INSTITUTE OF ACTUARIES OF AUSTRALIA

COURSE 2A LIFE INSURANCE **APRIL 2010 EXAMINATIONS**

Marking Guide

Level of Difficulty

Question	Syllabus Aims	Units	Knowledge & Understanding	Straight-forward Judgement	Complex Judgement	Total Marks
1a	8,9	3	7			7
1b	8,9	3		4		4
1c	8,9	3		3		3
1d	8,9	3			3	3
1e	8,9	3			3	3
2a	1,2,5,7,8,9,10, 11,13,14	1,2,3,4		7		7
2b	1,2,5,7,8,9,10, 11,13,14	1,2,3,4		4		4
2c	2,7,8,9,10	1,2,3			3	3
2d	1,2,4,5,7,9	1,2,3			3	3
2e	1,2,4,5,7,10	1,2,3			5	5
3a	16	5	2			2
3b	1,16	1,5		6		6
3c	1,2,4,7,9,12,13 ,15,16	1,2,3,4, 5	3			3
3d	1,2,4,5,7,9,10, 12,14	1,2,3,4		2		2
3e	1,2,3,4,5,7,9, 10,12,14	1,2,3,4	1		2	3
3f	1,2,3,4,5,7,9, 10,12,14	1,2,3,4			5	5
4a	1,9,12	1,3,4	6	3		9
4b	2,7	1,2	1			1
4c	1,2,4,5,7,12	1,2,4			2	2
4d	1,2,4,5,7,12	1,2,4			6	6
5a	1,2,5,7,10	1,2,3		5		5
5b	4,7,10,16	2,3,5		3		3
5c	1,2,3,4,5,7,9, 10,12,14	1,2,3,4		4		4
5d	1,2,3,4,5,7,9, 10,12,14	1,2,3,4			7	7
TOTAL			**20**	**41**	**39**	**100**

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COURSE 2A LIFE INSURANCE **APRIL 2010 EXAMINATIONS**

Answer all 5 questions.

QUESTION 1 **(20 Marks)**

Life Insurer Morby Ltd. specializes in selling a range of products such as stand alone Trauma, Total and Permanent Disability (TPD) and Disability Income.

You are the Pricing Actuary.

You are reviewing the current assumptions used in the pricing of these products.

This review will include an analysis of the lump sum claims experience for stand alone Trauma and TPD over the past 12 months.

You have been provided with the following information:

Current ultimate incidence rate pricing assumptions for Trauma and TPD (weighted by ages as anticipated by the profile used for pricing) are:

Gender	Trauma	TPD
Male	0.0200	0.0025
Female	0.0225	0.0015

The expected decrease in incidence rates arising from selection effects in the first two years for each product are:

Year	Trauma	TPD
1	60%	90%
2	20%	50%

Exposures measured in policy years, categorized by policy duration, are:

Year	Trauma male	Trauma female	TPD male	TPD female
1	6,526	5,675	1,519	1,235
2	15,602	13,567	3,195	2,598
3+	71,696	62,345	15,991	13,001

Information about average sums insured is:

	Trauma male	Trauma female	TPD male	TPD female
Average Sum insured	$65,000	$49,000	$125,000	$56,000

Claims data for the past 12 months is:

	Trauma male	Trauma female	TPD male	TPD female
Number of claims	1,600	1,325	30	45
Average claim size	$58,000	$45,000	$123,000	$55,000

(a) Based on this data, carry out appropriate analyses of the lump sum experience over the past 12 months. Present your findings in terms of actual to expected ratios for trauma males, trauma females, TPD males and TPD females. Show all workings in your answer. (7 Marks)

(b) Provide a commentary on your experience analysis. (4 Marks)

(c) In determining the pricing assumptions, describe any further analyses you would carry out and why? (3 Marks)

(d) The marketing manager has raised concerns with you about the impact of a predicted recession on the individual disability business. Describe the impact a recession is likely to have on the following:

i) lapses
ii) incidence rates
iii) termination rates

for individual disability business. (3 Marks)

(e) The CEO of Morby Ltd. wants to launch an enhanced TPD product in the market. The CEO notes that there have not been many TPD claims compared to trauma claims, so thinks that making the TPD product slightly more attractive is reasonable. He has proposed that restructuring TPD with a 3-month waiting period, instead of the standard 6-month waiting period, would be a clever and low-risk innovation. Comment on the CEO's proposal. (3 Marks)

(a) Analysis by number of claims

Calculate policy years for each tranche of business, allowing for selection effects, as follows:

Policy Year	Trauma male	Trauma female	TPD male	TPD female
Calculate exposure in policy years for each tranche of business, allowing for selection effects:				
1	(1-60%) x 6,526 = 2,610 [0.25 mark KU]	(1-60%) x 5,675 = 2,270 [0.25 mark KU]	(1-90%) x 1,519 = 152 [0.25 mark KU]	(1-90%) x 1,235 = 124 [0.25 mark KU]
2	(1-20%) x 15,602 = 12,482 [0.25 mark KU]	(1-20%) x 13,567 = 10,854 [0.25 mark KU]	(1-50%) x 3,195 = 1,598 [0.25 mark KU]	(1-50%) x 2,598 = 1,299 [0.25 mark KU]
3	71,696	62,345	15,991	13,001
Total	86,788	75,469	17,740	14,424
Expected number of claims	86,788 x 0.02 = 1,735.8 [0.25 mark KU]	75,469 x 0.0225 = 1,698.0 [0.25 mark KU]	17,740 x 0.0025 = 44.4 [0.25 mark KU]	14,424 x 0.0015 = 21.6 [0.25 mark KU]
Actual number of claims	1,600	1,325	30	45
A/E ratio	92% [0.25 mark KU]	78% [0.25 mark KU]	68% [0.25 mark KU]	208% [0.25 mark KU]

Marking Guide

Marks as specified above with:

Maximum of 1 mark KU for calculating policy year exposure in year 1 correctly (no marks awarded if selection effect incorporated incorrectly).

Maximum of 1 mark KU for calculating policy year exposure in year 2 correctly (no marks awarded if selection effect incorporated incorrectly).

Maximum of 1 mark KU for calculating expected number of claims correctly.

1 mark KU for getting all A/E ratios correct.

To a maximum of 4 marks KU overall.

Analysis in terms of weighting by sum insured

	Trauma male	Trauma female	TPD male	TPD female
Total expected claims	1,735.8	1,698.0	44.4	21.6
Expected $ value of claims	1,735.8 x 65,000 = 112,827,000 [0.25 mark KU]	1,500 x 49,000 = 83,202,000 [0.25 mark KU]	44.4 x 125,000 = 5,550,000 [0.25 mark KU]	21.6 x 56,000 = 1,209,600 [0.25 mark KU]
Total actual claims	1,600	1,325	30	45
Actual $ value of claims	1,600 x 58,000 = 92,800,000 [0.25 mark KU]	1,325 x 45,000 = 59,625,000 [0.25 mark KU]	30 x 123,000 = 3,690,000 [0.25 mark KU]	45 x 55,000 = 2,475,000 [0.25 mark KU]
A/E Ratio	82% [0.25 mark KU]	72% [0.25 mark KU]	66% [0.25 mark KU]	205% [0.25 mark KU]

Marking guide:

Marks as specified above with:

Maximum of 1 mark KU for calculating expected $ value of claims correctly.

Maximum of 1 mark KU for calculating actual $ value of claims correctly.

1 mark KU for getting all A/E ratios correct.

To a maximum of 3 marks KU overall.

To a maximum of 7 marks KU overall for part (a).

(b)

i) Summary of experience analysis by claim numbers:

- The analysis of claims experience by claims numbers for both males and females indicates that trauma experience is better than expected. For TPD, claims experience by claim numbers indicates experience is better than expected for males and worse than expected for females. [0.5 mark SJ]

- Because there is a high number of trauma claims to base this analysis on, the analysis suggests that lower claims than expected is a real feature for the trauma product, rather than a statistical feature with significant uncertainty. [1 mark SJ]

- Because the number of TPD claims is relatively low, there is a degree of statistical uncertainty attached to the claims analysis. Thus, it is difficult to say whether the better than expected TPD claims experience for males and the worse than expected TPD claims experience for females are real features for the TPD product. [1 mark SJ]

Summary of experience analysis by sums insured:

- The analysis of claims experience by sums insured indicates that Trauma experience is better than expected for both males and females. For TPD, claims experience by sums insured indicates experience is better than expected for males and worse than expected for females. [0.5 mark SJ]

- For trauma, experience as measured by A/E ratios is significantly better when using sums insured. (The males sum insured ratio is 82% compared to number of claims ratio of 92%. The females sum insured ratio is 72% compared to number of claims ratio of 78%).

  Whereas for TPD, experience as measured by A/E ratios is slightly better using sums insured. (The males sum insured ratio is 66% compared to number of claims ratio of 68%. The females sum insured ratio is 205% compared to number of claims ratio of 208%). [0.5 mark SJ]

- The lighter claims experience when weighted by sum insured represents the effect of higher standards of underwriting for higher covers, whereby healthier lives and/or higher net worth individuals are selected for insurance during the underwriting process. [0.5 mark SJ]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 4 marks SJ.

(c)

Further analyses required:

- Trauma: Additional insights into the experience can be gained by analysing the data by age and smoker status as these are significant factors for trauma incidence rates. [0.5 mark SJ]

- TPD: Provided there is credible data, additional insights can be gained by analysing data by age, smoker status, and occupation class as these are significant factors for TPD incidence rates. [0.5 mark SJ]

- Consider IBNR claims, as the data will probably not include these. There will be usually a delay between the date the claim is incurred and when its reported to Morby Ltd. for both Trauma and TPD claims. [0.5 mark SJ]

- Analyse recent experience in terms of A/E ratios over the last 3 years. This will help identify any trends in experience. In addition, any pricing assumptions should not just be based on the experience over 1 year. Also need to check if there has been any product design changes over the last 3 years, as this will affect the interpretation of your experience analysis. [0.5 mark SJ]

- Provided there is credible data, analyse trauma experience by type of claim to see if there are trends over time. [0.5 mark SJ]

- Using IFSA industry experience studies, the company's experience can be compared to industry experience (although information available is not up to date). [0.5 mark SJ]

- Reinsurers have extensive data on claim experience across the world, which tends to be more up to date than IFSA industry experience study. This would provide a valuable comparison of the company's claim experience with that of other companies. [0.5 mark SJ]

- Compare lump sum experience against recommended pricing basis assumptions for reinsurer [0.5 mark SJ]

- Any other valid points raised with a reasonable explanation. [0.5 mark SJ for any other valid points]

Marking Guide

Marks as specified with appropriate explanation to a maximum of 3 marks SJ.

(d)

A recession is likely to have the following impacts:

i) Lapses

During a recession some policyholders are likely to lapse their disability income policies as they can no longer afford to pay the premiums. [0.5 mark CJ]

However, unhealthy policyholders are also likely to hold on to their disability income policies, as during a recession they will need this type of cover. [0.5 mark CJ]

ii) Incidence rates

In a recession, incidence rates may increase or decrease depending on the circumstances of the policyholder.

Incidence rates may increase for self employed people as they suffer stress/depression or attempt to claim as a way to maintain their income. [0.5 mark CJ]

Employed people may be less likely to claim as they are worried about keeping their jobs and may work through an illness rather than take time off work. [0.5 mark CJ]

iii) Termination rates

In a recession, the following factors may lead to a decrease in claim termination rates:

Insured lives may have reduced incentives to come off claim because of unemployment, availability of work and the desire of their employer to minimise staffing levels. [0.5 mark CJ]

Self employed people see less opportunity to return to previous income levels and have reduced motivation to return to work. [0.5 mark CJ]

Marking Guide

Marks as specified above with an appropriate explanation to a maximum of 3 marks CJ.

(e)

- As the standard waiting period is 6 months, this is a change and could be perceived as an attractive change for brokers / prospective policyholders and rated highly by risk product rating companies. [0.5 mark CJ]

- However to say that it is reasonable to make TPD easier to claim based on low claim numbers is completely in error. Consideration needs to be given to the relative number of policies inforce and the overall expected incidence rate built into the premium rates. [0.5 mark CJ]

- The A/E ratios for TPD actually show worse experience than expected, and though there are not a large number of claims to base this on, this does not suggest a loosening of policy conditions. [0.5 mark CJ]

- Discussions are required with the underwriting and claims managers to see if this feature change is a viable option, and what impact it would have on claims and so whether a higher premium is required. [0.5 mark CJ]

- Need to do some market research to see if there is any demand for a more expensive TPD product. [0.5 mark CJ]

- All claim experience and data to date is based on a 6-month waiting period. So would need to estimate experience for a 3-month waiting period. A possible method is to look at how long it took to assess past TPD claims. You can then measure how many claims were either clearly TPD by the 3rd month or were still under review. [1 mark CJ]

- Because the proposal is so different to the market, and due to paucity of data, need to talk to the reinsurers to see if they would provide support. [0.5 mark CJ]

- Need to consider how we are going to deal with existing business. Thought would have to be given to allowing existing TPD policyholders the opportunity to upgrade to a new version, and managing the various complexities around that. [0.5 mark CJ]

Marking Guide

Marks as specified above with an appropriate explanation to a maximum of 3 marks CJ.

QUESTION 2 **(22 Marks)**

You are the pricing actuary of a publicly listed medium sized Australian life insurance company, Growth Ltd.

Growth's risk business is held in Statutory Fund No.1. The total risk premium is $600m per annum and includes group and individual risk business covering life, Total and Permanent Disablement (TPD), Trauma and Income Protection insurance products.

A very large industry superannuation fund, for which Growth Ltd. is not the incumbent insurance provider, conducts a tender every three years for the group insurance cover offered by the fund. The premium for this cover is expected to be at least $100m per annum, with premium rates to be guaranteed for three years. Cover available includes life, TPD and group salary continuance insurance. The tender has just come to market.

Experience data for the fund's last 6 years is available to interested tenderers. The experience data covers life and TPD insurance. It also covers group salary continuance insurance, but only for 1 and 2 year benefit periods. At the request of the trustees of the superannuation fund, the available group salary continuance cover options are to be expanded to include a 'to age 65' benefit period.

(a) Describe the main considerations in pricing for the group insurance cover associated with this fund. **(7 Marks)**

(b) Discuss the main issues to be considered with offering the new 'to age 65' feature compared to the existing 1 and 2 year only benefit periods? **(4 Marks)**

(c) You have been told that the business will be put to tender again in three years. Discuss the impact on pricing and how Growth Ltd manages the business? **(3 Marks)**

(d) Given the size of the potential new business relative to Growth Ltd's existing risk business, it has been suggested that the underwriting and claims management functions should be outsourced. The outsourced work would be provided by just one company.

Discuss the issues to be considered in outsourcing these functions. **(3 Marks)**

(e) Describe the major strategic and operational risks associated with this large block of business. **(5 Marks)**

Solutions

(a)

The main considerations centre around the following major points:

The insurance risk:

- As this is a large industry superannuation fund, there is potential for a large exposure to specific industries and catastrophe risks associated with any one company [0.5 marks SJ]

- Future changes in experience – even with data covering a larger time period, changes in experience can occur for a number of reasons, including environmental differences in the future. [0.5 mark SJ]

- The 3 year premium rate guarantee – allowance should be made that premium rates cannot be adjusted annually in the event that experience may differ to that expected. A loading for the uncertainty introduced by this may therefore have to be considered. [1 mark SJ]

- The level of automatic acceptance limits (AALs) and eligibility criteria. There is a greater the risk of anti-selection if the AAL are high and the eligibility criteria is less strict. However, the lower the AAL and the more strict the eligibility criteria, the greater the expenses due to more cases requiring underwriting. [0.5 mark SJ]

- Entry and eligibility criteria for the scheme may be important, for example if there are any pre-existing condition exclusions. [0.5 mark SJ]

- The quality and the level of detail in the data will be an important consideration for performing a meaningful experience analysis. If limited data is available then loss ratios and estimates of IBNR levels may only be possible. However, if detailed data is available, a full experience analysis can be performed which includes creating a run off triangle to estimate claim delays. [0.5 mark SJ]

Reinsurance:

- Need to determine how much to reinsure – this will depend on a number of factors such as the insurer's risk appetite and preference for risk/return, capital requirements and growth plans/opportunities, etc. [0.5 mark SJ]

- Need to consider the level of reinsurance support provided. This includes the extent to which the reinsurer shares in the risk, helps with the analysis, supports the underwriting and claims assessment and is involved in negotiations. [0.5 mark SJ]

- The reinsurer's premium rates will be a major determinant. [0.5 mark SJ]

- Pricing assumptions and method for determining experience profits or losses used by Growth Ltd. and the reinsurer need to be relatively consistent. [0.5 mark SJ]

Capital:

- The availability of various sources of capital and the cost of capital are major factors particularly with a scheme so large relative to the existing book of business. [0.5 mark SJ]

- Reinsurance reduces the capital requirement, but will have a cost associated with it. This needs to be weighed up against the costs of other capital support for the associated uncertain duration of this business. [0.5 mark SJ]

Competition:

- Pricing will depend on the level of competition in the group market for the tender of this large scheme. It is important to consider how low a price is needed in win the tender and whether the Reinsurer is prepared to cut reinsurance premiums rates. If Growth Ltd. cannot make a profit at this price, it should consider the proposal not viable and not tender for this business, [0.5 mark SJ]

Initial / Implementation costs such as:

- There needs to be a substantial budget to fund the costs of:
  - recruiting key staff to administer the business; and
  - installing a large administration system to manage this large scheme with large inflows of premiums and outflows of claim payments. [0.5 mark SJ]

- The availability of:
  - suitably skilled people to administer the business; and
  - administration systems

  will be an important consideration as well as how quickly this capability can be established. [0.5 mark SJ]

- Various additional costs will be associated with the group scheme, including stamp duty, quotation costs, training, and additional premises and equipment. [0.5 mark SJ]

- These costs will have to be amortised over the 3 years (or less) the policy will be held for. [0.5 mark SJ]

Ongoing costs:

- Dedicated staff may be required on an ongoing basis, as either specialist staff can not be contracted in, or unavoidably for a scheme this large roles for existing and new staff encompass all business lines and products. [0.5 mark SJ]

- The increase in overhead costs may not be immaterial and must be accounted for. [0.5 mark SJ]

- Synergies with other areas of the business may eventuate and can be factored in. [0.5 mark SJ]

Other:

- Any other valid comments raised with a reasonable explanation.
[0.5 mark SJ for each other valid comment]

Marking Guide

Marks to be awarded as above with appropriate explanations for the insurance risks to a maximum of 2 marks SJ.

Marks to be awarded as above with appropriate explanation for the other four subsections to a maximum of 5 marks SJ.

To a maximum overall of 7 marks SJ for part (a).

(b)

Issues to be considered are :

- The available GSC data is for 1 and 2 year benefit periods only. The 'age 65' benefit will not have experience that can be extrapolated or easily determined from the existing GSC data so care will have to be taken to develop appropriate assumptions. [0.5 mark SJ]

- Reserving requirements will involve estimating termination rates at longer claim durations and monitoring experience. [0.5 mark SJ]

- Reserves for open claims will be higher than with shorter benefit periods as termination rates post year 2 on claim are often considerably lower than shorter duration claim recovery rates. [0.5 mark SJ]

- A particular issue is with sickness claims which can continue for long periods (as opposed to accident which may have more of a defined short period). [0.5 mark SJ]

- It can introduce the potential for greater moral hazard as claimants can continue on claim without as much requirement to return to work compared to if their benefits are automatically ceasing at benefit term expiry. [0.5 mark SJ]

- Different Automatic Acceptance Limits may be required for longer term benefit periods. [0.5 mark SJ]

- Asset allocation decisions (and need for greater duration matching) are often greater as the average term of open claims will increase. [0.5 mark SJ]

- Claim indexation becomes more of a concern for longer benefit period claims.
[0.5 mark SJ]

- Need to confirm that reinsurer will support the increased benefit period. [0.5 mark SJ]

- Specialist skills are required to manage longer term open claims. [0.5 mark SJ]

- Claim management expenses may be higher as a result. [0.5 mark SJ]

- Any other valid points raised with a reasonable explanation. [0.5 mark SJ for each other valid point]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 4 marks SJ.

(c)

Impacts on pricing and managing the business are:

- It is necessary to take into account that all up-front costs must be amortised over three years, or at least be able to justify a good reason as to why a different period could be considered. [1 mark CJ]

- Or alternatively, the preparedness of Growth Ltd. to loss lead with the hope of retaining the business at the end of the initial 3 year period. [1 mark CJ]

- Consideration should also be given to the ramifications of losing the contract after 3 years, e.g. redundancy costs. [1 mark CJ]

- Consideration should be given to managing the business carefully to optimise the possibility of retaining the business, such as through superior service (claims management, general responsive to queries, etc), [1 mark CJ]

- Proactively building the relationship with those in key decision making positions. This requires a Service Level Agreement (SLA). [1 mark CJ]

- Any other valid impact with a reasonable explanation. [1 mark CJ for each other valid impact]

Marking Guide

Marks as specified above with appropriate explanation up to maximum of 3 marks CJ.

(d)

The main issues to be considered when outsourcing the underwriting and claim management functions with the one company include:

- The outsourced company must have a proven record in both functions:
  - Underwriting: experienced underwriters; and
  - Claims Management: experienced people and a range of capabilities available (claims management, medical, financial, rehabilitation, surveillance). [0.5 mark CJ]

- There must be a SLA which stipulates agreed standards for both functions:

  Underwriting:
  - The company's underwriting basis is replicated by the outsourced company, so that well established processes and tight underwriting rules replicate the standards the company has assumed in rating. [0.5 mark CJ]

  - The level at which the Automatic Acceptance Limit (AAL) must also be set, as any members with Sums Insured below the AAL will be accepted automatically. [0.5 mark CJ]

Claims Management:

  - Turnaround times, set levels at which the outsourcing company can decide when to defer to the insurer and/or reinsurer, maximum periods for claim acceptance without reconsideration). [0.5 mark CJ]

  - The SLA must also set out agreed approaches to managing claims which are not clear-cut so that the outsourced company manages these in accordance with the way that the insurer would if they did it directly. [0.5 mark CJ

- Both functions will need to have appropriate reporting, tracking and auditing processes in place to ensure both SLAs have been complied with. [0.5 mark CJ]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 3 marks CJ.

(e)

The broad areas of risk associated with this business include:

Strategic risks include:

- The essential issue is that Growth Ltd is trying to write a big block of business, where necessarily there will be an impact on existing overheads (i.e. some existing overheads are likely to be absorbed by the new business). This presents a risk in that the business may not be retained beyond 3 years. [1 mark CJ]

- This large block of new business may not be a strategic fit for the company. The new business will require significant management attention as the additional business is absorbed into the company and so an element of distraction from the existing business exists. [1 mark CJ]

- Existing business may suffer through losing the attention of the best staff, spreading of available resources, slippage of service standards, having to make up for any shortfalls in pricing and/or experience of the new block of business. [1 mark CJ]

- Not having the capital and capacity to gamble on the business being a success. [0.5 mark CJ]

- Impact on their business if they fail to service this scheme appropriately. [0.5 mark CJ]

- Any other valid strategic risks raised with a reasonable explanation. [0.5 mark CJ for any other valid strategic risk]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 4 marks CJ.

Operational risks include:

- Any new system capability required to support the new cover is not delivered on time or within budget. [0.5 mark CJ]

- Existing systems cannot cope with increased workloads, and fall below service standards, for existing business and/or for the new cover. [0.5 mark CJ]

- Administrative staffing levels assumed are insufficient or cannot be recruited, and/or any outsourced service providers cannot meet new requirements. [0.5 mark CJ]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 1 marks CJ.

To an overall maximum of 5 marks CJ for part (e).

QUESTION 3 **(21 Marks)**

You are an Actuary working in the marketing department for a large life insurer that has been operating for 30 years in a well developed south-east Asian country. The insurer sells a range of products but its major sales come from traditional participating products as well as allocated pensions. The allocated pensions have the same features and government regulations as for allocated pensions in Australia.

Up to this point in time, it has used a cash dividend approach to distribute profits to its participating policyholders. The Board and CEO now want you to investigate a change in the way that policyholder profits are distributed. In particular they want you to consider the issues involved with moving to a reversionary and terminal bonus system for new and existing policies.

(a) Describe the three main types of reversionary bonuses. **(2 Marks)**

(b) Describe the major advantages and disadvantages for:

i) an individual policyholder **(3 Marks)**
ii) the insurer **(3 Marks)**

in moving from a cash distribution of profit to a reversionary and terminal distribution of profit.

(c) Describe the product features of an allocated pension. **(3 Marks)**

The marketing manager of the retirement income products is looking to introduce a new product called a "5 star annuity" with the following features:

- **Upfront investment is placed in an account for the policyholder.**
- **Investment choice of the account is up to the policyholder.**
- **Annuity payments and fees are deduced from the account, investment income is added to the account.**
- **If the account balance is positive on death, then the balance is paid to the estate of the annuitant.**
- **A minimum death benefit.**
- **A fixed annuity payment of x% of the starting account balance.**
- **A guarantee that, even if the balance of the account is $0, an annuity payment of x% of the starting account balance will continue until the death of the annuitant.**
- **In return for this guarantee, an additional fee is charged on the account balance.**

They are hopeful that they will capture a large part of the market and leap ahead of the other participants in the market.

(d) What are the advantages of the "5 star annuity" product over an allocated pension? (2 Marks)

(e) Describe the factors that impact the cost of the guarantee? (3 Marks)

(f) Discuss the aspects, other than those outlined in your answer to (e), that you will need to consider when selling the "5 star annuity" product. (5 Marks)

Solutions

(a) Three main types of reversionary bonuses are:

- **Simple bonus**

  The reversionary bonuses distribution is in proportion to the basic sum insured of policies that are eligible to participate in reversionary bonus. [0.5 mark KU]

- **Compound bonus**

  The reversionary bonus distribution is in proportion to the basic sum insured and past declared reversionary bonuses of the policies eligible to participate. There is only one rate declared and this applies to both basic sum insured and past reversionary bonus. [0.5 mark KU]

- **Super compounding bonus**

  The reversionary bonus distribution is in proportion to the basic sum insured and past declared reversionary bonuses of the policies eligible to participate. There are two rates declared, one applying to the basic sum insured and one applying to the past reversionary bonuses. [0.5 mark KU]

- Under super compounding it is normal for the higher rate of reversionary bonus is applied to the past declared reversionary bonus which benefits longer term policies. [0.5 mark KU]

Marking Guide

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

(b)

i) Advantages and disadvantages to a policyholder of moving from a cash distribution of profit to a reversionary and terminal bonus distribution of profit are:

Advantages:

- Policyholders can expect to have a greater level/value of bonuses than they otherwise would get because the insurer has the benefit of retaining the cash otherwise distributed as bonuses. [0.5 marks SJ]

- Reversionary bonuses declared are usually stable and offer policyholder some predictability. [0.5 mark SJ]

- Terminal bonuses allow the policyholder to benefit from unrealised capital gains over time. [0.5 mark SJ]

- Fund can invest for the longer term due to retaining assets within the fund. [0.5 mark SJ]

- Benefits payable under the policy automatically increase each year with the declared reversionary bonuses added to the base sum assured and previously declared reversionary. This does not happen under the cash distribution method. [0.5 mark SJ]

- Bonuses once declared are guaranteed. [0.5 mark SJ].

- The policyholder has the flexibility to cash out the bonus at any time . [0.5 mark SJ]

- As additional bonuses are declared, the value of the policy for security and loan purposes increases. [0.5 mark SJ].

- Value of bonus increases as the life insured ages. [0.5 mark SJ]

- Any other valid advantages raised with a reasonable explanation. [0.5 mark SJ for each other valid advantage]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 1.5 marks SJ.

Disadvantages:

- Lose cash payment each year that the policyholder may need for some reason. [0.5 mark SJ]

- Harder to understand the benefits they get under the policy. [0.5 mark SJ]

- Have more uncertain benefits due to the non-guaranteed nature of terminal bonuses [0.5 mark SJ]

- Reversionary bonus rates are likely to be smoother than a cash dividend each year Hence, there may be a delay in distributing reversionary bonuses, as additional work is involved in determining smooth reversionary bonus rates. [0.5 mark SJ]

- Any other valid disadvantages raised with a reasonable explanation. [0.5 mark SJ for each other valid disadvantage]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 1.5 marks SJ.

To a maximum overall of 3 marks SJ for part (b) i).

ii) Advantages and disadvantages to the insurer in moving from a cash distribution of profit to a reversionary and terminal distribution of profit are:

Advantages:

- Short term cashflows are better in that the company retains the immediate use of the money that would otherwise be paid out. [0.5 mark SJ]

- And as for the individual policyholder advantage in (i) above, the insurer can invest these funds (minus additional reserves for future bonuses) back into the business (as well as interest on the additional reserves) and thereby return a greater profit in the long term. [0.5 mark SJ]

- It also gives the insurer more flexibility overall with bonuses, in that with cash bonuses the amount paid is certain when paid, but with bonuses of a more discretionary nature, future declarations of bonus can be more responsive to future experience. [0.5 mark SJ]

- Greater ability to reward longer standing policyholders through a super compounding reversionary bonus. [0.5 mark SJ]

- Any other valid advantages raised with a reasonable explanation. [0.5 mark SJ for each other valid advantage]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 1.5 mark SJ.

Disadvantages:

- Any changes will require simple yet thorough explanation, with the possibility that misunderstandings are possible, which is no trivial task. [0.5 mark SJ]

- Lapses could occur if policyholders are unhappy with the perceived motives of the insurer, or if they perceive that there is now greater uncertainty about future payments of their bonus. [0.5 mark SJ]

- Lapses could also occur if policyholders have/had current uses for the cash bonuses which will now not eventuate, or if they perceive that they can generate better long term returns themselves. [0.5 mark SJ]

- The insurer has to be prepared to manage a more complicated bonus system, in terms of determining fair, equitable and financially responsible values, and having the administration system ready to be updated for changes in sum insured, benefits upon death, etc. [0.5 mark SJ]

- Pressure may arise on consistency over time and between policies, in that some experience items such as investment returns may be volatile over the long term in a way that cash bonuses are not impacted as much, but longer term bonuses are. This requires monitoring and setting terminal bonuses to manage unrealised capital gains. [0.5 mark SJ]

- Need to set up a system to allow the cashing of bonuses. [0.5 mark SJ]

- Need to change administration systems to allow for reversionary bonuses and terminal bonuses in the calculation of surrender values. [0.5 mark SJ]

- Any other valid disadvantages raised with a reasonable explanation. [0.5 mark SJ for each other valid disadvantage]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 1.5 marks SJ.

To a maximum overall of 3 marks SJ for part (b) ii).

To a maximum overall for part (b) of 6 marks SJ.

(c)

Features of allocated pensions:

- A flexible investment that lets you rollover your superannuation into an account held by a super fund. [0.25 mark KU]

- The account balance is topped up by investment income and pension payments continue to be paid until the account balance runs out. [0.5 mark KU]

- Pension payments are not set at a given amount. The amount is chosen by the pensioner and can be varied within government minimum and maximum limits based on age. [0.5 mark KU]

- Can withdraw lump sum payments. [0.25 mark KU]

- If the investor dies the balance in their account is paid to their beneficiaries. [0.5 mark KU]

- Funds are invested at the discretion of the investor with a variety of options such as equity, capital stable or managed. [0.5 mark KU]

- Tax effective superannuation investment with investment income added to the account balance tax free, pension payments are taxable but may have a tax free component and lump sum withdrawals are subject to tax at super lump sum tax rates. [0.5 mark KU]

- Any other valid features raised with a reasonable explanation.
  [0.5 mark KU for each other valid feature]

Marking Guide

Marks as specified above with reasonable explanation to a maximum of 3 marks KU.

(d) Advantages of the "5 star annuity" product over allocated pensions:

- There is a longevity guarantee, in that payments will continue till death, which is not the case with allocated pensions (as payments cease if account balance falls below 0). [0.5 mark SJ]

- The "5 star annuity" product pays a minimum death benefit, whereas for allocated pensions this is not the case as the account balance may be zero at the time of death. [0.5 mark SJ]

- For the "5 star annuity " product , the policyholders can take on a more risky and aggressive risk profile by investing in shares and will benefit if there is a significant increase in the value of these investments. This is because there is guaranteed annuity payment and a minimum death benefit. However this is not the case for allocated pensions, as policyholders are more likely to take a more conservative investment strategy by investing in fixed interest as their account balance winds down. [1 mark SJ]

- Any other valid advantages raised with a reasonable explanation.
  [0.5 mark SJ for each valid advantage]

Marking Guide

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

(e)

Aspects to consider in assessing the cost of the guarantee are:

Things that impact the size of payments:

- The size of x% since this is the payment that will be made going forward, regardless of the account balance. [0.5 mark KU]

- The initial account balance since the annuity payment is based on this. [0.5 marks KU]

Things that impact the likelihood of the payments being made:

Mortality aspects since the longevity risks are retained by the company:

- The age at entry, smoking status, gender etc of the expected policyholders, since these all impact the mortality and thus the longevity of these policyholders. This is crucial for the company as it retains the longevity risk once the balance is zero. [0.5 mark CJ]

- Potential self selection by purchases of the “5 star annuity” products, as only those who think they will use the guarantee will opt to pay for this feature. [0.5 mark CJ]

Investment risks:

- The expected long term returns and volatility of the various asset classes, as these effect the likely time and variability of when the account balance will become $0. [0.5 mark CJ]

- The degree of mismatching between assets and liabilities, also impacts the timing and variability of when the account balance will become $0. [0.5 mark CJ]

- The interest rate environment (or risk-free yield curve/rates) since this drives the likely returns of the other asset classes and risk adjusted discounted payments made under the guarantee. [0.5 mark CJ]

- The effectives of the hedging strategy in using derivatives to match the guarantee. [0.5 mark CJ]

- The fees charged for managing the various investment choices offered since these are still deducted from the account balance over time. [0.5 mark CJ]

- The fees charged for the guarantee since this are also deducted from the account balance over time. [0.5 mark CJ]

Other risks:

- Any other valid risks raised with a reasonable explanation.
[0.5 mark CJ for each other valid risk]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 3 marks
[1 mark KU and 2 marks CJ].

(f)

Aspects to consider (other those outlined in part (e)) are:

Legal aspects:

- The legal requirements for retirement income products and any maximum and minimum drawdowns since these may limit the available options for the company.
[0.5 marks CJ]

- The interaction between the annuity payments and the social security system since this may impact customer behaviour with respect to purchases of retirement income products. [0.5 marks CJ]

Marketing Aspects:

- Pricing of other retirement income products in the market since the customer may be not considering the additional cost worth the benefit that the guarantee provides.
[0.5 mark CJ]

- Ability of customers to pay for the product since if it is too expensive then they won't purchase it. [0.5 mark CJ]

- What the marketing department/advisers thinks they can sell since they won't try to sell something they don't think is good value. [0.5 mark CJ]

- The need to train agents or advisors in the features of the "5 star annuity" product so they can be sold to retirees and meet their needs. [0.5 mark CJ]

- Design and contents of PDS and Marketing Literature. [0.5 mark CJ]

Company aspects:

- The level of risk that the company wants to retain since the annuity payment impacts the level of longevity risk it faces. [0.5 mark CJ]

- The potential to transfer the risk to another party (reinsures/market) since this may allow higher levels of risk to be taken by the company. [0.5 mark CJ]

- The level of capital required to support the product (as agreed with APRA). [0.5 mark CJ]
- The effectiveness of the models used to manage the risk and hedging strategies. [0.5 mark CJ]
- The additional controls to ensure risks are monitored and hedge effectiveness is maintained and that no dealing occurs outside authorities / limits. [0.5 mark CJ]
- Tax impacts. [0.5 mark CJ]
- Hedging strategy to reduce or overcome investment risks. [0.5 mark CJ]
- The extent to which existing administration systems need to be enhanced. [0.5 mark CJ]
- The ability to outsource any functions. [0.5 mark CJ]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 5 marks CJ.

QUESTION 4 **(18 Marks)**

MMM is a long established Australian Insurance Company, which has a substantial inforce block of YRT products and sales continue to be strong.

MMM is proposing to launch a new YRT death only product.

You are the product actuary for the YRT products.

You have been asked to recommend an appropriate reinsurance arrangement for the new YRT death only product.

You have the choice of recommending one of the following two reinsurance options:

<u>Option 1 with Reinsurance Company A</u>
Surplus with retention per policy = $300,000.
The applicable risk rate, in the first year, is $0.60 per $1000 of reinsured cover.
A selection discount of 100% applies in year 1.

<u>Option 2 with Reinsurance Company B</u>
Quota share, with 70% retained by the insurer.
Reinsurance commission = 25%.
A selection discount of 50% applies in year 1 and 25% in year 2.

You should assume that:

- **Distribution of Gross Sums Insured is:**

Gross Sum insured	% of policies
$180,000	40%
$500,000	35%
$812,000	25%

- **Number of YRT policies expected to be sold is 24,000 per annum with all new business sold on the first day of the year.**
- **Average office premium for YRT policies is $660 per annum.**
- **Death claim rate is 0.0003 for year 1, 0.0004 for year 2 and 0.0005 for year 3.**
- **Lapses of 10% occur each year and are on the last day of the year.**
- **Office premiums increase by 5% per year.**
- **Reinsurer's risk premium increase by 4% per year for Option 1 Surplus Reinsurance with Reinsurance Company A.**
- **Gross Sums Insured remain fixed from year to year.**

(a) Calculate the expected reinsurance cashflows (showing all workings) in years 1, 2 and 3 for a 1 year tranche of new business for:

i) Option 1:
Surplus Reinsurance with Reinsurance Company A (4 Marks)

ii) Option 2:
Quota Share Reinsurance with Reinsurance Company B (5 Marks)

(b) Based only on your calculations in part (a) recommend which reinsurance option you favour and why? (1 Mark)

(c) Specify, with reasons, any other calculations you would perform in determining which reinsurance arrangement you would recommend. (2 Marks)

(d) Besides the calculations performed, describe other factors you would consider in recommending the reinsurance option. (6 marks)

Solutions

(a)

i)

Determine Reinsurance Cashflows for Option 1 (Surplus)

1. Calculate Weighted Average Reinsured Sum Insured

Gross Sum Insured	% of policies	Sum Reinsured	No. of policies	Total Sum Reinsured*
180,000	40%	0	24,000 x 40% = 9,600	$0m [0.25 mark KU] for correct formula used. [0.25 mark KU] for correct calculation.
500,000	35%	200,000	24,000 x 35% = 8,400	200,000 x 8,400 = $1,680m [0.25 mark KU]
812,000	25%	512,000	24,000 x 25% = 6,000	512,000 x 6,000 = $3,072m [0.25 mark KU]
Total			24,000	**$4,752m**

*Total Sum Reinsured = Sum Reinsured x No. of policies

Marks as specified above up to a maximum of 1 mark KU.

2. Calculate Total Sum Reinsured and Reinsurance Premium Rate Years 1, 2 and 3

Year	Total Sum Reinsured*	Reinsurance Premium Rate per 1000
1	$4,752m	0.6
2	$4,752 x (1-10%) = $4,276.8m [0.25 mark KU]	0.6 x (1+4%) =0.624
3	$4,276.8 x (1-10%) = $3,849.12m [0.25 mark KU]	=0.624 x (1+4%) 0.64896

* Total Sum Reinsured (year) = Total Sum Reinsured (year-1) x (1-lapse rate)

Marks as specified above to a maximum of 0.5 mark KU.

3. Calculate Reinsurance Cashflows

Year	Net Reinsurance Premium (1)	Reinsurance Claims (2)	Reinsurance Cost (3)
1	$4,752m x 0.6 x (1-100%) = $0 [0.25 mark SJ] for using correct formula. [0.25 mark SJ] for calculation correct.	$4,752m x 0.0003 = $1,425,600 [0.25 mark KU]	= $1,425,000 - $0 = $1,425,000 [0.25 mark KU]
2	$4,276.8m x 0.624 x (1-0%) = $2,668,723 [0.25 mark SJ]	$4,726.8m x 0.0004 = $1,710,720 [0.25 mark KU]	$1,710,720 - $2,668,723 = -$958,003 [0.25 mark KU]
3	$3,849.12m x 0.64896 x (1-0%) = $2,497,925 [0.25 mark SJ]	$3,849.12m x 0.0005 = $1,924,560 [0.25 mark KU]	= $1,924,560 - $2,497,925 = -$573,365 [0.25 mark KU]
Total Marks	1 mark SJ	0.75 mark KU	0.75 mark KU

(1) Net Reinsurance Premium = Total Sum Reinsured x Reinsurance Premium rate x (1 – Selection Discount)

(2) Reinsurance Claims = Total Sum Reinsured x Death rate

(3) Reinsurance Cost = Reinsurance Claims – Net Reinsurance Premium

Marks as specified above to a maximum of 2.5 marks [1.5 marks KU, 1 mark SJ].

Marking Guide

Marks as specified above for to a maximum overall of 4 marks [3 marks KU, 1 mark SJ] for part (a) (i)

ii)

Determine Reinsurance Cashflows for Option 2 (Quota Share)

1. Calculate Weighted Average Reinsured Sum Insured

Gross Sum Insured	% of policies	Sum Reinsured	No. of policies	Total Sum Reinsured*
180,000	40%	54,000	24,000 x 40% = 9,600	54,000 x 9,600 = $518.4m [0.25 mark KU] for correct formula. [0.25 mark KU] for calculation correct.
500,000	35%	150,000	24,000 x 35% = 8,400	150,00 x 8,400 = $1,260m [0.25 mark KU]
812,000	25%	243,600	24,000 x 25% = 6,000	243,600 x 6,000 = $1,461.6m [0.25 mark KU]
Total			24,000	**$3,240m**

*Total Sum Reinsured = Sum Reinsured x No. of policies

Marks as specified above to a maximum of 1 mark KU.

2. Calculate Sum Reinsured and Office Premium for years 1, 2 and 3.

Year	Total Sum Reinsured*	Total Office Premium*
1	$3,240m	= 660 x 2,000 x 12 = 15,840,000 [0.25 mark SJ] for correct formula. [0.25 mark SJ] for correct calculation
2	$3,240 x (1-10%) = $2,916m [0.25 mark KU]	15,840,000 x (1+5%) x (1-10%) = 14,968,800 [0.25 mark SJ]
3	$2,916m x (1- 10%) = $2,624.4m [0.25 mark KU]	14,968,800 x (1+5%) x (1-10%) = 14,145,516 [0.25 mark SJ]
Total Mark	0.5 mark KU.	1 mark SJ.

* Total Office Premium = Average premium x No, of new policies per month x 12

Marks as specified to a maximum of 1.5 mark [0.5 mark KU, 1 mark SJ].

3. Calculate Reinsurance Cashflows

Using formula for Net Reinsurance Premium:

= Total Office Premium x
(1 - % retained) x (1 - (Selection discount + Reinsurance Commission))

Year	Net Reinsurance Premium (1)	Reinsurance Claims (2)	Reinsurance Cost (3)
1	$15,840m x (1-70%) x (1-50%-25%) =$1,188,000 [0.25 mark SJ] for correct formula. [0.25 mark SJ] for calculation correct.	$3,240m x 0.0003 = $972,000 [0.25 mark KU for calculation correct.	= $972,000 - $1,188,000 = -$216,000 [0.25 mark KU]
2	$14,968.8m x (1-70%) x (1-25%-25%) =$2,245,320 [0.25 mark SJ]	=$2,916m x 0.004 = $1,166,400 [0.25 mark KU]	=$1,166,400 - $2,245,320 = -$1,078,920 [0.25 mark KU]
3	$14,145.516m x (1-70%)x(1-0%-25%) =$3,182,741 [0.25 mark SJ]	=$2,624.4m x 0.005 =$1,312,200 [0.25 mark KU]	=$1,312,200 - $3,182,741 =-$1,870,541 [0.25 mark KU]
Total Mark	1 mark SJ	0.75 mark KU	0.75 mark KU

(1) Net Reinsurance Premium = Total Office Premium x
(1 - % retained) x
(1 - (Selection discount + Reinsurance Commission))

(2) Reinsurance Claims = Total Sum Reinsured x Death rate

(3) Reinsurance Cost = Reinsurance Claims – Net Reinsurance Premium

Marks as specified above to a maximum of 2.5 marks [1.5 marks KU, 1 mark SJ].

Using alternative formula for Net Reinsurance Premium:

= Total Office Premium x
(1 - % retained) x (1 - Selection discount %) x (1 - Reinsurance Commission %)

Year	Net Reinsurance Premium (1)	Reinsurance Claims (2)	Reinsurance Cost (3)
1	$15,840m x (1-70%) x (1-50%) x (1-25%) =$1,782,000 [0.25 mark SJ] for correct formula. [0.25 mark SJ] for calculation correct.	$3,240m x 0.0003 = $972,000 [0.25 mark KU for calculation correct.	= $972,000 - $1,782,000 = -$810,000 [0.25 mark KU]
2	$14,968.8m x (1-70%) x (1-25%) x (1-25%) =$2,525,985 [0.25 mark SJ]	=$2,916m x 0.004 = $1,166,400 [0.25 mark KU]	=$1,166,400 - $2,525,985 = -$1,359,585 [0.25 mark KU]
3	$14,145.516m x (1-70%)x(1-0%)*(1-25%) =$3,182,741 [0.25 mark SJ]	=$2,624.4m x 0.005 =$1,312,200 [0.25 mark KU]	=$1,312,200 - $3,182,741 =-$1,870,541 [0.25 mark KU]
Total Mark	1 mark SJ	0.75 mark KU	0.75 mark KU

(1) Net Reinsurance Premium = Total Office Premium x
(1 - % retained) x (1 - Selection discount %)
x (1-Reinsurance Commission %)

(2) Reinsurance Claims = Total Sum Reinsured x Death rate

(3) Reinsurance Cost = Reinsurance Claims – Net Reinsurance Premium

Marks as specified above to a maximum of 2.5 marks [1.5 marks KU, 1 mark SJ].

Marking guide:

Marks as specified above to a maximum overall of 5 marks [3 marks KU, 2 marks SJ] for part (a) (ii).

(b) The following table compares the cost of reinsurance between Option 1 and 2 for years 1, 2 and 3:

Using formula for Net Reinsurance Premium:

= Total Office Premium x
(1 - % retained) x (1 - (Selection discount + Reinsurance Commission))

Year	Cost of Reinsurance	
	Option 1: Surplus Reinsurance with Reinsurance Company A	Option 2 Quota Share with Reinsurance Company B
1	$1,425,600	-$216,000
2	-$958,003	-$1,078,920
3	-$573,365	-$1,870,541

OR

Using alternative formula for Net Reinsurance Premium:

= Total Office Premium x
(1 - % retained) x (1 - Selection discount %) x (1 - Reinsurance Commission %)

Year	Cost of Reinsurance	
	Option 1: Surplus Reinsurance with Reinsurance Company A	Option 2 Quota Share with Reinsurance Company B
1	$1,425,600	-$810,000
2	-$958,003	-1,359,585
3	-$573,365	-$1,870,541

From this table, the cost of reinsurance for Option 1 Surplus is less than that for Option 2 Quota share for each of the first 3 years, and thus for the 3 years combined.
[0.5 mark KU]

Based on this information, I would recommend taking Option 1 Surplus Reinsurance with Reinsurance Company A. [0.5 mark KU]

Marking Guide

Marks as specified above to a maximum of 1 mark KU for part (b)

(c)

Other calculations to be performed include the following:

- Basing your recommendation on 3 years reinsurance cost is too short a time frame and thus is not sufficient. Instead the reinsurance costs under each reinsurance option should be projected for each year for the remaining life of the policy for this tranche of new business. The present value of the reinsurance cost for each reinsurance option should be calculated using an appropriate discount rate. The reinsurance option with the smaller present value of reinsurance cost (with all else being equal) will produce the highest profit margin and thus become the recommended reinsurance option. [1 mark CJ]

- For Option 1 Surplus Reinsurance, for 1 years' tranche business there is a negative reinsurance cost in year 1 (the reinsurer pays the insurer) followed by reinsurance costs. Thus it is important to then project layers of new business into the future. Thus you can not only assess the reinsurance option with the smaller present value but the pattern of reinsurance costs (i.e. There may be an actually reinsurance cost in the early years of the reinsurance arrangement as the reinsurance costs beyond the first year may exceed the profit in the first year). [1 mark CJ]

- Any other valid calculations raised with a reasonable explanation.
[0.5 mark for each other valid calculation]

Marking Guide

Marks as specified above with an appropriate explanation to a maximum of 2 marks CJ.

(d)

Other factors to be considered (besides calculations) when deciding on the reinsurance option are:

- The insurers attitude to profit volatility is an important consideration in recommending the appropriate reinsurance arrangement. Under quota share, the insurer is still vulnerable to large one off claims, which will cause profit volatility. Whereas under excess of loss reinsurance, large claims are covered by the reinsurer. Although this provides smoother profits, this is at the expense of higher overall claim rates. [1 mark CJ]

- The extent to which the reinsurer provides support in underwriting applications and assessing claims. This will depend on the extent of the reinsurer's resources and the proportion of the risk retained and the business volumes. Any lack of underwriting support would lead to the majority of underwriting decisions being made by the insurer. Under quota share reinsurance where the size of the risks are reasonably large, it would be expected that the reinsurer would provide greater support (as risks are shared) than for surplus reinsurance where the retention levels are high.
[1 mark CJ]

- Ancillary services provided by the reinsurer including:
  - assistance in developing new products; and
  - training and development of underwriting and claims functions.

  [0.5 mark CJ]

- This will be in respect of particular gaps or weaknesses of the insurer as well as the particular strengths of the reinsurer. [0.5 mark CJ]

- The extent to which capital requirements are met by the reinsurer by reducing the new business strain. For surplus reinsurance, the capital requirements are not reduced as much as for quota reinsurance. [1 mark CJ]

- Reinsurance terms and conditions for facultative cases that may fall outside the normal treaty terms such as very large sum insureds [0.5 mark CJ]

- Whether either reinsurer offers catastrophe reinsurance. It may be easier and more efficient to have catastrophe reinsurance and treaty reinsurance with the same reinsurer. [0.5 mark CJ]

- The credit rating of the reinsurer is important, as this indicates their capacity to pay claims. [0.5 mark CJ]

- The reputation of the reinsurer in the market, such as ease of dealing with them and their propensity to pay claims. [0.5 mark CJ]

- Strength of the reinsurer's administration systems and processes. [0.5 mark CJ]

- If the reinsurer is a large global organisation then this provides the insurer with confidence in the financial strength of the reinsurer. [0.5 mark CJ]

Marking Guide

Marks as specified above with an appropriate explanation to a maximum of 6 marks CJ.

QUESTION 5 (19 Marks)

You are the Appointed Actuary for InsureCo Ltd, an Australian life insurer that has a large book of participating Whole of Life (WOL) business. The WOL has been profitable to date, but is getting more expensive to maintain as the supporting IT and policy administration systems begin to age.

InsureCo Ltd distributes reversionary bonuses and terminal bonuses to the WOL business.

The WOL business has been exclusively sold by tied agents. InsureCo is now looking to diversify both its product lines and its distribution channels, with plans in place to build relationships with independent life risk brokers and to develop yearly renewable term (YRT) products. The YRT product will provide insurance cover for death, total and permanent disablement (TPD) and trauma.

The CEO of InsureCo has been analysing the business and accounts of a competitor, Gotcha Ltd. Gotcha Ltd concentrates on selling a range of direct to consumer life insurance products, with business characterised by high volumes and low sums insured.

(a) Through her own analysis, your CEO has identified that the level of expenses in InsureCo appear noticeably higher compared to Gotcha Ltd. She would like you to comment on why this might be the case. Describe the issues that you would raise in addressing the CEO's concerns. (5 Marks)

(b) InsureCo has invested in a major new IT system with the intent to enhance its efficiency across the company, particularly the WOL business. The CEO wants to know how this investment will be reflected in bonus declarations on the participating WOL business. Discuss the implications for bonus declarations. (3 Marks)

(c) The CEO wants to move quickly to establish and build a distribution channel with independent life risk brokers to advise and sell the YRT product. Describe the costs that would be incurred in setting up the new distribution channel. (4 Marks)

(d) Alternatively, the CEO has mentioned that if offering YRT via brokers is too difficult then she would consider offering direct to consumer term products, thus competing with Gotcha Ltd.

Prepare a memo for the management team describing:

i) the product design and
ii) marketing approaches

that should be considered if the direct distribution channel is pursued.
(7 marks)

Solutions

(a)

Issues to be addressed with the CEO about the expense levels of InsureCo potentially being high relative to Gotcha Ltd:

Reasons for differences with Gotcha Ltd:

- Commissions paid are likely to be quite different, as our agents have a commission aspect to their remuneration whereas sales of direct products are often rewarded via different structures. [1 mark SJ]

- Our underwriting function, and other areas like marketing, are likely to be quite different to Gotcha Ltd., for example, Gotcha may be able to reduce levels of medical underwriting that it pursues on a compulsory basis, in light of the sums insured of its' applicants being relatively low. Also there may be differences between the two companies in terms of the nature of the business that is underwritten versus those with pre-existing claims exclusions. [1 mark SJ]

- The costs of administration are likely to be quite different, especially for WOL business where there are more complexities due to the issuing and recording of policy bonuses, conversions of policies and loans against policies. [0.5 mark SJ]

- InsureCo will incur costs in managing an ageing IT and policy administration systems which is probably not the case for Gotcha. [0.5 mark SJ]

- The costs of managing the investments for WOL in a mixture of fixed interest, australian equities, international equities and property will be greater than for Gotcha which is likely to invest in Cash or Short term fixed interest. [0.5 mark SJ]

- InsureCo will incur costs in managing policyholder reserves, particularly the monitoring and setting of terminal bonuses. [0.5 mark SJ]

- On the other hand, some of Gotcha's products may be simpler than InsureCo's. For example, Gotcha may sell simple total and permanent disablement, or trauma products. Claims assessment for these products will generally be less costly than for the more complex products that InsureCo sells. [0.5 mark SJ]

- Gotcha as a newer company may be incurring lower costs as products may be sold online, uses automated processes and employs fewer people. [0.5 mark SJ]

- Gotcha could just be a front company for a reinsurer or is outsourcing a lot of the activities and so just gets a margin on the business and doesn't administer it so the real expenses of the business are with the reinsurer or other external party. [0.5 mark SJ]

- Any other valid differences raised with a reasonable explanation.
[0.5 mark SJ for each other valid difference]

Marks as specified above with appropriate explanation to a maximum of 4 marks SJ.

Other Comments:

- More work would be required to understand whether there are truly operational efficiencies in Gotcha's operations relative to InsureCo's or against those of other insurers. [0.5 mark SJ]

- The volume of business sold has a direct bearing on the spread of overhead costs. The larger the company, the more it benefits from economies of scale compared to a smaller company. Consideration needs to be given to the size of Gotcha compared to InsuredCo. [0.5 mark SJ]

- although it is worth noting that not all of the information required for such an analysis may be readily available. [0.5 mark SJ]

- Any other valid comments raised with a reasonable explanation.
[0.5 mark SJ for each other valid comment]

Marks as specified above with appropriate explanation to a maximum of 1 mark SJ.

To a maximum of 5 marks SJ overall for part (a).

(b)

Implications for bonus declarations on the participating WOL business:

- Bonuses would be expected to increase in the longer-term if the efficiencies eventuate, for policies of all durations. [0.5 mark SJ]

- However if efficiencies do not eventuate, then bonuses for policies of all durations will decrease to the extent that the expense-overrun is not recouped. [0.5 mark SJ]

- It may be that in the next 2-4 years bonuses are reduced relatively significantly with the thought that bonuses can then increase back to former, or greater levels if efficiencies do then arise. [0.5 mark SJ]

- This overall approach tends to disproportionately affect newer policies as they have a greater proportion of their bonus history impacted by this outcome. In addition this may not be in accordance with the company's principles for management of policyholder interests through bonuses, for example, if a stated objective communicated to clients is that bonuses will be smoothed over a lengthy period.
[1 mark SJ]

- The choice of whether to make a recovery of expenses through reversionary or terminal bonuses must also be considered, based on the impacts to maturing members' benefits and the portion of benefits that the company is expected or required to guarantee. [0.5 mark SJ]

- Care must be taken with any changes to bonus levels over time as InsureCo may suffer reputational damage and policyholder dissatisfaction if their movements are quite different to the market. [0.5 mark SJ]

- If expense recoveries are unable to be made as quickly as desired, the company must be comfortable that an extended period of reduced bonuses will be sufficiently acceptable and equitable to clients. [0.5 mark SJ]

- Any other valid implications raised with a reasonable explanation. [0.5 mark SJ for each other valid implication]

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Marks as specified with appropriate explanation to a maximum of 3 marks SJ.

(c) There are a range of costs to be considered in entering this new distribution channel:

Commission levels:

- Likely costs and structure of commission with independent brokers, such as the split of initial and renewal, and what the market is offering in this regard. [0.5 mark SJ]

- The levels of override/volume bonuses required to interest brokers in offering InsureCo's YRT product. [0.5 mark SJ]

Internal infrastructure/staffing costs:

- The costs associated with training staff to deal with brokers, particularly underwriters and claims managers [0.5 mark SJ]

- The costs of employing specialist persons in the sales area such as business development or relationship managers, who would be the primary point of contact between the brokers and InsureCo. [0.5 mark SJ]

- The costs associated with employing staff to research the types of YRT / other products sold by the independent broker channel at present, and how future trends are likely to transpire, as well as research on what may make InsureCo's offer a more attractive one than those of many competitors (e.g., evaluating product research house ratings) [0.5 mark SJ]

- There may be costs associated with new IT systems or enhancements to register broker details. [0.5 mark SJ]

Other costs:

- The costs and time of management attention to this new venture need to be considered. Costs can include: running road shows, meeting agents to convince them to sell the new products, and providing incentives to the agents.
  [0.5 mark SJ]

- As does the opportunity cost of not focusing on the tied agents. [0.5 mark SJ]

- As does the costs associated with the risk of potential channel conflict with the agents. [0.5 mark SJ]

- Any other valid costs with a reasonable explanation.
  [0.5 mark SJ for each other valid cost]

Marking Guide

Marks as specified above with appropriate explanation to a maximum of 4 marks SJ.

(d)

Memo
TO: Management Team
FROM: Appointed Actuary
RE: Direct Channel Product Design and Market Approaches

Dear Management Team

With regards to the potential consideration of offering our soon to be developed term product through the direct channel, this memo provides general advice on the product design and marketing approaches required if we are to pursue the direct channel.

I will provide a more formal LP310 advice to the board of directors, once the design and pricing of the product are finalised. [0.5 mark CJ]

<u>Product Design</u>

The direct channel requires the following product design:

- Relatively simple and straightforward products with features and conditions that are easy to understand by consumers (as no advice or intermediary to explain is used).
  [0.5 mark CJ]

  Examples of features and conditions products include:
  - Only younger lives would be insured,
  - there would be pre-existing condition exclusions,
  - funeral plans would be offered, and
  - premiums with interest are returned only if the policy lapses in the first few years of the policy.

  [0.5 mark CJ]

- Simple processes with automated and streamlined processing of applications. [0.5 mark CJ]
- Selling insurance direct to customers using the internet and using specialist direct marketing call centres are becoming cost effective. [0.5 mark CJ]
- Limited, if any, ancillary options or choices. [0.5 mark CJ]
- Pre-approved sum insured acceptance limits (subject to pre-existing conditions exclusions), without need for medical reports. [0.5 mark CJ]
- Premium rate scales that are simple and have limited adjustments. [0.5 mark CJ]
- Focus on lower sum insured levels (and restrictions capping maximum sum insured). [0.5 mark CJ]
- Any other valid product features raised with a reasonable explanation. [0.5 mark CJ for each other valid product feature]

Marks as specified above with appropriate explanation to a maximum total of 3 marks CJ.

<u>Marketing Approaches</u>

The direct channel requires the following marketing approach:

- Target market segmentation in order to ensure maximum focus on the specific segment desired (e.g. insurance of over 50s). Need to maximise the response rate and minimise the lapse rate. [1 mark CJ]
- No advice sales (or limited call centre question/answer). [0.5 mark CJ]
- Use of specific medium such as television, mail campaigns etc; [0.5 mark CJ]
- Greater use of end consumer brand promotion and recognition (as opposed to ensuring adviser brand recognition with broker channel). [0.5 mark CJ]
- Acceptance of relatively lower response (or “hit”) rates relative to exposed market. [0.5 mark CJ]

Other valid marketing approaches raised with a reasonable explanation. [0.5 mark CJ for each other valid marketing approach]

Marks as specified above with appropriate explanation to a maximum total of 3 marks CJ.

I trust this helps answer some of your queries. Please let me know if I can be of further help.

Kind regards,
Actuary

Marking Guide

0.5 mark CJ for answer in memo format and with an introduction.
0.5 mark CJ for language used in the memo.

To a maximum overall of 7 marks CJ for part (d).

END OF PAPER

