and how you would determine this.

(3 marks)

(d) How the pattern of transfers compares with the profits emerging from this line of business as reported under the Margin on Services regime.

(5 marks)

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QUESTION 3 **12 MARKS**

You are the actuary in a medium-sized Australian life office which writes a range of business representative of the market in Australia. Your office has recently taken over a portfolio of participating ordinary whole of life and endowment insurances contained in a single statutory fund closed to new business, being the Australian business of an overseas parent.

It has been suggested that this statutory fund be merged with your main fund which also contains ordinary participating business.

(a) Briefly comment on the likely similarities and possible differences between the surplus distribution methods of the two companies.

(4 marks)

(b) Your managing director has requested a report on the actuarial issues to be addressed in order to effect the merger. He has expressed a wish to achieve economies by treating both blocks of business identically, with a single bonus structure and policy value calculation module in future.

Draft sections of your report under the following headings:

(i) Statutory and legal requirements
(ii) Equity
(iii) Policyholder expectations
(iv) Policy administration

(8 marks)

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QUESTION 4 **15 MARKS**

Commissioner's Rules 21 (financial reports) require expenses to be presented, by statutory fund and class of business, under the following classifications:

Policy Acquisition -	Commission
	Other
Policy Maintenance -	Commission
	Other
Investment Management	

(a) You are presented with the total dollar amounts in each category reported at year end for a statutory fund, containing traditional participating, term life and disability income insurance business.

Explain how you would derive a set of assumptions for expense rates (or unit costs) for the products in that fund for the year end margin on services and capital adequacy valuation. Identify any further information or statistics which you would require.

(10 marks)

(b) You explained the accounting requirements to the accounting manager. He has asked why policy maintenance expenses should not be determined by dividing the policy maintenance cost by the premiums received in the period.

Outline the key points you would make in your reply to him.

(5 marks)

QUESTION 5 **18 MARKS**

You are the appointed actuary for a life insurance company that has just started a new statutory fund that sells only business in a South East Asian country. The only product the statutory fund sells is Yearly Renewable Term. There are plans to launch a Participating Conventional product.

An enthusiastic actuarial student has done some work on the solvency requirements of this new statutory fund.

The actuarial student has come to you with some documentation of what was done and has made the following statements.

On each of the statements below, respond to the student.

a) As the business is overseas, Actuarial Standard 2.01 does not apply. However, I have combined the business with another statutory fund and have used AS2.01 with the same parameters as for the Australian business.

(3 marks)

b) As the assets are more risky assets than in Australia, I have taken a lower value for the assets when calculating the excess free assets.

(3 marks)

c) As the policy liabilities are negative, the assets will be negative. Therefore, the resilience reserve will also be negative.

(3 marks)

d) The Yearly Renewable Term policy contract does **not** guarantee premiums if the claims experience worsens. The solvency requirement has been reduced to allow for the maximum possible increases in premiums.

(3 marks)

e) The most important requirement for pricing the proposed Participating Conventional product is competitiveness. Therefore, a competitor's product should be copied with slightly lower premium rates.

(3 marks)

f) In the first few years there will be losses for the proposed Participating Conventional product as the expense rates will be higher than expense loadings assumed in the premium rates. Therefore there should be **no** bonuses paid for the first few years.

(3 marks)

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QUESTION 6 **14 MARKS**

As the actuary responsible for providing Policy Liabilities for a recently established non participating related product group, you are given the following data:

> The prior valuation period was the first in which the related product group existed. On application of the valuation best estimate assumptions the following values ($,000) at commencement (ie new business commencement values) were obtained:

PV_Benefit	PV_Maintenance Expense	PV_Premium	Acquisition Expense
1,000	400	1,600	250

Premium was chosen as the Profit Carrier.

Total expected premiums for the year were 400.

At the end of the current valuation period best estimate assumptions have been reviewed, in particular investment earnings and maintenance expenses for in force business have been revised. Also, a second tranche of business has been written, and the best estimate assumption for acquisition expenses has been revised. You are given the following data:

New Business Commencement Values:

PV_Benefit	PV_Maintenance Expense	PV_Premium	Acquisition Expense
500	200	800	20

Total expected premiums for the year were 250.

At Valuation	PV_Ben	PV_Exp	PV_Prem
In Force Business:			
Prior Assumptions	900	350	1,200
Prior Assumptions, revised Investment Earnings	850	325	1,125
Current Assumptions	850	250	1,125
New Business			
Current Assumptions	480	190	680

Total expected premiums for the year (both tranches of business) 361.

Question 6 continues over page

Question 6 continued

Determine for the current valuation:

(a) Profit Margin (5 marks)

(b) Policy Liability (2 marks)

(c) Expected Profit Released , ignoring earnings on MoS reserves. (1 mark)

For each step in (a), (b) & (c) above, provide the justification for your conclusions

(d) Explain why a product might have negative profit margins when the actuarial pricing report indicates that the product is profitable. (3 marks)

(e) Explain why a company would sell products that have negative profit margins. (3 marks)

QUESTION 7 21 MARKS

(a) Describe the main components of an appraisal value. Indicate the relative level of actuarial judgement required for each of these components.

(3 marks)

(b) What is meant by a "short term expense overrun" that is included in some appraisal values and how is it calculated?

(3 marks)

(c) What is the purpose of a risk discount rate with respect to an appraisal value?

(2 marks)

(d) What factors should be taken into consideration when determining a risk discount rate?

(3 marks)

(e) You are a consulting actuary employed by the shareholder of Large Life, a life insurance company. The shareholder is currently negotiating to merge its insurance operations with Smaller Life, another life company.

Why could appraisal values be considered when assessing the suitability of a merger?

(4 marks)

(f) You have calculated an appraisal value for Large Life. Another consulting actuary has calculated an appraisal value for Smaller Life.

What factors should be taken into account when comparing the appraisal values of the two companies?

(6 marks)

END OF PAPER ONE