THE INSTITUTE OF ACTUARIES OF AUSTRALIA
LIFE INSURANCE MARKING GUIDE & SOLUTIONS

PAPER 1 **2000 EXAMINATIONS**

The purpose of this document (which should be read in conjunction with the corresponding examination) is to assist candidates in their preparation for future examinations. It is emphasised, however, that the solutions herein are not necessarily the only solutions or the best solutions, especially for those questions testing judgement. They should be regarded as illustrative only. However, a candidate who covered all the points in the specimen solution in the examination would have scored a very comfortable pass. This document should be used in conjunction with the 2000 Examiner's Report which is on the IAAust web site**.**

QUESTION 1 (10 Marks)

Question Part	Aim	Difficulty	Marks
(b)	16	A	2
(c)	12	B	3
(d)	1	C	5

Suggested grade cut-offs

Grade	**Cut-off**
A (clear pass)	7-10
B (pass)	5-6.5
C (below standard)	2.5-4.5
D (weak)	1-2

a)
Surpluses are distributed as increases in future benefits rather than as a cash distribution. The most common method of surplus distribution is uniform compound reversionary bonus where the bonus is a (fairly) uniform percentage of the sum insured (and often on past bonuses as well).

(1 mark)

The usual method for handling unrealised capital gains is through a terminal bonus. Terminal bonuses are not guaranteed and are only paid on death or maturity (or on limited circumstances surrender)

(1 mark)

b)
The 3 standards in Australia for valuing policy liabilities are used for different purposes.

Standard AS1.01 is used for realistic profit reporting in particular to recognise profit when it is earned.

Standard AS2.01 is for Solvency and is published and is designed to demonstrate the company will be solvent in a wind up situation. The assumptions are prescribed and allows the public to compare the solvency of different companies.

Standard AS3.01 is for capital adequacy and is not published and its purpose is to provide an early warning to the regulator of problems. allowing actions to be taken outside the public eye.

Question 1 continued

Marking guide: *0.5 marks for identifying the 3 standards*
0.5 mark for saying they have different purposes
0.5 marks each for describing the main purpose of each.
Max 3 marks

c)
The approach will not be successful unless it is adapted to Australian market conditions. The market size of the traditional participating new business is negligible. The growth prospects for traditional participating are not good. Traditional participating business was an important part of the Australia market more than 20 years ago but now hardly any traditional participating policies are sold any more. The investment market is now entirely unbundled due to customer pressure for easily understood and flexible products.

It would be better to offer unbundled contracts and probably better to offer unit trusts. Very good investment performance is very important to get sales.

It will be difficult and expensive to start up a tied agency network from scratch. Only the very large companies have tied agents. There is a strong base of independent agents in Australia and it would be more efficient to distribute your products through this channel.

Marking Guide
- *1 mark for saying will not be successful unless adapted to Australia*
- *0.5 mark for traditional new business is (almost) non existent*
- *0.5 mark for strong in past,*
- *0.5 mark for move to unbundled,*
- *1 mark for reasons for move*
- *0.5 mark for alternative proposal for products*
- *0.5 mark for difficulties with setting up tied agents*
- *0.5 mark for alternative proposal for distribution*
- *other relevant points*

Max 5 marks

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QUESTION 2 **(10 Marks)**

Question Part	Aim	Difficulty	Marks
(i)	2,6	B	5
(ii)	2,6	B	5

Suggested grade cut-offs

Grade	Cut-off
A (clear pass)	8-10
B (pass)	5-8.5
C (below standard)	2-4.5
D (weak)	0-1.5

a) overhead expenses

i) In the short term the overhead expenses will increase due to costs of completing the deal, costs of integrating the business, including additional advertising, and probable redundancy for duplicated staff.

ii) In the long term the overhead expenses should decrease as a number of overhead functions like senior management and personnel can be combined and the combined cost should be less than the total of the separate costs.

Marking Guide:

- *0.5 for increased short term overheads*
- *0.5 mark for implementation costs*
- *0.5 marks for redundancies*
- *1 mark for reduce duplicated expenses*
- *0.5 mark for reasonable example of types of duplicated expenses*

<u>Question 2 continued</u>

b) sales volumes

i) Short term sales volumes may go either up or down depending on the immediate reaction of the market to the merger. It will increase the profile of the company which should increase the volumes but the company could be distracted from normal business and it may take some time for optimal efficiency to return.

ii) In the long term, sales volumes should increase following the merger due to be able to sell products through the bank as the bank will have its own distribution system or through cross selling or referrals from bank. The sales volumes through the existing distribution system may increase (if the market now perceive the company to have a better marketing image) or decrease if the market react negatively (e.g. if the service standard were to slip)

The volumes may increase if the company can reduce its charges as its costs have decreased.

Marking Guide:
- *1.5 marks for saying either short term increase or decrease WITH a good reasoning*
- *1 mark for increased selling through the bank*
- *0.5 mark for impact on sales through existing distribution method*

c) surrender rates

i) In the short term there may be a one off impact as the market reacts to the news and This one off impact will only occur if the market think that they will suffer from merger or they really hate the bank.

ii) The long term impact will depend on the long term performance, especially in terms of charges. If the company passes part of the expense savings on to policyholders then the surrender rates should be lower.

Marking Guide
- *1 mark for short term impact on surrender rate with reasons*
- *1 mark for long term impact on surrender rate with reasons*

d) Mortality Rates

i) Mortality rates depend on primarily on underwriting and claims standards (although more so for income protection) and random events. In the short term there should be no impact on mortality rates as the underwriting and claims standards should not have changed significantly enough to change the mortality rates

Question 2 continued

ii) In the long term it is possible that underwriting standards or claims control may change. This could be the case if there is an increase in the volumes sold through the banking channel and the banking channel has less strict underwriting. Also, it might be that the underwriting and claims standards changing was one of the specific reasons for the merger (i.e. the bank may feel that it does not had the necessary skills in underwriting and claims) although it is unlikely that this would be a reason for the merger.

Marking Guide

- *0.5 mark for no short term impact*
- *0.5 mark for what impacts mortality rates*
- *1 mark for one suggested possible long term reason why the underwriting/claims standards may change*

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QUESTION 3 **(17 Marks)**

Question Part	Aim	Difficulty	Marks
(a)	6	A	5
(b)	6	A	3
		B	6
(c)	6	C	3

Suggested grade cut-offs

Grade	Cut-off
A (clear pass)	14 – 17
B (pass)	10 – 13.5
C (below standard)	6 – 9.5
D (weak)	0 – 5.5

(a) Purposes of Expense Analysis

The purposes are:

- setting the pricing assumptions;

  The level of expenses actually experienced in the recent past is an important guide to suitable expense assumptions when calculating premiums and charging structures. Of course, it may be necessary to adjust expense levels when it is likely that the past is not a good guide to the future.

- preparing financial statements;

  Expenses must be apportioned between statutory funds and between various categories of business within a statutory fund. The Life Insurance Act 1995 requires that the apportionment of expenses be made on an equitable basis.

  Section 80 of the Act requires that "the directors of the company must obtain the appointed actuary's written advice" on the appropriateness of the expense apportionment.

- setting valuation assumptions;

  As for premium rating, the level of expenses in the past provides a guide to best estimate assumptions of future experience. Further, in the case of the solvency liability, the expense assumption explicitly requires comparison with the actual cost of servicing policies in the previous 12 months.

Question 3 continued

- developing budgets;

  As for premium rating and valuation assumptions, the past can provide some guide for the future. Major differences between the past experience and expected future expenses should be justifiable based on management action, changes in the mix of business etc.

- monitoring experience.

Comparisons of expense levels over time can provide guides to the effectiveness of management actions and highlight areas requiring further attention.

Marking guide: ½ mark per purpose and ½ mark for how it is used, maximum 5 marks

(b) Allocating Expenses of Claims Department

Factors:

The cost of managing the claims will vary because of:

- the amount of time required to assess the claim;
- the level of seniority required of the manager assessing the claim;
- the number of times that payments need to be made;
- the cost of dealing with disputed claims; and
- the cost of medical investigations.
- Underwriting implications (need to investigate non-disclosure);
- Policy conditions (eg exclusion clauses);
- Reinsurance (cost of processing reinsurance recoveries, sharing of expenses with reinsurer);
- Type of policy;
- Size of claims (in dollar per claim).

Marking guide: 0.5 mark per item, maximum 3 marks

Question 3 continued

Death claims will typically be the simplest of the claims. They will therefore be expected to be processed faster and by less senior claims managers. Payments are only made once, and there is comparatively little investigation required or disputed claims. As such, death claims expenses will be lower than the other types of claim and will be relatively insensitive to the size of claim. A flat amount per claim is probably reasonable.

Trauma and TPD claims require more time to manage because of the need to make a determination on the permanency of the disability. It will also require expenses for medical investigations which will vary depending on the size of the claim. Disputed claims are not uncommon. Payments are only made once. The level of seniority required to assess the claims will vary with the complexity and size of the claim. As such, the expenses involved will be at a higher level than for death claims and vary with the size of the claim. A flat amount per claim, along with a sum insured related component is appropriate.

Disability income claims differ from the other types because they are paid over a period of time rather than a single payment. This will mean that expenses will be incurred for each claim, as the initial assessment is made, and then on an on-going basis as further payments must be processed and further medical examinations carried out. As such, the structure of the expenses should be a flat amount per claim plus a sum insured related component, plus a flat amount per payment and a further component related to benefits actually paid.

Marking guide: 2 marks per item, maximum 6 marks
Total 9 marks for part b

(c) Comment on Assertions

- The increase in IT expenses should not be ignored.
- Even if the increase were truly a one-off, it should be spread over an appropriate period to allow for the fact that other one-off costs will occur in the future.
- In particular, the introduction of the GST and Ralph reforms will result in increased expenditure on IT in 2000.
- However, the increase is not purely a one-off because the company has also upgraded computer systems at the same time.
- The expense analysis should therefore still recognise that part of the increase is not one-off but is part of an on-going maintenance of computer equipment and/or software.
- It may well be true that unit costs will decrease as a result of the upgrade, but this would need to be further explored.

Marking guide: ½ marks per valid point, maximum 3 marks

QUESTION 4 **(17 Marks)**

Question Part	Aim	Difficulty	Marks
(a)	15(c)	B	3
(b)	10(a)	A	3
(c)	10(b)	B	3
(d)	9	A	3
		B	5

Suggested grade cut-offs

Grade	Cut-off
A (clear pass)	9.5-17
B (pass)	6.5-9
C (below standard)	3.5-6
D (weak)	0-3

(a)

MoS Liability = 99% Surrender Value

Start of year SV = 100m
New SP = $20m
Assume SP on average half way through the year
Assume investment earnings uniform.

SV mid year = 100 x $1.12^{1/2}$
= 106 m
MoS liability = 99% * 106m

(1 mark)

Expected Surrenders = 10.6m
Actual Surrenders = 30m

Expected Surrender Strain = -10.6 + .99 * 106 * 10% = (0.1)m

(0.5 mark)

Actual Surrender Strain = -30 + 106 * .99 * .1 * 30 / 10.6 = (0.3)m

(1 mark)

Loss = (0.3) – (0.1) = (0.2)m

0.5 mark
Need to get Loss calculation correct to get maximum 3 marks
(alternative approaches can be used)

<u>Question 4 continued</u>

(b)

The areas to review are:

Adequacy:	The solvency for continuing policyholders should not be endangered by an upsurge in surrenders
Equity:	This measures the extent to which those who surrender their policies receive a "fair" value compared to continuing policyholders.
Consistency:	The structure should not contain any major anomalies, for example with paid up policies.
Competitiveness:	The extent to which the company's surrender values are higher or lower than competitors will impact on the company's sales.
Profit:	The structure should be such that the company expects to make a profit.
Stability	The surrender scales should be relatively stable over time
Ease of use:	This measures the extent to which the structure is easy to administer and easy to explain to policyholders.

Marking guide: ½ mark per criterion plus explanation, maximum 3 marks

(c)
Purpose of standard:–

1. minimum amount payable on surrender
2. amount required to be held as minimum termination value, on which the Minimum Termination Value is based

1 mark for purpose

Standard particularly considers the impact of front and back end charges on surrender value bases as these are most important in setting the surrender value

A particular concern is to limit the adverse effects on policyowner of excessive charges on establishment and termination

1 mark for commentary on charges

Question 4 continued

Need to also consider impact of basis on remaining policyowners as well as exiting policyowners – an equity consideration

1 mark for equity

Any changes recommended would only be able to be implemented effectively for new business

Even if possible contractually to implement changes for existing business, potentially will provoke early policyholder withdrawals and complaints if increase charges retrospectively.

1 mark for ability to implement changes in reality
Maximum 3 marks

(d) Methods

Four methods are set out below. The student need only cover two methods. Reasonable methods which are not listed below are acceptable.

Method 1

Charge expenses as they occur as an explicit debit against premiums. In practice, this means that the bulk of at least the first year's premiums are lost.

Advantages:

- Ensures that charges are adequate because there is no risk of losses from early lapse.
- Fully equitable because each policyholder meets all their own costs.
- Easy to use and explain.

Method 2

Charges are recovered from an additional charge to the investment value over the life of the contract.

Advantages:

- Easy to explain and use.
- Attractive to policyholders.

Question 4 continued

Method 3

Charges are recovered from an additional charge to the investment value over the life of the contract. Any unrecouped expenses are recouped through a surrender charge if the policyholder lapses early.

Advantages:

- Equitable.
- May be easy to use depending on complexity of charging basis.
- Expenses will be adequately recouped.

Method 4

Use two types of investment units. Premiums in the first year or two buy one type of unit which has heavy charges, while premiums in later years purchase another type of unit with lighter charges. Unrecouped expenses are recouped via a surrender charge.

Advantages:

- Equitable.
- Expenses will be adequately recouped.

Recommendation
(As this is a recommendation there are a range of appropriate answers.)
Sample Answer
I recommend that the annual charge with a surrender penalty be adopted as it is in the current market it is important to have a product that is easy to under but at the same time does not appear to have excessive charges. By spreading the charge over time the extent of the change is not as obvious to the policyholder.

Marking guide: 1 mark per suggested method and explanation, plus ½ mark per advantage to maximum of 2.5 marks per method,
1 marks for recommendation
2 marks for reasons
maximum 8 marks

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QUESTION 5 **(18 Marks)**

Question Part	Aim	Difficulty	Marks
(a)	15	B	4
(b)	16,17	C	5
(c)	14	B	5
(d)	17	C	4

Suggested grade cut-offs

Grade	Cut-off
A (clear pass)	13-18
B (pass)	9-12.5
C (below standard)	5-8.5
D (weak)	0-4.5

(a) Prevention of the error in future:

- The policy liabilities at year end date need to be supported by a detailed analysis of profit for the year. The change in policy liabilities in the year should be consistent with the net revenue in the year, allowing for interest.

(1 mark)

- The untraced component in the analysis of profit should be small and the actuary should have a feel for the items that make it up.

(½ mark)

- The undervaluation of policy liabilities at year end may have been an error in the previous year's valuation as well. If this is the case, the analysis of profit for the current year may not have picked up the problem. For this reason, it is necessary to carry out reasonableness checks on the policy data and on the inforce and movements policy statistics.

(1 mark)

- The movement statistics generated by the computer system, e.g. policies passing their maturity dates and changing to out-of-force status, should be reconciled with the maturity payments shown in the accounts, on a monthly or quarterly basis.

(1 mark)

- The accounts or administration staff need to reconcile, for a given period, the notified claims with the paid claims and the change in outstanding claims over the period.

(½ mark)

- Do an audit of the administrative processes of the company.

½ mark

Maximum of 4 marks

Question 5 continued

(b) Actions to be taken after discovering the error:

The management team needs to decide between changing the accounts to adjust for the error and retaining the original accounts.

(½ mark)

Reasons for retaining the original accounts are:

- On materiality grounds, the $2 million error can be ignored and can be picked up in the following year's profit reporting (i.e. a loss of $2 m in 2000).

  (½ mark)

- There may be other compensating margins in the 1999 accounts that can be used to offset the $2 million undervaluation. Possible examples are slightly conservative asset values or values of fixed assets, lack of discounting in outstanding claims reserves or tax reserves and conservative valuations for minor product groups.

  (1 mark)

- The disruptions and delays created by changing them would be too onerous.

  (½ mark)

- The note in the financial statements on "subsequent events" could mention the error.

  (½ mark)

Reasons for changing the accounts to reflect the error are:

- The error is large enough to be significant and material.

  (½ mark)

- The accounts will be cleaner if the error is corrected.

  (½ mark)

- There are no positive margins in the original 1999 accounts that can be used to offset the undervaluation of policy liabilities.

  (½ mark)

- The board may refuse to approve the accounts if the change is not made.

  (½ mark)

- APRA may give special dispensation to the company by allowing them to submit the revised accounts say 2-3 weeks after the due date of 31 March 2000.

  (½ mark)

<u>Question 5 continued</u>

If the accounts are changed, the following <u>actions</u> may need to be taken:

- the board meeting may need to be delayed.
(½ mark)

- the detailed accounting and policy liability papers will need to corrected and reissued. The board will need to be given revised 1999 financial statements, 1999 financial condition report and 1999 performance commentaries. (½ mark)

- the changes will need to be agreed with the external auditors. (½ mark)

- The management may need to ask APRA for an extension of 2-3 weeks for filing the 1999 financial statements, 1999 FCR & other 1999 returns as they are due 31 March.
(½ mark)

Maximum 5 marks

(c) Items to be changed in the 1999 accounts:

- Profit and Loss statement:
  - "Claims expenses" will remain the same. (½ mark)
  - "Increase in policy liabilities" will increase by $2 m. Alternatively, this could be handled by "claims expenses" increasing by $2 m, on the basis that the pending maturity payments become "current liabilities". (½ mark)
    - "Closing retained profits" will decrease by $2 m. (½ mark)
  - "Profit before and after tax" will decrease by $2 m. (½ mark)
  - "Dividends provided for" may need to be reduced. (½ mark)

- Balance Sheet: *½ mark if both points mentioned as covered above*
  - "Policy Liabilities" or "Other liabilities" (creditors) increase by $2 m.
  - "Retained profits" will decrease by $2 m.

- Other changes, mainly to Notes:
  - The solvency requirements will change if the policy liabilities or other liabilities change. The resilience reserve will increase due to the additional policy liabilities, causing the solvency requirement to increase and solvency ratios to change.
(1 mark)
  - Minor changes may be made to the tax calculations due to a revised split of liabilities between the various classes of business (for tax purposes).
(½ mark)
  - The notes showing the sources of profit (planned profit margins, interest on retained earnings and experience variations) will need to be changed.
(½ mark)

Question 5 continued

- The notes on components of policy liabilities will need to be changed. (½ mark)

Maximum 5 marks

(d) Professional responsibilities

Board

The board needs to be made aware of the error and its ramifications, even if the 1999 accounts are not changed. The board ultimately approves the accounts and needs to be advised of all relevant information. The actuary has a professional duty to the board, as set out in the 1995 Life Insurance Act.

The actuary would use the FCR and any commentaries on the liabilities and analysis of profit to explain the error and any recommended actions to the board.

APRA

APRA may be advised of the error by the management team when an extension is sought for the filing the company's annual returns.

Apart from this, the actuary does not need to draw APRA's attention to the error and they can find out about it when the FCR is submitted.

In an extreme situation where the management refuses to change the accounts, contrary to the actuary's advice, APRA would need to be advised directly, as a high priority.

Auditors

The auditors would need to be advised of the error and would need to agree with the recommended actions to retain or change the accounts. The actuary has a duty to advise the auditors of all relevant matters, as set out in IAA Guidance Note 551.

Management

The actuary would need to similarly advise the management of the error and the recommended actions. It is clearly not acceptable to ignore the error and leave it to appear in the next year.

For their part, the management must acknowledge the error, even if it detracts from their performance bonuses.

Marking Guide: 1 mark for each heading, total 4 marks for part (d)

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QUESTION 6 **(18 Marks)**

Question Part	Aim	Difficulty	Marks
(a)	5	A	3
(b)	5,12,13	B	5
		C	4
(c)	4	C	6

Suggested grade cut-offs

Grade	Cut-off
A (clear pass)	12-18
B (pass)	8-11.5
C (below standard)	6-8.5
D (weak)	2-5.5

a)
It is difficult to find large quantities of sufficiently long dated securities in Australia. Undated fixed interest securities are unobtainable and most government securities are relatively short dated in relation to the term of immediate annuity liabilities. Foreign securities could be used but there would be a currency risk that would need to be managed.

It is not practical to keep the portfolio perfectly matched at all times as this would mean continually rebalancing the portfolio or having a perfect match for each cash flow which would be difficult with a limited number of available securities.

Having a perfect match means that the fund is immunised from profits as well as losses. A small mismatch may be preferable if the company is prepared to take a "bet" on which way interest rates will move.

The assets could be mismatched by type of asset. In particular, equities can be used to match very long dated liabilities and could be a better match than maximum dated (but shorter) fixed interest assets.

Marking Guide:

- *1 mark for mentioning perfect match not practical*
- *1 mark for mentioning both the limited quantities and suitable assets*
- *1 mark for discussing immunised against profit and may be positioning for a profit*
- *1 mark for equities being a better match*
- *Only award marks for 3 reasons, maximum of 3 marks*

Question 6 continued

b)
i)
The reported annual MoS profit will be more volatile if the assets and liabilities are not matched, all other things being equal. The policy liabilities will be based on best estimate assumption for, among other things, the long term investment earning assumption of the assets backing the liabilities.

The experience profit is the actual investment earnings less the required earnings to fund the movement in the liability (including the impact of movements in yields on the value.

If the assets and liabilities are not matched then the movement in the assets for a change in earning rates will be different to the movement in the liabilities for the change in the net earning rate.

Depending on the reason for the mismatch the long term profit could be lower (if the reason is because of the unavailability of suitable assets) or higher if the company can add value through interest rate management.

Marking Guide:
- *0.5 mark for more volatile*
- *0.5 mark for reason for volatility*
- *1 mark for different long term earning rate so long term profit could be higher or lower*

ii)
The resilience reserve in the capital adequacy reserve allows for the mismatch between assets and liabilities. The resilience reserve tries to ensure that the company still has sufficient assets after a large movement in yields. Immunisation "immunises" the company's profit from small movements in yields. So being perfectly matched does not necessarily mean a minimal resilience reserve requirement.

However, it would be reasonable to assume that a significant mismatch would increase the resilience reserve.

So the capital requirements would typically increase if there was a deliberate mismatch.

Marking Guide
- *1 mark for saying difference between resilience (large shift) and immunisations (small shift)*
- *1 mark for saying related*
- *1 mark for higher resilience reserve*

Question 6 continued

iii)
The appraisal value is:
- adjusted net worth
- value of business inforce
- value of future new business

The net worth will typically decrease with mismatching because the resilience reserve will increase which will increase the capital adequacy requirement which decreases the net worth.

The value of business will increase with an increase in the capital adequacy but by less than the amount of the increase in the capital adequacy because the additional capital requirement will earn investment earnings at the net earning rate but be discounted at the risk discount rate which will, almost certainly, be higher.

The value of business inforce will increase if the net earning can increase by having a mismatched position. In this situation it is unclear, without actually doing the calculations, if this impact more than offsets the impact of having higher capital requirements.

It will decrease if the net earning decreases by mismatching (i.e. if the mismatching is unavoidable). In this case the impact on the value of business inforce will definitely be negative.

The impact on the value of future new business is affected by similar considerations but an additional impact is that the volumes may be affected by the change in price.

Overall, if the mismatch decreases the net earning rate then the appraisal value will decrease but this is unavoidable. The impact of an increase in earnings rates is uncertain.

Marking Guide
- *1 mark for increase in capital*
- *1 mark for increase in capital decreases the embedded value (or increase in inforce less than decrease in net worth)*
- *0.5 mark for change in long term profitability for inforce*
- *0.5 mark for change in profitability for new business*
- *1 mark for change in new business volumes*

<u>Question 6 continued</u>

c)
Allow for mortality improvements in the pricing and in the best estimate valuation assumptions. This is very straight forward and should always be done.

Arrange a reinsurance treaty whereby the reinsurer:
covers all the losses from mortality if it exceeds more than $x in a year
shares in % of all the profit.

Reinsurance for annuities is not common and it would not be straight forward to do immediately but it could possibly be arranged

Make the contract participating with the policyholders bearing the mortality losses (and profit). This is suitable because losses come from the surviving policyholders and they would be the ones sharing in the losses. This would not be practical because the annuities would not then be attractive to the market as they are looking for long term dependable income. There could also be problems with Social Security (non complying)

Marking Guide
- *1 mark for mortality improvements*
- *1 mark for easy to all for mortality improvements*
- *1 mark for reinsurance*
- *1 mark for reinsurance not simple but could be done (or similar reasonable comment)*
- *1 mark for participating*
- *1 mark for not likely to be well received (unless they can argue strongly the other way)*

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QUESTION 7 **(10 Marks)**

Question	Aim	Difficulty	Marks
2	14	C	10

Suggested grade cut-offs

Grade	Cut-off
A (clear pass)	8-10
B (pass)	5-7
C (below standard)	3-4
D (weak)	0-2

General Comments

Profit under margin on services (MoS), for each product, is based on the planned profit margin plus the experience variation. The profit in MoS emerges as the service is performed and revenue received and MoS profits tend to be stable from year to year, with minor fluctuations as assumptions change. This is because the profit margin is reset when assumptions are varied and there is no change to the policy liability.

However, if the product is in loss recognition, the impact of changes in assumptions also flows directly into profit or loss.
2 marks – students can get credit for these points in their product by product answers

1. Unit Linked ordinary single premium bond

The 1999 profit would be the planned profit using the old profit margin plus experience variations. The 1999 experience variations would be: small negative/loss for expenses; small positive/gain for mortality; medium positive/gain for surrenders. On balance, the variations would be positive due to the impact of the lapse and surrender experience.

It is likely that there is no surrender profit or strain for this product, i.e. the surrender values are similar to the MoS policy liabilities. The lower than expected surrenders in 1999 would improve profit because the average funds under management in 1999 would be higher than expected and the profit margin would be linked to this.

(2 marks)

Question 7 continued

2. Immediate annuities

As the product is in loss recognition at 12/99, the 1999 profit would be:

- the planned profit using the old profit margin, if loss recognition did not apply at 12/98, plus
- experience variations in 1999, plus
- the impact of the change in MoS basis, offset by the present value of profit margins at 12/98, if positive.

The experience variations in 1999 would be: small negative/loss for expenses; large negative/loss for annuitant mortality. The lapse change is not relevant for immediate annuities. On balance, the experience variations would be negative. In addition, the impact of the change in the expense and mortality bases would contribute to a significant loss.

(2 marks)

3. YRT Term and Trauma insurance

The 1999 profit would be the planned profit using the old profit margin plus experience variations. The experience variations would be: small negative/loss for expenses; large positive/gain for mortality; medium positive/gain for lapses. On balance, the experience variations would be positive.

(2 marks)

4. Unit Linked regular premium superannuation

The 1999 profit would be the planned profit using the old profit margin plus experience variations. The experience variations would be: small negative/loss for expenses; small positive/gain for mortality; medium positive/gain or medium negative/loss for lapses (depending on the relative importance of the profits on surrenders). On balance, the experience variations for expenses and mortality would probably cancel out, leaving the surrender situation as the key influence.

It is likely that surrender profits will apply for this product, i.e. the surrender values are less than the MoS policy liabilities. The lower than expected lapses and surrenders in 1999 would have two impacts:

- surrender profits received in 1999 would be less than expected
- profits in 1999 related to average funds under management (i.e. the likely profit driver) would be higher than expected

(2 marks)

2 marks for general comments and 2 marks each for products 1- 4.

(alternatively the student could answer by item instead of by product)

END SOLUTIONS PAPER ONE