**INSTITUTE OF ACTUARIES OF AUSTRALIA**

**LIFE INSURANCE PART A** **NOVEMBER 2005 EXAMINATIONS**

**MARKING GUIDE**

**Level of Difficulty**

**PAPER ONE**

| Question | Syllabus Aims | Units | Knowledge & Understanding | Straight-forward Judgement | Complex Judgement | Total Marks |
|---|---|---|---|---|---|---|
| 1 (a) | 3 | 1 | 2 | | | 2 |
| 1 (b) (i) | 2, 6, 7, 12 | 1, 2, 3, 4 | | 3 | 1 | 4 |
| 1 (b) (ii) | 2, 6, 7, 12 | 1, 2, 3, 4 | | | 3 | 3 |
| 1 (c) | 2, 4, 7, 12 | 1, 2, 3, 4 | | | 3 | 3 |
| 2 (a) | 7 | 3 | 7 | | | 7 |
| 2 (b) | 7 | 3 | | 6 | | 6 |
| 2 (c) | 1, 2, 11 | 1, 4 | | | 5 | 5 |
| 2 (d) | 2, 6 | 1, 2 | | | 3 | 3 |
| 3a (i) | 2, 4, 6, 11 | 1, 2, 4 | | 4 | | 4 |
| 3a (ii) | 6, 11 | 2, 4 | | 2 | | 2 |
| 3a (iii) | 4, 11 | 2, 4 | | 2 | | 2 |
| 3b | 4 | 2 | | 4 | 4 | 8 |
| 3c (i) | 8 | 3 | 1 | | | 1 |
| 3c (ii) | 8 | 3 | | | 3 | 3 |
| 4a | 2, 6, 13 | 1, 2, 5 | | 3 | | 3 |
| 4b | 6,13 | 5 | 3 | | | 3 |
| 4c | 2, 3, 6, 13 | 1, 2, 5 | 3 | | | 3 |
| 4d | 13 | 5 | | 6 | | 6 |
| 4e | 11, 13 | 4, 5 | | | 3 | 3 |
| 5a (i) | 7, 8 | 3 | | | 5 | 5 |
| 5a (ii) | 11, 12 | 4 | | 3 | | 3 |
| 5a (iii) | 4 | 2 | | 3 | | 3 |
| 5b | 2, 11 | 1, 4 | | | 3 | 3 |
| 6a | 3 | 1 | 1 | | | 1 |
| 6b | 1, 3 | 1 | 3 | | | 3 |
| 6c | 2, 3, 6 | 1,2 | | 4 | | 4 |
| 6d | 2, 3, 7, 9, 12 | 1, 3, 4 | | | 4 | 4 |
| 6e | 3, 6, 12 | 1, 2, 4 | | | 3 | 3 |
| TOTAL | | | 20 | 40 | 40 | 100 |

**QUESTION 1** **(12 Marks)**

**Analysis**

| **Component** | **Aim** | **KU** | **SJ** | **CJ** | **Total** |
|---|---|---|---|---|---|
| Part (a) | 3 | 2 | | | 2 |
| Part (b) (i) | 2, 6, 7, 12 | | 3 | 1 | 4 |
| Part (b) (ii) | 2, 6, 7, 12 | | | 3 | 3 |
| Part (c) | 2, 4, 6, 7, 12 | | | 3 | 3 |
| Total | | 2 | 3 | 7 | 12 |

**Question**

**You are an actuary with responsibility for the unit pricing process of a large Australian life insurance company. The company offers a number of investment-linked products, with each product having a wide range of investment options. These products are all issued from the No. 2 Ordinary Statutory Fund.**

**You have awoken this morning to hear that the American equity market has fallen 20% in overnight trading and local analysts are forecasting a similar fall in the Australian market.**

**Once at work, you have re-valued the assets of the largest Australian equity only investment option allowing for the anticipated fall of the asset values and the results are:**

| | **Assets** | **Deferred Income Tax Liability** |
|---|---|---|
| | **$'000** | **$'000** |
| **Value last night** | **2,565,893** | **56,893** |
| **Value this morning** | **2,052,714** | **?** |

**The Chief Financial Officer (CFO) has suggested that the resulting Future Income Tax Benefit created by this market movement be used across the Statutory Fund to reduce the Deferred Income Tax Liability in other high performing investment options.**

**(a) Calculate the Future Income Tax Benefit for this Australian equity investment option after the fall in asset values. (2 marks)**

**(b) In a memorandum to the CFO:**

**(i) Explain the issues raised by the CFO's suggestion. (4 marks)**

**(ii) Indicate, giving reasons, whether you support the CFO's suggestion. (3 marks)**

**(c) How would you expect the future performance of the equity investment option to be affected if the CFO's suggestion was not adopted? (3 marks)**

 

**QUESTION 1: SOLUTION** **(12 Marks)**

(a)

| | |
|---|---|
| Difference in asset value is 2,565,893 – 2,052,714 = | 513,179 |
| Tax on this at 30% is | 153,954 |
| Existing deferred tax liability is | 56,893 |
| FITB is now | 97,061 |

Nb: The solution implicitly assumes that there was no change in the cost base of the assets i.e. no assets had been sold from the previous asset valuation. This is reasonable as you are working out an expected change in the assets.

It is also necessary to make an assumption on the basis of the current DITL as it is not detailed whether there is a discount or not – the above solution assumes that the deferred tax was calculated without discount for time value. (When IFRS comes in the accounts cannot discount Future tax liability but this does not prevent pricing from discounting.)

**Marking guide:**
**- ½ mark for difference;**
**- ½ mark for tax calculation;**
**- ½ mark for understanding DITL;**
**- ½ mark for getting the correct final answer.**
**Total of 2 marks (KU).**

(b)

**Memorandum**

To: CFO

From: Unit Pricing Actuary

Date: 1 November 2005

**Subject: Actions post fall in market value of assets**

In response to your suggestion I would like to raise the following issues.

(i)

- <u>Equity:</u> These FITB's have been generated by the assets belonging to the equity fund policyholders. Just as the unit price should reflect the asset values of the fund, the tax situation is also linked to the assets of those policyholders. Thus using the FITB to reduce the tax liability of other policyholders would provide them with an advantage at the expense of these policyholders, which would not be equitable.
- <u>Price:</u> What price should be paid for the FITB? Should the other options pay an equivalent amount or a discounted amount? Purchasing the FITB at a discounted value might be beneficial to all unit holders.

- Effect on unit prices: Transferring the FITB to other investment options is a manipulation of unit prices. The effect on the other options, in reducing the DITL, would result in higher unit prices being calculated than would be 'true' if the appropriate liability were used (unless these options purchased the tax benefits). If the market moved up and the transfer was reversed, the effect would be a corresponding artificial lowering of unit prices for these other options.
- Other options also affected: If the other options have their own equity components they should experience a reduction in DITL or increase in FITB with the market move in any case, so transfers from this option would not be required (or useful).
- Volatility: Given the recent drop and the known volatility of equity assets, further volatility may require daily transfers back and forth, further complicating the unit pricing process and increasing the chance of an error in the unit price. We should wait until some stability has returned to the market so that only one transfer is made.

**Marking guide:**
- **1 mark for each reasonable point, maximum of 3 marks (SJ).**
- **1 mark for format and appropriate language (CJ) (provided format etc continued in (b) (ii)).**

**Total of 4 marks.**

**Note the following list of points have been provided to candidates for further background/explanation. Some of these could be categorised into the above areas, whilst others are completely new.**

In response to your suggestion to utilize the anticipated FITB across the Statutory Fund the following issues arise.

- The FITB will arise from a fall in market values of assets. At the current time these losses have NOT been realized and the eventual amounts realized are likely to be different.
- Whilst we have estimated the newly created FITB for Australian Equities, it is likely that ALL units will have significant changes in their deferred tax positions. The final company position will be unclear for a while.
- At a company level the FITB from one Ordinary unit will normally be offset against DITL of the other Ordinary units (and indeed other shareholder assets) as tax is payable at the company level not at the unit level.
- In an equity / pricing sense it is important to retain the benefits from a set of assets to the appropriate policyholders – as gains occur the policyholders receive an after tax increment and when losses occur they again receive the after tax component. This is reinforced by the requirements of the Life Act.
- The policies and Disclosure documents would need to be consulted as they may specify the treatments that must be applied.
- As these are unrealized losses it would be extremely difficult to transfer them to other units without seriously affecting unit pricing systems and the tax keeping records.

- The large drop in asset values reflect the volatility of the asset class. It needs to be considered what will happen if / when the unrealized losses reverse as the risk of unit pricing errors would be considerable.
- The other high performing units are also likely to have either International or Australian equity exposure and are likely to have losses generated and hence reduced current DITLs as well.
- If these were realised losses then the FITB could more readily be transferred between units, but would need to be transferred for a reasonable price. If the FITB was transferred there would only be a change in unit price if the amount paid was different to the face value of the tax benefit transferred (e.g. for time value).

(ii) This question could be answered in two ways:

Supporting the suggestion:

Provided the transfer occurred at a fair value to all investment options concerned (or other ordinary statutory funds), then I would support the suggestion as:

- Tax is payable at a company level (subject to the VPST and SEA) rather than unit level.
- The FITB is likely to be fully realized as it can be offset against other units and shareholder liability.
- It is possible that the assets will be "turned over" to realize the losses as part of the asset management strategy. (Hence these losses offset other units taxable income and we do not pay the tax to the ATO.)
- This action would enable the Equity unit to obtain immediate cash benefit for the asset and hence reduce the "negative gearing" that is implicit in a non income earning asset.
- Tax benefits should be used where they can be, as this benefits all unit holders / shareholders (if FITB is sold to shareholders).
- May not be able to use all tax benefits within the current options but could use the benefits in other parts of the business.

The only issue is implementation and I suggest we wait one or two weeks for some stability to return to the market.

Not supporting the suggestion:

- It will only have an affect on the unit prices if we do the transfer at a price that could be considered inequitable.
- There would be significant difficulty in ensuring that changing unit pricing systems during a period that will be quite volatile will not cause errors.
- The FITB generated is an unrealized one at the moment and the final value is yet unknown.
- Difficulties in explaining current and future performance in the various options.

**Marking guide**
**- 1 mark for making a recommendation**
**- 1 mark for each supporting argument**
**Maximum of 3 marks (CJ).**

(c) If the CFO suggestion is NOT accepted, I would expect the unit price will increase at a lower rate than if it was accepted.

The unit price has a component that is backed by REAL assets and then the tax liability/asset (current and deferred) is used to determine the Net Asset Value (and hence unit price). If the DITL is not discounted then the unit is effectively geared (i.e. we are using the tax liability to hold shares which generate future income). If the DITL is discounted then this only arises to the extent that the real earnings exceed the discount rate.

Where a FITB exists there is a non-income earning asset. Hence the CFO suggestion, which is to swap a non income earning asset for an income earning asset (cash), - or even for no asset would be to increase the percentage of NAV that is able to earn income.

If withdrawals increased as a result of the fall in equity values, investment assets would have to be sold to meet the redemptions. This would increase the proportion the FITB comprises of the remaining assets, dragging investment performance down further for the remaining policyholders.

**Marking guide:**
**- 1 mark for worse performance;**
**- 1 mark for FITB gearing;**
**- 1 mark for withdrawal impact.**
**Total 3 marks (CJ).**

**QUESTION 2** **(21 Marks)**

**Analysis**

| Component | Aim | KU | SJ | CJ | Total |
|---|---|---|---|---|---|
| Part (a) | 7 | 7 | | | 7 |
| Part (b) | 7 | | 6 | | 6 |
| Part (c) | 1, 2, 11 | | | 5 | 5 |
| Part (d) | 2, 6 | | | 3 | 3 |
| Total | | 7 | 6 | 8 | 21 |

**Question**

**You are an actuary at Professional Life Insurance. For the last 5 years, Professional Life has sold a guaranteed renewable Disability Income Insurance product targeted at university degree holders working in a field related to their degree. The premium rates for this product are not guaranteed, with the company able to change the premium rates with 3 months notice. Professional Life has been successful in selling this product and now has a substantial block of this business.**

**This policy pays a monthly income for a maximum of 2 years for each claim if the insured is unable to work due to illness or injury. For example, a monthly claim payment may be paid for a maximum of 2 years for an illness or accident (only at the end of this claim period can another claim be paid for a different illness or accident).**

**You have just received the results of the morbidity experience analysis covering this 5 year period. The company's results are as follows (expected results are based on the pricing basis):**

**Actual to expected ratios for claims incidence by main cause and occupation group**

| | Cause of claim | | | | |
|---|---|---|---|---|---|
| **Occupation** | **Injuries/ accidents** | **Mental illness** | **Back / neck problems** | **Other causes** | **All causes** |
| **Medical practitioners** | **1.52** | **.95** | **1.25** | **.91** | **1.15** |
| **Legal** | **.89** | **1.34** | **1.05** | **.93** | **1.07** |
| **Other** | **.96** | **1.02** | **1.01** | **.96** | **.97** |
| **All occupations** | **1.48** | **1.01** | **1.15** | **.95** | **1.09** |

**NB: A/E for incidence result = number of claims / number of expected claims**

**Actual to expected ratios for claims termination by main cause and occupation group**

| | Cause of claim | | | | |
|---|---|---|---|---|---|
| **Occupation** | **Injuries/ accidents** | **Mental illness** | **Back / neck problems** | **Other causes** | **All causes** |
| **Medical practitioners** | **.85** | **1.02** | **.88** | **.96** | **.90** |
| **Legal** | **1.01** | **.87** | **.92** | **.99** | **.93** |
| **Other** | **.98** | **.99** | **.98** | **1.00** | **.99** |
| **All occupations** | **.91** | **.95** | **.90** | **.99** | **.92** |

**NB: A/E for termination result = number terminating / number expected to terminate**

**(a) Comment on the results of the experience analysis.** **(7 marks)**

**(b) What further investigations would you request to provide additional understanding of these results?** **(6 marks)**

**(c) Discuss what actions could be taken to improve the experience for new business.** **(5 marks)**

**(d) Recommend the action(s) the company should take to improve the overall profitability of this portfolio of business (i.e. both existing and new business).** **(3 marks)**

**QUESTION 2: SOLUTION (21 marks)**

(a)

| | **Incidence** | **Termination** |
|---|---|---|
| **General comments** | • Poor experience – number of claims being greater than expected number of claims (i.e. ratio >1) | • Poor experience – number of claims terminating is lower than the expected number of claims terminating (i.e. ratio <1) |
| **Medical Practitioners** | • The number of claims due to all causes is higher than expected.<br>• The number of claims due to "injuries/accidents" and "back/neck problems" is significantly higher than expected<br>• Claims experience due to "injuries/accident" is worse than "back/neck" problems. | • The results also indicate that the termination experience for claims caused by "injuries/accidents" and "back/neck problems" is worse than expected.<br>• Not only are there more claims, but also the claims are continuing for longer than expected. |
| **Legal** | • The overall experience is poor.<br>• The main cause of claim contributing to this is "mental illness".<br>• "Back/neck" problems are also slightly above expected. | • There are poor termination results for "mental illness" and "back/neck" and these two combined would make these sections of the portfolio unprofitable. |
| **Other** | • Whilst the experience for "mental illness" and "back/neck" is only slightly worse than expected, the experience from other causes is better than expected.<br>• The overall experience is slightly better than expected. | • The termination experience for the other occupation category is much better than for the medical or legal professions by comparison.<br>• However, the termination experience is still marginally worse than that expected. |
| **All occupations** | • The incidence experience over all occupations and causes is significantly higher than expected.<br>• This is mainly due to medical practitioner experience.<br>• The experience for the legal professionals has also contributed to the poor experience. | • The termination experience overall is also poor and worse than expected. |

| | | |
|---|---|---|
| | • The total results by cause would indicate that the result for medical practitioners has a large effect on the result over all occupation groups.<br>• It can thus be inferred that medical practitioners make up a large proportion of the business, with their results affecting the overall results unfavourably. | |

**Marking guide:**
**- ½ mark for each point under General to maximum of 1 mark;**
**- ½ mark for each point under Medical to maximum of 2 marks;**
**- ½ mark for each point under Legal to maximum of 2 marks;**
**- ½ mark for each point under Other to maximum of 2 marks.**
**Total of 7 marks (of which 3½ maximum for incidence and 3½ maximum for termination)(KU).**

(b)

Number of claims for credibility

Investigate the number of claims within each cell of the analysis (occupation/cause) to determine whether the results could have arisen from statistical fluctuation or whether the results were credible.

Occupation groups

Investigate the following:

- Difference within the group, e.g. dentists vs. doctors vs. nurses, liability lawyers vs. others.
- Difference in employer, e.g. private practitioners vs. hospital registrars
- Difference in job description, e.g. surgeons vs. general practitioners, area of specialisation, areas of work, e.g. geriatric or disabled patients.
- Breakdown of the “other” occupation group into occupations.

Cause of claim

Break down the accidents/injuries into their main sub-groups, particularly car accidents, work related injuries etc to see if there were areas of high experience.

Investigate the “neck/back problems” and “mental illness” to identify areas within these groups having particularly poor experience to further narrow down the exact causes.

Claims management process

Request access to claims files and claims management staff to go through the claims in the main sub-groups to obtain qualitative information on the claimant, their claim and the claims management process. It would need to be confirmed whether the various sub groups would have sufficient experience to provide statistically significant results.

Prepare a list of the claims where termination was later than expected for the cause of claim and also consult the claims staff to obtain information on why these claims went longer than anticipated.

Check whether individual claimants have made more than one claim.

Check whether claims management practices have changed lately but have not yet been reflected in the experience.

<u>Waiting periods</u>
Obtain information on the average waiting periods of claimants vs. the entire book.

<u>Large claims</u>
Determine whether the results were distorted by the presence of a few large claims.

<u>Other rating factors</u>
Analyse differences in experience for the other rating factors e.g. sex, smoker status, age i.e. experience should be analysed with all credible rating factors. The poor experience in some categories could be due to other rating factors and not just occupation.

<u>Industry Experience</u>
Check whether the pricing basis is consistent with industry experience, i.e. are the trends shown in the company's analysis consistent with the industry or company specific.

**Marking guide:**
- **Maximum of 2 marks for occupation group issues, ½ mark per point;**
- **Maximum of 2 marks for claims management process, ½ mark per point;**
- **½ mark for every other valid point made by the candidates.**

**Maximum of 6 marks (SJ).**

(c) Possible actions are:

- Increase premium rates.
- Tighten underwriting process, using the results of the further investigations to consider declining those lives that are in sub-groups identified as being a problem.
- Introduce more detailed occupation rating factors.
- Use the results of the further investigation to adjust the occupational loading factors for those occupations more likely to claim.
- Improve claims management practices for the groups known to be at risk.
- Increase waiting periods.

- Introduce limited/reduced benefits for specific cause of claims such as mental illness/back injury.

**Marking guide:**
**1 mark for appropriate discussion of each point.**
**Maximum 5 marks (CJ).**

(d) The actions I would recommend are:

Improve claims management in a targeted fashion.

The reason for this is that cancelling policies is not an option and if premium rates are increased across the board we are likely to lose the better risks to competitors with lower premium rates and retain the poor risks who are more likely to claim (poorer risks do not want to be underwritten again).

There are also economic and reputational costs involved with this that make it an expensive option. Increasing claims management vigilance also has a cost, but I would expect the cost to be relatively low for the improvement anticipated.

Increase premium rates

An increase in premium rates would assist with profitability, but I am concerned about lapses, so it would only be a small increase.

Improve our rating factors to load people at risk:

To avoid the need for a large premium increase, adjusting rating factors and the application of underwriting will be beneficial.

Targeted underwriting using the more refined rating factors could easily result in experience such that an increase in premium is not required. It would also alleviate the problem of having new and in force business on two different premium rate bases. We could extend waiting periods and reduce benefit periods as part of this strategy.

**Marking guide:**
**- 1 mark for making a clear recommendation;**
**- 2 marks for a well reasoned argument.**
**Total of 3 marks (CJ).**

 

**QUESTION 3** **(20 Marks)**

**Analysis**

| Component | Aim | KU | SJ | CJ | Total |
|---|---|---|---|---|---|
| Part (a) (i) | 2,4, 6, 11, 12 | | 4 | | 4 |
| Part (a) (ii) | 6, 11 | | 2 | | 2 |
| Part (a) (iii) | 4, 11 | | 2 | | 2 |
| Part (b) | 4 | | 4 | 4 | 8 |
| Part (c) (i) | 8 | 1 | | | 1 |
| Part (c) (ii) | 8 | | | 3 | 3 |
| Total | | 1 | 12 | 7 | **20** |

**Question**

**You are an Australian actuary who has recently joined a large South African based life insurance company as a pricing actuary.**

**Your company wishes to develop a new individual life insurance product for release in the South African market. This product will provide a sum insured payable upon death caused specifically by AIDS, but not from any other cause.**

**You have been researching the situation in South Africa regarding AIDS and have found the following information, as compared with Australian experience:**

| | South Africa | Australia |
|---|---|---|
| **Population (2005)** | **44 million** | **20 million** |
| | | |
| **Life expectancy (at birth) – all lives (years)** | **43.3** | **80.4** |
| **Population mortality rate /1000 population** | **21.32** | **7.44** |
| **Infant mortality rate /1000 live births** | **61.81** | **4.69** |
| **Median age of population (years)** | **24.0** | **36.6** |
| **Population below poverty line** | **50%** | **<0.5%** |
| | | |
| **Proportion of adults infected with HIV/AIDS** | **21.5%** | **0.1%** |
| **Number of people infected with HIV/AIDS** | **5.3 million** | **14,000** |
| **Number of deaths attributed to HIV/AIDS ( in 2003)** | **370,000** | **<200** |
| **Number of people newly infected with HIV/AIDS (in 2003)** | **219,000** | **782** |

**(a) Discuss what issues, requiring your consideration, might be expected to arise for this new product at the following times:**

**(i) Around commencement of a new policy;** **(4 marks)**

**(ii) Over the duration of a policy; and** **(2 marks)**

**(iii) When a claim occurs on a policy.** **(2 marks)**

**(b) Identify the rating factors that might be suggested for underwriting this new product and discuss the issues associated with each of them.**
**(8 marks)**

**(c) (i) Calculate an indicative incidence rate for pricing this product.**
**(1 mark)**

**(ii) What adjustments to this indicative incidence rate would you need to consider prior to finalising a rate for use in pricing this product? (Note: This part is not numerical.)** **(3 marks)**

 

**QUESTION 3: SOLUTION (20 Marks)**

(a) The issues that might be expected to arise for this new product requiring consideration would include –

(i) Around commencement of a new policy:

Risk of anti-selection – people most interested in this product would more likely be 'at risk'; thus the claims rate may be expected to be higher than the population average.

Concealment – the extent to which a person already infected or at high risk may be able to conceal that from the insurer. This would depend on a number of factors such as the level of honesty among the medical fraternity. The extent to which it may be easier in South Africa than Australia to conceal this type of information could be harder for the Australian actuary to judge.

Testing limits – should every applicant be tested? Would the company be able to take the client's word or rely on declarations? How effective would declarations be? What would be the cost/benefit of testing?

What is a 'standard' life – how do you determine the 'norm'? E.g. how do you assess or prove whether a client has lied or has simply not understood?

Marketability – the section of the population most at risk and hence most in need of the cover is the poor and uneducated. The educated with sufficient resources to purchase cover would also be educated enough to understand the risks and be able to avoid them, hence they have less need for cover. Health workers may be interested in the cover but would also take precautions and the company would need to consider the risks specific to transmission for health workers.

Affordability – would the premium be set to take into account the population average AIDS-based mortality rate plus an allowance for the anti-selection which might result in the cost of cover being out of the reach of most people?

Timeliness of AIDS tests – the efficacy of testing every applicant would be limited by the 3-month time lag where a person who is infected may not test positive for HIV. This would be especially tricky where anti-selection is at risk of occurring by a recently 'at risk' person. E.g. People at risk may take the cover and lapse after the 3 month waiting period (usual test regime for HIV testing is two tests 3 months apart) if their test comes back negative **(Bonus 1 mark).**

**Marking guide:**
- **1 mark for each valid point;**
- **1 bonus mark for timeliness of test point.**

**Maximum of 4 marks plus the potential bonus mark (SJ).**

(ii) Over the duration of a policy:

Selective lapsation (1) – if prevention (e.g. due to education) improves across the country, people may find ways to avoid becoming infected; and those least 'at risk' may lapse policies, leaving those at higher risk.

Selective lapsation (2) – people at risk may take the cover and lapse after the 3 month waiting period (usual test regime for HIV testing is two tests 3 months apart) if their test comes back negative.

Increase in risky behaviour – while hard to imagine, it is possible that cover may encourage some people to take risks that they wouldn't without cover. Again it could be harder for the Australian actuary to gauge this.

Ability to increase premium rates or absorb losses – there is a risk that either the experience of the new product portfolio or the transmission rate in the country as a whole may deteriorate, resulting in an increase in claim rates. If the contract doesn't allow premium rates to be increased, this could lead to deteriorating profitability issues.

Monitoring Experience – the monitoring of experience on a regular basis is very important – mortality, lapse, expenses, profitability etc. Rates and capital reserves will need to be adjusted if experience deteriorates.

**Marking guide:**
**- 1 mark for selective lapsation (both points);**
**- ½ mark other valid points.**
**Maximum of 2 marks (SJ).**

(iii) When a claim occurs on a policy:

Determining the cause of death – how do you differentiate between the final cause of death and 'death caused specifically by AIDS'? E.g. would a client who died after contracting severe 'flu have died from the 'flu anyway? Or did they die because their immune system was compromised by HIV/AIDS?

(This is an issue at policy drafting time, as well as when a claim occurs.)

Deaths being declared as 'due to AIDS' to obtain payment – it is possible that fraudulent claims may be received stating the Cause of Death as AIDS, when it actually is not, to obtain the policy proceeds. The likelihood of this could be harder for the Australian actuary to determine.

Declining a claim – arguments could arise around the definition of claim and payment that could result in legal challenges and/or reputational risk.

Collecting data – ensure sufficient information is collected to monitor experience on a regular basis.

**Marking guide:**
**- ½ mark per valid point.**
**Maximum of 2 marks (SJ).**

(b) The rating factors that might be suggested for underwriting this new product are:

<u>Race</u> – AIDS may seem to be more prevalent among certain races (where education is weak) within the overall population. The issues with using this as a rating factor are:

- *Fairness* – this makes a generalised assumption that may hold for the majority, but would certainly not hold for all;
- *Discrimination* – why should two people who are otherwise equally 'at risk' have one denied cover due to race alone?
- *Other points could be made* – e.g. is race a politically or socially acceptable rating factor?

<u>Lifestyle/behaviour</u> – whilst behaviour is directly relevant in respect of the HIV/AIDS risk, determining questions to ask that would elicit responses that facilitate effective underwriting may prove difficult. E.g. "engaging the services of a prostitute" may carry very different risks depending on actual behaviour involved.

It would be difficult to assess or prove at the point of claim whether the life insured had lied, as they may have had a different view on their behaviour to that of the company and this may not be easy to resolve fairly.

The questions would have to be culturally acceptable as well – which may limit the company. Nor would it necessarily follow that the insured will not undertake future risky behaviour, even if they hadn't in the past.

There is also an issue of 'fairness' in refusing someone cover who has previously engaged in risky behaviour, hasn't for a while, does not any more, and is not HIV positive if tested. This would be unnecessarily harsh or discriminatory; so there would need to be a reasonable 'historical' timeframe to the questions.

<u>Income/socio-economic factors</u> – again, AIDS may be more prevalent among lower socio-economic sections of the population. Should the poor not have access to cover even if it is difficult for them to afford (the issue of 'fairness' again)? The cost itself may be one of the most effective self-limiting features of the product. If this were combined with some degree of socio-economic rating factors, such as income or real assets, it could be an effective rating factor. However, discrimination may be a significant issue.

<u>Education level</u> – as above, AIDS may be more prevalent among the more poorly educated sections of the population. On that basis, it may be a good proxy for determining the 'at risk' group, as an applicant with poor education would make it difficult for the company to obtain reliable evidence and for the applicant to understand the risk factors and methods of applying protection. Occupation could also be used as a proxy for education level. Again there may be a significant

discrimination issue, as it may result in those who are in the group most needy of cover not having access and vice versa.

Marking Note: With all the above rating factors, there is an issue of legality i.e. Does current legislation permit the above to be used? The issue should be rewarded with marks only once, unless separate points are made.

**Marking guide:**
**- 1 mark for each issue identified, to a maximum of 4 marks (SJ);**
**- 1 mark for appropriate discussion of each issue, to a maximum of 4 marks (SJ).**
**Total of 8 marks for Part (b). Note the discussion does not have to be as detailed as the solution above.**

(c)

(i) An indicative incidence rate would be the ratio obtained from the number of deaths due to HIV/AIDS, divided by the entire population. In this case:

370,000 / 44,000,000 = 8.4091 per 1,000. **1 mark (KU)**

(ii) Adjustments to the rate above would need to allow for the following:

- The figures quoted are for <u>different years</u>, so an adjustment would need to be made one way or another, to bring these into line.
- As an average population incidence rate, it would need to be adjusted upwards to allow for the likely effects of ‘applicant <u>anti-selection</u>’.
- As a population incidence rate, it would need to be adjusted downwards to allow for lower socio-economic / educational groups being directly or indirectly excluded from access to the product (<u>positive selection</u>).
- As a historical incidence rate, it needs to be adjusted for the projected <u>future increases (or decreases</u>) in AIDS deaths, based on the anticipated effect of the current HIV transmission rate. (A population projection or AIDS development model would be required.)
- Adjust the rate for <u>anticipated medical advances</u>.
- Investigate the transmission rate <u>specifically amongst adults</u> and adjust the incidence assumption accordingly. If transmission is largely from mother to child at birth this would affect the assumptions for insurance-based incidence rates differently, as these children would not qualify for cover where underwriting occurs (even if they lived to a sufficient age to be able to apply for cover).
- Following on directly from the point above, the incidence rate is a broad average total population rate. Steps should be taken to adjust it so as to remove the elements of the population that are <u>outside the insurance age</u> bands for the new product. For example, specifically exclude those below adult age (or the minimum qualifying age for this new product), as well as any that are above the maximum age limit, if applicable.
- Reduce the incidence rate to remove those that would not be covered because they are <u>already HIV positive</u>.

- Adjust the assumed incidence rates upwards to cover the costs of any fraudulent claims that may end up being payable.

**Marking guide:**
**- ½ mark for each valid point**
**Maximum of 3 marks (CJ).**

## QUESTION 4 (18 Marks)

**Analysis**

| Component | Aim | KU | SJ | CJ | Total |
|---|---|---|---|---|---|
| Part a) | 2, 6, 13 | | 3 | | 3 |
| Part b) | 6,13 | 3 | | | 3 |
| Part c) | 2, 3, 6, 13 | 3 | | | 3 |
| Part d) | 13 | | 6 | | 6 |
| Part e) | 11, 13 | | | 3 | 3 |
| Total | | 6 | 9 | 3 | 18 |

**Question**

**You are a product actuary working for Great Super Solutions, an Australian life insurance company specialising in superannuation products. Your company is about to launch a new retail product onto the Australian market. This new product is known as a "Term Allocated Pension". Several other Australian companies already sell this type of product.**

**The key features of a Term Allocated Pension are as follows:**

| | |
|---|---|
| **Term of policy** | **Chosen by the insured from a range set by the Government based on life expectancy.** |
| **Investment** | **The investor can choose from a range of investment-linked options.** |
| **Taxation status** | **Investments are rolled into the fund from superannuation funds. The product is treated for tax (in all respects) in the same way as a complying annuity.** |
| **Annual income payment** | **Determined by a formula incorporating the current value of the investment each year and a factor related to the remaining term.** |
| **Death benefit** | **No lump sum residual is payable upon death. However, the remaining income payments can be transferred to a nominated beneficiary of the insured.** |
| **Commutation (i.e. Surrender)** | **Only available in certain circumstances subject to approval by the company.** |

**You have been asked to provide information for each of the following:**

**(a) The sales force has asked you to explain (including reasons), the circumstances in which the company would or would not allow a commutation of the pension. (3 marks)**

**(b) Identify for the administration department which pieces of information the company would require from the client at the time of commutation (assuming it was a case that is allowed). (3 marks)**

**(c) Specify for the customer service department, the information the company should provide to a client who requests a commutation. (3 marks)**

**(d) Prepare a discussion of the important considerations when setting a surrender value basis for this product.** **(6 marks)**

**(e) Advise the pricing actuary how commutations could be incorporated into the pricing model for this product.** **(3 marks)**

**QUESTION 4: SOLUTION** **(18 marks)**

(a) Commutation would be allowed in the following circumstances:

Upon request of the client – commutation would generally not be allowed as it defeats the purpose of having invested funds in a tax-effective retirement vehicle, has taxation implications for the client and is contrary to the Government's objectives.

However, commutation would be allowed within a reasonably short period after initial investment to ensure that clients are not disadvantaged if the product does not meet their needs or isn't what they thought it would be.

Rollover into another similar fund/product – this would be allowed, as the client does not benefit financially from the change, but should be able to change investment managers if they wish.

Other reasons allowable under the regulations – i.e. to pay super surcharge or allow a split of benefits under family law.

**Marking Note: Few, if any students would know this, so 1 mark for this or any other circumstances that would seem reasonable for one not working in the industry, e.g. approved under financial hardship; going overseas permanently; quite possibly upon death of the main life insured etc. A maximum of 1 mark here including explanation.**

**Marking guide:**
- **1 mark for each of the first 3 paragraphs plus marks as identified in the last paragraph.**

**Maximum of 3 marks. (SJ).**

(b) The sort of information that would be required *from* the client in those circumstances where a commutation would be allowed should include:

- Details of how the commutation payment is to be made, i.e. by cheque to the client or transfer to an account (upon request of the client at short duration), or into a fund or product of another company: in broad terms, "payment instructions", date of surrender.

- Physical return of the original policy document, a safeguard for the policy owner and for the company against fraudulent request from anyone other than the entitled policy owner. If lost or otherwise not available a tightly controlled process must be followed.

- A properly signed, witnessed and legally executed discharge. Again this is a safeguard for the policy owner and for the company against any unauthorised request, whether from the entitled policy owner or anyone else. This represents the legal authority for the company's actions.

- Details of the fund and product that the investment is to be transferred to, where rollover is being made into another similar fund/product at any duration. The application form for the new fund, signed by the client, will enable transfer to be effected quickly and simply.

- Substantiating evidence in the case of other reasons allowable under the legislation – i.e. a detailed request from the client explaining the reasons for the payment being required together with documentary evidence to support the request – e.g. surcharge advice from the government, family court order, etc.

**Marking guide:**
– **1 mark per point.**
**Maximum of 3 marks (KU).**

**Marking Note: Markers should give marks for reasonable comments supporting items where marks were granted in (a).**

(c) The information the company should provide to a client who requests a commutation should include the following:

- Information about the potential taxation implications for the commutation payment if the client goes ahead with their requested path.

- Information about any other Government requirements and complaints handling procedures.

- Information about the method of calculating the commutation value, the commutation value, exit fees incurred, returns earned since last report to the client.

- Information about the need to fund retirement adequately and the possible consequences of the client's actions.

**Marking guide:**
– **1 mark per valid point.**
**Maximum of 3 marks (KU).**

(d) The considerations particular to this product when setting a surrender value basis are:

Equity – The important aspect of ensuring equity with this type of product is to ensure that any commuting client takes only their fair share of the fund. This means that the commutation value given should in theory reflect the current value of the client's investment less any outstanding set-up costs that would have been recouped out of future fees. This would be implemented by way of a surrender or exit penalty. This is so that the remaining clients don't end up having fees increased to cover the un-recouped expenses of those who commuted without paying their equitable share. This needs to be balanced against the ability/willingness of the shareholder to support any un-recouped costs from future profits.

Solvency – Although the circumstances under which a commutation is allowed are quite restrictive, it is possible that an increase in commutations (i.e. nervousness after poor investment performance following entry, poor selling practices of an agent) may occur. Any cross-subsidisation within the commutation value, from other policyholders or the shareholders, must be looked at carefully to ensure solvency is not compromised. This is particularly so given the typically small margins in fees of these types of products.

Stability – Following on from the point above, the commutation basis should not change whenever circumstances change. Therefore the basis set should be one that is fair whether there are few or many commutations. It would be poor practice to set a basis assuming a low level of commutations that required a reasonable degree of cross-subsidisation only to have to alter the basis if circumstances result in a high level of commutations.

Ease of Calculation – Given the product structure a simple calculation should be able to be determined with ease.

Consistency – The commutation value should not be materially different from the value of the client's policy. The commutation value should reflect unrecouped costs and represent a fair value to the policyholders.

Legal – The value should also be consistent with any minimum surrender values under legislation.

Marketability – While these products would not be sold on the basis of their commutation value, unhappy clients who have commuted would have an effect on the advisers who may then avoid the product. Bad press coverage and the associated effect on sales would also need to be considered.

**Marking guide:**
- **1 mark per consideration, provided each is well discussed and related to the product.**

**Maximum of 6 marks (SJ).**
**Marking Note: ¼ marks for headings only without discussion.**

(e) There is no need to allow for commutations in the model, if:

- The number of commutations is not expected to be material.
- The commutation value is a fair value and the commutation basis truly reflects the actual value of the client's investment less recouped costs.

However, where there is any cross-subsidisation of commutation values (and a material number is expected) the model should incorporate these commutations so that the effect on profitability and/or future fee levels can be determined and sensitivity tested. These would be included via a set of decrements for commutations together with the surrender value basis and this would gradually reduce the FUM over time.

**Marking guide:**
**– 1 mark per valid point.**
**Maximum of 3 marks (CJ).**

**QUESTION 5** **(14 Marks)**

**Analysis**

| **Component** | **Aim** | **KU** | **SJ** | **CJ** | **Total** |
|---|---|---|---|---|---|
| Part (a) (i) | 7, 8 | | | 5 | 5 |
| Part (a) (ii) | 11, 12 | | 3 | | 3 |
| Part (a) (iii) | 4 | | 3 | | 3 |
| Part (b) | 11 | | | 3 | 3 |
| Total | | | 6 | 8 | 14 |

**Question**

**You are the pricing actuary working for a small Australian life insurance company specialising in the risk market.**

**Your company is developing a new Yearly Renewable Term (YRT) policy designed to insure people who have undergone genetic testing which confirmed the presence of genes for a number of specified illnesses. For those genes being tested the applicant would be almost certain of developing an illness expected to cause death before age 60. The sum insured is paid upon death from any cause.**

**You have been requested to determine appropriate premium rates for this policy.**

**(a) What are the main considerations for each of the following areas of product development:**

**(i) The mortality assumptions to be used in pricing the product;** **(5 marks)**

**(ii) Pricing of the product;** **(3 marks)**

**(iii) Underwriting the product.** **(3 marks)**

**(b) Suggest three changes to the product that would make this product more viable.** **(3 marks)**

**QUESTION 5: SOLUTION** **(14 Marks)**

(a)

(i) The mortality assumption to be used:

- We would not be able to use a standard mortality table as the shape would be completely different to the pattern expected for these lives.
- The mortality table would need to represent the accumulated expected mortality pattern of each disease, i.e. people with different diseases would have different patterns of dying at different ages.
- The mortality assumption would need to take into account the probability of people having the genetic marker present and continuing on to develop the disease.
- The expected proportion of the portfolio having each disease would also have to be incorporated in to the table.
- The overall table would need to be structured so that as age approaches 60 mortality would approach 1.
- Allow for selection against the office i.e. demand for the product would only be from those who actually had the disease. There would be low or no demand from those tested with the gene but have no symptoms currently (i.e. who may or may not develop the disease later). This selection would skew the mortality assumption.
- Relevant overseas experience should be investigated.
- Knowledge support from the reinsurers should be sought.
- Review medical research.
- Consider any medical advances that may prolong life expectancy in the future. However, it is unusual to set assumptions allowing for the effect of medical advances as this assumes mortality improvements in the premium rates.

**Marking guide:**
**– ½ mark for each of the above and any other valid points.**
**Maximum of 5 marks (CJ).**

(ii) Pricing of the product

- How big is the market for this product? If only a very small proportion of the population is affected by these diseases there may be insufficient numbers to support the product. Unit costs will also be higher if the expected sales volumes are low.
- The mortality assumption will increase rapidly over time, approaching 1 as age approaches 60. This will make the cover very expensive as insured lives age, with premiums gradually approaching the sum insured. Thus the main issue is affordability for the insured as the product becomes limited over time.
- This translates into the issue of having an increasing lapse rate over time that is also likely to approach 1 as age increases to 60.
- Who pays for the genetic test and how will this affect the underwriting costs of the product? Will underwriting costs be cheaper?

- Will you be able to obtain reinsurance support for the product?
- Consider having different premium rates for different illnesses – need to balance this against complexity of the product.
- Consider an appropriate profit margin given the risks under this contract.
- Lower commission rate to reflect a somewhat captive market.

**Marking guide:**
**– ½ mark for each of the above and any other valid point.**
**Maximum of 3 marks (SJ).**

(iii) Underwriting the product

- Underwriting is still required, as there are the usual risk factors that will affect mortality rates that need to be considered.
- The standard underwriting proposal form plus additional questions relating to genetic tests will be required.
- Checking that the insured has the required genetic test should not be required, as the premium rates should be self-regulating (as the premium rates for this product would be much higher than a standard YRT). A check will only be required if there are different premium rates for different genetic conditions.
- The underwriters also need to check for issues that are present that could hasten the mortality of a person with one of these genetic illnesses and be able to load accordingly.
- Financial underwriting should still be considered to avoid over insurance by the potential life insured.

**Marking guide:**
**– 1 mark for genetic test and discussion;**
**– ½ mark for other valid points.**
**Maximum of 3 marks (SJ).**

(b) Valid suggested changes are:

- Have premiums and cover ceasing with the ultimate mortality age, i.e. 60, to avoid the associated pricing problems.
- Have a low maximum entry age.
- Have premiums only payable to age 50 or 60 with cover continuing past this point.
- Have premiums and cover ceasing at an age below this age, say 50 or 55, to make the cover more affordable/useful and reduce lapse risk.
- Change the definition of coverage under the policy to be based on the severity or longevity of the disease the test is for, rather than the list of diseases – this will reduce issues with diseases not covered, new tests and constant changes to the policy terms and conditions as genetic tests cover more items.
- Have a reducing sum insured over time. This would reduce the premium burden over time. It may also better match the real needs for cover of the insured lives as the mortgage and other debts/financial needs would reduce over time.

Invalid suggested changes are:

- Having the policy pay claims only for death from these causes. This would cause issues when the ultimate cause of death is, say, renal failure, but the underlying cause is the genetic disease. This is likely to make the product worse, not better.

An alternative solution presented might cover offering a different product such as an endowment assurance to age 60. Premiums could cease prior to age 60 and this would overcome many of the difficulties outlined above.

**Marking guide:**
– **1 mark for each of the above and any other valid suggestions made. Maximum of 3 marks (CJ).**
– **3 marks for an alternative solution provided it is well documented.**

## QUESTION 6 (15 Marks)

**Analysis**

| Component | Aim | KU | SJ | CJ | Total |
|---|---|---|---|---|---|
| Part a) | 3 | 1 | | | 1 |
| Part b) | 1, 3 | 3 | | | 3 |
| Part c) | 2, 3, 6 | | 4 | | 4 |
| Part d) | 2, 3, 7, 9, 12 | | | 4 | 4 |
| Part e) | 3, 6, 12 | | | 3 | 3 |
| Total | | 4 | 4 | 7 | 15 |

**Question**

**You are an actuary employed by an Australian actuarial consulting firm. The Board of Directors of a small Australian life insurance company has asked you to attend a meeting along with one of the industry regulators. The company has only one Statutory Fund for superannuation investment-linked business and this business has only been issued under a group policy. The Statutory Fund is well capitalised with a significant buffer above the Capital Adequacy Requirement (i.e. reserves required under the Life Insurance Act 1995, "Life Act")**.

**In this meeting you are informed that the company has failed to provide its annual reports and a copy of the financial condition report to the Regulator by the dates required under the Life Act. The reason given is that the company's Appointed Actuary (who was also the sole actuarial staff member) resigned and left after the end of the financial year prior to completing these reports. His current whereabouts is unknown. The company has tried to replace the actuary, but so far without success.**

**The company, with the support of the Regulator, wishes to ask your firm to provide an actuary who can act as the company's Appointed Actuary and advise them of a proper course of action. The company would like your firm to assign to you the task of performing this role.**

**(a) Identify the Regulator involved and briefly explain your answer. (1 mark)**

**(b) What provisions in the legislation could the Regulator consider invoking in these circumstances? (3 marks)**

**(c) Why might the Regulator initially refrain from invoking the provisions contained in the legislation, preferring to meet with the parties involved? (4 marks)**

**(d) You have now commenced this work and have found the draft Financial Condition Report. It contains the following extract:**

> **The transitional taxation arrangements ended on 30 June 2005.**
>
> **When these changes were announced, the company took the decision not to change the fee basis for our product, continuing to have large up front fees and a very competitive product. As a result we have continued to rely on the transitional tax arrangements on fees to support profitability. (These transitional arrangements resulted in only two thirds of the management fee income being assessable on any policy written prior to 1 June 2000.)**
>
> **As a result, from 1 July 2005 onwards, the expected underlying profitability of new business will be below the company's benchmark.**

**Based on this information, explain the situation to the company, including the underlying reasons. (4 marks)**

**(e) The company has continued to write significant levels of new business for the 4 months since the end of the financial year. What is your advice to the company? (3 marks)**

**QUESTION 6: SOLUTION (15 marks)**

(a) The Regulator involved is APRA, as it has the responsibility under the Life Insurance Act 1995 for the supervision of life insurance companies, including their solvency and financial management. [LIA'95 – s3(2)(c);s7(1)(a)]

**Marking guide:**
**– 1mark (KU).**

(b) The range of provisions available to the Regulator in this situation would include:

- Require that the company provide information on any matter relating to the company's business. [LIA'95 – s.131]
- Require that the company produce any records relating to the affairs of the company. [LIA'95 – s.132]
- Give the company a written direction re the movement of company assets. [LIA'95 – s.134]
- Give the company a show cause notice of why the Regulator should not investigate the company's business. [LIA'95 – s.135]
- Perform its own investigation of the company. [LIA'95 – ss.137-151]
- Apply to the court to have the company placed under judicial management. [LIA'95, Part 8]

**Marking guide:**
**– ½ mark for each point**
**Maximum 3 marks (KU).**

**Marking Note: LIA sections need not be quoted to secure marks but are provided for marker guidance.**

(c) The Regulator might initially refrain from invoking the provisions contained in the legislation, preferring to meet with the parties involved because:

- No reason to think that the company is insolvent.
- Don't want to panic customers given the lack of conclusive information.
- It would be better for all concerned if the company can remedy the situation, so they should be given a chance to do so**.**
- Lack of any information available to APRA to pursue any action.
- Lack of actuarial (or other appropriate) staff to produce the required information.
- Company has been trying to actively recruit an AA and make every effort to comply with the legislation.
- Bad publicity can damage reputation and this affects new business sales, discontinuance on in force business, staff etc.
- APRA's ultimate purpose is to ensure stability in the financial system and without valid cause; APRA should not invoke provisions and create unnecessary instability.

**Marking guide:**
**– ½ mark for each well discussed point.**
**Maximum of 4 marks (SJ).**

(d) When the review of the Taxation Act in relation to Life Insurance companies was conducted (the Ralph Review and Report) in the late 1990's a number of changes were foreshadowed to the taxation treatment of life insurance business.

Foremost of these changes was the change to the definition of assessable income and deductible expenses.

For this particular company, assessable income was increased by the fees on investment-linked products. However, whilst the deductibility of expenses was increased it did not offset the effect from taxing fees.

The problem from a life company perspective was that for business already in force at 30/6/2000, fee income was now assessable but there was no deduction for the initial expenses (which were incurred before 30/6/2000). This is likely to have caused problems for this particular company given that it had a high entry fee which was most likely matching the commission payment.

Given that the asset fees in later years were intended to pay for these initial expenses, this wasn't an equitable situation. So a transitional arrangement was introduced whereby one third of fee income on policies commencing before 30/6/2000 was exempt from tax for five years.

However, as the company has a group superannuation policy any new members joining after 1/7/2000 were still considered to have joined a policy that commenced prior to 1/7/2000 and thus their fees still qualified for the transitional arrangement.

Hence, the expected profit from 1/7/2005 will decline as all fees will be fully assessable as the transitional period has expired.

**Marking guide:**
**- ½ mark for background explanation mentioning Ralph;**
**- ½ mark for change in treatment of fees and expenses;**
**- 1 mark for explaining problem of prior expenses and the introduction of the transitional arrangement;**
**- 1 mark for group policy effect;**
**- 1 mark for declining profitability of new business.**
**Maximum 4 marks (CJ).**

(e) My advice to the company is:

- To identify and quantify the amount of business the company is willing to accept at this lower level of profitability until a new product can be developed.
- To review the terms and conditions of the contract to determine the ability of the company to increase fees on the in force business.
- Where fees can be increased, to proceed with increasing fees to a supportable level.
- Re-price the contract (for new business) for re-issue to the market.
- Where fees cannot be increased, to arrange a sale of the block of business, if possible, to another party.

- A sale would need to be managed carefully as there is a large expense base currently being supported by this business.
- Reduce the expenses of the organisation to improve the overall profitability of the product.

**Marking guide:**
**– ½ mark per point**
**Maximum of 3 marks (CJ).**

**END OF PAPER SOLUTIONS**