QUESTION 1 (11 Marks)

It is valuation time at the Australian life company that you work for and you are involved in the valuation of a unit-linked product released to the market exactly one year ago. This is the only unit-linked product written by the company and the product is in its own Statutory Fund.

This product has an Administration Fee of 1.4% p.a., charged on a monthly basis as a percentage of the account balance. This is designed to cover the servicing expenses and support the product's profitability.

The best estimate assumption for servicing expenses used to price the product was 1.0% p.a., expressed as a percentage of account balance.

A recent expense analysis has indicated that the actual servicing expenses incurred during the year, calculated as a percentage of account balance, were 1.5% p.a.

The chief valuation actuary has decided, after a significant amount of argument with the CFO and the Board, to use the pricing assumption for servicing expenses in the valuation of policy liabilities. It has also been decided that the capital adequacy assumption for servicing expenses will be the pricing assumption plus a margin of 3%.

The rationale for choosing these assumptions is that:

- the business is new and the expenses will settle down over time; and
- 30% of all servicing expenses incurred during the year were spent on training the staff who manage the business, which is considered to be one-off in nature.

Comment on the appropriateness of the following for your company:

(a) The use of the pricing assumption for servicing expenses in the valuation of policy liabilities; (3 marks)

(b) The use of the pricing assumption for servicing expenses as the base to which a margin is applied for the capital adequacy assumption; (2 marks)

(c) The margin applied to the assumption for servicing expenses for capital adequacy purposes.

(6 marks)

QUESTION 2 **(20 Marks)**

You are a valuation actuary at ABC Ltd, a large life insurer writing a wide range of business including an old portfolio of non-participating endowment insurance policies with the following characteristics:

- in-force annual premium ("IFAP") is 2% of the total IFAP of the company;
- premiums are level and payable throughout the lifetime of the policy;
- the average term to maturity is currently 5 years;
- the product is closed to new business;
- the assumed surrender rate is 18%, based on past experience;
- a refund of premiums with interest is paid on surrender; and
- the ratio of total surrender value to policy liability for this portfolio is 50%.

It is now the end of the financial year and you have been provided with the following information:

	Cash flows in $'000						Reserves in $'000	
	Premium	Expenses	Death claims	Surrender Claims	Maturity Claims	Interest	Policy Liability	Policy Liability
	BOY	BOY	EOY	EOY	EOY	EOY	BOY	EOY
Expected	1,557	195	289	934	0	215	1,801	1,937
Actual	1,557	125	289	700	0	210	1,801	2,401

Note: 'BOY' means beginning of year and 'EOY' means end of year.

(a) Calculate the expected profit and the actual profit for the financial year. (2 marks)

(b) Perform an analysis of profit. (8 marks)

(c) Due to the small size of the endowment portfolio in terms of IFAP, the policy of ABC Ltd is to review the assumptions for this portfolio every 5 years. The last review was performed 4 years ago. Comment on the appropriateness of ABC's policy of 5-yearly assumption reviews for this portfolio. (4 marks)

(d) Comment on the appropriateness of the surrender rate assumption. (3 marks)

(e) Explain how the lower than expected surrenders affect the policy liabilities by considering each of the items which are used to calculate the policy liability. (3 marks)

QUESTION 3 **(16 Marks)**

Retro Funds Management is a large funds manager with a small life insurance subsidiary writing only Yearly Renewable Term Insurance.

It is the end of the current financial year and you have been asked to calculate the Solvency Reserve for this business in accordance with the Australian Solvency Standard (AS2.03).

You have been provided with the following valuation information and assumptions (all figures are in $'000):

- the statutory fund currently has assets of 6,530 which are invested 20% in a mixed portfolio of Australian equities and 80% in zero coupon bonds with a term to maturity of exactly 1 year;
- the dividend yield on equities is 4.0% and the yield on the zero coupon bonds is currently 4.5%;
- the tax rate is 30% and expenses will be fully deductible in a solvency situation;
- the full Management Capital offset is available in accordance with AS6.02;
- the acquisition expenses for the current financial year are as follows:

  - 18,675 commission paid to agents
  - 7,145 marketing department salary
  - 6,100 underwriting department salary
  - 11,325 advertising expenses
  - 2,641 other fixed acquisition expenses

- the policy liability is -39,358;
- the solvency liability is -50,058;
- there are no other liabilities or inadmissible assets; and
- all premiums are paid monthly and no refunds or surrender values are available.

(a) Calculate the Solvency Requirement. (10 marks)

(b) Shortly after the year end the Reserve Bank has increased interest rates in Australia by 1.5% p.a. This has had a flow on effect to nervous equity markets where values have fallen by 15%.

Determine your solvency position, assuming the resilience reserve does not change. (3 marks)

(c) Suggest some practical measures the company could employ to reduce its risk position in relation to its solvency position. (3 marks)

QUESTION 4 (18 Marks)

You work for the Asian subsidiary of an American life insurance company. This company has one Statutory Fund and only sells level premium guaranteed term insurance that provides lump sum benefits. This product is characterised by very high initial commissions paid to agents (150% of first year's premium) and is experiencing rapid growth as a result.

The subsidiary is required to report the profit of its Statutory Fund on a Statutory Reporting Basis, being a cash accounting basis, as follows:

Statutory profits:	Premiums received + Investment Income – Commission – Expenses – Claims paid – Tax paid – Increase in Statutory Reserve

Investment Income assumes assets are held at market value and includes unrealised capital gains and losses. The Statutory Reserve is set by the regulator as the minimum capital requirement and is calculated as follows:

Calculation method:	Gross premium valuation
Mortality assumption:	Company's best estimate assumption plus 25%
Expense assumption:	Company's most recent year of experience plus 25%
Interest Rate assumption:	Previous year's 10 year Government bond yield (7%) less 2%

The subsidiary is also required to report the profits of its Statutory Fund to its parent using a change in Embedded Value basis. The Embedded Value comprises:

Net Worth:	Market Value of Assets – Statutory Reserve
Value of In-Force:	The present value of future profits on a Statutory Reserve Basis at a risk discount rate of 15% p.a.

It is proposed that in the future, profits of the subsidiary will be passed on to the American parent based on the change in Embedded Value.

(a) Explain why the profit calculated on the Statutory Reporting Basis may not accurately reflect the subsidiary's performance for a particular year. (5 marks)

(b) Compare the Statutory Reporting Basis and the Embedded Value basis of reporting profit and discuss any problems that the use of two different bases would cause with regard to repatriation of profit. (8 marks)

(c) Discuss the similarities and differences with regard to capital requirements between the Statutory Reserve and the Capital Adequacy Requirement (AS3.03) for this subsidiary. (5 marks)

QUESTION 5 **(16 Marks)**

You are an actuary working for Benevolent Funds Group (BFG), a global funds manager and life insurer operating throughout Europe and Asia.

The company has decided to introduce a Long-term Care product into an Asian market with a regulatory requirement that profit from participating business be split between policyholders and shareholders on an 80/20 basis, identical to the Life Insurance Act 1995 in Australia.

The main features of the product are:
- pays for medical and carer expenses if the policyholder becomes disabled for any reason, including old age;
- benefit payments are made monthly and are subject to an annual benefit limit;
- the policy must be purchased with a single premium before the 65th birthday;
- the policyholder is underwritten at purchase; and
- no surrender value or death benefit is payable.

Your company's pricing stance is to load all assumptions to ensure the product is highly profitable due to its long-term nature and uncertainty around the assumptions used for pricing. There are, as yet, no competitors issuing a similar product in your market.

A suggestion has been made that a bonus system be implemented on these contracts to return excess profit to loyal policyholders. The suggested method is as follows:
- a cash bonus would be paid to all in-force policyholders that are not on claim at the end of the financial year;
- the bonus amount would be a percentage of the annual benefit limit;
- the company would aim to pay a smooth bonus rate from one year to the next.

(a) Provide reasons for and against the proposal to make this a participating product. (6 marks)

(b) Discuss the equity issues raised by the proposed bonus distribution method. (8 marks)

(c) How could customer/market behaviour change should this product prove to be popular with consumers and what could the impact be on assumptions? (2 marks)

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

QUESTION 6 **(19 Marks)**

Transit Life (TL) is a medium sized Australian life insurer. The company has three Statutory Funds, two of which are open to new business. Statutory Fund No.1 (SF1) is closed to new business and has a collection of liabilities including traditional policies and capital guaranteed investment account business.

The company is currently up for sale. SF1 makes up 40% of the current appraisal value of the company.

The asset allocation backing the valuation of liabilities of SF1 is as follows:

Asset class	Value $million	Percent
Australian Equity	171.6	52%
Overseas Equity	16.5	5%
Australian Property	33.0	10%
Australian Fixed interest	59.4	18%
Overseas Fixed Interest	26.4	8%
Cash	23.1	7%
Total	330.0	100%

The policy liability for SF1 is $315 million and the Capital Adequacy Requirement is $325 million, including a Resilience Reserve of $16 million. No reserve is held for inadmissible assets.

The company's SF1 investments include a $16.5 million holding of government debt of Avada, a small country in Asia which has particularly attractive long term bond yields. The company's SF1 property and equity investments are well diversified.

(a) Give your opinion on the suitability of this asset allocation. (5 marks)

(b) Comment on whether there is any evidence that the company is non-compliant with the Resilience Reserve and admissibility of assets requirements of AS3.03. (5 marks)

An article in this morning's news has caught your eye. There has been a coup in Avada and the new government has announced it will seize all foreign investments in its country, with these assets becoming the property of the new government.

(c) Comment on the solvency position of SF1 following the coup and suggest possible courses of action. (4 marks)

(d) How will the coup, and any actions taken following the coup, affect the company's appraisal value? (5 marks)

END OF PAPER