COURSE 2B LIFE INSURANCE SEMESTER 2 2019 EXAM MARKING GUIDE

QUESTION 1: MARKING GUIDE (35 Marks)

a) Refer to sheet "Embedded Value 31 Dec 2019" in the accompanying workbook.

Marking Guide:

- **0.5 mark for appropriately determining "Investment Return on FUM" (column D)**
- **1 mark for appropriately determining "Management Fees" (column E)**
- **1 mark for appropriately determining "FUM Withdrawals" (column F)**
- **1 mark for appropriately determining "Management Expense" (column G)**
- **0.5 mark for appropriately determining "Investment Return on Capital Requirements" (column H)**
- **1 mark for appropriately determining "FUM (after cash flows for the year)" (column I)**
- **0.5 mark for appropriately determining "Policy Liability" (column J)**
- **0.5 mark for appropriately determining "Capital Requirement" (column K)**
- **1 mark for appropriately determining "Reported Profit" (column L)**
- **1 mark for appropriately determining "Capital Release" (column M)**
- **0.5 mark for appropriately determining "Tax on Reported Profit" (column N)**
- **0.5 mark for appropriately determining "PV of Tax on Reported Profit" (column O)**
- **1 mark for appropriately determining "Distributable Profit (Net of Tax)" (column P)**
- **0.5 mark for appropriately determining "PV of Distributable Profits (Net of Tax)" (column Q)**
- **1 mark for appropriately determining "Adjusted Net Worth (ANW)" (cell C8)**
- **0.5 mark for appropriately determining "Value of In-Force Business (VIF)" (cell C9)**
- **0.5 mark for appropriately determining "Value of Imputation Credits (VIC)" (cell C10)**
- **0.5 mark for appropriately determining "Embedded Value (EV)" (cell C11)**

Up to 12 marks

b) Refer to sheet "Analysis of Movement 2020" in the accompanying workbook.

Marking Guide:

- **1 mark for appropriately determining "Unwinding of Discount Rate" (row 9)**
- **2 marks for appropriately determining "Investment Return on ANW" (row 10). Note that this needs to include the impact of the tax and imputation credits.**
- **1 mark for appropriately determining "Transfer between VIF, VIC and ANW" (row 11)**
- **1 mark for appropriately determining the impact of "Event 1: Dividend Payment of $10 million" (row 14)**
- **2 marks for appropriately determining the impact of "Event 2: Impact of Fraud Event" (row 15)**
- **2 marks for appropriately determining the impact of "Event 3: Impact of Stock Market Crash" (row 16)**
- **1 mark for appropriately determining "Actual Value as at 31 December 2020" (row 19)**

Up to 9 marks

c)

i. The potential impacts on Embedded Value (EV) are as follows:

- Investment returns being consistently lower than competitors could result in significantly increased withdrawal rates, driven by policyholders switching to allocated pension products offered by other competitors or dissatisfied policyholders who prefer investing their money elsewhere.

- This means significantly lower FUM, significantly lower management fees, significantly lower distributable profits, and therefore significantly lower EV.
- If FUM reduces to a level where the management fees are unable / barely able to sustainably cover fixed management expenses (e.g. overheads), this would result in higher capital requirements (due to expense overruns triggering Insurance Risk Charge). This reduces the ANW, and reduces EV due to the discounting effect on capital releases over time.

Marking Guide:
- **1 mark for each valid point on the impact on EV**

Up to 3 marks

ii. The potential impacts on Embedded Value (EV) are as follows:
- For policyholders who were already withdrawing at the minimum rates, a portion may lower their withdrawal rates further if they had intended to do so previously but were restricted by the legislated minimum withdrawal rate. For policyholders who were already withdrawing above the minimum rates, they would likely have done it voluntarily and are less likely to reduce their withdrawal rates.
- APLIFE's past experience shows that majority of its policyholders withdraw above the legislated minimum rates. Therefore the overall FUM withdrawal rate is not expected to reduce significantly.
- Lower withdrawal rates means higher FUM, so higher reported profit hence higher EV (but not significantly higher).

Marking Guide:
- **1 mark for the impact on EV for APLIFE not being significant, up to 1 mark**
- **1 mark for each additional valid point, up to 2 marks**

Up to 3 marks

d)

i. Two possible reasons are:
- Simpler to understand: Method 2 effectively splits the calculation of VNB into two components (VOYNB) and a capitalisation factor, which may be simpler to understand and communicate than a full projection approach under Method 1.
- Ease of use: Where rough indications of VNB impacts are required (e.g. from a change in business strategy under consideration), under Method 2 the VOYNB from the previous year could be used (subject to no significant changes in experience and valuation assumptions) with the capitalisation factor adjusted accordingly, without having to perform a full projection.

Marking Guide:
- **1 mark for each valid point**

Up to 2 marks

ii. To: CFO
From: EV/AV Actuary
Re: Determining the latest view of the VNB under the new initiative

I refer to your suggestion on updating the VNB figure (to reflect management's new initiative) and publishing it in the shareholders' report. The suggestion was to take last year's VNB figure and multiply it by three, to reflect that the total sales level (over all future years) is expected to triple.

This may not appropriately reflect the Value of New Business that shareholders can expect because:

- The experience (investment and account balance withdrawal) may have changed significantly since the previous year. The VNB needs to be updated for the latest view of future experience.
- While the total sales levels over all future years is expected to triple, multiplying the VNB by three may not be appropriate because:
  - Timing of profit release: The increase in the total sales levels is not expected to happen immediately but rather over the next five years as per management's targeted timing of release of the new products. Allowing for discounting impacts (at the cost of shareholders' capital), this means that the multiplication factor would be less than three.
  - Profit margins: When new business volumes increase significantly, this can change the unit costs: either lower due to lower fixed costs as a percentage of Funds Under Managements due to higher FUM, which in turn means higher profit margins, or alternatively may increase due to the unit costs might increase due to further investment in marketing and product investment. This will affect the multiplication factor.
  - Capital requirements: Rapid new business growth can result in higher capital requirements (driven by higher Operational Risk Charge under APRA standards). This means slower capital releases, and allowing for discounting impacts this reduces the VNB capitalisation multiplication factor.

The VNB capitalisation factor is expected to grow gradually over the next five years due to the increase in sales, and then reach a stable level after 5 years at the completion of the 5 year road-map.

I suggest we perform a more detailed calculation given the purpose of publishing the revised VNB figure in the shareholders' report. Happy to discuss.

Thanks,
EV/AV Actuary

Marking Guide:

- **1 mark for each valid explanation on why you would disagree with the CFO's suggestion, up to 4 marks**
- **1 mark for explaining how the VNB capitalisation factor is expected to change as new business growth increases, up to 1 mark**
- **1 mark for appropriate memo language to the CFO, up to 1 mark**

Up to 6 marks

END OF QUESTION 1: MARKING GUIDE

QUESTION 2: MARKING GUIDE (29 Marks)

a)

Dear CFO,

You have recently made some enquiries as to how the assumption changes have impacted ABC's capital position and what actions the company could take to improve its current and future capital position.

This memo sets out my response.

(i) Impact of Assumption Changes on the PCA

For insurance risks, the regulatory capital we hold is predominantly made up of:

- Stresses on claims that have been incurred at the date of calculation
- Stresses on claims that will be incurred over 12 months following the calculation date

The table below describes how the assumption changes have impacted these components.

Assumption	Impact on Incurred Claim Reserves
Incidence	The loss ratio that the IBNR is based on will increase as the cost of claims has increased as incidence is higher i.e. we will have more claims reported than we had assumed and these claims will last for a longer period of time as the termination rates have also deteriorated. This will therefore increase the capital requirement. The PCA will allow for stresses on these additional claims.
Termination	The change will increase the claim reserves we currently hold as we now expect that these claims will last for longer than previously assumed. The PCA will allow for stresses on these additional claims.
Claim Delays	As claim delays are getting longer, it means that there is more claims yet to be reported compared to what we previously assumed. This will increase the level of reserves and hence the capital requirement. The PCA will allow for stresses on these additional claims.

The impact of the assumption changes will reduce the level of profits available to absorb the stresses on the claims incurred over the next 12 months. The stressed termination value will also increase as both the DLR and IBNR components will increase. Hence, there will be some increase in the PCA as a result of these changes in the termination value. The increase will be even greater if the stressed termination value no longer exceeds the stressed policy liability.

Marking Guide:

- **1 Mark for each point (incidence, termination and claim delays), up to 3 marks**
- **1 Mark for explaining that the capital requirement will be increased due to less profits available to absorb stresses**

Up to 4 marks

(ii) Actions to Improve Capital Position

The following actions could help the current and future capital position of ABC:

- Current Capital Position
  - Increase the price on the existing product will help the current capital position as the higher profit margins over the next 12 months can offset the higher stresses on the claims cost
  - If it is not possible to increase the price on the IP benefit given its commercial objective and market position, it could consider increasing premiums on the lump sum business
  - It is also noted that the capital calculation is based on the current book of business as opposed to business ABC will write in the future. In accordance with the Life Act, product design changes would not be permitted if they resulted in terms less generous than the current ones

- Future Capital Position
  - Change the benefit design: By changing the benefit design to reflect terms that would reduce the propensity to claim would reduce the claims cost and hence the capital requirement (assuming it was priced to meet ABC's hurdle rate of return)
  - Close to new business: A closure to new business will mean that the upfront capital (i.e. initial commission) expense will no longer be required which will allow the capital to be used elsewhere
  - Re-price: ABC may choose to re-price in the future (as opposed to now) for commercial reasons and the capital position would improve based on the same arguments above
  - It should be mentioned that reinsurance could typically be uses to improve the capital position. However, given the book is 60% reinsured, it is unlikely to be able to increase this level of reinsurance. Although it could "sell" a proportion of the business to a reinsurer.
  - Raise new capital from shareholders/parent – this will improve the capital position

Regards,
Capital Management Actuary

Marking Guide

- **1 Mark for how the current position could be improved**
- **1 Mark for each action to improve the future capital position, up to 3 marks**
- **Up to 4 marks**

b)

i. ABC may have higher stress margins in its IP business as a result of:

- Being a relatively young company compared to other industry competitors with less credibility on its own internal experience investigations and greater reliance on external data (which increases the uncertainty of the claims cost)
- The quality of its experience investigations and internal controls may be at the lower end of the industry range. This would mean that it would take longer for ABC to

detect an adverse trend compared with a company with a more advanced controls framework

- ABC's product is unique in the market and may offer terms that are more generous compared to other industry participants. This may mean that ABC can rely less on industry benchmarks compared with other participants and that it may be subject to risks that other participants are not subject to
- Although ABC's sales are 40% of the market, they will not have 40% in terms of overall premium volumes. Hence, their margins (particularly the random margins) may be higher as they are one of the smaller market participants in terms of overall size

Marking Guide
- **1 Mark for each valid point for higher IP stress margins**

Up to 3 marks

ii. As prescribed by LPS 115, the event stress must at a minimum include a pandemic scenario. However, if there is a more adverse scenario that ABC is exposed to, ABC must base their event stress on this scenario. This could be done as follows

- Analyze their exposure to IP business by various risk factors including location, occupation, size (sum insured, number of lives) and employer
- For the larger groups, determine what risks each group and whether they are exposed to any single large risks (such as covering a large employer)
- For each single event, estimate the cost of such an event in terms of incidence and termination. This may involve using industry or reinsurer data. If the estimate cost of this event is greater than the regulatory minimum, the higher cost should be used in the capital calculations
- It should be said that for companies writing business through advisers, the exposure is generally well diversified such that the regulatory minimum applies.

Marking Guide
- **1 Mark for each valid point**

Up to 2 marks

iii. Re-Pricing

- For a company to be able to re-price in 12 months, it relies on its ability to become aware of, understand and act on underlying trends in the experience. 12 months is a short time frame compared with the industry average for this type of business, particularly to decide whether it is one-off poor experience or a resetting of the claim experience.
- A more reasonable allowance for ABC would be 2 to 3 years, more likely at the higher end given it is still developing processes and procedures to measure its claims experience. This would be at the higher end of the industry range.
- There are limits on what ABC can assume in terms of re-pricing. The regulatory maximum is the amount of the stresses that the re-pricing is assumed to offset – that is, it cannot re-price to a higher profit margin than it is currently getting (unless this re-price has been approved by the Board and there is an intent to communicate this increase to policyholders). In addition, there are other constraints:

- Whether the approach is consistent with ABC's past practice
- Whether the approach will mean that ABC will not meet its commercial objective of ensuring that its price is in the lowest quartile

Marking Guide
- **1 Mark for each valid point on 12 months being unreasonable re-pricing horizon, up to 2 marks**
- **1 Mark for a reasonable timeframe for re-pricing**
- **1 Mark for each valid limit on the amount of re-pricing that can be allowed for, up to 2 marks**

Up to 5 marks

c)

(i) Level of Target Surplus

There are 2 key concerns that I have on the level of Target Surplus:

- The definition of Target Surplus does not link to the risk appetite of ABC. It is common for target surplus to be defined in terms of ensuring a level of sufficiency of not breaching the PCA over a defined time period (typically one year)
- The level of Target Surplus is low relative to other companies in the industry. Assuming a normal distribution, holding Target Surplus of 50% of the PCA is equivalent to being able to withstand a 1/10 year event

It is more typical to have Target Surplus defined in a manner such that ABC will not meet its PCA at the end of 12 months once every x years where x is typically 40 or 50.

Marking Guide
- **1 Mark for each concern, up to 2 Marks**
- **1 Mark for alternative**

Up to 3 Marks

(ii) Prudential Regulator Action

The prudential regulator could take the following actions:

- Request that ABC reduce the volume of IP business that it writes or that ABC cease writing IP business;
- Establish a Board approved recovery plan that sets out how ABC's capital position will be restored
- Request that ABC's parent provide capital support. This may have been a condition of ABC's licence when it was established 5 years' ago
- Impose a supervisory adjustment to the prudential capital requirement so that the company holds a level of capital that the regulator thinks is appropriate These actions may have the following impacts on the current and future capital position of ABC.

Action	Potential Impact on Current Capital Position	Potential Impact on Future Capital Position
Limit/Cease writing new IP business	None – the capital calculation is done at a point in time and does not consider new business. However, there may be expense impacts,	Improve – if new business volumes are lower (or stop), the capital position of ABC will improve as capital will not be needed to fund the initial commission or establish reserves to cover regulatory capital and target surplus
Recovery Plan	None – a recovery plan will take time to implement so the impacts may not be visible immediately (unless there was an immediate Board approved price increase)	It would be expected that the recovery plan would improve the capital position over time. Such a plan should have appropriate controls and metrics such that progress against the plan could be measured and that mitigating action be taken if progress was not as expected. The regulator may also expect that such a plan undergoes regular independent reviews externally
Parent Support	Assuming this was in the form of a capital injection, it would improve the capital position if it was received immediately	Similarly, assuming that parental support was in the form of a capital injection, the capital position would be expected to improve all else being equal. This step may be part of the recovery plan and hence have interactions with the other steps above
Supervisory Adjustment	This would reduce the capital ratio at the time of the adjustment being imposed, due to the higher capital requirement.	The capital position is expected to improve over time, as the company is required to hold more backing capital to meet the higher capital requirements.

Marking Guide

- **1 Mark for each valid action, up to 3 marks**
- **1 Mark for explaining how this action impacts the current and future capital position, up to 3 marks**

Up to 6 Marks

<u>(iii) Lead Indicators</u>

The following lead indicator could be used as an early indication of adverse IP claims experience:

- Determining the number of claims managers per in-force claim. The lower the average case-load per claims manager, the better claims termination should be as managers have more time to actively manage the claim (and spend less time on administration). Hence, when average case-loads increase, it may be an indication of higher claim incidence and/or worse termination since there are less people to manage the claims;

Marking Guide
- **0.5 Mark for listing a valid indicator**
- **1.5 Marks for a valid explanation of how it might provide early signals**

Up to 2 Marks

END OF QUESTION 2: MARKING GUIDE

QUESTION 3: MARKING GUIDE (26 Marks)

a)

i. Key differences are:

- Confidence level: The Random Stress is calculated at a confidence level of 99.5%, while the Risk Margin is calculated at a confidence level of 75%.
- Calculation level: The Random Stress is split between mortality and morbidity and is calculated at an overall Statutory Fund level, whilst the Risk Margin is only applied within the grouping which the policy liability is calculated.

Marking Guide:

- **1 mark for each valid point. Other points may include diversification**

Up to 2 marks

ii. Using the simple example, the profit reporting pattern under the different bases are as follows:

$ million	At New Business Commencement	At End of Year 1	At End of Year 2	At End of Year 3	At End of Year 4	At End of Year 5
PV Premium	100.0	90.0	81.0	73.0	66.0	59.0
PV Claims	60.0	55.0	50.0	46.0	42.0	38.0
PV Expense	32.0	29.0	26.0	23.0	21.0	19.0
Best Estimate Liability	-8.0	-6.0	-5.0	-4.0	-3.0	-2.0
Under MoS						
Profit Margin	8.0	7.3	6.7	6.1	5.6	5.1
Policy Liability	0.0	1.3	1.7	2.1	2.6	3.1
Reported Profit	0.0	0.7	0.7	0.5	0.5	0.5
Under Difference 1 (Risk Margin Percentage 10%)						
Risk Margin	6.0	5.5	5.0	4.6	4.2	3.8
Policy Liability	-2.0	-0.5	0.0	0.6	1.2	1.8
Reported Profit	2.0	0.5	0.5	0.4	0.4	0.4
Under Difference 1 (Risk Margin Percentage 15%)						
Risk Margin	9.0	8.3	7.5	6.9	6.3	5.7
Policy Liability	1.0	2.3	2.5	2.9	3.3	3.7
Reported Profit	-1.0	0.8	0.8	0.6	0.6	0.6

Marking Guide:

- **Up to 2 marks for determining the projected profit under MoS basis**
- **Up to 2 marks for determining the projected profit under new basis (with Risk Margin Percentage 10% and 15%)**

Up to 4 marks

This means that:

- Under the new basis, **there may be a profit or loss recognised at new business commencement i.e. profit at new business commencement offset by the amount withheld as Risk Margin (the higher the Risk Margin, the lower the profit / the greater the loss at new business commencement)**. This is different from the MoS basis where zero profit is recognised at new business commencement (if not in loss recognition), but is rather recognised as the services (i.e. insurance coverage) are provided over life of the business.
- The **overall profitability of the product does not change**. Under the new basis, where profit is recognised at new business commencement, lower profit would be expected to be recognised over the life of the business (compared to MoS basis); on the other hand, where a loss is recognised at new business commencement, higher profit would be expected to be recognised over the life of the business (compared to MoS basis).

Marking Guide:

- **1 mark for comment on profit/loss recognised at new business commencement**
- **1 mark for comment on profit/loss recognised over life of the business after commencement**
- **1 mark for comment that total profit for the product does not change**

Up to 3 marks

The reported profit is also expected to be more volatile under the new basis:

- Where non-economic assumption changes are made, under the MoS basis changes to expected profit are not recognised immediately (if the business does not go into loss recognition) but rather spread over the life of the business. Under the new basis the **changes to non-economic assumption changes are capitalised and recognised immediately**.
- Where adverse assumption changes are made such that the business goes into loss recognition, under the MoS basis all expected future losses are recognised immediately, and zero profit/loss is expected to be recognised over the life of the business; under the overseas basis, **a larger loss (compared to the loss recognised under MoS basis) is recognised immediately (due to the Risk Margin), and if experience emerges as expected this additional loss would be “recouped” via profit recognised over the life of the business, as the Risk Margin gets released.**

Marking Guide:

- **1 mark for identifying the increased volatility of the new basis with assumption changes capitalized and recognised immediately. (0.5 marks for MoS, 0.5 marks for new basis).**
- **1 mark for identifying a larger loss in the new basis compared to the MoS basis when the business goes into loss recognition. (0.5 marks for MoS, 0.5 marks for new basis).**
- **1 mark for other valid points. (0.5 marks for MoS, 0.5 marks for new basis).**

Up to 2 marks

b)

i. A potential rationale is that risks that are sold in different years may be subject to different pricing, product design, underwriting practice, targeted subgroup, experience, etc. and would require different assumptions to be used in the valuations.

Marking Guide:
- **1 mark for valid point**

Up to 1 mark

ii. Three operational challenges are:

- Data availability: There may not be sufficient/accurate historical data available to determine the current profit margins of the cohorts, as this would require determining the historical profit margins at the commencement date and any profit margin changes from historical assumption changes which may not be available.
- Assumptions: Given that the risks across cohorts cannot be pooled together, separate valuation assumptions need to be considered for all the different cohorts of business since commencement of AUSLIFE's business. The experience for each cohort also needs to be monitored separately. Credibility problems can occur in setting appropriate assumptions for small cohorts.
- Modelling systems and reporting processes: These need to be modified to split calculations by cohorts, which may be operationally challenging if AUSLIFE has established systems and processes in place already (which may be the case given that AUSLIFE has been established for 20 years).

Marking Guide:
- **1 mark for each valid point**

Up to 3 marks

c)

i. It is expected that the BEL will be lower compared to the MoS basis because:

- Increasing the discount rate reduces the present values. For a level premium business, it is expected that the average duration of claims to be longer than that for premiums and expenses. This means that the PV claims is expected to reduce more than PV premiums and PV expenses when moving from MoS basis to the overseas basis.
- As Disability Income claims are generally paid over a period of time, the duration impact is much greater, resulting in the higher discounting under the overseas basis further reducing the PV claims.

Marking Guide:
- **1 mark for stating BEL will be lower**
- **1 mark for stating that PVs will reduce from an increase in discount rates**
- **1 mark for stating that the average duration of claims to be longer than premiums and expenses for level premium products**
- **1 mark for noting DI claims have a greater impact from discounting due to payments over a period of time**

Up to 4 marks

ii. Key considerations are:

- Under MoS basis, AUSLIFE would have attempted to match both the expected timing and amount of cashflows between the assets and liabilities, in order to reduce the volatility of reported profit resulting from investment experience.
- With the change to the overseas basis, a higher discount rate is used for the policy liabilities. This means that changes to the risk-free rate would impact the value of assets more than the value of the policy liabilities.
- Therefore AUSLIFE could invest in assets of shorter duration (e.g. invest in fixed income assets of shorter durations), so that changes in risk-free rate have similar impact on the values of both the policy liabilities and the assets backing policy liabilities, giving nil investment experience profit.

Marking Guide:
- **1 mark for each valid point**

Up to 3 marks

d) Given the focus of 2BRICH on profit performance, AUSLIFE's business strategy needs to minimise the volatility in profit. Profit under the overseas basis is more sensitive to assumption changes.

Business operations of claims management and underwriting teams:

- For the claims management departments, there may be changes to the Key Performance Index (KPI) so that it is measured by cohort of business (e.g. number of Disability Income claim closures by cohort of business).
- For the underwriting department, there may be stricter underwriting to ensure good proportion of healthy lives per cohort of business.
- Any changes in claims management or underwriting practice needs to be carefully monitored.

Marking Guide:
- **1 mark for each valid point on business operations of claims management team, up to 1 mark**
- **1 mark for each valid point on business operations of underwriting team, up to 1 mark**

Up to 2 marks

Additional considerations AUSLIFE needs to make in making dividend payments to 2BRICH:

- It is noted that under paragraphs 49 and 50 of APRA LPS 110, AUSLIFE must obtain APRA's written approval prior to making any planned capital base reductions. This includes paying dividends of greater amounts than the profits reported (under MoS basis) over the financial year.
- This means that, even if AUSLIFE reports high profits under the overseas basis and intends to distribute majority of the profits as dividends to 2BRICH, the dividend payment may result in a capital base reduction (under APRA standards) and so AUSLIFE would need

to satisfy APRA that its capital base will remain adequate for future needs after the dividend payment.

Marking Guide:

- **1 mark for each valid point on making dividend payments to 2BRICH**

Up to 2 marks

END OF QUESTION 3: MARKING GUIDE

END OF MARKING GUIDE