INSTITUTE OF ACTUARIES OF AUSTRALIA

COURSE 2B LIFE INSURANCE APRIL 2011 EXAMINATIONS

Marking Guide

Level of difficulty

Question	Syllabus Performance Outcome	Units	Knowledge & Understanding	Straight-forward judgement	Complex Judgement	Total Marks
1 a)	5	3	1			1
1 b)	5	3	6	3		9
1 c)	2,5	1,3		5		5
1 d)	2,3,5	1,2			6	6
2 a)	7	4	2			2
2 b)	7	4		7		7
2 c)	1,7	1,4	2			2
2 d)	1,7	1,4		2		2
2 e)	7	4			6	6
3 a)	1, 2, 3	1,2		5		5
3 b)	2,7,12	1,4,6			8	8
3 c)	5,7	3,4		6		6
4 a)	4	2	4			4
4 b)	4	2	2			2
4 c)	4	2		4		4
4 d)	4	2		4		4
4 e)	4,9	2,5			7	7
5 a)	5,13	3,6		3		3
5 b)	5,13	3,6	3			3
5 c)	5,13	3,6			5	5
5 d)	5,13	3,6		2	7	9
TOTAL			**20**	**41**	**39**	**100**

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COURSE 2B LIFE INSURANCE APRIL 2011 EXAMINATIONS

Answer all 5 questions

QUESTION 1 (21 Marks)

You are the valuation actuary of a large Australian Life Insurance Company, which has a large block of non-par traditional business. This block of business is now closed to new business.

The traditional business is backed by fixed interest investments.

The CFO is examining the financial results and wants to compare actual versus expected profits for the year for the non-par traditional business. The following table shows the experience of the non-par traditional business over the current year:

	Actual	Expected
	$000s	$000s
Premiums	500	500
Investment Income (including IORE*)	147	168
Expenses	-133	-140
Death Claims	-150	-165
Surrender Claims	-400	-450
Maturity Claims	-100	-100
Policy Liability (boy)	3,500	3,500
Retained Earnings (boy)	200	200
Total Assets (boy)	3,700	3,700
Policy Liability (eoy)	3,273	3,205

*** IORE is Interest on Retained Earnings**

You can make the following assumptions:

- **All cashflows are at the end of the year except for premiums which are at the start of the year.**
- **Tax can be ignored.**
- **There has been no change to the assumptions at end of year.**
- **Policy Liability released on death is the amount payable on death divided by 120%.**
- **Policy Liability released on surrender is the amount payable on surrender divided by 90%.**
- **Policy Liability released on maturity is the amount payable on maturity.**

a) Calculate the actual and expected profit (showing all workings). (1 Mark)

b) Perform an analysis of profit for the year (showing all workings). (9 Marks)

c) The CFO has noticed that there were less surrenders than expected this year. He believes this should result in a profit for the company because everyone in the company is aware that retention of policies is a crucial issue.

Provide an explanation to the CFO with regard to this issue covering:

i) current profits (2 Marks)
ii) future profits (3 Marks)

d) The CFO believes the poor actual investment return was one of the main reasons for not meeting the expected profit. The CFO suggests that more risk should be taken with the assets in terms of duration and volatility of assets (e.g. equities) in order to improve investment returns.

Discuss the implications of such a move. (6 Marks)

QUESTION 1: SOLUTIONS

a)

Actual Profit

= Actual Premiums + Actual Investment Income – Actual Expenses
– Actual Death Claims – Actual Surrender Claims – Actual Maturity Claims
– (Actual Policy Liability (eoy) – Actual Policy Liability (boy))

= 500 + 147 – 133 – 150 – 400 – 100 – (3,273 – 3,500)
= 91 (0.5 mark KU)

Expected Profit

= Expected Premiums + Expected Investment Income – Expected Expenses
– Expected Death Claims – Expected Surrender Claims – Expected Maturity Claims
– (Expected Policy Liability (eoy) – Expected Policy Liability (boy))

= 500 + 168 – 140 – 165 – 450 – 100 – (3,205 – 3,500)
= 108 (0.5 mark KU)

Marking Guide

Marks as above for the correct calculations to a maximum of 1 mark KU.

b)

Note: In the analysis of profit below, the following signing convention is used (this is particular important for getting the right sign (+/–) for claims experience (profit/loss)):

Revenue Account Item	**Sign**
Income: Premiums and Investment Income	+
Outgo: Expenses and Claim payments	–
Release of Policy Liabilities	–

Actual Investment Earning Rate

= Actual Investment Income / (Total Assets (boy) + Actual Premiums)
= 147/(3,700 + 500)
= 3.5% (0.5 mark KU)

Expected Investment Earning Rate

= Expected Investment Income / (Total Assets (boy) + Expected Premiums)
= 168/(3,700 + 500)
= 4.0% (0.5 mark KU)

Expected IORE

= Expected Investment Earning Rate x IORE (boy)
= 4.0% x 200
= 8 (0.5 mark KU)

Expected Profit Margins

= Expected Profit – Expected IORE
= 108 – 8
= 100 (0.5 mark KU)

Actual IORE

= Actual Investment Earning Rate x IORE (boy)
= 3.5% x 200
= 7 (0.5 mark KU)

Total Experience Profits

= Actual Profit – Actual IORE – Expected Profits
= 91 – 7 – 100
= -16 (0.5 mark KU)

Investment Experience Profit

= Actual Investment Earning Rate
x (Policy Liability (boy) + Actual Premiums)
– Expected Investment Earning Rate
x (Policy Liability (boy) + Expected Premiums)

= 3.5% x (3,500 + 500) – 4% x (3,500 + 500)
= 140 – 160
= -20 (1 mark KU)

or alternatively:

= (Actual Investment Earning Rate – Expected Investment Earning Rate)
x (Policy Liability (boy) + Actual Premiums)
= (3.5% – 4%) x (3,500 + 500)
= -20 (1 mark KU)
or alternatively:

= (Actual Investment Income – Actual IORE)
– (Expected Investment Income – Expected IORE)
= (147 – 7) – (168 – 8)
= 140 – 160
= -20 (1 Mark KU)

Expense Experience Profit

= Actual Expenses – Expected Expenses
= -133 – (-140)
= +7 (0.5 mark KU)

Death Experience Profit

= (Actual Death Claims – Policy Liability released on actual Death claims)
– (Expected Death Claims – Policy Liability released on expected Death claims)

= (-150 – (-150/1.2)) – (-165 – (-165/1.2)
= (-150 + 125) – (-165 + 137.5)
= -25 + 27.5
= + 2.5(1 mark SJ)

[On death, there is a death strain or loss. As actual deaths are less than expected deaths, the actual death strain is less than the expected death strain, which means there is a death experience profit. Note this is a comment. Students are not required to state this]

Or alternatively:

= (Actual Death Claims – Expected Death Claims)
– (Policy Liability released on actual Death claims
– Policy Liability released on expected Death claims)

= (-150 – (-165)) – ((-150/1.2) – (-165/1.2))
= 15 – (-125 – (-137.5)
= 15 – 12.5
= +2.5 (1 mark SJ)

Surrender Experience Profit

= (Actual Surrender Claims – Policy Liability released on actual Surrender claims)
– (Expected Surrender Claims – Policy Liability released on expected Surrender claims)

= (-400 – (-400/0.9)) – (-450 – (-450/0.9))
= (-400 + 444.4) – (-450 + 500)
= 44.4 – 50
= -5.6 (1 mark SJ)

[On surrender, there is a surrender profit. As actual surrenders are less than expected surrenders, the actual surrender profit is less than the expected surrender profit, which means there is a surrender experience profit. Note. This is a comment. Students are not expected to state this.]

Or alternatively:

= (Actual Surrender Claims – Expected Surrender Claims)
– (Policy Liability released on actual Surrender claims
– Policy Liability released on expected Surrender claims)

= (-400 – (-450)) – (-400/0.9 – (-450/0.9))
= 50 – (-444.4 + 500)
= 50 – 55.6
= -5.6 (1 mark SJ)

Maturity Experience Profit

= (Actual Maturity Claims – Policy Liability released on actual Maturity claims)
– (Expected Maturity Claims – Policy Liability released on expected Maturity claims)

= (-100 – (-100) – (-100 – (-100)
= 0 – 0
= 0 (0.5 mark KU)

Or alternatively:

= (Actual Maturity Claims – Expected Maturity Claims)
– (Policy Liability released on actual Maturity claims
– Policy Liability released on expected Maturity claims)

= (-100 – (-100)) – (-100 – (-100))
= 0 – 0
= 0 (0.5 mark KU)

Calculate Total Explained Experience Profit

Investment Experience Profit	-20.0
Expense Experience Profit	+ 7.0
Death Experience Profit	+ 2.5
Surrender Experience Profit	-5.6
Maturity Experience Profit	0.0
Total Explained Experience Profit	-16.1

(0.5 Mark KU)

Unexplained Experience Profit

= Total Experience Profit – Total Explained Experience Profit
= -16 – (-16.1)
= +0.1 (0.5 mark KU)

A comment is required on the size of the unexplained amount as follows:

Either:

if the unexplained is small:

Given the expected profit is 100, an unexplained of +0.1 or +0.1 % is acceptable. This indicates we have covered all the experience items. (1 mark SJ)

Or:

If the unexplained is larger due to say a calculation error:

The unexplained is relatively large. This could imply there is a calculation error in my analysis of profit for which I will need to check or there are other items causing experience profits/losses which I need to include in the AOP. (1 mark SJ)

Summary of Analysis of Profit *[Not required to be shown by candidates]*

	$m
IORE	7.0
Expected Profit Margins	100.0
Experience Items:	
Investment Experience Profit	-20.0
Expense Experience Profit	+ 7.0
Death Experience Profit	+ 2.5
Surrender Experience Profit	-5.6
Maturity Experience Profit	0.0
Total Explained Experience Profit	-16.1
Untraced	+0.1
Total Profit	+91.0

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Marks as specified above to a maximum 9 marks (6 marks KU, 3 marks SJ).

c)

i) Explanation to CFO in respect of lower surrenders on the current year's profit:

- Due to the surrender penalties on the products, the payment of surrender value is lower than the release of policy liabilities on surrenders. (0.5 mark SJ)

- On average each surrender actually creates profit for the company in the current year due to the payment of surrender value being lower than the release of policy liabilities on surrender. (0.5 mark SJ)

- In the profit analysis, actual surrenders were lower than expected surrenders. This means actual MOS profit from surrenders was less than expected MOS profit from surrenders. Therefore from a MOS profit perspective, in the current year having lower surrenders means that we have lower MOS profit from surrenders than expected. (1 mark SJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation.

To a maximum of 2 marks SJ.

ii) Explanation to CFO in respect of lower surrenders on future years' profit:

- Lower surrenders in the current year means that future MOS profits will be higher (assuming everything else is unchanged) as there are more policies inforce in the future than expected. (1 mark SJ)

- If the lower surrenders continues and is an indicator of a longer term trend, then the surrender rate assumption may be lowered. This also means that future MOS profits will be higher as there are more policies inforce in the future. (1 mark SJ)

- Having lower surrenders than expected also means that we have more policies inforce than we expected to spread maintenance expenses, thereby resulting in lower expense unit costs. This results in a further increase in future MOS profits. (1 mark SJ)

- Any other relevant issue raised with an appropriate explanation. (1 mark SJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation.

To a maximum of 3 marks SJ.

d)

The following issues should be identified:

- If there is an asset allocation change reflecting changes to the investment strategy, this will impact the investment earning rate assumption. This is a non-market economic assumption change and will not change the policy liability and thus has no impact on the profit in the year this change occurs. However, future profit margins will increase, leading to higher future profits. (1 mark CJ)

- Asset Allocation is set with a number of different elements and investment earning rate is only one of them. Apart from earning rates, there are serious considerations of asset liability and cash flow matching as well as capital management that influence the current asset allocation. (1 mark CJ)

- If more risk is taken on with the assets such as equity investment then this could result in a greater mismatching between the assets and liabilities. This mismatch will result in higher solvency and capital adequacy requirements. (1 mark CJ)

- The more risky assets such as equities have significantly more volatility and as a result may not produce higher earning rates in the short term as is required by the CFO. (1 mark CJ)

- The traditional business is backed by suitably dated fixed interest investments taking into account the guarantees that are offered as this assists in cash flow matching of surrender payments and assets maturities. If investments are made into equity investments then this fundamental principle is not being followed. This leaves the company vulnerable to not meeting surrender payments when equities are at a low level and hence liquidity risks. (1 mark CJ)

- Even if investing in more risky assets does increase investment income, it may actually reduce the return on capital due to the much higher capital requirements of those risky assets. This could reduce the return on capital to lower than the company's required rate of return. (1 mark CJ)

- There could be an opportunity to mismatch the durations of the bonds or take additional risk with different bonds such as corporate bonds instead of government bonds to increase the returns. (1 mark CJ)

- Consideration needs to given to the company's risk profile to see if an asset/liability mismatch is allowed. (1 mark CJ)

- Tax implications and transaction costs when selling assets. (1 mark CJ)

- The existence of hedging strategies to overcome poor investment returns. (1 mark CJ)

- Any other relevant point raised with an appropriate explanation. (1 mark CJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation.

To a maximum of 6 marks CJ.

QUESTION 2 (19 Marks)

You are a consulting actuary, who has been engaged by an Australian life company BENLIFE, to provide advice on the purchase of a large block of retail business from a competitor AUSCO.

The AUSCO retail business comprises a large book of open non-par endowment business (providing death benefits only) and a large block of open unit-linked business.

BENLIFE, the potential purchaser, specialises in group business, providing lump sum death, TPD and salary continuance benefits via consulting tenders.

You decide you will use an Appraisal Value method to place a value on AUSCO's retail business.

a) In order for you to understand AUSCO's retail business under consideration, list 8 pieces of information you require. (2 Marks)

b) Explain how you would place a value on this business to be used as the basis for the purchase covering the following:

i) assumptions (3 Marks)

ii) capital requirements (2 Marks)

iii) calculations (2 Marks)

c) Describe the checks you would perform to obtain comfort on the value you have placed on the business. (2 Marks)

d) You have just been advised that the block of retail business also includes an option for the maturing endowments to convert into life annuities.

Describe how you would value this option covering the following:

i) assumptions (1 Mark)

ii) capital requirements and calculations (1 Mark)

e) The CEO of BENLIFE has asked you to explain what are the risks associated with purchasing this block of retail business.

Discuss the key risks associated with the purchase. (6 Marks)

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QUESTION 2: SOLUTIONS

a)

i) The 8 pieces of information you require include:

- Previous AUSCO Policy Liability Valuation Reports and Appraisal Value Reports, Financial Statements and APRA returns.
- AUSCO's board reports and internal management reports on this business.
- Broker reports which may give some insight into AUSCO and the retail business BENLIFE wishes to purchase.
- Capital adequacy requirements
- Statistical information on the block of retail business such as number of policies, annual premiums inforce, sums insured and movements in number of policies over the past few years.
- Individual policy data so a complete projection of cash flows can be carried out.
- If individual policy data is not available, projection of cashflows from AUSCO.
- Policy terms and conditions of the products, including any guarantees that are provided on the unit-linked business. LPS 320 reports.
- Information on the investment strategy for both non-par endowment and unit-linked business.
- Type of investment managers (internal and/or external managers).
- Details on the type of distribution channel selling the business (e.g. tied agency force or a direct channel).
- Systems used to administer the non-par endowment business and unit-linked business.
- Details on unit-pricing of unit-linked business, including unit-pricing methodology in how unit prices are determined.
- Assumptions used in the Appraisal Value reports prepared by AUSCO.
- Actual to expected experience with regard to mortality, lapses and surrenders over the past few years.
- Information on new business production over the past few years.

- Information on other recent industry purchases.

- Current reinsurance arrangements of the non-par endowment business.

- Interview with the purchasing company, BENLIFE, to get an understanding of scope of the project and their strategic intentions for the purchased business etc;

- Interview with AUSCO management to obtain an understanding on why AUSCO is selling the business. Are they remaining in life insurance?

- Other valid information.

Marking Guide

0.25 marks KU for each point above to a maximum of 2 marks KU.

b)

Value to be placed on the business:

i) Assumptions:

- Set own assumptions for the purpose of the valuation, to place a value of AUSCO's retail business. (0.5 mark SJ)

- Determine BENLIFE's risk discount rate that reflects the shareholders risk of BENLIFE. (0.5 mark SJ)

- Determine one off costs, including costs of the purchase process (due diligence, legal and advisor fees and integration costs with existing portfolio (system integration, staff recruitment and retraining, incentives for key AUSTCO staff to transfer to BENLIFE). (0.5 mark SJ)

- Determine maintenance expense assumptions, taking into account future synergies with any reduction in unit costs per policy. (0.5 mark SJ)

- Determine investment manager fees, depending on whether internal and/or external investment managers are used. (0.5 mark SJ)

- Determine remuneration for distribution channel (salaried versus commissions) and any increase in costs to retain the advisors. (0.5 mark SJ)

- Determine lapse assumption, taking into account any potential increase in lapses from dissatisfied policyholders. (0.5 mark SJ)

- Determine mortality assumptions for the non-par endowment business taking into account any change to underwriting standards, particularly if AUSCO's underwriters and claim managers (with their procedures) are not employed by BENLIFE. (0.5 mark SJ)

- Determine investment earning assumptions based on the assets backing the liabilities. This needs to take into account the investment strategy adopted by BENLIFE for the non-par endowment business and unit-linked business, which may not be the same as AUSCO. (0.5 mark SJ)

- Determine new sales, new business growth rates and margin squeeze for the new retail business, taking into account business plan of BUSLIFE. (0.5 mark SJ)

- Other valid points raised on assumptions with an appropriate explanation. (0.5 mark SJ)

Marking Guide

Marks as specified above for each point described with an appropriate explanation

To a maximum of 3 marks SJ.

ii) Capital Requirements:

- Calculate the value of the capital requirement for the business under BENLIFE's ownership, which will be used in your projection models. (0.5 mark SJ)

- Need to determine whether to use the capital adequacy requirement with or without target surplus. (0.5 mark SJ)

- Target Surplus will be based on the target surplus policy for BENLIFE. BENLIFE will need to consider the target surplus policy for the non-par endowment business and unit-linked business, as these have different profiles to the group life business of BENLIFE. (0.5 mark SJ)

- Any capital injections required to fund the non-par endowment business. (0.5 mark SJ)

- Other valid points raised on capital requirements with an appropriate explanation. (0.5 mark SJ)

Marking Guide

Marks as specified above for each point described with an appropriate explanation

To a maximum of 2 marks SJ.

iii) Calculations:

- VIF: Calculate value of inforce business as the present value of future distributable profits (allowing for capital adequacy requirement/target surplus), tax and imputation credits. (0.5 mark SJ)

- VNB: Calculate value of new business as the present value of future distributable profits from new business (allowing for capital adequacy requirement/target surplus), tax and imputation credits. (0.5 mark SJ)

- Perform sensitivities on the different assumptions to get different values, especially with lapse, surrender rates, risk discount rates and expense assumptions. (0.5 mark SJ)

- The key sensitivity is the impact on the value of the retail business if there is a shock lapse, where a large proportion of policies lapse after the purchase date. (0.5 mark SJ)

- For both VIF and VNB, ensure that the valuation of all the guarantees for investment linked business are appropriately addressed. (0.5 mark SJ)

- Other valid points raised on calculations with an appropriate explanation. (0.5 mark SJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation

To a maximum of 2 marks SJ overall.

c)

Checks to be performed

- Verify that the movement in the policies inforce at the start and end of year is consistent with the new policies and exits.

- Check that policy information is consistent with the summary information provided on number policies, sum assureds, premiums and value of units.

- Perform consistency checks on the data between the administration system and the valuation system.

- Ratio checks on results such as Value Inforce/Annual Premium Inforce and Value of New Business/Inforce.

- Check your value against internal Appraisal values perfomed by AUSCO, adjusting for differences in assumptions.

- Check your value against values achieved for similar purchases.
- Other valid checks.

Marking Guide

0.5 marks KU for each point above with an appropriate explanation

To a maximum of 2 marks KU.

d)

How to value the option:

i) Covering assumptions:

- Assumption will be set on the rate of conversion of the maturing policies to annuities. (0.5 mark SJ)
- If the annuity basis is not guaranteed at the start of the policy, then assumptions will be required regarding mortality and interest for those who decide to convert. (0.5 mark SJ)
- Other valid points raised with an appropriate explanation. (0.5 mark SJ)

Marking Guide

To a maximum of 1 mark SJ.

ii) Capital Requirements:

- Examine the capital requirement for such an option and include it in value of capital. (0.5 mark SJ)

Calculation:

- Valuation of the option and sensitivities at different rates of conversion, using stochastic projection models. (0.5 mark SJ)
- Other valid impacts raised with an appropriate explanation. (0.5 mark SJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation with:

0.5 mark SJ for capital requirements.
0.5 mark SJ for calculation.

To a maximum of 1 marks SJ.

e)

Risks associated with the purchase include:

- If the retail block of business was sold via tied agency force, then the agents could influence the persistency of the policies and the policies could lapse after the purchase. This would be a real threat unless an arrangement could be made to mitigate this risk. Need to take into account whether the other company's agents are receiving commissions from this block of business as this will influence the actions of their agents after the purchase. (1 mark CJ)

- The risk of the annuity option could be considered to be unmanageable if the annuity basis is agreed at the start of the policy. (1 mark CJ)

- The purchase of this block of business only makes sense if the company wishes to enter the retail market for new business that could involve the opening up of a tied agency force which would be a major restructure for the company. (1 mark CJ)

- Management focus could be directed to the purchase of these products, with loss of focus on the current group business. (1 mark CJ)

- If the purchase arrangement includes offers of employment in BENFLIFE to AUSCO's underwriters and claim managers, there is the risk they may not accept these offers and their specialists skills and knowledge are lost. If offers of employment to key AUSTCO staff are not part of the purchase arrangements, then there are the costs of recruiting specialists and retraining staff. (1 mark CJ)

- Complexity would be introduced in the administration of this block of business as it is currently administered on the other company's systems. There would be issues of transferring the policies to our company or buying the other company's systems and this would be very complex. The same issue applies to the unit pricing system. (1 mark CJ)

- Risks associated with unit pricing, particularly unit pricing errors. (1 mark CJ)

- Need to be sure that we understand the reason why the other company is selling this portfolio of business to us. Perhaps they are getting out of the life insurance business or perhaps they are just trying to remove a problematic block of business but still intend to keep selling life insurance business. (1 mark CJ)

- The expense synergies to be delivered may not arise as expected with the risk of expenses increasing. (1 mark CJ)

- Policyholders may be dissatisfied with another company taking over, with potential shock lapses. (1 mark CJ)

- Other valid risks raised with an appropriate explanation. (1 mark CJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation with:

1 mark CJ for first point on agents' persistency influence risk.

Marks as specified above for each other point with an appropriate explanation to a maximum of 5 marks CJ.

To a maximum of 6 marks CJ overall.

QUESTION 3 (19 Marks)

You are the Appointed Actuary for a medium size Australian life insurer named AUSLIFE that has a portfolio dominated by an old block of participating endowment business and yearly renewable term (YRT) business. Both the participating endowment business and YRT business are open to new business.

Unit costs have been increasing due to the relatively low sales and the increase in lapses over the last few years on all portfolios. In addition the company has recently been going through a cost reduction program with a decrease in number of staff in the past 2 years.

The participating business has only a reversionary bonus with a 25% shareholder entitlement. Past declarations have been kept relatively stable.

The company was recently taken over by an Asian based insurance group named ASIANLIFE. The CEO of ASIANLIFE has experience of the net premium valuation method of setting reserves in his own country, but no experience of the Australian environment.

The CEO has been looking into the financial situation of AUSLIFE company and has some questions for you.

a) He has asked you to explain the differences between the margin on services (MOS) method of valuing the policy liabilities for the above products in AUSLIFE and the net premium valuation method (NPV) he is used to.

Discuss the differences between MOS and the NPV method. (5 Marks)

b) He has noticed that you have just recommended an increase in the unit cost assumption. He is not happy with the impact of the increase in unit cost expense assumption as it seems to decrease the value of the company from what ASIANLIFE recently paid for it. He has told you that he is currently in discussion with the CEO of AUSLIFE and that he is going to insist on a further redundancy program in the company to decrease the expenses of the company over the next few years.

He demands that you take into account this expense reduction plan in setting the expense assumption so that there is not a negative impact on the company's reported MOS profits and Appraisal Value.

Draft a memo to him to explain your view on this in respect of:

i) MOS profits (7 Marks)

ii) Appraisal Value (1 Mark)

c) He has seen projections of your expected profits for the next few years. He wants to see higher reported profits coming out of the Australian company.

He notices the large amount of bonuses that are given to policyholders each year. He is interested in understanding the impact declaring policyholder bonuses has on profit and other issues.

He wonders if you could reduce the bonus declaration to the policyholders in order to increase both the current and future shareholder profits.

i) Describe the impact of reducing declared bonuses on current and future shareholder profits. (3 Marks)

ii) Discuss the other issues that arise from reducing bonuses declared to policyholders. (3 Marks)

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QUESTION 3: SOLUTIONS

a)

Differences between MOS and NPV are set out in the following table:

Point of Difference	MOS	NPV
Compulsory Point:		
Purpose	Used for realistic reporting of profit. (0.5 mark SJ)	Used primarily for solvency and capital adequacy purposes. (0.5 mark SJ)
Marks for compulsory point:	0.5 SJ for compulsory point.	0.5 SJ for compulsory point.
Non Compulsory Points:		
Pattern of profits year by year	Profits tend to be smooth as profits reflect planned profits, with profit recognised over time in line with the services provided such as risk (using premiums or claims as the profit carrier) for YRT and investment management (using supportable bonus as the profit carrier) for par endowment business. (0.5 mark SJ)	Profits are not smooth as profits are not designed to emerge in line with the services. A loss occurs in the first year, with profits in the early years that follow lower than MOS Profits, but in later years profits increase and are larger than MOS Profits. (0.5 mark SJ)
Nature of Assumptions	Assumptions are best estimate assumption based on trends in the underlying experience of the company. (0.5 mark SJ)	Assumptions are conservative with a margin above best estimate assumptions to give a higher reserve than under best estimate assumptions. (0.5 mark SJ)
Range of Assumptions	A full range of assumptions is used to the extent that future cashflows are affected. This covers: investment earning rates, tax rates, discount rates, inflation rates, CPI indexation, lapses rates, mortality rates, tpd rates, trauma rates, disability incidence and termination rates, acquisition, maintenance and investment expenses. (0.5 mark SJ)	Usually only a discount rate and a mortality rate. In particular, lapse rate and expense assumptions are not included. (0.5 mark SJ)

Treatment of acquisition expenses	Acquisition expenses are effectively deferred with part of each future premium used to recover the acquisition expense. (0.5 mark SJ)	There is an allowance for acquisition expenses called a Zillmer or Sprague that alleviates some of the expense strain but in general the profits are lower in the earlier years than under MOS reporting and higher in later years. (0.5 mark SJ)
Change in Assumptions	Assumptions used in the valuation of the policy liabilities are reviewed each year and changes in non-economic assumptions will affect the level of future profits unless there are losses to be capitalised or reversed. Changes in economic assumptions are capitalised. (0.5 mark SJ)	The assumptions are locked in at the outset of the policy and are not revised subsequently. (0.5 mark SJ)
Calculation of Policy Liability	Calculation of policy liabilities is more complex as they typically use a projection method. Policy Liability is the sum of the Best Estimate Liability (present value of further net cash flows) and present value of future profit margins using best estimate assumptions. (0.5 mark SJ)	Calculation of policy liabilities is simpler as commutation factors are used. The policy liability is the present value of net premiums less the present value of benefits and premiums, with often no allowance for surrenders or expenses. (0.5 mark SJ)
Consistency with Asset Values	Profit influenced by changes in asset values that are generally valued at market value. (0.5 mark SJ)	Profit not affected by changes in asset values as assets may be valued at book value. (0.5 mark SJ)
Other valid differences raised	Appropriate explanation for MOS method in respect of any other valid difference. (0.5 mark SJ)	Appropriate explanation for NPV method in respect of any other valid difference. (0.5 mark SJ)
Total Marks for non-compulsory points:	Marks as specified above for each point with an appropriate explanation to a maximum of 2 marks SJ.	Marks as specified above for each point with an appropriate explanation to a maximum of 2 marks SJ.
Total Marks	Maximum of 0.5 marks SJ for compulsory point. Maximum of 2 marks SJ for non-compulsory point. To a maximum of 2.5 marks SJ.	Maximum of 0.5 marks SJ for compulsory point. Maximum of 2 marks SJ for non-compulsory point. To a maximum of 2.5 marks SJ.

Marking Guide

To a maximum of 5 marks SJ.

b)

Memo to CEO

To: CEO
From: Appointed Actuary
Subject: Setting of Expense assumption

Introduction

I am writing this memo in response to your enquiry on the setting of the expense assumption. The experience of the company shows that the unit costs have increased despite a material redundancy program that was put in place over the last two years. This is due to the relatively low sales and the increase in lapses over the last few years on all portfolios.

Requirements of Actuarial Standards

For some assumptions such as lapse rates, it is possible to look at a number of years of experience and take into account all the data as well as the trend in coming up with the assumption. (1 mark CJ)

The actuarial standard that governs the setting of the assumptions requires that the assumption regarding renewal expenses is sufficient in order to meet the expected expenses in the following year. (1 mark CJ)

Circumstances when Expense Assumptions can be Reviewed

You have mentioned that you are considering a redundancy program over the next few years, however given the above, I can only take this into account in setting the expense assumption if there are well established and agreed plans for reducing the costs in the next year. As I have not been provided with agreed plans which will reduce costs next year I cannot allow for them. (1 mark CJ)

I should stress though that for me to allow for these plans, they need to be realistic and achievable and any material reduction of expenses such as a large redundancy program will likely have a significant impact on the operations of the business and this impact should be allowed for in the official business plans of the company. (1 mark CJ)

Professional Issues

If the reduction of expenses appears to be unrealistic then I would not be able to incorporate them in my assumption setting as it would put me at risk of professional negligence in accordance with non compliance with the regulatory standard that Appointed Actuaries must comply with. (1 mark CJ)

Any change in expense assumption is subject to review and sign off by the actuarial auditors who must also act professionally and comply with the regulatory standards that govern auditors. (1 mark CJ)

Impact on Current Year's Profit

I would like to emphasise that the change of the expense assumption does not change the profit in the current year as the policy liability is unchanged, so the profit and loss will not be impacted for the current year. (1 mark CJ)

Impact on Future Profit

A reduction in the expense assumption would increase the expected future profit margins and so increases the future profits that are expected from the company. However please note that it does not mean that the actual profits will be higher as they will depend on the actual expenses at that time. (1 mark CJ)

If your redundancy plans do eventuate then they will benefit the actual profits in the future, but this might be offset by loss of staff morale and productivity. (0.5 mark CJ)

In addition, once the actual expenses have reduced then I will be able to take the reduction into account in setting the expense assumption in a few years time that will increase expected future profits. (0.5 mark CJ)

[Other valid point: You should also note that it doesn't matter that I have not adjusted the expense assumption for the future redundancy program. This is because if lower expenses do emerge then an experience profit will emerge and reported profit will be higher than planned - thus the same profit will be earned irrespective of whether the expense assumption is changed or is not changed (ignoring issue of capitalised losses). (1 mark CJ)]

Impact on Appraisal Value

The increase in the expense assumption will reduce the current Appraisal Value as this will reflect the lower expected future profits, but as stated above, if the expenses are reduced in the next couple of years, I will be able to revise the expense assumption and then the Appraisal Value would increase again so the reduction in Appraisal Value would be temporary. (1 mark CJ)

Yours Sincerely,

Appointed Actuary

Marking Guide

Marks as specified above for each point above with an appropriate explanation with:

For i):

Maximum of 1 mark for appropriate memo format, introduction and wording (plain English with no jargon).

Maximum of 1 mark for discussion on requirements of actuarial standards.
Maximum of 2 marks for discussion on circumstances when expense assumptions can be reviewed.
Maximum of 3 marks for discussion of other points.

To a maximum of 7 marks CJ for part b) i).

For ii)

Maximum of 1 mark for discussion on Appraisal Value.

To a maximum of 8 marks CJ overall for part b).

c)

i) Impact on profit of reducing bonuses declared to policyholders:

- In accordance with the profit sharing arrangement in place, policyholders and shareholders share in total profits and total distributions 80%/20%. Total distributions are policyholder bonuses plus shareholder dividends. Whenever policyholders receive bonuses, the shareholders are entitled to receive a dividend at most equal to 25% of these policyholder bonuses. (1 mark SJ)

- By definition, profit is before the distribution of a dividend. Hence a dividend will not impact profit. As a dividend does not impact the current year's profit, a reduction in policyholder declared bonuses does not increase current year's profit. (1 mark SJ)

- There is small second order impact on future profits. Reducing bonuses declared to policyholder reduces the shareholder dividend, which leads to higher shareholder retained profits. Higher shareholder retained earnings means interest on shareholder retained profits is higher. (1 mark SJ)

- Other valid points raised with an appropriate explanation. (1 mark SJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation

To a maximum of 3 marks SJ.

ii) Other issues:

- Impact on policyholder expectations would also be impacted as they expected a stable declared bonus. This could severely impact the company, with the increase in surrender rates from dissatisfied policyholders. (1 mark SJ)

- Impact on the competitive position in the market as a result of the lower declared rate with consequence impact on new business sales. (1 mark SJ)

- Increase in surrender rates and lower sales, would lead to a reduction in future MOS profits and the Appraisal Value. (1 mark SJ)

- If a lower bonus rate is declared then it would simply increase policyholder retained earnings for future bonus distributions. At the same time it would increase shareholder retained earnings for future dividends. (1 mark SJ)

- Any other valid point raised with an appropriate explanation. (1 mark SJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation.

To a maximum of 3 marks SJ.

QUESTION 4 (21 Marks)

You are the capital actuary of a medium sized Australian life insurance company called LIFECO, which has a large block of yearly renewable term lump sum business (YRT) on its books. Sales of the YRT business have been strong over recent years, with increased sales growth expected in the future.

LIFECO is a subsidiary of an overseas bank (GLOBALBANK).

Regular and sizeable dividends have been paid by LIFECO to its parent company over a long period of time.

You have been given a memo from the Head office of the parent company stating that there is an urgent requirement for capital from all their subsidiaries due to the impact of the upcoming solvency II requirement and they are requiring an up-streaming of capital from your company to the group. They want to understand what the minimum capital requirement for your company is and what is the maximum possible amount of capital that can be released to the Group.

You have been provided with the following information on LIFECO as at the end of the year (31 December 2010). All numbers are in $m.

	Total
Solvency Liability	-550
Capital Adequacy Liability	-420
Minimum Termination Value	120
Current Termination Value	120
Expense Reserve (net of $5m offset)	30
New Business Reserve	60
Inadmissible Assets Reserve	10
Resilience Reserve (Solvency)	16
Resilience Reserve (Capital Adequacy)	22
<u>Assets</u>	
Australian Fixed Interest /Cash	217
Property	0
Australian Equities	62
International Equities	31
Total Assets	310

Liabilities	
Policy Liabilities	**-600**
Other Liabilities	**10**
Total Liabilities	**-590**
Net Assets	
Retained Profits	**100**
Capital	**800**
	900

Target Surplus is set at a fixed $20m.

APRA, the regulator, is introducing new capital adequacy requirements for life companies at 31 December 2011. Preliminary calculations indicate that the total Capital Adequacy Requirement for LIFECO will increase by 5% based on the 31 December 2010 figures with Target Surplus still a fixed $20m.

a) The Head office wants to see the calculation of the Solvency Requirement and the Capital Adequacy Requirement for LIFECO.

Calculate the following as at 31 December 2010 under the current standards (showing each step in your calculation and all workings):

i) Solvency Requirement according to LPS2.04. (2 Marks)

ii) Capital Adequacy Requirement according to LPS3.04. (2 Marks)

b) The Head office wants an understanding of Target Surplus.

Describe what Target Surplus is and the purpose of Target Surplus. (2 Marks)

c) Head office has the view that the Solvency Requirement is the minimum capital requirement for LIFECO. Head Office is putting on pressure so that all excess capital above the Solvency Requirement is up-streamed to the group.

Discuss the implications if you complied with this request. (4 Marks)

d) Recommend how much capital could be streamed up, including the reasons behind your recommendation. (4 Marks)

e) The Head office then requests that LIFECO reduce its capital requirement so that it would be in a position to up-stream more capital.

Describe the options that are available to reduce the capital requirements of LIFECO. (7 Marks)

QUESTION 4: SOLUTIONS

a)

i) **Solvency Requirement:**

a) Solvency Liability = -550 (0.25 Mark KU)

b) Minimum Termination Value (MTV) = 120 (0.25 Mark KU)

c) Greater of MTV and Solvency Liability

= Max(120,-550) = 120 (0.25 Mark KU)

d) Add Expense Reserve

Amount from c)	= 120
Expense Reserve	= 30
Total	= 150

(0.25 Mark KU)

e) Greater of Current Termination Value (CTV) and d)

CTV = 120
= Max(120,150) = 150 (0.25 Mark KU)

f) Add Other Liabilities

Amount from e)	= 150
Other Liabilities	= 10
Total	= 160

(0.25 Mark KU)

g) Add Inadmissible Asset Reserve

Amount from f)	= 160
Inadmissible Asset	= 10
Total	= 170

(0.25 Mark KU)

h) Add Resilience Reserve

Amount from g)	= 170
Resilience Reserve	= 16
Solvency Requirement	= 186

(0.25 Mark KU)

Marking Guide

Marks as specified above to a maximum of 2 marks KU.

ii) **Capital Adequacy Requirement:**

a) Capital Adequacy Liability = -420 (0.25 Mark KU)

b) Current Termination Value (CTV) = 120 (0.25 Mark KU)

c) Greater of CTV and Capital Adequacy Liability

= Max(120,-420) = 120 (0.25 Mark KU)

d) Add Other Liabilities

Amount from c)	= 120
Other Liabilities	= 10
Total	= 130

(0.25 Mark KU)

e) Add Inadmissible Asset

Amount from d)	= 130
Inadmissible Asset	= 10
Total	= 140

(0.25 Mark KU)

f) Add Resilience Reserve

Amount from e)	= 140
Other Liabilities	= 22
Total	= 162

(0.25 Mark KU)

g) Minimum of Solvency Requirement and amount in f)

Solvency Requirement	= 186
Amount in f)	= 162
Minimum	= 186

(0.25 Mark KU)

h) Add New Business Reserve

Amount from g)	= 186
New Business Reserve	= 60
Capital Adequacy Requirement	= 246

(0.25 Mark KU)

Marking Guide

Marks as specified above to a maximum of 2 marks KU.

To a maximum of 4 marks KU overall for part a).

b)

What is Target Surplus ?

Target Surplus is the holding of a level of shareholder free reserves in excess of the statutory capital requirement. (0.5 mark KU)

Purpose of Target Surplus

It is generally accepted that free reserves above the statutory capital requirement should be maintained to ensure unusual events do not expose the company to breaching the capital adequacy requirement. (0.5 mark KU)

Examples of unusual events include adverse claims experience, overrun in expenses and a significant fall in the market value of assets which generates a mismatch between guaranteed liabilities and assets. (0.5 mark KU)

APRA does strongly recommend holding these reserves to satisfy policyholder obligations, although it is not required by legislation. (0.5 mark KU)

Target Surplus is also required to support a credit rating for the business. (0.5 mark KU)

Any other valid purpose with an appropriate explanation. (0.5 mark KU)

Marking Guide

Marks as specified above for each point with an appropriate explanation with:

0.5 mark KU for an explanation of what target surplus is.
Maximum of 1.5 marks KU for describing the purpose of target surplus.

To a maximum of 2 marks KU.

c)

Implications of complying with Head Office's request to pay capital in excess of the Solvency Requirement are:

- Could easily become technically insolvent with assets falling below the Solvency Requirement from the slightest change such as a small investment return fluctuation. The company would then suffer the severe consequences of becoming insolvent. (1 mark SJ)

- Australian standards require that the Capital Adequacy Standard be met at all times or there would be restrictions on the business to conduct as an ongoing entity. The request to upstream all capital in excess of the Solvency Requirement would leave it falling short of the Capital Adequacy Requirement. (1 mark SJ)

- If the company failed to comply with the Capital Adequacy Standard then the regulator would insist on understanding why such a situation has come about and would demand a plan for correcting it. If deliberate up-streaming of capital resulted in this then the regulator would insist on understanding why such an action was taken deliberately which breached the capital adequacy requirement. (1 mark SJ)

- If the Capital Adequacy Standard is breached then no dividends can be paid. This is of particular concern, as LIFECO has been paying substantial dividends to its parent company for a number of years. (1 mark SJ)

- No capital would be available to fund the capital strain from new business. (1 mark SJ)

- If the Appointed Actuary deliberately allowed this situation to occur then he/she would be at risk of being questioned on professional negligence. (1 mark SJ)

- Other valid points raised with an appropriate explanation. (1 mark SJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation.

To a maximum of 4 marks SJ.

d)

My recommended amount of capital to be up streamed is set out below with reasons:

- In order to ensure that assets do not fall below the Capital Adequacy Requirement plus Target Surplus, the maximum amount of capital that can be up-streamed to Head Office is based on the level of capital in excess of this level. (1 mark SJ)

- It is important to take into account the new Capital Adequacy Requirements being introduced by APRA for life companies at 31 December 2011. It is estimated that LIFECO's Capital Adequacy Requirement will increase by 5% based on 31/12/2010 figures. It would not make sense to release capital based on the current Capital Adequacy Requirements as at 31 December 2010, and then have to inject capital in one year's time to cover the increase in capital adequacy requirement. (1 mark SJ)

- The following table shows estimated level of assets in excess of the Capital Adequacy Requirement plus Target Surplus is $32m, if the new capital adequacy requirements applied at 31/12/2010:

	$m
Total New Capital Adequacy Requirement	258 (246*1.05%) (0.5 mark SJ)
Target Surplus	20
Total New Capital Adequacy Requirement plus Target Surplus	278 (0.25 mark SJ)
Excess of total assets over New Capital Adequacy Requirement plus Target Surplus	32 (0.25 mark SJ)
Total Assets 31/12/2010	310
Total Marks	Maximum of 1 mark SJ.

- Based on the net assets as at 31 December 2010, capital backs the assets in excess of New Capital Adequacy Requirement plus Target Surplus. (0.5 mark SJ)

  Hence I would recommend $32m of capital be up-streamed to GLOBALBANK. (0.5 mark SJ)

  [Note to markers: For the last point on the recommended capital to be up-streamed, none of the 0.5 mark should be given if the student mentions paying less than $32m to allow a buffer for adverse experience over the target surplus (as this is the purpose of target surplus anyway)].

Marking Guide

Marks specified above with:

1 mark SJ for stating the amount of excess assets is the maximum capital that can be up-streamed.
1 mark SJ for stating need to base calculations on new capital adequacy requirement.
1 marks SJ for calculations under new capital adequacy requirement.
0.5 mark SJ for commenting that capital backs the excess assets.
0.5 mark SJ for recommended capital to be up-streamed.

To a maximum of 4 marks SJ.

e)

Reducing Capital Adequacy Requirement

New Business Reserve:

- New Business Reserve is a significant part of the Capital Adequacy Requirement. It could be reduced by lowering the capital requirements of new business. This could be achieved by reducing initial commission and paying higher renewal commission. (1 mark CJ)

- Look at start selling less capital intensive products, such as investment style products. (1 mark CJ)

Resilience Reserve:

- There is scope to reduce the Resilience Reserve as there are too many risky assets (equity) for YRT, causing an asset/liability mismatch. If all assets are invested in fixed interest and cash, the Resilience Reserve would fall. (1 mark CJ)

- The fixed interest portfolio should also be reviewed to assess if there is any duration mismatch between assets and liabilities. Better matching of duration will reduce the Resilience Reserve. (0.5 mark CJ)

- The credit rating of the fixed interest portfolio should also be reviewed in terms of mix of government and corporate bonds, as well as the credit rating mix within each of these bond classes. A higher portion in government bonds with strong credit ratings will reduce the Resilience Reserve. (0.5 mark CJ)

- Reducing the exposure to international equities will reduce the currency risk and thus reduce the Resilience Reserve. (0.5 mark CJ)

Inadmissible Assets:

- Depending on the nature of the inadmissible assets, it may be able to reduce or eliminate its exposure to these assets by selling part of or all of them so that the inadmissible asset reserve reduces or is eliminated. This could be the case for shares in a company where the value of shares exceeds 5% of total assets. (1 mark CJ)

- This is more difficult for an intangible asset such as a future income tax benefit. (0.5 mark CJ)

Expense Reserve:

- The Capital Adequacy Requirement is driven by the Solvency Requirement, for which the expense reserve is a large component. The expense reserve is equal is 70% of annual fixed acquisition expenses (i.e. non-commission acquisition expenses). If this could be reduced, then the Solvency Requirement would reduce and thus the Capital Adequacy Requirement would fall. (0.5 mark CJ)

Reinsurance:

- Make use of standard risk reinsurance to reduce capital, but this will come at cost and will reduce profits. Reinsurance reduces the capital requirement by reducing the MTV and the CTV. (1 mark CJ)

- Under certain reinsurance arrangements, reinsurance funds the capital requirements of new business. This will reduce the need for capital to fund new business. Capital injections are less likely in the future. (1 mark CJ)

Reducing Target Surplus

- It is not mandated by legislation that you need to hold reserves in excess of the Capital Adequacy Requirement. Thus capital up-streamed could be more than the $32m indicated above. However, the implication of reducing the Target Surplus is that there would be less of a buffer to ensure that the Capital adequacy standard will not be breached. If there was deterioration in the position the company could find itself short of capital. Therefore by reducing the Target Surplus it makes it more likely that a capital request may be forthcoming from the company to the Head office. (1 mark CJ)

Other:

- By paying less or even no dividend this year or in future years, more retained earnings remain in the business, which can provide capital support for the high acquisition costs of future new business. This reduces the reliance on capital to be provided by the parent company. (1 mark CJ)

- Instead of capital use subordinated debt, which is cheaper than shareholder capital. (1 mark CJ)

- Any other valid points raised with an appropriate explanation. (1 mark CJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation.

To a maximum of 7 marks CJ overall.

QUESTION 5 (20 Marks)

You have just been appointed as the valuation actuary in an Eastern European life insurance company that specialises in participating traditional business.
The company has had a growing market share in the past 5 years as a result of successful sales of new business through their tied agency force.

The insurance company has performed well over many years, with substantial levels of policyholder retained earnings and shareholder retained earnings.

The insurance regulator in the Eastern European country enforces the same Solvency Requirement and Capital Adequacy Requirements as Australia on all insurance companies operating in the country.

All insurance companies in this Eastern European country only use reversionary bonuses to distribute profits.

The local insurance market is very competitive and the company has prided itself in the high reversionary bonuses that it has declared in the past 5 years of about 8%. It uses this fact strongly in its marketing and sales strategy and is seen as the key reason why the company has been very successful in growing its market share.

Despite the fact that only one bonus rate has been historically declared for all policies, the administration system has the capability to allow for multiple declared bonus rates to be used for different groups of policyholders.

In examining the method that was used in the past for setting the bonus rate, you realise that it has not been based on the supportable bonus concept but only on marketing arguments based on competitor bonus rates. Shareholders receive 25% of declared bonuses.

a) Describe the principles behind the concept of a supportable bonus. (3 Marks)

b) You have an actuarial student who will calculate the supportable bonus for inforce and new business.

Explain in detail the calculations the actuarial student will need to follow to determine the single supportable bonus for inforce business. (3 Marks)

The actuarial student has calculated the supportable bonus rates as follows:

	Supportable bonus rate % *
Inforce Business	**6%**
New Business	**4%**

*** applied to current sums assured and accrued reversionary bonuses**

Both inforce and new business have had the same premium rates for many years.

c) The CEO asks you for your opinion whether they could continue using the high declared rates as used in the past.

Discuss the issues the company faces if high bonus rates continue to be declared. (5 Marks)

d) You inform the CEO that you can recommend an alternative method (based on reversionary bonuses only) that addresses the issues raised about continuing to pay high declared rates.

i) Describe your recommended method. (2 Marks)

ii) Explain why your recommended method is appropriate. (4 Marks)

iii) Describe other strategies that could be adopted to help complement your recommended method. (3 Marks)

QUESTION 5: SOLUTIONS

a)

Principles behind supportable bonus calculation are:

- Supportable bonus is an indication of what level of bonus can be financially afforded for each year in the future. (0.5 mark SJ)

- Requires available assets which with interest and premiums is expected to pay for the supportable bonus paid to the policyholder when a claim is paid, the shareholder dividend (25% of the supportable bonus), expenses and claims (based on bonuses declared up to the calculation date). (1 mark SJ)

- Uses best estimate assumptions. (0.5 mark SJ)

- The bonus based on the supportable bonus concept allows the company to declare relatively smooth bonuses from year to year. (0.5 mark SJ)

- This keeps the policyholder expectations in line with what can be supported by the product. (0.5 mark SJ)

- Theoretically, when the last policyholder leaves the company, all assets are extinguished. This is a function of the supportable bonus. (0.5 mark SJ)

- Any other valid points raised with an appropriate explanation. (0.5 mark SJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation

To a maximum of 3 marks SJ.

b) The supportable bonus for inforce business is calculated as follows:

It does not follow exactly the MOS supportable bonus calculation method, as assets available includes retained profits. (Note, MOS supportable bonuses are used to smooth profit for profit reporting purposes).

1. Determine the total assets available

Policy Liabilities + Policyholder Retained Profits + Shareholder Retained Profits.
(1 mark KU)

2. Deduct from the total assets available an amount to provide a buffer for future volatility in experience. (0.5 mark KU)

3. Determine best estimate liability:

= PV future benefit payments (based on bonuses declared to date)
+ PV future expenses + PV future commissions - PV future premiums

on best estimate assumptions

(0.5 mark KU)

4. Supportable bonus is the policyholder bonus such that:

Assets available equals:

PV future policyholder bonus
+ PV future shareholder share of bonuses (25% of policyholder bonuses)
+ Best Estimate Liability

(0.5 mark KU)

This requires repeating calculations using various bonus rates, perhaps by using a starting bonus then increasing the bonus at 0.5% intervals and then interpolating to get the supportable bonus rate.

or any other appropriate method with an appropriate explanation. (0.5 mark KU)

Marking Guide

Marks as specified above for each point with an appropriate explanation

To a maximum of 3 marks KU.

c)

Issues the company faces if high declared rates continue to be used:

- Continuing to declare high bonus rates based on a market competitive position is not sustainable and financially unsound. As companies price their products differently, the bonuses that competitors declare have no relevance to this company and what it can afford. (1 mark CJ)

  This is because an 8% declared rate exceeds the 6% supportable rate for inforce business and the 4% supportable bonus rate for new business. (1 mark CJ)

- If we declare the high levels of bonus as in the past it will continue to use up policyholder retained earnings until they are exhausted and there would be no buffer left for dealing with future variations in experience and to finance new business. (1 mark CJ)

- Maintaining these high unsustainable declared bonus rates will increase the Solvency Requirement, as the Solvency Liability, MTV and CTV will increase. This could lead ultimately to the company not being able to satisfy solvency as the Solvency Requirement becomes greater than the total assets. (1 mark CJ)

- The Capital Adequacy Requirement is essentially the Capital Adequacy Liability (the policyholder retained profits plus the policyholder component of the policy liability). Maintaining high declared bonus rates will not impact the Capital Adequacy Liability as there is just a transfer of declared bonuses from policyholder retained earnings to the policy liability. However, the Capital Adequacy Requirement will ultimately be breached as the Capital Adequacy Requirement becomes greater than the total assets. (1 mark CJ)

- There are issues of equity between existing policyholders and new policyholders because continuing to declare high levels of bonus for new business will use up part of the retained earnings that have been built up by existing policyholders. (1 mark CJ)

- The company will ultimately need to declare lower bonus rates that are supportable. As policyholders prefer stable and smooth bonus rates, this will cause dissatisfaction, leading to potentially high surrenders. This along with lower sales from uncompetitive bonus rates, will reduce the amount of business on the books and thus future profits. (1 mark CJ)

- The longer the delay in cutting bonus rates, the bigger the adjustment will be required to bonus rates as continuing to eat into retained profits will make the supportable bonus rate even lower than 6% for inforce business. The consequences for the business will be even greater. (1 mark CJ)

- Other valid points raised with an appropriate explanation. (1 mark CJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation

To a maximum of 5 marks CJ.

d)

i) Description of Method

The method to use is based on separate supportable bonus rates for inforce and new business with 3 distinct rates for new business according to the premium rate (which the administration system can handle).

Inforce:

7% this year, then 6% for next year.

Gradually drops the declared rate to the supportable bonus rate of 6%.

(1 mark SJ)

New Business:

Different declared bonus rates depending on the premium rate.

The declared bonus rate for each premium rate is the supportable bonus rate that the premium and investment strategy can support using best estimate assumptions.

Declared bonus rates by premium rates are:

Premium Rate Series	Declared Bonus Rate
Standard (current premium rates)	4%
Silver (between current and high premium rates)	6%
Gold (high premium rate)	8%

(1 mark SJ)

[Note to Markers. Other valid methods may be described by candidates and marks should be awarded accordingly.]

Marking Guide

Marks as specified above to a maximum of 2 marks SJ.

ii) My recommended method is appropriate because

Declared rates are supportable:

- Resets the declared rate for the inforce to one that is supportable in one year's time. (0.5 mark CJ)
- Sets new policyholder expectations from the start of the policy, that a supportable rate will be based on the chosen premium rate. (0.5 mark CJ)

More equitable between inforce and new business:

- As new business funds its supportable bonus rates from its own premium, there is less chance that new business will use up the retained earnings that belongs to the inforce business. (1 mark CJ)

Reduces surrender risk:

- Reducing the declared rate by 1% in the first year (from the previous declared rate of 8% to 7%) and then reducing it to the supportable 6% bonus rate after that, is a small gradual drop that may reduce surrenders on inforce policies. This is a better alternative than dropping it by 2% immediately to the 6% supportable rate. (1 mark CJ)

Rates are Competitive:

- A new business declared rate of 4% based on the standard premium will be competitive in the near future, as the 8% declared rate offered by competitors is not sustainable and must come down to 4% (assumes all companies are the same in terms of investment strategy and pricing assumptions). (1 mark CJ)
- Although a higher premium is charged, a new business declared rate of 8% attempts to maintain the competiveness of the company. (1 mark CJ)

Different Affordable Rates:

- Offering different premium rates with different declared rates, allows new policyholders to select the premium rate they can afford. (1 mark CJ)

Other:

- Other valid reasons raised with an appropriate explanation. (1 mark CJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation

To a maximum of 4 marks CJ.

[Note to Markers for parts i] and ii): Other methods may be acceptable. Marks should be awarded for how the answers cover the points above – declared rates are supportable, more equitable between inforce and new business, reduces surrender risk, rates are competitive and rates are affordable.]

iii)

Other strategies that should be adopted to complement my recommended method are those that help reduce surrender risk and maintain new business sales.

These include:

Increasing Commission:

- Provides incentives for agents to keep business on the books by increasing renewal commission. The declared bonus rates would need to reduce due to the fall in the supportable bonus rate. (0.5 mark CJ)

- Encourages agents to sell new business by increasing initial commission. The declared bonus rates would need to reduce due to the fall in the supportable bonus rate. (0.5 mark CJ)

Introducing a Terminal Bonus:

- Introduce a terminal bonus based on date of entry of this policy. This is a new and innovative product feature which would distinguish this company from other life companies. This could help reduce surrenders and may be attractive to new policyholders. In addition it would help address equity issues between different cohorts of policies (including inforce and new business). (1 mark CJ)

Communication:

- An effective communication strategy with policyholders outlining:

    - Disadvantages of policyholders surrendering their policies due to the surrender penalties. (0.5 mark CJ)

    - The high declared bonus rates offered by competitors are not sustainable and therefore must reduce in the near future. Contrast this with the company's prudent financial management and financial security as a key selling point. (0.5 mark CJ)

- Other communication strategies with an appropriate explanation. (0.5 mark CJ)

Other Strategies

- Other strategies with an appropriate explanation. (1 mark CJ)

Marking Guide

Marks as specified above for each point with an appropriate explanation with:

1 mark CJ for discussion on increasing commission.
1 mark CJ for discussion on introducing a terminal bonus.
1 mark CJ for discussion on communication strategies.
1 mark CJ for discussion on other strategies.

To a maximum of 3 marks CJ.

END OF PAPER