

COURSE COVERAGE

| Question | Unit(s) | Syllabus Performance Outcome(s) | Chapter Reference in Textbook | Total Marks |
|--------------|---------|---------------------------------|---|-------------|
| 1 a) | 1 | 1.1 | 21.3, 21.7 | 2 |
| 1 b) | | | | 6 |
| 1 c) | | | | 3 |
| 1 d) | 3 | 3.5 | 25.2, 25.3 | 7 |
| 1 e) | 1, 3 | 1.1, 3.6 | 21.7, 25.9 | 11 |
| 2 a) | 1, 4 | 1.1, 1.2, 4.8 | 21.3, 21.5, 22.2, 22.4, 27.3, 27.4, 27.7, 27.10 | 14 |
| 2 b) | 4 | 4.8 | 27.5 | 11 |
| 2 c) | 4 | 4.8, 4.9 | 27.8, 27.9 | 6 |
| 3 a) | 2 | 2.4 | 24.4 | 7 |
| 3 b) | 2, 3 | 2.4, 3.7 | 24.3, 24.6, 26.2, 26.3, 26.6, 26.8 | 9 |
| 3 c) | 2 | 2.4 | 24.4, 24.5 | 10 |
| 3 d) | 2, 3 | 2.3, 3.7 | 23.6, 26.2, 26.3 | 4 |
| Total | | | | 90 |

COURSE 2B LIFE INSURANCE
SEMESTER 2 2017 MARKING GUIDE
QUESTION 1: MARKING GUIDE

a) The formula holds under the following conditions:

1. The book of business is not loss making meaning some level of DAC is supportable and there is no need to include a reserve over and above the surrender value in respect of onerous contracts.
2. There is no upfront fee revenue which needs to be recognised and earned over the lifetime of the contract.

Marking Guide

- 1 mark for point around business is not loss making
- 1 mark for one additional point, provided some type of brief explanation is given

Up to 2 marks

b)

| Calculations | | | | | | Present Value | 1,060,280,612 | 848,224,490 | 64,592,913 | 147,463,210 |
|---|---------------|-------------------|----------------|-------------------------|-------------|--------------------|---------------|-----------------|------------------------|-----------------------|
| Timing (B/EOY = Beginning/End of Year): | | | | EOY | BOY | EOY | BOY | BOY | BOY | BOY |
| Projection Year | Calendar Year | Age last birthday | Mortality Rate | No. of Policies inforce | Premiums \$ | Account balance \$ | Fees \$ | AUM Expenses \$ | Per Policy Expenses \$ | Fees Less Expenses \$ |
| 0 | | | | 200,000 | | 10,000,000,000 | | | | |
| 1 | 2018 | 40 | 0.001015 | 179,817 | ##### | 10,306,565,707 | 82,500,000 | 66,000,000 | 8,000,000 | 8,500,000 |
| 2 | 2019 | 41 | 0.001078 | 161,661 | 899,086,500 | 10,498,591,580 | 84,042,392 | 67,233,913 | 7,408,473 | 9,400,006 |
| 3 | 2020 | 42 | 0.001155 | 145,327 | 808,305,556 | 10,592,631,524 | 84,801,729 | 67,841,383 | 6,860,251 | 10,100,095 |
| 4 | 2021 | 43 | 0.001232 | 130,633 | 726,634,767 | 10,603,401,840 | 84,894,497 | 67,915,598 | 6,352,107 | 10,626,792 |
| 5 | 2022 | 44 | 0.001330 | 117,413 | 653,165,598 | 10,543,633,599 | 84,424,256 | 67,539,405 | 5,881,149 | 11,003,702 |
| 6 | 2023 | 45 | 0.001428 | 105,521 | 587,067,199 | 10,424,715,630 | 83,480,256 | 66,784,205 | 5,444,574 | 11,251,477 |
| 7 | 2024 | 46 | 0.001547 | 94,822 | 527,605,980 | 10,256,428,064 | 82,142,412 | 65,713,930 | 5,039,913 | 11,388,569 |
| 8 | 2025 | 47 | 0.001666 | 85,198 | 474,110,796 | 10,047,539,394 | 80,479,041 | 64,383,233 | 4,664,772 | 11,431,036 |
| 9 | 2026 | 48 | 0.001806 | 76,540 | 425,988,835 | 9,805,512,250 | 78,551,462 | 62,841,169 | 4,317,039 | 11,393,253 |
| 10 | 2027 | 49 | 0.001960 | 68,751 | 382,697,549 | 9,536,920,250 | 76,411,573 | 61,129,259 | 3,994,668 | 11,287,647 |
| 11 | 2028 | 50 | 0.002121 | 61,744 | 343,752,716 | 9,247,550,938 | 74,105,047 | 59,284,038 | 3,695,799 | 11,125,210 |
| 12 | 2029 | 51 | 0.002303 | 55,442 | 308,721,255 | 8,942,305,476 | 71,672,041 | 57,337,633 | 3,418,739 | 10,915,669 |
| 13 | 2030 | 52 | 0.002499 | 49,773 | 277,209,243 | 8,625,489,000 | 69,146,360 | 55,317,088 | 3,161,873 | 10,667,399 |
| 14 | 2031 | 53 | 0.002702 | 44,675 | 248,864,847 | 8,300,877,664 | 66,557,654 | 53,246,123 | 2,923,731 | 10,387,799 |
| 15 | 2032 | 54 | 0.002933 | 40,089 | 223,373,173 | 7,971,552,074 | 63,931,881 | 51,145,505 | 2,702,976 | 10,083,401 |
| 16 | 2033 | 55 | 0.003178 | 35,966 | 200,446,217 | 7,640,261,187 | 61,289,987 | 49,031,990 | 2,498,309 | 9,759,688 |
| 17 | 2034 | 56 | 0.003451 | 32,257 | 179,828,279 | 7,309,248,096 | 58,650,671 | 46,920,537 | 2,308,573 | 9,421,561 |
| 18 | 2035 | 57 | 0.003766 | 28,922 | 161,286,923 | 6,980,320,913 | 56,029,013 | 44,823,210 | 2,132,662 | 9,073,141 |
| 19 | 2036 | 58 | 0.004137 | 25,922 | 144,611,565 | 6,654,917,468 | 53,436,994 | 42,749,595 | 1,969,532 | 8,717,867 |
| 20 | 2037 | 59 | 0.004564 | 23,224 | 129,611,976 | 6,334,252,894 | 50,883,971 | 40,707,177 | 1,818,203 | 8,358,591 |
| 21 | 2038 | 60 | 0.005047 | 20,796 | 116,118,384 | 6,019,350,088 | 48,377,785 | 38,702,228 | 1,677,782 | 7,997,775 |
| 22 | 2039 | 61 | 0.005593 | 18,612 | 103,979,101 | 5,711,025,567 | 45,924,969 | 36,739,975 | 1,547,454 | 7,637,540 |
| 23 | 2040 | 62 | 0.006195 | 16,647 | 93,057,791 | 5,409,998,473 | 43,530,625 | 34,824,500 | 1,426,467 | 7,279,658 |
| 24 | 2041 | 63 | 0.006867 | 14,879 | 83,233,169 | 5,116,790,666 | 41,199,237 | 32,959,390 | 1,314,143 | 6,925,705 |
| 25 | 2042 | 64 | 0.007595 | 13,289 | 74,395,446 | 4,831,899,213 | 38,933,896 | 31,147,117 | 1,209,845 | 6,576,934 |

Refer to the calculation of inflows net of outflows on tab "CF_b)Soln".

PV (Fees – Expenses) is \$147,463,210

Marking Guide

- 2 marks for correct account balance (deduct 0.5 marks per distinct error)
 - 1.5 marks for correct Fees & AUM Expenses (deduct 0.5 marks per distinct error)
 - 1 mark for correct per policy expense calculation (deduct 0.5 marks per distinct error)
 - 0.5 marks for correct fees less expenses calculation
 - 1 mark for correctly calculating NPV (0.5 marks if timing is incorrect)
- Up to 6 marks

c) i)

| Calculations | | | | | | Present Value | 1,060,280,612 | 989,595,238 | 80,741,141 | -10,055,767 |
|---|---------------|-------------------|----------------|-------------------------|-------------|--------------------|---------------|-----------------|------------------------|-----------------------|
| Timing (B/EOY = Beginning/End of Year): | | | | EOY | | EOY | BOY | BOY | BOY | BOY |
| Projection Year | Calendar Year | Age last birthday | Mortality Rate | No. of Policies Inforce | Premiums \$ | Account balance \$ | Fees \$ | AUM Expenses \$ | Per Policy Expenses \$ | Fees Less Expenses \$ |
| 0 | | | | 200,000 | | 10,000,000,000 | | | | |
| 1 | 2018 | 40 | 0.001015 | 179,817 | ##### | 10,306,565,707 | 82,500,000 | 77,000,000 | 10,000,000 | -4,500,000 |
| 2 | 2019 | 41 | 0.001078 | 161,661 | 899,086,500 | 10,498,591,580 | 84,042,392 | 78,439,565 | 9,260,591 | -3,657,765 |
| 3 | 2020 | 42 | 0.001155 | 145,327 | 808,305,556 | 10,592,631,524 | 84,801,729 | 79,148,280 | 8,575,314 | -2,921,865 |
| 4 | 2021 | 43 | 0.001232 | 130,633 | 726,634,767 | 10,603,401,840 | 84,894,497 | 79,234,864 | 7,940,134 | -2,280,501 |
| 5 | 2022 | 44 | 0.001330 | 117,413 | 653,165,598 | 10,543,633,599 | 84,424,256 | 78,795,972 | 7,351,436 | -1,723,153 |
| 6 | 2023 | 45 | 0.001428 | 105,521 | 587,067,199 | 10,424,715,630 | 83,480,256 | 77,914,906 | 6,805,718 | -1,240,367 |
| 7 | 2024 | 46 | 0.001547 | 94,822 | 527,605,980 | 10,256,428,064 | 82,142,412 | 76,666,251 | 6,299,891 | -823,731 |
| 8 | 2025 | 47 | 0.001666 | 85,198 | 474,110,796 | 10,047,539,394 | 80,479,041 | 75,113,772 | 5,830,965 | -465,695 |
| 9 | 2026 | 48 | 0.001806 | 76,540 | 425,988,835 | 9,805,512,250 | 78,551,462 | 73,314,698 | 5,396,299 | -159,535 |
| 10 | 2027 | 49 | 0.001960 | 68,751 | 382,697,549 | 9,536,920,250 | 76,411,573 | 71,317,469 | 4,993,335 | 100,770 |
| 11 | 2028 | 50 | 0.002121 | 61,744 | 343,752,716 | 9,247,550,938 | 74,105,047 | 69,164,711 | 4,619,749 | 320,587 |
| 12 | 2029 | 51 | 0.002303 | 55,442 | 308,721,255 | 8,942,305,476 | 71,672,041 | 66,893,905 | 4,273,424 | 504,712 |
| 13 | 2030 | 52 | 0.002499 | 49,773 | 277,209,243 | 8,625,489,000 | 69,146,360 | 64,536,603 | 3,952,341 | 657,416 |
| 14 | 2031 | 53 | 0.002702 | 44,675 | 248,864,847 | 8,300,877,664 | 66,557,654 | 62,120,477 | 3,654,664 | 782,513 |
| 15 | 2032 | 54 | 0.002933 | 40,089 | 223,373,173 | 7,971,552,074 | 63,931,881 | 59,669,756 | 3,378,720 | 883,406 |
| 16 | 2033 | 55 | 0.003178 | 35,966 | 200,446,217 | 7,640,261,187 | 61,289,987 | 57,203,988 | 3,122,887 | 963,112 |
| 17 | 2034 | 56 | 0.003451 | 32,257 | 179,828,279 | 7,309,248,096 | 58,650,671 | 54,740,626 | 2,885,716 | 1,024,329 |
| 18 | 2035 | 57 | 0.003766 | 28,922 | 161,286,923 | 6,980,320,913 | 56,029,013 | 52,293,745 | 2,665,827 | 1,069,440 |
| 19 | 2036 | 58 | 0.004137 | 25,922 | 144,611,565 | 6,654,917,468 | 53,436,994 | 49,874,527 | 2,461,915 | 1,100,551 |
| 20 | 2037 | 59 | 0.004564 | 23,224 | 129,611,976 | 6,334,252,894 | 50,883,971 | 47,491,706 | 2,272,754 | 1,119,511 |
| 21 | 2038 | 60 | 0.005047 | 20,796 | 116,118,384 | 6,019,350,088 | 48,377,785 | 45,152,599 | 2,097,227 | 1,127,958 |
| 22 | 2039 | 61 | 0.005593 | 18,612 | 103,979,101 | 5,711,025,567 | 45,924,969 | 42,863,304 | 1,934,318 | 1,127,347 |
| 23 | 2040 | 62 | 0.006195 | 16,647 | 93,057,791 | 5,409,998,473 | 43,530,625 | 40,628,584 | 1,783,084 | 1,118,958 |
| 24 | 2041 | 63 | 0.006867 | 14,879 | 83,233,169 | 5,116,790,666 | 41,199,237 | 38,452,621 | 1,642,679 | 1,103,937 |
| 25 | 2042 | 64 | 0.007595 | 13,289 | 74,395,446 | 4,831,899,213 | 38,933,896 | 36,338,303 | 1,512,306 | 1,083,287 |

The revised expected present value of fees less expenses is (\$10,055,767) which is calculated by changing the two expense assumptions as shown in tab "CF_c)i)Soln".

Marking Guide

- 0.5 mark per parameter changed correctly (without penalising students again if they had an incorrect calculation in part b))

Up to 1 mark

c) ii)

Given the future expense outflows exceed fee inflows, the contracts are in loss recognition. In this case there is no DAC and the investment contract liability is equal to the account balance plus the PV of the future losses.

i.e. Investment Contract Liability = \$10,000,000,000 + \$10,055,767 = \$10,010,055,767

Marking Guide

If candidate's NPV in c)i) is negative:

- 1 mark for identifying onerous contracts/loss recognition and implication
- 1 mark for correct answer (without penalising students again if incorrect calculation in part c)ii))

Up to 2 marks

If candidate's NPV in c)i) is positive:

- 1.5 marks for answer consistent with part c)i) (deduct 0.5 marks per distinct error)

Up to 1.5 marks

d)

| | | | |
|---|--|---|--------------------|
| 2017 Expected Profit | | | |
| Expected fees | | | 80,044,912 |
| (Expected AUM expenses) | | | -64,035,930 |
| (Expected per policy expenses) | | | -8,629,981 |
| (Expected DAC amortisation/run-off) | | - | 3,201,796.49 |
| Expected Profit Before Tax | | | 4,177,205 |
| 2017 Analysis of Before Tax Profit | | | |
| Expected profit before tax | | | 4,177,205 |
| Experience variance 1: Unit Pricing remediation project costs & remediation provision | | | -7,000,000 |
| Experience variance 2: DAC write-off at 31 December 2017 | | | -26,798,204 |
| Experience variance 3: Additional loss - onerous contracts | | | -10,055,767 |
| Actual profit before tax | | | -39,676,765 |
| | | | |
| Check - actual profit 2017 | | | -39,676,765 |
| Difference | | | -0 |

Refer to the calculation on tab "AOP_Soln".

Marking Guide

- 2 marks for correct expected fixed and variable expenses (0.5 mark deduction for each distinct error, including if no allowance/comment for inflation over the past year)
- 1 mark for correct expected DAC writeoff (0.5 marks if 4% of Beginning of year DAC)
- 1 mark for correct experience variance for expenses (unit Pricing remediation project costs & remediation provision)
- 2 marks for correct AOP item for DAC writeoff (1 mark if DAC writeoff but incorrect)
- 1 mark for correct AOP item for additional impact from onerous contracts
- 1 mark for a correct bottom up calculation of profit as a check on the AOP (even if check itself not balancing)

Up to 7 marks

e) i)

Dear CFO,

This memo is in response to the initiative to change the fee structure for new business.

The introduction of an upfront fee will generate some additional short term fee revenue but is not expected to enhance profitability over either the short term or the long term, but rather the opposite.

The basic reason is that the increase in upfront fees is insufficient to offset the reduction in PV of annual fees because the annual fees are applied to account balance which increases substantially over time.

By changing various parameters in the cash flow projection calculations, it is possible to see that writing another tranche of new business on this basis is expected to result in a further loss of around \$15m over the life of the new policies.

In addition, it is noted that under the accounting standards part of the upfront fee would need to be deferred (i.e. not recognised immediately).

As such it is not recommended to amend the product fee schedule in the manner proposed

Marking Guide

- 2 marks for high level estimate or spreadsheet calc showing that company is economically in a worse position by changing the fee structure in this way (deduct 0.5 mark per distinct error/omission)
- 1 mark for high level explanation why this is the case
- 1 mark for discussion around part of upfront fee revenue being deferred
- 1 mark for clearly stating that there will be an additional up front loss to book in spite of the higher fee revenue
- 0.5 marks for appropriate language throughout
- 0.5 marks for a clear and sensible recommendation/conclusion

Up to 5 marks

ii)

Some possible alternative strategies may include:

- 1) Consider initiatives to reduce expenses: This might include consideration of a business case to rationalise the system landscape of Invest4Life, being careful not to underestimate the initial project risks. A reduction in the expense assumption would return Invest4Life to a projection of future profits and the PV of additional future profits is expected to be capitalised as profit in the year of an assumption change up to a maximum of approx. \$36.7m (\$26.8m of DAC written off at 31 Dec 2017 plus \$9.9m of loss recognition).
- 2) Seek to acquire another book of business: In this case the expected future profits of the entire entity (existing book plus newly acquired book) would be expected to increase given that acquisitions are generally done on a higher discount rate than the rate consistent with the assets backing the liabilities. There may also be expense synergies from economies of scale. The PV of additional future profits is expected to be capitalised as profit in the year of a transaction (and amalgamation of statutory funds) up to a maximum of approx. \$36.7m.

Regards,
Valuation Actuary

Marking Guide

- 1.5 marks for each reasonable strategy identified which achieves the aim (0.5 marks if strategy is not clear or is a minor point)
- Up to 1.5 marks for a good explanation as to why each strategy may be beneficial to achieving the desired outcome (0.5 or 1 mark if why it is beneficial is not clearly or well explained).

Up to 6 marks

Total 29 marks

END OF MARKING GUIDE QUESTION 1

QUESTION 2: MARKING GUIDE

a)

DRAFT for Appointed Actuary review

From: Appointed Actuary, ABC Life

To: CFO, ABC Bank

Subject: EV and VNB Comparison to MoS Profit Reporting

Dear CFO,

I am writing to you in response to your query around EV/VNB Reporting, as they relate to ABC's product lines.

i) Differences between EV/VNB Reporting and MoS Reporting***Key Points:***

- MoS Reporting produces an accounting profit (which is the basis of the profit that can be distributed to the shareholder in the form of dividends) whereas EV/VNB Reporting produces a distributable profit (which represents the cash flows attributable to the shareholder after taking into account not only accounting profit but also capital injections/releases from the regulatory capital requirements and target surplus).
- EV/VNB Reporting uses a risk-discount rate to value the future distributable profits, which is higher than the risk-free rate used under MoS Reporting. The margin over the risk-free rate reflects the uncertainty of the timing and amounts of these future profits and reflects the compensation that shareholders require to take on these risks.
- MoS Reporting ignores capital requirements, whereas traditional EV/VNB Reporting allows for specific capital reserves.
- The capital required to support the business gets released over the remaining life of the business as the business runs off. As the investment earning rate on the capital required to support the business is less than the return shareholders require, there is a cost of holding this capital. This is not reflected in MoS Reporting.
- MoS Reporting does not capitalise the impact of assumption changes – it respreads these through profit margins (if the RPGs are not in loss recognition) whereas EV/VNB Reporting immediately capitalises the impact.

Other Points:

- EV/VNB Reporting includes the value of "free" assets of the company (adjusted net worth), i.e. the assets of the company which are held in excess of capital requirements. MoS Reporting does not identify the excess assets nor places a value on them.
- Under MoS Reporting, new business written does not have an immediate impact on profitability as profit is only realised as it is earned. It is also not clearly identifiable. In EV/VNB reporting, the value of the new business is capitalised once written. The financial implications of writing new business are more transparent under EV reporting.
- EV/VNB reporting takes into account franking credits, as this considers profit from a

shareholder perspective overall. MoS Reporting considers profits from a company perspective and so does not allow for franking credits.

Marking Guide

- 1 mark for each valid *Key Point* (0.5 marks if point is not clear), for up to 2 points
- 1 mark for each valid *Other Point* or additional *Key Point* (0.5 marks if point is not clear), for up to 2 points

Note: raising accumulation method for MoS vs projection for EV is to be given credit under the marking guide for part a)iii)

Up to 4 marks

- 0.5 marks for appropriate and clear use of language (across parts i), ii) and iii)
- 0.5 marks for memo format

ii) Areas of judgment required in the determination of EV

- Capital Allocation. It will be necessary to allocate regulatory capital between Individual Insurance and Group Insurance as these portfolios are in the same Statutory Fund. Regulatory Capital is calculated at a Statutory Fund level as opposed to a portfolio level.
- Projection of capital over time. The determination of regulatory capital is a complex process. In the determination of the EV, it is common practice to use approximate methods (such as using drivers) to determine regulatory capital over the course of the remaining lifetime of the business.
- Approach to Group Business. EV requires the projection of the future distributable profits of each scheme over its remaining life. However, due to data limitations, it is not uncommon to make approximations such as grouping schemes together using a combined set of assumptions about future experience. Also, the projection period of the group business needs to be determined (e.g. until the next tender/renewal date, allowing for one additional renewal, assuming will always have a book of viable group business, probability of renewal, etc.).
- Determination of discount rate. The discount rate used to discount distributable profits is a risk discount rate. The risk discount rate is made up of the risk-free rate plus a margin that reflects the uncertainty of the timing and amount of those future distributable profits and represents the compensation shareholders require to accept these risks. The determination of this margin is partially subjective. For ABC Life, the return on capital required by ABC Bank can be used to inform this.
- Projection assumptions for the Wealth Management business. Judgment is required in setting withdrawal rates, additional contribution top-up rates and setting the expected investment returns for the different products (ordinary and superannuation).
- EV assumptions can be different from MoS best estimate assumptions, with judgement required to consider where appropriately it can be varied. For example setting the expense assumption: EV allows for more flexibility in future expense assumptions, with judgment is needed in determining if a future cost savings is to be projected (how much and for how long).

Marking Guide

For each area

- 0.5 marks for identifying a valid area of judgment.
- Up to 1.5 marks for valid discussion.

For up to 3 areas

Up to 6 marks

iii) Practical Considerations prior to ABC implementing EV and VNB Reporting

- Does the actuarial team have the resources available to introduce EV/VNB reporting within the required time frame given their current commitments? Do they need additional training? Should external consultants be engaged to help implement the process?
- A clear statement of the purpose of doing the EV reporting is required. If the purpose is solely for internal management reporting, the assumptions selected (particularly the risk discount rate) and the level of precision in the development will be different compared to an EV that will be externally reported as a comparative value to other life insurance companies that are reporting their EV.
- Projection model for group and investment business. As this business is currently valued on an accumulation basis, a model to project the future cashflows and capital requirements for this business will need to be built.
- Enhancements are required to the individual risk projection model to include capital, investment earnings and tax
- Review of current individual risk projection model. The impacts from model changes will be capitalized in the EV and VNB and may be more visible as compared with the current MoS Profit Reporting. Hence, an external review of the projection models in advance of disclosing EV for the first time may be appropriate.
- Similarly, an external review of approach particularly in relation to areas where judgement has been applied may be appropriate
- Time required to obtain data and to build and test models.
- Stakeholder Engagement. As this will be a new metric reported in the insurance company and the bank, there needs to be some time to educate those not familiar with EV and VNB and communicate with key stakeholders.
- Embedding into financial reporting processes especially for external reporting periods.
- Interaction with risk function. Consideration as to whether the risk appetite needs to include EV and VNB and whether scorecards need to change to reflect the new metric.

Marking Guide

- **1 mark for each valid, distinct point**
Up to 3 marks

Regards,
[Appointed Actuary]

b) i)

- Using the VNB at the previous year-end, extract the VNB for each product line ensuring that the sum of the parts equals the total. (1)
- Obtain the sales (in API terms) that were used in the determination of the VNB for each product in (1) above. (2)
- For each product line, the Multiplier is determined as $(1)/(2)$. (3)
- The sales for the current YTD (in API terms) are determined for each product line. (4). It is assumed that this information is readily available.
- The VNB for the current YTD period for each product line can be determined as $(3) * (4)$
- Depending on data availability and ability to meet timelines imposed by the CFO, the YTD VNB can be enhanced by adjusting for any difference in the acquisition cost per sale that occurred between the previous year end and the current period.
- Furthermore, depending on data availability and ability to meet timelines, Multipliers may be determined at a level lower than product line such as distribution channel within a product line.

Marking Guide

- **3 marks for a clear description of an approach which uses the product level sales and product level VNB from the prior year end to determine the multipliers, deducting 1 mark for each omission/point that lacks clarity; or**
- **Up to 1 mark for an approach which doesn't utilise the product level sales and product level VNB from the prior year end, but can still reasonably produce the Multipliers**

ii)

- Advantages
 1. Easy to compute and should therefore be available on a timely basis and meet CFO requirements
 2. It should be relatively straightforward to communicate the results to non-technical audiences
 3. Due to its simplified nature, it may also effect a change in mindset of business teams as they may start to think in 'value' terms rather than just sales or current period profit.
 4. The methodology can be employed on a more frequent basis by the business as sales numbers become available. Hence, can understand early if the business being written is value creating/destroying and if value being created is in line with target
 5. Depending on data availability, the approach can be enhanced
 - o Allow for changes in acquisition cost per sale since prior year-end
 - o Setting the Multipliers at a lower level of granularity will attempt to capture any changes in the business mix since the prior year-end

- Disadvantages
 1. The methodology assumes that the products being sold in the current period are the same as those in the prior financial year. Hence, if ABC is selling a new product in the current year, the approach may not be appropriate
 2. The approach does not allow for any changes in the acquisition cost per sale since the prior year-end. For example, the current year's sales may be on a lower level of initial commission compared with the prior year
 3. Does not allow for changes in business mix within a product line since the prior year-end.
 4. It doesn't add value in helping to understand the business performance as it is essentially reporting the amount of new business sold in terms of annual premium (if Multipliers are kept the same over the course of the year).
 5. Does not capture other changes in VNB such as assumption and discount rate changes. However, it is unlikely non-economic assumptions would change monthly
 6. Hence, the 'true' VNB (the one that will be reported) for the period will not be known until a full valuation is performed
 7. Hence, the approach will only be suitable to some audiences. It will not be suitable to those parties interested in the overall value of the business as opposed to the performance of individual product lines
 8. It may lead to inappropriate decisions being made about an individual product line - the VNB for each product is not necessarily a stand-alone VNB for that product as assumptions and capital may have been set across various product lines

Marking Guide

- 1 mark for each correct advantage up to a maximum of 2 marks
- 1 mark for each correct disadvantage up to a maximum of 3 marks

Up to 5 marks

iii)

- Excluding the potential impact of any discount rate changes, the most significant change to the EV over the month is likely to be driven by the VNB which is already measured monthly
- Assumptions (non-economic) will not be updated monthly so there will be no major change to the EV until these are updated
- Experience variations, including discount rate changes, may already be measured through the monthly valuation process.
- Changes to the EV as a result of discount rate changes or other experience variations can be estimated from the prior year-end sensitivities (if available)
- Capital calculations and attribution to product lines take time and are unlikely to be ready at the same time as the simplified VNB calculations.

Marking Guide

- Up to 1.5 marks for each valid point which is clearly expressed, for up to 2 points

Up to 3 marks

c) i)

- Prior to allowing for VNB and discount rate changes, the EV for Group Business was expected to be \$540m but the actual value was \$500m which is unchanged from the opening EV.
- There were unfavorable experience variations over the year (-\$10m).
- There were assumption changes that reduced the value of future profits (-\$30m).
- The VNB of 0 indicates that there has been no new business added over the year even though the book is open to new business. This is a further indication of the contraction that this business line has experienced over the last 5 years.
- Although the EV increased over the year, the increase was as a result of discount rate changes which are not under the control of the Group Insurance executive.

Marking Guide

- 1 mark for each valid point which is appropriately described

Up to 2 marks

ii)

- Sensitivities
 - Show how the EV and VNB varies due to changes to key assumptions such as claims, lapses, expenses and investment returns (very relevant for wealth management business)
 - Produce EV and VNB on a range of discount rates
- Disclose the value of franking credits included in the EV and VNB
- Discussion on the methodology used to produce the EV and VNB. For example, disclosing what acquisition costs were used in determining the VNB and whether they are the same as those used for profit reporting

Marking Guide

- 2.5 marks for raising sensitivities:
 - 1 mark for stating that sensitivities should be disclosed.
 - Up to 1.5 marks for discussion around which sensitivities should be disclosed (only 0.5 marks if only 1 assumption discussed, e.g. risk discount rate).
- 1.5 mark for any other relevant point appropriately described

Up to 4 marks

Total 31 marks

END OF MARKING GUIDE QUESTION 2

QUESTION 3: MARKING GUIDE

a)

TO: CRO
From: Actuary
Subject: Reduction in Teen Life Capital Base

Dear CRO,

Below I have outlined possible reasons for a reduction in the capital base for each Statutory Fund of Teen Life.

- Statutory Fund 1
 - Capital transfer to SF2 or the Shareholder Fund over the year. This reduces the net assets (and hence the capital base) of the fund. (Note: dividends would come out of the Shareholder Fund, rather than directly from a Statutory Fund.)
 - Adverse investment experience that resulted in the VSA falling below the RFBEL and hence, resulting in loss recognition. These losses reduce the net assets (and hence the capital base) of the fund.
 - Significant losses on surrender/maturity/deaths as a result of increased volumes of decrements and benefit payments being too generous (i.e. significantly more than the asset share). These losses reduce the net assets (and hence the capital base) of the fund.
 - Operational Risk event that the shareholders needed to cover, such as an understatement of bonuses in respect of prior years due to a model/data issue. This would lead to losses, reduce the net assets of the fund and directly reducing the capital base.
 - The declaration of a reversionary bonus would reduce the capital base, because the RFBEL would increase by more than the Policyholder Retained Profits (PRP) would reduce. This is because the "cost of the bonus" to the PRP would be determined based on a discount rate that allows for the mix of investment assets, and therefore be lower than on a risk-free rate (which is being added to the RFBEL). This reduces the capital base through the adjusted policy liabilities.
- Statutory Fund 2
 - Capital transfer to SF1 or the Shareholder Fund over the year. This reduces the net assets (and hence the capital base) of the fund.
 - Strengthening of BE claims assumptions over the year resulting in loss recognition. These losses reduce the net assets (and hence the capital base) of the fund.
 - Significant volumes of new business written over the year requiring large upfront commission payments to advisors with inadequate release of distributable profits from the inforce book to fund the strain. This increases the regulatory adjustment to net assets, reducing the capital base.
 - Asset liability mis-match losses over the year such as the CICP not being matched since there is an under-developed ALM Framework in place. These losses reduce the net assets (and hence the capital base) of the fund.

- o Large operational Risk event that the shareholders needed to cover (such as a cyber-attack). These losses reduce the net assets (and hence the capital base) of the fund.
- o If there was a loss in the period, then this would reduce the shareholder retained earnings within the Stat Fund, and therefore reduce the Capital base.

Regards,
Actuary

Marking Guide

- For each example:
 - o 0.5 marks for identifying a valid example/reason
 - o Up to 1 mark for clearly outlining how it reduces the capital base

Up to 3 marks for each statutory fund

For up to 2 examples.

- For elements that are common to both statutory funds, candidates should only get credit for that point once
- Up to 1 mark for appropriate language in the e-mail to the CRO.

Up to 7 marks

b) i)

The Appointed Actuary would need to give the Board written advice, with the following considerations applicable:

- Regulatory Considerations.
 - o Need to ensure that the total dividend paid does not exceed the reported profit for the last 4 quarters (LPS 110), otherwise approval from the prudential regulator (APRA) is required (which requires supplying APRA with projected future capital positions).
 - o What is the capital position of the fund after the transfer and can it meet regulatory capital requirements (PCR) (and internal capital requirements depending on ICAAP) post dividend
 - o In respect to the shareholder retained profits generated by the participating business, these cannot be distributed to the shareholder without bonus being paid to policyholder. Hence, need to declare a bonus prior to any distribution to shareholders (LPS 600 PARA 31). Note that there is no such restriction on the retained profits generated from the shareholder capital in SF1.
- Other Considerations
 - o If the aim was to distribute all surplus to shareholders (after the declaration of the bonus), what does this mean from a PRE viewpoint and future bonus declarations? Is it consistent with its disclosed bonus philosophy?
 - o Are there any equity issues between policyholders and shareholders? For example, will shareholders need to invest more capital in order to fund guaranteed benefits?

- o It is typical for a life office to hold capital in excess of PCA as defined in its ICAAP Summary Statement. Teen Life should consider whether such an option would lead to any breach of its ICAAP and what, if any, actions this may result in
- o What changes could any increase in reversionary bonus have on surrenders?
- o Is the asset mix for the participating business still appropriate following the distribution? As more of the liabilities are guaranteed, should the asset mix move towards more conservative assets and is this consistent with PRE
- o Are any changes required to Administration Systems?
- o Could Teen Life continue to meet its guaranteed obligations and PRE in the future on a Best Estimate basis? What level of stress could Teen Life withstand prior to not being able to do this and is this in breach of its ICAAP and PRE?
- o Is there sufficient liquidity to pay such a dividend to its parent company? There are some property assets backing the participating business
- o Opens up the company to regulatory supervision, including a supervisory adjustment in the future, because capital margin may not meet APRA's expectations.
- o There could be an impact on rating agency ratings, because if one Statutory Fund has insufficient capital buffer, it could impact the whole company's ability to meet its obligations

Marking Guide

- **Up to 1.5 marks to be awarded for each regulatory constraint up to 4.5 marks**
- **Up to 1.5 marks to be awarded for each other consideration up to 4.5 marks**

Up to 6 marks

ii)

- Generally, the same constraints and considerations will still apply. However, there are some additional considerations that will apply:
 - o Will need to ensure that the regulatory capital requirements of both SF1 and SF2 are met post transfer. Although capital is staying in the company, the prudential requirements relate to both the company and each individual statutory fund.
 - o The transfer of excess assets from one Statutory Fund to another in the same life company does not require APRA approval
 - o In addition to the above, Teen Life also needs to consider the future capital requirements of each statutory fund including the impact this transfer will have on those future capital requirements and whether future capital support will be needed from the parent
 - o Target Surplus Policy. It is not uncommon for life companies to hold Target Surplus in its shareholders fund rather than in each individual statutory fund. Hence, could some of this capital be moved into SF2 to support?
 - o A transfer of shareholder retained profits from SF1 to SF2 in order to provide capital support implies that this capital will not be distributed to the parent company as a dividend. Teen Life should ensure that any transfer to SF2 complies with its dividend policy and ICAAP

Marking Guide

- Up to 1.5 marks for identifying that the regulatory requirements of both SF1 and SF2 need to be met post transfer
- Up to 1.5 marks for identifying that this transfer does not require APRA approval
- Up to 1.5 mark for each valid additional point

Up to 3 marks

c) i)

- Bonuses
 - o Could Teen Life pay a greater share of bonuses as a terminal bonus as opposed to a reversionary bonus? Teen Life would need to consider its disclosed bonus philosophy, and past practice.
 - o This would mean that the level of guaranteed benefits would be less than the current state (over time) meaning that the PRP could absorb more of the asset stresses. The exact level would depend on PRE and any minimum level of terminal bonus policyholders may expect.
- Reinsurance
 - o Obtain further reinsurance cover for the insurance business in SF2. For example, it may wish to obtain surplus cover in order to cap its liability at a certain level
 - o This should include investigating whether reinsurance could be obtained with another reinsurer (including with the parent company). This is particularly true if Teen Life has an ACRC due to its current arrangements since it only has 1 reinsurer
 - o Ensuring that all treaties and addenda are fully executed
- ALM Framework
 - o Develop its ALM framework, since it is underdeveloped, in order to minimize the impact of market changes on the capital base
 - o This may include changing the asset mix of the participating fund
- Process reviews
 - o Investigate to what extent operational risk events have caused losses or those that could cause material losses and ensure there are robust processes in place to mitigate against 'surprises'
- Counterparty Risk
 - o Teen Life could look at its asset mix and understand if it is over-exposed to a single counterparty and take steps to reduce this exposure

Marking Guide

- 1 mark for each point identifying a key/core option to reduce the volatility of the PCA Coverage Ratio (0.5 marks for an option that is not key/core). To a maximum of 2 marks.
- Up to 1 further mark for a valid explanation of each option. To a maximum of 2 marks.

Up to 4 marks

ii)

- Insurance Risk Charge: No change since this is determined for participating and non-participating business separately.
- Asset Risk Charge: No change
- Aggregation Benefit
 - Presently, there is no Agg Ben in SF1 as there is no IRC but there is a significant ARC. Similarly, there is a small Agg Ben in SF2 due to the large IRC and relatively small ARC
 - By combining the SFs, there will be a larger diversification benefit between the large ARC in SF1 and large IRC in SF2
 - $\text{Agg Ben} = (330 + 330) - \sqrt{330^2 + 330^2 + 2 \cdot 330 \cdot 330 \cdot 20\%} = 149 > \text{SF1} + \text{SF2}$
- Asset Concentration Risk Charge
 - There is currently no ACRC for SF1 and there is one for SF2. As SF2's assets are in Australian government securities, the ACRC arises out of its reinsurance agreement and/or any unpaid premiums after allowing for offsets.
 - As the VAF is now higher, the size of the asset can be tested against a higher limit which means that the ACRC may reduce
- Operational Risk Charge: No change since this is determined for risk business and other business (participating in this case) separately
- Combined Scenario Adjustment
 - As the IRC and ARC are unchanged and the Agg Ben has increased, the CSSA should also reduce since there are less tax benefits in the sum of the $\text{ARC} + \text{IRC} - \text{Agg Ben}$
- Overall PCA
 - Overall, PCA should reduce largely due to the aggregation benefit and any reduction in ACRC

Marking Guide

- Up to 1.5 marks for stating Agg Ben should provide an additional benefit & why (numeric illustration not necessary for full marks).
- Up to 1.5 marks for ACRC discussion.
- Up to 1 mark for CSSA discussion.
- 1 mark for stating that Op Risk should be unchanged and why (0.5 marks for statement and 0.5 marks for reason).
- 1 mark for stating IRC should be unchanged and why (0.5 marks for statement and 0.5 marks for reason).
- Up to 1 mark for indicating that overall the PCA should reduce (statement/indication should be supported by other points within the answer in order to get 1 mark)

Up to 6 marks

d)

- The RFBEL contains guaranteed benefits that cannot be reduced. Hence, a conservative investment strategy may be set for this part of the liability. These assets may be matched closely to the RFBEL
- As the book moves towards maturity, more of the liability will be in the RFBEL so the asset mix will need to change over time to reflect this
- The business may have been sold as an investment policy that smooths investment returns over time. Policyholder's may therefore expect that part of the assets would be in riskier assets in order to provide a return in excess of the risk-free rate. As the PRP is not guaranteed, but PRE still applies, it is not unreasonable for these assets to have a higher risk-profile compared with the RFBEL

Marking Guide

- Up to 2 marks for stating that the RFBEL is guaranteed and may have a more conservative investment strategy.
- Up to 2 marks for stating that the PRP is not guaranteed but there is still an expectation that policyholders would expect a return from these assets and potentially a return greater than those assets backing the RFBEL.
- Up to 1.5 marks for stating that the policy would have been sold to smooth investment returns, which implies that there would be ups/downs, but that there is also a guaranteed level of benefits.

Up to 4 marks

Total 30 marks

END OF MARKING GUIDE QUESTION 3

END OF MARKING GUIDE