

ILA LFMC Model Solutions

Fall 2024

1. Learning Objectives:

1. The candidate will understand and apply pre-IFRS 17 valuation principles to individual life insurance and annuity products issued by Canadian life insurance companies.

Learning Outcomes:

- (1a) The Candidate will be able to:
 - The Candidate will be able to describe, apply and evaluate the appropriate IFRS 17 accounting and valuation standards for life insurance and annuity products
 - Compare and apply methods for life and annuity product reserves
 - Evaluate, calculate, and interpret liabilities
 - Recommend and justify appropriate valuation assumptions

Sources:

CIA Educational Note: IFRS 17 Measurement and Presentation of Canadian Participating Insurance Contracts

Commentary on Question:

This question tested the candidates' knowledge of the treatment of participating products under IFRS17. Candidates were generally able to demonstrate their knowledge of the subject matter and performed better on the written-answer parts of the question than the calculation parts of the question.

Solution:

- (a) Describe the changes required to value the product using the Variable Fee Approach (VFA).

Commentary on Question:

Candidates generally did well on this part of the question.

The contractual terms specify that the policyholder participates in a share of a clearly identified pool of underlying items. The contemplated product satisfies this condition.

The entity expects to pay to the policyholder an amount equal to a substantial share of the fair value returns on the underlying items. This needs to change: 50% is not considered substantial.

1. Continued

The entity expects a substantial proportion of any change in the amounts to be paid to the policyholder to vary with the change in fair value of the underlying item. May need to adjust the minimum guarantee to allow for this variance.

- (b) Describe considerations in setting the risk adjustment for this product.

Commentary on Question:

Candidates generally demonstrated their understanding of risk adjustment at a high level. However, few candidates were able to relate risk adjustment specifically to the participating contracts in question.

A risk adjustment (RA) on participating insurance contracts is required to the extent that adverse non-financial experience (e.g., mortality, lapse, expense, etc.) would not be offset by a reduction in policyholder dividends. Dividend design may affect the amount of pass-through room. Less pass-through room results in higher RA. Need to ensure no double counting, especially w.r.t interrelationships. Some items may or may not be shared with policyholders (experience on AoD Policy Loans), and RA for those items would vary - RA would be increased due to no expense component in dividends.

- (c) Recommend whether an implicit or explicit approach should be used to estimate the present value of future cash flows for the underlying items shared with policyholders. Justify your response.

Commentary on Question:

Most candidates correctly explained the implicit and explicit approaches but did not correctly explain the third approach. Either the explicit or implicit approach could be recommended with appropriate justification.

There are three possible approaches to projecting changes in dividends in the cash flows:

- 1) Implicit - “Perfect pass-through” is measured assuming all experience can be absorbed by changes in dividend scales; plus the cost of guarantees, which measures the inability of the dividend scale to absorb changes.
- 2) Explicit - The total is measured by projecting explicit dividend scale changes corresponding to future experience changes; may require a supplement to reflect cost of guarantees depending on the experience changes considered.
- 3) For participating insurance contracts with little or no dividend room – i.e., essentially non-participating contracts. The approach is to measure the present value of future guaranteed benefits (using the IFRS 17 “unlinked” discount rate¹²), plus a provision for any residual dividend room and any future “upside” that would be passed through to policyholders

1. Continued

The explicit approach is likely most suitable for this product, as it has dividend room remaining so (3) isn't appropriate and (1) would be challenging with only 50% pass-through and potentially some experience items not shared with policyholders.

- (d) You are given the following information for a different block of participating policies:
- The Risk Mitigation Option is not applied
 - All assets are part of the underlying items
 - The VFA measurement model is used

Additional financial information is provided in Excel.

Determine the CSM at the end of each period. Show your work.

Commentary on Question:

Candidates generally did not do well on this part of the question. Few candidates included the correct components in the CSM rollforward or the correct components for the CSM amortization.

CSM Rollforward	Time 0	Time 1	Time 2	Time 3
Change in Entity's Share		1.1	0.9	0.7
Time Value of Money of RA		(0.4)	(0.4)	(0.3)
Change in CoG		0.8	0.8	0.9
- CSM Amortization		(2.0)	(1.9)	(1.8)
End of Period	8.70	8.16	7.57	7.09

The change in the entity's share of the underlying item would adjust CSM (see Section 7.1.3.2).

RA is disaggregated in this example, so portion of change related to the time value of money (i.e. required interest) would adjust CSM (see Section 7.1.3.3).

The change in CoG is financial risk and the risk mitigation option is not applied, so all changes in CoG impacts the CSM (see Section 7.1.3.3).

CSM Amortization = CSM Amortization % x (BOP CSM + Change in Entity's Share + Time Value of Money of RA + Change in CoG)

2. Learning Objectives:

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 - Compare and apply methods for life and annuity product reserves
 - Evaluate, calculate, and interpret liabilities
 - Recommend and justify appropriate valuation assumptions

Sources:

CIA Report - Lapse Experience Study for 10-year Term Insurance, Jan 2014, pp. 6 -32

CIA Educational Note: Selective Lapsation for Renewable Term Insurance Products, February 2017

OSFI Guideline E15: Appointed Actuary - Legal Requirements, Qualification and External Review (Aug 2023)

LFM-645-23: OSFI LICAT Guideline, Chapters 1 - 11, excluding Sections 4.2-4.4 and 7.3-7.11

Commentary on Question:

The question tested the candidates' knowledge of determining mortality deterioration assumptions and their application.

Solution:

- (a) Compare and contrast Dukes-Macdonald (DM) and VTP2.

Commentary on Question:

Candidates were expected to describe both similarities and differences between the two methods for determining mortality deterioration assumptions.

Most candidates identified the segments of cohorts (S, A, U and P) and described the differences in the methods in this context. Most candidates identified the differences between DM1 and DM2 which earned credit. Fewer candidates described the similarities between the methods.

Full marks were provided for identifying at least four similarities and four differences.

2. Continued

Similarities between the methods:

- Have similar concepts and require similar parameters.
- Are based on underlying base mortality tables that do not contain experience from products exhibiting high lapses (and associated mortality) resulting from an increase in premium
- Are based on knowing the underlying lapse rates (i.e. lapses consistent with the base mortality table)
- Keep track of notional cohorts that lapse and persist (P)
- Further segment the cohorts that lapse into those with select mortality (S) or average (i.e. attained age) mortality (A)
- Decrement the cohorts at their respective mortality rates and at the underlying lapse rates
- Assume that all lapses other than the underlying lapses occur just prior to the end of the policy year
- Apply the principle of conservation of deaths to the cohorts to solve for the mortality of the residual persisting (persisters) cohort
- Result in excess mortality that grades off to nil after the select period of the base table
- Assume no grace period
- Do not provide for skew lapses
- Understate persister mortality

Differences between the methods:

- Unlike VTP2, DM1 assumes that the underlying lapses occur immediately prior to the selective lapses.
- The most important difference between VTP2 and DM1 resides in the occurrence of the underlying lapses. VTP2 assumes:
 - The average and selective lapse rates are applied to the population persisting just prior to the anniversary and acted on instantaneously at the anniversary
 - The underlying lapse rate, like the mortality rate, applies continuously
- A subtle but important difference between the methods is the definition of residual mortality and simultaneously, the size of the cohort of persisters.
- DM accounts for the group who lapse with underlying mortality (U), i.e. those lapses already accounted for in the construction of the base mortality table, whereas VTP2 ignores U
- DM2 ignores A in determining the size of the cohort of persisters
- DM1 overstates persister mortality compared to DM2 and VTP2

2. Continued

(b) DEF Life sells two 10-year renewable term products:

- Basic Term:
 - Maximum face amount of 500,000
 - Guaranteed issue
 - Renewal premium = 800% of the initial premium
 - Grace period of 30 days

- Premium Term
 - Maximum face amount of 2,000,000
 - Full underwriting
 - Renewal premium = 300% of the initial premium
 - Grace period of 100 days

Critique the following statements regarding selective lapsation and mortality deterioration for these products:

- A. *Selective lapses occur only at renewal and are highly skewed towards the end of policy year 10 and beginning of policy year 11.*

- B. *Policies with larger premium increases at renewal will have higher lapse rates. It is appropriate to assume that lapse rates increase linearly with the size of the premium increases.*

- C. *Mortality, mortality deterioration, and lapse assumptions should be set together for the entire term portfolio to increase credibility. Differences in product features are not expected to have a material impact on lapse rates or mortality.*

- D. *Deaths during the grace period can be ignored when calculating mortality deterioration.*

- E. *The underlying base mortality table used to calculate mortality deterioration should be based on experience data from the term products.*

- F. *The shape of the underlying base mortality table does not affect how quickly the excess mortality wears off.*

2. Continued

Commentary on Question:

Candidates generally did well critiquing statements A, B, and C. For statement D, many candidates failed to mention that the impact of grace period deaths is minimal if lapse rates are low. For statement E, many candidates incorrectly stated that the basis of the assumptions should be term products from the company and/or industry experience. For statement F, most candidates correctly identified that the shape of the underlying base mortality table does affect how quickly the excess mortality wears off; however, for full credit candidates had to discuss that unusual run-off pattern may occur if there are discontinuities in the shape of the table.

Statement A

- The first part of the sentence is incorrect: selective lapses may occur at time other than renewal.
- The second part of the sentence is true: lapses for renewable Term are highly skewed around the premium jump.

Statement B

- While lapse rates do increase with the premium jump, it is not appropriate to assume that they increase linearly.
- Lapse rates increase very quickly at the lowest premium jumps, begin to level off as jumps begin to increase, and then level off at the highest premium jump levels.

Statement C

- It is not appropriate to set the same assumptions for the entire term portfolio.
- Both lapse and mortality (including mortality deterioration) assumptions should reflect the product differences.
- Provide at least one example of how assumptions could differ between the products:
 - Mortality rates increase significantly as the premium jump ratio increases.
 - Level period mortality will vary between the two products due to only one being underwritten.
 - Difference in lapsation due to differences in face amounts, which will also impact mortality and mortality deterioration.

2. Continued

Statement D

- It is not true that deaths during the grace period are insignificant unless lapse rates are small.
- If lapse rates are low, modelling deaths during the grace period is insignificant. This is not the case when excess lapses are very high.
- The mortality add-on for the grace period can be added to the persistor cohort mortality.
- All mortality deterioration methods assume no grace period.

Statement E

- Incorrect
- All methods of calculating mortality deterioration are based on underlying base mortality tables that do not contain experience from products exhibiting high lapses (and associated mortality) resulting from an increase in premiums.
- It would not be appropriate to construct the underlying base mortality table from Term data.

Statement F

- Incorrect
- A consequence of all the methods is that the level and run-off pattern of the excess mortality is highly dependent on the shape of the underlying mortality table.
- An unusual run-off pattern may be observed where there are discontinuities in the shape of the table. This means that it is important to ensure that the base mortality table is appropriately selected.

3. Learning Objectives:

4. The candidate will understand how to explain and apply the methods, approaches and tools of financial management in a life insurance company context.

Learning Outcomes:

- (4a) The Candidate will be able to:
- Explain and apply methods in determining regulatory capital and economic capital
 - Explain and evaluate the respective perspectives of regulators, investors, policyholders and insurance company management regarding the role and determination of capital
 - Explain Canadian regulatory capital framework and principles
 - Explain and apply methods in capital management

Sources:

A Multi-Stakeholder Approach to Capital Adequacy, Conning Research

LFM-636-20: OSFI Guideline A-4 Internal Target Capital Ratio for Insurance Companies, December 2017

LFM-641-19: OSFI: Own Risk and Solvency Assessment (E-19), December 2017

LFM-151-22: IAIS—International Capital Standard, ComFrame, Holistic Framework for Systemic Risk in the Insurance Sector, Dec 2019 Only pages 1-3, 8-28

Economic Capital for life Insurance Companies, SOA Research paper, Oct 2016 (only sections 2 and 6)

Commentary on Question:

This question tested the candidates' understanding of regulatory capital and economic capital, the respective perspectives of stakeholders and the methods in capital management.

Solution:

- (a) Describe the objectives of capital adequacy for each of the following stakeholders with respect to a life insurance company:
- (i) Policyholders
 - (ii) Regulator
 - (iii) Shareholders
 - (iv) Company Management

3. Continued

Commentary on Question:

Most candidates did well on this part of the question. Candidates generally understood the perspectives of regulators, shareholders, policyholders, and company management related to solvency requirements and return maximization. However, to receive full credit candidates had to demonstrate understanding that the cost of capital is not a concern for policyholders and regulators, and that the growth of business and capital risk management are also objectives of shareholders.

- (i) Policyholders want capitalization levels to be set such that they are fully protected in the event of a loss. They are not concerned with cost of capital
 - (ii) The regulator's primary concern is the policyholder. Regulators want rates to be affordable and insurers to be able to pay claims fully. They are not concerned with over-capitalization or the cost-of-capital. The more capital the better.
 - (iii) Shareholders have multiple objectives:
 - maximize their return through lower capital; do not want inefficient use of capital
 - maintaining enough capital to absorb shocks
 - maintain enough capital to support growth
 - (iv) Company management given incentives to operate company in line with best interests of shareholders
(Management has incentive to keep company open for gainful employment (return on capital) and would require higher levels of capital aligning with regulators, policyholders, shareholders)
- (b) Critique the following statements.
- A. *Economic capital measures a life insurance company's capital needs based on the future economic risks that the life insurance industry faces. Economic capital is the amount required to cover a risk neutral distribution of risks with a high degree of certainty over the life of the policyholders.*
 - B. *The Standard and Poor's Capital Adequacy Ratio is well known and understood industry measure that a life insurance company can use for its own economic capital models.*
 - C. *Failing an economic capital calculation could result in a stage 1 early warning intervention by OSFI.*

3. Continued

- D. *Prior to approving a company's Own Risk and Solvency Assessment, OSFI will review it to understand its risk profile, methodology, assumptions, and quality of capital.*
- E. *Under International Capital Standard's (ICS) standard method for determining ICS 2.0 capital requirements for life insurers, insurance and market risks are quantified using stress tests, while credit and operational risk are quantified using factor-based approaches.*

Commentary on Question:

Candidates generally did well critiquing statements B, C, and D. For statement A most candidates did not discuss the length of projection. For statement E few candidates discussed the concentration risk and insurance risks for non-life.

- A. EC is based on the risks the company faces, not the industry. It is company specific risk, Real world distributions, not RN, length of projection is debatable. Some feel a one-year period is more appropriate
- B. The "one-size-fits-all" standardization of these formulas makes them universal, but limits their ability to predict accurately the necessary amount of capital for a specific insurer
The risks that are modeled are calibrated based on industry data and not specific to the company being modeled
- C. Stage 1 early warning intervention is for breaching LICAT supervisory targets
However, no consequences to failing. Results of model are internal only and provide information to the company, not monitored by OSFI
- D. OSFI does not approve ORSA
Otherwise, rest is true
- E. True for insurance - using stress tests,
Credit - Factor based and operational risks - Factor based
Note some insurance risks in the SN are factor based, but they are for non-life.
True for all market risks - using stress tests
except concentration risk, which is factor based

- (c) You are given the following information for a Canadian life insurance company:

Tier 1 Capital	500
Tier 2 Capital	200
Base Solvency Buffer	650
LICAT Total Ratio	123%
LICAT Core Ratio	88%
Internal Target Total Ratio	125%
Internal Target Core Ratio	70%

3. Continued

The life insurance company's Own Risk and Solvency Assessment determined its own capital needs to be 800.

Assess the life insurance company's ratios.

Commentary on Question:

Few candidates did well on this part of the question. Many candidates performed the comparison between LICAT Total/Core ratio and internal target ratios, but not many candidates compared the internal target Total/Core ratio with ORSA and supervisory target.

- The ORSA required capital / BSB = $800/650 = 123\%$
- Thus, internal total target of 125% is reasonable, just above the ORSA to BSB ratio
- The total ratio of 123% is below internal target of 125%. That is permitted, but insurer should inform OSFI and provide plans on how it expects to get back to Internal Targets
- Core target of 70% is set at the supervisory target of 70%. Internal core targets should be greater than supervisory target.

4. Learning Objectives:

2. The candidate will understand U.S. financial and valuation standards, principles and methodologies applicable to life insurance and annuity products.
5. The candidate will understand important insurance company issues, concerns and financial management tools.

Learning Outcomes:

- (2a) The Candidate will be able to describe U.S. valuation and capital frameworks, and explain their impact on the valuation of reserves, capital and financial statements.
- (5a) The candidate will be able to describe, apply and evaluate considerations and matters related to:
 - Insurance company mergers and acquisitions
 - Embedded Value determinations
 - Climate risk management

Sources:

LFM-106-07: Insurance Industry Mergers and Acquisitions, Chapter 4 (Sections 4.1-4.6)

Regulatory Capital Adequacy for Life Insurance Companies: A Comparison of Four Jurisdictions (including spreadsheet)

Commentary on Question:

This question tested the candidates' knowledge of adjustable life products and financial condition testing.

Solution:

- (a) Critique each of the following principles as they apply to changes to adjustable policies:
 - (i) *Policy classifications should be established at issue and are not subject to change.*
 - (ii) *The changes to adjustable policies should be based on underlying experience and not on projected future experience.*
 - (iii) *It is never appropriate to cross-subsidize one policy cohort with another cohort.*
 - (iv) *Past losses cannot be recovered through future adjustments.*

Commentary on Question:

This part of the question tested the candidates' knowledge of adjustable policies. Candidates had to clearly state whether the principle is true or false for full credit.

4. Continued

- (i) This statement is mostly true. Policy classification for adjustable policies should be established at issue. There should be no post-issue changes except when the re-classification can be justified or is required as a result of external circumstances beyond the control of the insurer arising post-issue. Some of these external circumstances include regulation amendment, merge and acquisition, etc.
 - (ii) This statement is false. The changes to adjustable policies should be based on associated underlying experience and projected future expectations.
 - (iii) This statement is false. There should be no material, planned, or systemic cross-subsidization of one cohort by another. However, small amounts of cross-subsidization may occur due to practical considerations such as volatility smoothing, etc.
 - (iv) This statement is false. Some adjustable policies may allow the recovery of past losses, which should be explicitly provided for in the adjustable policy contract or in marketing or sales disclosure material.
- (b) Explain the analysis that the Appointed Actuary is required to prepare for Financial Condition Testing (FCT)

Commentary on Question:

This part of the question tested the candidates' understanding of FCT as a risk management tool. A common error was just describing the detailed scenarios that should be considered for the FCT test.

FCT is an annual exercise where the appointed actuary should design and perform stress testing to investigate the insurer's recent and current financial position and financial condition. The appointed actuary is expected to provide a written report on the finding of the stress testing, and document management actions for mitigation of the identified threats. The assumptions and scenarios tested should be current and forward looking.

4. Continued

(c) The table below summarizes the FCT results at the end of the projection period.

Scenario	Type	Statement value of assets	Statement value of liabilities	LICAT Total ratio
Base	Base	150	80	140%
Pandemic	Solvency	110	100	75%
Increased mortality	Going concern	120	110	95%
Business Growth	Going Concern	200	130	200%

- The Company's target LICAT total ratio is 150%

For each scenario:

- Explain whether the results are satisfactory.
- Identify actions the Company might take to address unsatisfactory results.

Commentary on Question:

This part of the question tested the candidates' understanding of OSFI's requirements and possible management actions to improve FCT results. For part (ii) simply stating that the LICAT ratio can be improved by increasing available capital or reducing required capital was not sufficient to receive credit.

- Base scenario – LICAT ratio at the end of the period is lower than the insurer's internal target. Therefore, this is not satisfactory.

Solvency scenario (Pandemic) – The assets are greater than the liabilities at the end of the projection. Therefore, this is satisfactory. However, the LICAT ratio is less than OSFI's supervisory minimum. Management actions should be identified in the FCT report to increase the LICAT ratio to supervisory minimum.

Going-concern scenario (Increased mortality) – The LICAT ratio is higher than OSFI's regulatory target at the end of the projection period. Therefore, this is satisfactory. However, the LICAT ratio is lower than OSFI's supervisory target and the insurer should identify management actions in the FCT report.

Going-concern scenario (Business Growth) – Satisfactory. However, FCT is a defensive investigation, and this is a favorable scenario which is not a scenario that should be tested in FCT.

4. Continued

- (ii) To address the unsatisfactory results, the insurer should consider raise additional available capital or reduce its required capital. Some actions can be considered include:
- Issue more common share
 - Require parent capital injection
 - Use of registered reinsurance to reduce insurance required capital
 - Reprice certain high risk products
 - Reduce dividend scale for participating products
 - Reduce adjustable elements for adjustable products
 - Strengthen risk management practices such as implementing hedging, better ALM, etc.
- (d)
- (i) Critique each statement from the Financial Condition Testing (FCT) report from the perspective of a peer reviewer:
- A. *The Company sustained material mortality losses and assumed all claims in excess of the expected mortality level are due to COVID. Therefore, no changes were made to the base mortality assumption.*
- B. *Significant changes to the Income Tax Act are expected to materially impact the Company's income. This was not considered in the scenarios as the new rules will only be effective nmortality post COVID. Actuary should test the potential impact of increased mortality in their FCT.*
- C. *The Company only tested the impact of the most severe risks.*
- (ii) Explain OSFI's objectives in requiring a peer reviewer for the work of the Appointed Actuary

Commentary on Question:

Candidates generally did well on part (i). A common error for part (ii) was that instead of OSFI's objective in requiring a peer reviewer, many candidates provided a description of OSFI's qualification requirement for a peer reviewer.

4. Continued

- (i)
 - A. This is not acceptable. Actuary needs to consider the potential changes to mortality due to COVID. Actuary should test the impact of increased mortality under the company's FCT.
 - B. This is not acceptable. Actuary is expected to consider impact of material events such as tax changes in the FCT projection if the events are expected to occur over the projection period.
 - C. This is not acceptable. The company should consider severe but plausible scenario for solvency testing. The company should also consider scenarios that are less severe but more plausible to test the company's financial adequacy for going-concern.
- (ii) OSFI requires a peer reviewer for the work of the appointed actuary to help provide an assessment of the insurer's financial condition safety and soundness. The peer reviewer can also provide independent advice to the appointed actuary and act as an additional source of professional education to the appointed actuary. Peer reviewer can help maintain confidence in the work of the AA by public, management and supervisory authorities.

5. Learning Objectives:

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Learning Outcomes:

- (2a) The Candidate will be able to describe U.S. valuation and capital frameworks, and explain their impact on the valuation of reserves, capital and financial statements.
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Regulatory Capital Adequacy for Life Insurance Companies: A Comparison of Four Jurisdictions (including spreadsheet)

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) A US-domiciled insurance company is redomiciling to Bermuda. On the effective date, the assets have a book value lower than the market value. The conservatism in the US liability reserves has been reconciled to a risk margin using the cost of capital approach with a 10% cost of capital rate.
 - (i) Explain the impact on the assets on the statutory accounting balance sheet.
 - (ii) Explain the impact on the liabilities on the statutory accounting balance sheet.
 - (iii) Describe the implications for the surplus on the statutory accounting balance sheet.

Commentary on Question:

This question tested the candidates' understanding of the impacts of changing the accounting basis. Most candidates correctly identified that the company is transitioning from a book value basis to a market value basis for reporting. However, some candidates overlooked that this change would result in an increase in reported assets.

5. Continued

- (i) US statutory accounting for assets and liabilities is on a book value basis, Bermuda statutory accounting for assets is based on market values and liabilities are based on a fair value approach, which is the sum of the “Best Estimate Liability” and a “Risk Margin” (i.e., Reserves equal Best Estimate Liability plus Risk Margin). Once the company is redomiciled to Bermuda, it can take a gain from marking to market the assets which increases the available capital.
- (ii) The US liabilities are held on a conservative basis using a discount rate set at issue of the policy. EBS liabilities are based on a fair value approach, which is the sum of the “Best Estimate Liability” and a “Risk Margin” (i.e., Reserves equal Best Estimate Liability plus Risk Margin). Bermuda Risk margin is based on a cost of capital approach with a 6% prescribed CoC rate. The company would be able to release reserves from the less conservative risk margin.
- (iii) The increase in assets and decrease in liabilities will increase the surplus.

(b) You are given the following information for a block of business in Bermuda:

Year	0	1	2	3	4	5
Best Estimate Liability (BEL)	900	800	720	560	340	0
Market risk free rate		4.5%	4.5%	4.5%	4.5%	4.5%

BSCR capital	Time 0
C_{Market}	40
$C_{\text{P\&C}}$	0
C_{LT}	10
C_{Credit}	0
Operational risk charge (%)	2%
Loss absorbing capacity adjustment	0

Correlation Matrix	C_{Market}	$C_{\text{P\&C}}$	C_{LT}	C_{Credit}
C_{Market}	1	0.25	0.125	0.125
$C_{\text{P\&C}}$	0.25	1	0.5	0.25
C_{LT}	0.125	0.5	1	0
C_{Credit}	0.125	0.25	0	1

Bermuda Solvency Capital Requirement (BSCR)	175%
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Assume the following:

- The required capital is a constant ratio of BEL throughout the projection period.

5. Continued

- The risk margin is based on non-market risk.
- (i) Calculate the required capital at time 0. Show all work.
 - (ii) Calculate the technical provision at time 0. Show all work.

Commentary on Question:

This part of the question tested the candidates' understanding of how to calculate Bermuda's capital requirements using a specified correlation matrix. Candidates either understood the requirements and earned nearly full credit or struggled significantly and earned little credit.

(i)

BSCR before operational risk

$$\begin{aligned} &= \sqrt{C_{\text{Market}}^2 + CLT^2 + 2 * C_{\text{Market}} * CLT * \text{Corr}(C_{\text{Market}}, CLT)} \\ &= \sqrt{40^2 + 10^2 + 2 * 40 * 10 * 0.125} = 42.43 \end{aligned}$$

Operational risk

$$\begin{aligned} &= \text{BSCR before operational risk} * \text{Operational risk charge (\%)} \\ &= 42.43 * 2\% = 0.85 \end{aligned}$$

$$\begin{aligned} \text{BSCR} &= \text{BSCR before operational risk} + \text{Operational risk} = 42.43 + 0.85 \\ &= 43.27 \end{aligned}$$

$$\text{BSCR at 175\%} = \text{BSCR} * 175\% = 43.27 * 175\% = 75.73$$

(ii) *Required capital (exc. Market) as % of BEL =*

$$\frac{CLT * (1 + \text{Operational risk charge (\%)})}{\text{BEL at time 0}} = \frac{10 * (1 + 2\%)}{900} = 1.13\%$$

$$\text{Required capital (exc. Market)} = \text{Required capital as \% of BEL} * \text{BEL}$$

$$\text{Required capital (exc. Market) at time 0} = 1.13\% * 900 = 10.2$$

$$\text{Required capital (exc. Market) at YEAR 1} = 9.07$$

$$\text{Required capital (exc. Market) at YEAR 2} = 8.16$$

$$\text{Required capital (exc. Market) at YEAR 3} = 6.35$$

$$\text{Required capital (exc. Market) at YEAR 4} = 3.85$$

5. Continued

CoC Rate = 6% (prescribed)

$$RM = CoC \times \sum_t \frac{SCR(t)}{(1 + r(t+1))^{t+1}}$$

Where:

- CoC denotes the Cost-of-Capital rate;
- SCR(t) denotes the Solvency Capital Requirement after t years;
- $r(t+1)$ denotes the basic risk-free interest rate for the maturity of t + 1 years.

The basic risk-free interest rate ($r(t+1)$) shall be chosen in accordance with the currency used for the financial statements of the insurance and reinsurance undertaking.

$$\begin{aligned} RM \text{ at time } 0 &= 10.2 + \frac{9.07}{1 + 4.5\%} + \frac{8.16}{(1 + 4.5\%)^2} + \frac{6.35}{(1 + 4.5\%)^3} + \frac{3.85}{(1 + 4.5\%)^4} \\ &= 2.02 \end{aligned}$$

$$\begin{aligned} \text{Technical Provision at time } 0 &= RM \text{ at time } 0 + BEL \text{ at time } 0 = 2.02 + 900 \\ &= 902.02 \end{aligned}$$

6. Learning Objectives:

1. The candidate will understand and apply pre-IFRS 17 valuation principles to individual life insurance and annuity products issued by Canadian life insurance companies.

Learning Outcomes:

- (1a) The Candidate will be able to:
- The Candidate will be able to describe, apply and evaluate the appropriate IFRS 17 accounting and valuation standards for life insurance and annuity products
 - Compare and apply methods for life and annuity product reserves
 - Evaluate, calculate, and interpret liabilities
 - Recommend and justify appropriate valuation assumptions

Sources:

CIA Educational Note: IFRS 17 Discount Rates for Life and Health Insurance Contracts

CIA Draft Educational Note: IFRS 17 – Fair Value of Insurance Contracts

CIA Educational Note: IFRS 17 Risk Adjustment for Non-Financial Risk for Life and Health Insurance Contracts, Jul 2

CIA Educational Note: IFRS 17 Estimates of Future Cash Flows for Life and Health Insurance Contracts

JKL Life is setting IFRS17 discount rates for a newly acquired block of universal life (UL) policies.

Commentary on Question:

The question tested the candidates' understanding of IFRS17.

Solution:

- (a) Describe the impact on the illiquidity premium for each of the following UL product features:
- (i) No surrender charges
 - (ii) Market value adjustments
 - (iii) Level cost of insurance (LCOI)
 - (iv) Option to add term rider
 - (v) Variable interest option with guaranteed minimum interest rate

6. Continued

Commentary on Question:

This part of the question tested the candidates' knowledge of how the illiquidity premium is influenced by product features. Candidates generally performed well. To receive full credit candidates had to explain the impact on exit value/inherent value and the direction of impact on the illiquidity premium (ILP) (that is, explain why the product feature increased or decreased the ILP rather than just stating the impact). Common mistakes include failing to state the impact on ILP or only explaining the impact on the product's liquidity but not to the illiquidity premium. Few candidates were able to describe the impacts in part (iv).

- (i) The absence of surrender charge reduces the exit cost from the policyholder's perspective, hence causes illiquidity premiums to decrease
 - (ii) The presence of market value adjustment increases the exit cost from the policyholder's perspective, hence causes illiquidity premiums to increase
 - (iii) The level cost of insurance builds up the contract's inherent value, hence causes illiquidity premiums to increase
 - (iv) This option has no effect on the illiquidity premium because increasing coverage does not change the liquidity characteristics already present in the base policy.
 - (v) The interest guarantee increases up the contract's inherent value, hence causes illiquidity premiums to increase
- (b) Critique the following statements related to applying the Fair Value method under IFRS 17 for the acquired block of UL policies:
- A. *If this product generates a loss component at initial recognition, JKL should not expect a positive fair value CSM at acquisition since another potential buyer would experience similar losses.*
 - B. *OSFI's Supervisory Target Capital Ratios should be used as the capital basis for determining fair value. OSFI's Minimum Capital Ratios would not be appropriate since they do not include any margin for risks not included in the LICAT guideline.*
 - C. *The fair value for the reinsurance contracts held on this UL block of business may need to be determined using different assumptions since reinsurers are a different group of market participants than the direct writers.*

6. Continued

- D. *JKL can use their own assumptions for the risk adjustment in determining the fair value since they use a margin approach and their margins for this product are consistent with other insurers.*

Commentary on Question:

This part of the question tested the candidates' knowledge of a fair value measurement. Candidates generally did not do well on this part of the question and did not provide relevant justification to support their critiques. To receive full credit candidates had to explain why the statements were incorrect and specifically mention considerations related to fair value methodology.

- A. When calculating a fair value, as per IFRS 13, the transaction is assumed to take place in the principal market or in the most advantageous market. This means that the transaction is expected to be priced such that profits will be enough to cover the cost of capital, or when $PV\ IF = 0$. The loss component at initial recognition from ABC is irrelevant. The profits needed to cover the cost of capital will be profitable, leading to a positive transition CSM.
- B. It's true that neither of OSFT's capital ratios would be appropriate. The appropriate target would be a market participant's internal target capital ratio and insurers are expected to operate at capital levels above their internal targets. This internal target represents a lower bound for fair value measurement.
- C. Market participants for reinsurance contracts held would be the same as those for the underlying contracts. In most M&A transactions, the potential buyer of a block of business would acquire both the direct contracts and reinsurance contracts held. In other words, the fair value for a group of reinsurance contracts held could be seen as the amount that would bring the fair value of the direct contracts without reinsurance to the net fair value of the underlying contracts including reinsurance. Therefore, the assumptions would be consistent between the direct and reinsurance contracts.
- D. JKL can use their own assumptions for the RA but will also need to consider diversification with other portfolios (e.g., annuities) to determine the level of risk premium to reflect the compensation required to bear the non-diversifiable risk from their point of view. Further adjustments, such as operational risk, will be needed to reflect differences in size between JKL and other market participants.

6. Continued

- (c) Calculate the fair value CSM at acquisition under the Adjusted Fulfillment Cash Flow approach for the UL block using the information in the excel spreadsheet. Show all work.

Commentary on Question:

This part of the question tested the candidates' ability to calculate the fair value CSM. Candidates generally were able to correctly calculate the weighted average cost of capital (WACC) and PV fulfilment cashflows (FCF) but struggled to calculate the adjusted FCF, cost of capital, and release of risk provision, which are all components used to calculate the fair value.

The transition CSM under the adjusted fulfilment cashflow approach = fair value (FV) - PV fulfilment cashflows (FCF)

PV FCF is the PV of the 10 years of 1000 BEL cashflows + \$20 RA (2% of BEL) discounted at the IFRS 17 discount rate of 5% = 7876.17

To calculate the FV, the adjusted FCF, cost of capital, and release of risk provision are required.

The adjusted FCF is the PV of the 10 years of \$1000 BEL cashflows + 20 RA + 10 non-directly attributable expenses (1% of BEL) discounted at the fair value rate of 5.1% = 5% IFRS 17 discount rate + 0.10% own credit risk.
Adjusted FCF = 7914.90

To calculate the cost of capital, the target available capital at each year is required. The available capital each year is the base solvency buffer * target capital ratio * (1-diversification credit) - RA balance, where the BSB is the BEL balance * capital requirement %. For example, at year 0 the available capital = \$1578.32 = PV BEL \$7721.73 * 22% * 120% * (1-15%) - RA 154.43.

The cost of capital is the available capital at beginning of year * WACC, where WACC = 40%*12% + 60%*6% = 8.4%. For example, the cost of capital at end of first year = \$1578.32 * 8.4% = \$132.58. The PV of the 10 years of CoC discounted at the hurdle rate of 12% = \$508.10.

The risk provision is the PV of the 10 years of \$20 RA cashflows discounted at the hurdle rate of 12% = \$113.00

Putting it all together, fair value = 7914.90 + 508.10 - 113.00 = 8310.00.

Finally, fair value CSM = 8310 - 7876.17 = 433.83.

7. Learning Objectives:

1. The candidate will understand and apply pre-IFRS 17 valuation principles to individual life insurance and annuity products issued by Canadian life insurance companies.
4. The candidate will understand how to explain and apply the methods, approaches and tools of financial management in a life insurance company context.

Learning Outcomes:

- (1a) The Candidate will be able to:
- The Candidate will be able to describe, apply and evaluate the appropriate IFRS 17 accounting and valuation standards for life insurance and annuity products
 - Compare and apply methods for life and annuity product reserves
 - Evaluate, calculate, and interpret liabilities
 - Recommend and justify appropriate valuation assumptions
- (4a) The Candidate will be able to:
- Explain and apply methods in determining regulatory capital and economic capital
 - Explain and evaluate the respective perspectives of regulators, investors, policyholders and insurance company management regarding the role and determination of capital
 - Explain Canadian regulatory capital framework and principles
 - Explain and apply methods in capital management

Sources:

CIA Educational Note - Market Consistent Valuation of Financial Guarantees for Life and Health Insurance Contracts

LFM-645-23: OSFI LICAT Guideline, Chapters 1 - 11, excluding Sections 4.2-4.4 and 7.3-7.11

LFM-657-22: The IFRS 17 Contractual Service Margin: A Life Insurance Perspective (Sections 1-4.8)

Commentary on Question:

This question tested the candidates' understanding of LICAT requirements for segregated funds.

7. Continued

Solution:

(a) You are given:

- OSFI has not approved QRS' hedging program for LICAT purposes.
- LICAT Total Gross Calculated Requirement (TGCR) = 26

Calculate the segregated fund Net Required Component at the supervisory level under the Base scenario. Show all work.

Commentary on Question:

A common error was excluding the 125% factor. Most candidates included CSM in the liability calculation.

$$\begin{aligned}\text{Net Requirement} &= \text{TCGR} - \text{Net Actuarial Liability} \\ &= \text{Max } [0, 26 - (4 + 1 + 20)] = 1 \text{ million}\end{aligned}$$

$$\begin{aligned}\text{Apply 125\% factor to the net requirement to get the net required component} \\ &= 1 \text{ million} * 125\% = 1.25\end{aligned}$$

CSM should be included in the calculation of the Net Actuarial Liability

(b) Before a price shock, the value of the hedging derivatives is 0. The fulfilment cash flows (FCF) and derivative values after equity price shock are given by:

- $\text{FCF} = -410p/35 + 5$
- $\text{Derivatives value} = -12p$

Where p = price shock

Calculate the contractual service margin after a -35% price shock ($p = -0.35$)

- without the use of the risk mitigation exception
- with the use of the risk mitigation exception, with hedge ineffectiveness reflected in CSM
- with the use of the risk mitigation exception, with hedge ineffectiveness reflected in Profit/Loss

Commentary on Question:

Candidates generally did well on part (i). Many candidates mistakenly applied the 95% hedge effectiveness in part (ii).

7. Continued

Current CSM = 20

Current BEL + RA = 5

BEL+ RA after a -35% shock = $-410/(-35\%)/35 + 5 = 9.1$

(i) CSM after a -35% shock = $20 - (9.1 - 5) = 15.9$

(ii) Derivates value after a -35% shock = $-12(-35\%) = 4.2$
CSM after a -35% shock = $20 - (9.1 - 5 - 4.2) = 20.1$

(iii) Derivates value after a -35% shock = $-12(-35\%) = 4.2$
Hedge effectiveness = 95%
CSM after a -35% shock = $20 - (9.1 - 5 - 95\% * 4.2) = 19.89$

8. Learning Objectives:

5. The candidate will understand important insurance company issues, concerns and financial management tools.

Learning Outcomes:

- (5a) The candidate will be able to describe, apply and evaluate considerations and matters related to:
- Insurance company mergers and acquisitions
 - Embedded Value determinations
 - Climate risk management

Sources:

LFM-106-07: Insurance Industry Mergers and Acquisitions, Chapter 4 (Sections 4.1-4.6)

Commentary on Question:

This question tested the candidates' understanding of the valuation of life insurance companies.

Solution:

- (a) Describe three methods used to value an insurance company.

Commentary on Question:

This part of the question tested the candidates' understanding of the three common valuation methods. To receive full credit candidates had to state the method and provide a brief description. Candidates who did not do well on this part of the question simply listed the three methods instead of describing them. Some candidates chose to describe the embedded value and actuarial appraisals which are valuation metrics as opposed to methods.

The solution below accounts for various alternative solutions. Full credit was received for any reasonable description of the criteria used to identify comparable companies/transactions, calculating statistics, and applying the range of multiples to the company valuation. Credit was received for discussing the 'change of control premium'.

For the discounted cashflow method candidates were expected to discuss after-tax cashflows, dividend payout projections, terminal values and quote an appropriate discount rate.

The 3 methods to value an insurance company are:

- 1) **Comparable company analysis** – This method uses various financial statistics for the industry or similar companies to value the insurance company XYZ. The financial statistics are applied to the company “multiples” in order to generate a range of valuations.

8. Continued

The first step is to choose a peer group of companies similar to the insurance company XYZ. The peer group should be large enough to be statistically significant. The following factors are considered while selecting “similar companies”, so that they are as close as possible to company XYZ.

- Companies should comply with the same regulatory, accounting and tax requirements
- Companies should be similar enough in terms of financial and operating performance. Some aspects are:
 - geographical locations where the products are sold
 - credit ratings
 - distribution channels
 - Revenue/Market capitalization
 - Risk profile (financial leverage, reliance on reinsurance)
- If the insurance company is well-diversified, we must attempt to choose a peer group which is at least similar to the company’s core business.
- For publicly traded companies, various factors related to the stock are examined to choose comparable companies. These include:
 - Relative stock price performance
 - Average daily volume
 - Liquidity

Once similar companies have been chosen, the next step is to review the financial, operational and market metrics and choose market multiples (For e.g. Price/Earnings ratio, book value) that are most significant for the insurance industry.

Statistics such as mean, median and quartiles are calculated to analyze the performance of the peer group. This analysis identifies the high and low value multiples.

This range of multiples is then applied to the actual earnings/projections of the company being valued to calculate an implied range. (Company valuation X high and low values of multiples from the comparable company analysis.)

The next step is to evaluate the amount of premium (‘change of control premium’) that buyers are willing to pay over the company’s valuation, in order to obtain a final valuation for XYZ.

8. Continued

- 2) **Comparable transaction analysis** – This method is similar to the comparable company analysis, except that it looks at the financial data for recent insurance transactions/mergers between similar sized deal values involving companies in similar sectors/subsectors/lines of business.

The financial advisor attempts to ascertain what the buyers have paid in arm's length transactions.

Other considerations when identifying comparable transactions are accounting and tax treatment, stock or cash paid, post-transaction price adjustments etc. After identifying these transactions, the financial advisor calculates price multiples to the book value/embedded value/EBITDA. These multiples are then applied to the valuation estimate of the insurance company being valued, similar to the comparable company analysis.

- 3) **Discounted cashflow method (DCF)** – This method calculates the present values of future streams of after-tax cashflows in the foreseeable future (5 years), using an appropriate discount rate. The discount rate is typically the WACC (Weighted average cost of capital)

This method is a variant of the actuarial appraisal method.

A DCF analysis must factor in:

- a projected dividend payout rate (assuming the company is public and has paid out historic dividends or plans future payouts)
- Earnings estimates derived from management's projections
- Ultimate book value as of terminal date which will be used in the projections. The terminal value is calculated for the final year as:
 - Seller's projected earnings for the terminal year X P/E multiple
 - Seller's GAAP book value X P/B value multipleThese multiples are derived from the comparable transaction analysis.

The projection cashflows and terminal value are discounted using the WACC to calculate a net present value.

A sensitivity analysis can also be done to show different net present values under a range of discount rate scenarios.

8. Continued

- (b) ABC Life is acquiring XYZ Life. XYZ has the following financial information:

Capital and surplus	50,000,000
Asset valuation reserve	2,500,000
Interest maintenance reserve (undiscounted)	1,500,000
Interest maintenance reserve (discounted)	1,000,000
Book value of assets	100,000,000
Market value of assets	90,000,000
Value of inforce business	75,000,000
Value of future business	40,000,000
Intrinsic value of brand name	20,000,000

Calculate the following:

- (i) Adjusted Book Value
- (ii) Embedded Value
- (iii) Actuarial Appraisal Value
- (iv) Total Company Value

Show all work.

Commentary on Question:

This part of the question tested the application of different components of an actuarial appraisal to a practical numerical scenario. The adjusted book value calculation was the most complex part of the calculation and received the most credit. Most candidates did not do well on this part. Candidates excluded several parts of the ABV calculation or were subtracting the components instead of adding them.

Full credit was received for later parts of the question, even if they got the previous parts incorrect if they demonstrated sound knowledge of the theory behind the calculation. Most candidates did better on the later parts of the question. The candidates who did not do well were subtracting the components instead of adding them.

- (i) **Adjusted Book Value (ABV)** = Net worth of insurance company on a statutory basis i.e. the excess of statutory assets over statutory liabilities with adjustments for liabilities or non-admitted assets that are in the nature of surplus.

8. Continued

ABV = Capital & Surplus +
Asset Valuation Reserve (AVR) +
Interest Maintenance Reserve (IMR) discounted +
Deferred Tax Asset +
Non-admitted Assets +
Surplus Notes +
Mark-to-Market on assets allocated to ABV

ABV = 50,000,000 +
2,500,000 +
1,000,000 +
0 + 0 + 0 +
(90,000,000 – 100,000,000)
= 43,500,000

- (ii) **Embedded Value** = Adjusted Book Value + Value of Inforce Business

Embedded Value = 43,500,000 + 75,000,000 = 118,500,000

- (iii) **Actuarial Appraisal Value** = Embedded Value + Value of Future New Business

Actuarial Appraisal Value = 118,500,000 + 40,000,000 = 158,500,000

- (iv) Total Company Value is the appraisal value, plus additional adjustments such as brand value/market position/buyer's synergies or general market conditions. These adjustments are for items that are not included in the financial statements.

Total Company Value = Actuarial Appraisal Value + Intrinsic Value of Brand Name

Total Company Value = 158,500,000 + 20,000,000 = 178,500,000

- (c) Explain the impact of the following items on the purchase price of XYZ:
- (i) The level of confidence in the underlying assumptions used to calculate the value of inforce and value of future business.
 - (ii) The degree of urgency associated with the sale of XYZ.
 - (iii) Rising interest rate environment.

8. Continued

- (iv) Concerns that XYZ's target market is becoming saturated or oversold.

Commentary on Question:

This part of the question tested the application of concepts to different scenarios. It tested the candidates' ability to carefully consider the impact on XYZ's valuation and describe their rationale. Full credit was received for explicitly stating the impact on the price and appropriate explanation. Most candidates did better on the later parts. Most candidates received partial credit for part (i) as candidates did not explicitly mention the provisions for adverse deviation. For part (ii) appropriate credit was received for recognizing the buyer/seller perspectives. Several candidates discussed these perspectives but did not explicitly state the price impact, for which partial credit was received. In part (iii) several candidates did not mention the required rate of return by the buyer, for which credit was not received. In part (iv) several candidates did not mention the impact on future new business.

- (i) The greater the uncertainty (lower confidence) around assumptions, the higher the volatility and therefore higher PADs (provisions for adverse deviations) are required. These PADs are not used directly in the best estimate valuation of the business, but are considered for the overall price.

ABC would require a lower price to reflect this uncertainty.

- (ii) The greater the urgency to sell, the lower the price.

Urgency signals financial distress on XYZ's end.

As XYZ is in a hurry to sell, they might take less time to do the due diligence. ABC might view a rushed due diligence as a risk, and therefore require a lower purchase price.

- (iii) In a rising rate environment, the buyer would naturally desire a higher rate of return.

A higher rate of return would increase the discount rates at which future cashflows from XYZ's business are discounted, to calculate the present value.

This would lower the profitable value of inforce and new business.

The buyer would require a lower price to accommodate this.

8. Continued

- (iv) If the market in which XYZ sells products becomes saturated, it could potentially lower future new business sales estimates.

This would in turn, decrease the value of future new business.

The buyer would require a lower price to accommodate this.

9. Learning Objectives:

3. The candidate will understand Canadian taxation applicable to life insurance companies and products.

Learning Outcomes:

- (3a) The Candidate will be able to describe and apply the taxation regulations applicable to Canadian life insurance companies and life insurance products.

Sources:

Canadian Insurance Taxation, Swales, et. Al., 4th Ed, 2015, Chapter 6, Reserves,

Canadian Insurance Taxation, Swales, et. Al., 4th Ed, 2015, Chapter 10, The Taxation of Life Insurance Policies

Commentary on Question:

This question tested the candidates' understanding of taxation applicable to life insurance products.

Solution:

- (a) Explain how taxable reserves are determined for the following:
 - (i) Life Insurance policy
 - (ii) Unearned premiums
 - (iii) Unpaid claims
 - (iv) Experience Rating refunds

Commentary on Question:

Candidates generally struggled with this part of the question. In part (ii), many candidates did not explain that unearned premiums are only deductible when the coverage period is 1 year or less. In part (iv), some candidates provided the formula, but not the definition of the ERR reserve.

- (i) Insurers may deduct life insurance reserves from taxable income, up to the maximum prescribed by regulation. The deduction is the minimum of the reported reserve and policy liability, and it's determined without reference to projected income and capital taxes (other than IIT).
- (ii) A deduction is allowed on policies that provide coverage for 1 year or less. The maximum taxable reserve is 100% of unearned premium.

9. Continued

- (iii) Reserves for claims that have been reported but not paid are 100% deductible. Incurred but not reported claims get a 95% deduction.
 - (iv) Under a group policy, an ERR may be used to reduce future adverse claims experience. Taxable Reserve = $\min\{\text{Reported Reserves}, 25\% \text{ of Annual Premium}\}$
- (b) Critique the following statements for Canadian life insurance policies sold after 2017.
- A. *The purpose of the exempt test is to distinguish between life insurance policies with significant cash values and policies with low cash values.*
 - B. *A life insurance policy will qualify as exempt if, on each anniversary, the accumulating fund of the policy is less than the face amount of the policy*
 - C. *A policy that fails the exempt test will immediately become non-exempt, but can be made exempt at any time by increasing the face amount*
 - D. *The accumulating fund for a policy without cash values will always be 0*
 - E. *The 250% test will fail if, at any point after the 10th anniversary, the death benefit of the policy increases by more than 250% over a 3-year period.*

Commentary on Question:

For statement A, many candidates correctly identified the purpose of the exempt test. For statement B, common omissions were that the ETP uses the same issue basis and face amount of the original policy, and that the test is performed at each anniversary. For statement C, partial credit was received for acknowledging the permanence of exempt status, but not mentioning the grace period. For statement D, very few candidates recognized that the AF is a measure of savings in the policy. For statement E, many candidates identifying the 250% test is based on AF not death benefit but did highlight the 3/20 rule.

- A. False. The purpose is to distinguish between policies that serve primarily as an investment/savings vehicle rather than insurance. Policies that pass the exempt test get more favourable treatment, with proceeds taxed on disposition rather than on an accrual basis. The level of the cash value may impact whether the policy passes or fails.

9. Continued

- B. False. A life insurance policy qualifies as exempt if the accumulating fund is less than or equal to the accumulating fund of an Exempt Test Policy (ETP). The ETP is a hypothetical policy, issued on the same basis, and with the same face amount, as the original policy. The test is performed at each anniversary after issue.
- C. Partially true. A policy that fails the exempt test becomes non-exempt. The issuer has 60 days to take corrective action, including but not limited to increasing the policy face amount. Once the grace period is over, a non-exempt policy cannot be made exempt.
- D. False. The accumulating fund is a measure of savings within the policy. It's defined as the greater of the cash value and policy MTAR. Thus, a policy with no CSV can still have an AF.
- E. Partially true. The 250% test will fail if the following two conditions are met: 1) at any point after the 10th anniversary, the AF of the policy increases by more than 250% over a 3-year period. 2) The Policy AF at that time exceeds 3/20 of the ETP AF.
- (c) Determine the amount of taxable income attributable to the policyholder on surrender for the following UL policy issued on January 1, 2020 and surrendered on December 31, 2022.

	Premium	Fund Value at EOY	Surrender Charge	Net Cost of Pure Insurance
2020	500	510	5%	40
2021	300	850	4%	45
2022	300	1200	3%	50

Show all work.

Commentary on Question:

Candidates generally performed well on this part of the question. To receive full credit candidates had to calculate POD and ACB at 2022, then take the difference to calculate taxable income. A common mistake was to set POD equal to the Fund Value and not accounting for the surrender charge.

9. Continued

Taxable income will be the difference between the proceeds on disposition (POD) and adjusted cost base (ACB) at 2022.

$$\text{POD}_{2022} = 1200 * (1 - 3\%) = 1164$$

$$\text{ACB} = \text{Prem} - \text{NCPI}$$

$$\text{ACB}_{2020} = 500 - 40 = 460$$

$$\text{ACB}_{2021} = 300 - 45 = 255$$

$$\text{ACB}_{2022} = 300 - 50 = 250$$

$$\text{ACB}_{\text{Total}} = 460 + 255 + 250 = 965$$

$$\text{Taxable Income} = \text{POD} - \text{ACB} = 1164 - 965 = \mathbf{199}$$