

Exam ILALFMC

Life Financial Management - Canada

Date: Tuesday, May 7, 2024

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 9 questions numbered 1 through 9 with a total of 80 points.

The points for each question are indicated at the beginning of the question.

2. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions provided in this document.

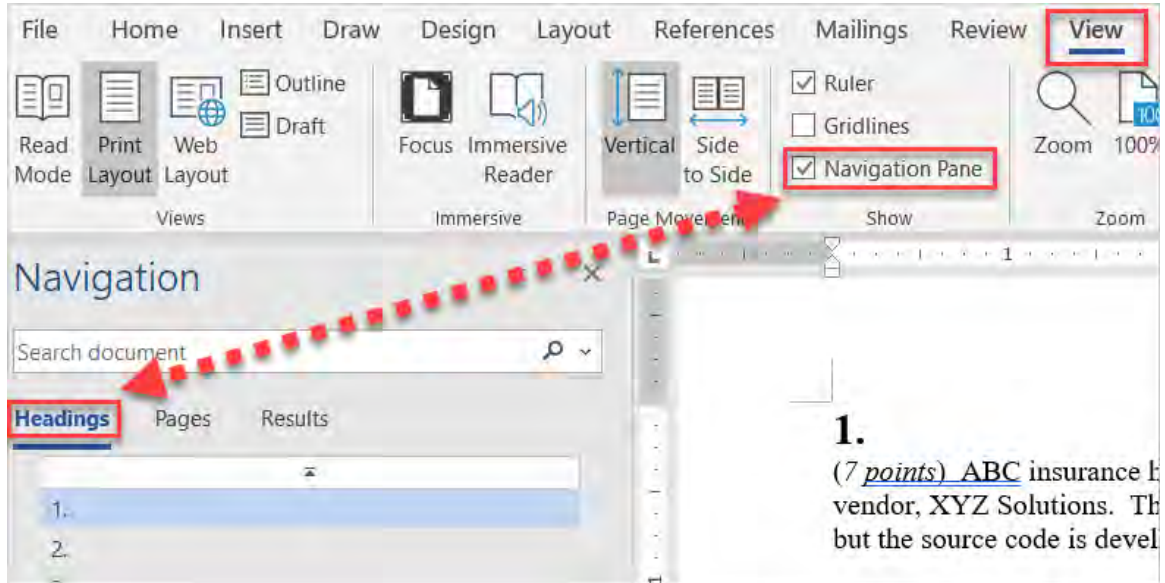
Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel document as directed within each question. Graders will only look at work in the indicated file.
 - a) In the Word document, answers should be entered in the box marked ANSWER within each question. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example, β_1 can be typed as beta_1, and x^2 can be typed as x^2.
 - b) In the Excel document formulas should be entered. For example, $X = \text{component1} + \text{component2}$. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit.
 - c) Individual exams may provide additional directions that apply throughout the exam or to individual items.
2. The answer should be confined to the question as set.
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your five-digit candidate number in the filename.
4. The Word and Excel documents that contain your answers must be uploaded before the five-minute upload period expires.

Navigation Instructions

Open the Navigation Pane to jump to questions.

Press Ctrl+F, or click View > Navigation Pane:



1.

(8 points) MLB Life Insurance, a US-based insurer, is adopting VM-20 for a block of newly issued universal life with secondary guarantee insurance policies.

- (a) (6 points) Describe the assumptions used for the reserve methodologies by completing the table:

	Mortality	Mortality Improvement	Lapse
VM-20 Net Premium Reserve			
VM-20 Deterministic Reserve			
Liability for Future Policyholder Benefits under Long Duration Targeted Improvements (LDTI)			

The response for this part is to be provided in the Excel spreadsheet.

- (b) (2 points) Calculate the Scenario Reserve given the projected scenario below. Show all work.

Projection period	0	1	2	3	4	5	6	7	8	9	10
Statement Value of Assets (000s)	20	11	2	(7)	(3)	1	5	9	13	17	21
One-Year Treasury Rate (%)		1.34	0.65	0.14	1.03	1.08	0.74	0.59	1.05	0.57	0.48

The response for this part is to be provided in the Excel spreadsheet.

2.

(10 points) With respect to IFRS 17 discount rates:

- (a) (3 points) Evaluate the impact of each of the following changes to the product features of an annual renewable term (ART) product with respect to liquidity characteristics:

- (i) Replace the ART premium structure with a level premium structure

ANSWER:

- (ii) Add a term conversion option

ANSWER:

- (iii) Add a waiver of premium benefit

ANSWER:

- (iv) Add a return of premium rider that refunds 100% of the last three years of premiums upon termination

ANSWER:

- (b) (4 points) A company's liabilities are backed by a portfolio of 50% Government of Canada bonds and 50% corporate A bonds. You are given the following information:

Yield on Government of Canada Bond	5.00%
Corporate A spread	0.40%
Mortgage-backed securities spread	0.70%
Yield on credit default swaps	5.40%
Average market risk premium for equities and real estate	0.50%
Yield on mortgage-backed securities insured by Canada Mortgage and Housing Corporation	5.30%
Yield on mortgage-backed securities not insured by Canada Mortgage and Housing Corporation	6.00%

2. Continued

Calculate the discount rate under the following approaches. Show all work.

- (i) Top-down approach

The response for this part is to be provided in the Excel spreadsheet.

- (ii) Hybrid approach

The response for this part is to be provided in the Excel spreadsheet.

- (c) (3 points)

- (i) Explain why an ultimate risk-free rate is needed.

ANSWER:

- (ii) Describe the key principles and desirable characteristics when setting the ultimate risk-free rate.

ANSWER:

3.

(10 points)

(a) (5 points) Critique the following statements with respect to IFRS 17:

A. *All liability cash flows should be discounted at a rate that reflects the variability of cash flows.*

ANSWER:

B. *The risk adjustment reflects impacts of aggregation and therefore may reduce liability cash flows after accounting for diversification benefits.*

ANSWER:

C. *Insurance profits under IFRS 17 are calculated and earned at initial recognition.*

ANSWER:

D. *When the underlying contract uses the variable fee approach (VFA), the associated reinsurance contracts held must also use the VFA to avoid measurement mismatches.*

ANSWER:

E. *The premium allocation approach is a simplified alternative to the general measurement model and can only be used for contracts with coverage periods 12 months or less.*

ANSWER:

3. Continued

(b) (5 points) You are given the following about DJS, a Canadian life insurance company:

- DJS uses the cost-of-capital approach to determine its risk adjustment
- There are two product lines: life insurance and life annuities.
- The risk adjustment is calculated from annual cash flows.

Target rate of return on capital for life business	6%
Target rate of return on capital for annuity business	10%
Discount rate	5%

- Required capital for both life insurance and annuities is given on a quarterly basis over four years in the Excel spreadsheet.

(i) (3 points) Calculate the risk adjustment for DJS.

The response for this part is to be provided in the Excel spreadsheet.

(ii) (1 point) Describe the disadvantages of using the cost-of-capital approach for determining the risk adjustment.

ANSWER:

(iii) (1 point) Explain why the target return on capital may be different for life insurance and annuity contracts.

ANSWER:

4.

(7 points)

(a) (1 point) Critique the following statements:

A. Any business income earned by a non-resident insurer in Canada will always be treated as taxable income in Canada.

ANSWER:

B. A Canadian resident insurance company is subject to income tax on all worldwide income.

ANSWER:

(b) (2 points) A Canadian resident life insurer only does business in Canada and acquired a property on July 1, 2023.

You are given:

Cost of the property	10,000
Expenditures during the year	1,500
Income earned during the year	50
Average annual rate of interest	5%

Calculate the imputed cost for income tax reporting in 2023. Show all work.

The response for this part is to be provided in the Excel spreadsheet.

(c) (4 points) Explain how an insurance company would classify and treat each of the following for taxable income reporting:

(i) A corporate bond with fixed semi-annual coupons that will be held to maturity.

ANSWER:

(ii) A corporate bond with fixed semi-annual coupons held at fair value.

ANSWER:

4. Continued

- (iii) A share of a corporation where the insurer holds an immaterial interest.

ANSWER:

- (iv) Property acquired with the intent of generating rental income.

ANSWER:

5.

(10 points) ABC is a Canadian life insurance company that currently invests entirely in provincial bonds with a high degree of duration matching between assets and liabilities.

Upon the adoption of IFRS 17, ABC is considering changes to its investment strategy with the objective of increasing investment returns without increasing net income volatility.

(a) (7 points) Critique the following proposed actions.

- A. *Moving a portion of the portfolio from provincial to investment grade corporate bonds will increase returns. ABC can still maintain the same asset liability matching policy so net income volatility will not be affected.*

ANSWER:

- B. *Acquiring private debt would decrease the IFRS 17 discount rates to reflect the illiquid nature of these assets, which would increase liabilities.*

ANSWER:

- C. *High yield bonds are highly correlated with other fixed income assets and would introduce additional interest rate sensitivity.*

ANSWER:

- D. *Acquiring preferred shares will increase yields in a low interest rate environment. However, in a rising and volatile interest rate environment, they do not offer any advantages over higher yielding bonds.*

ANSWER:

5. Continued

- E. *Changing the investment strategy will change the length of the observable period of the IFRS 17 discount rate due to changes in the asset portfolio duration.*

ANSWER:

- F. *Moving a portion of the portfolio from provincial bonds to investment grade corporate bonds will have no impact on LICAT required capital if the assets and liabilities remain duration matched.*

ANSWER:

- G. *Establishing stable long-term assumptions for the ultimate period will decrease the liability duration and allow assets and liabilities to be duration matched without the need for derivatives.*

ANSWER:

5. Continued

(b) (3 points) You are given:

ABC is evaluating 3 proposed investment portfolios:

Asset Class	Current Portfolio		Proposed Portfolio 1		Proposed Portfolio 2		Proposed Portfolio 3	
	Allocation	Expected Return	Allocation	Expected Return	Allocation	Expected Return	Allocation	Expected Return
Provincial bonds	100%	2.60%	60%	2.60%	30%	2.60%	20%	2.60%
Corporate bonds	0%	3.40%	40%	3.40%	50%	3.40%	30%	3.40%
High yield bonds	0%	4.30%	0%	4.30%	20%	4.30%	25%	4.30%
Private debt	0%	4.25%	0%	4.25%	0%	4.25%	25%	4.00%
Total	100%	2.60%	100%	2.92%	100%	3.34%	100%	3.62%
Standard deviation of asset returns		10.00%		10.80%		11.40%		11.80%

Recommend which one of the 3 proposed portfolios should be implemented by ABC. Justify your response.

The response for this part is to be provided in the Excel spreadsheet.

6.

(9 points) Your company is buying a block of insurance business.

- (a) (4 points) Describe the treatment for each of the following items under Market Consistent Embedded Value (MCEV), fulfilment value (IFRS 17) and fair value (IFRS 13) by completing the table below:

	Market Consistent Embedded Value	Fulfillment Value (IFRS17)	Fair Value (IFRS 13)
Future Renewal of In-force Business			
Future New Business			
Expense Assumption			
Profit Emergence			

The response for this part is to be provided in the Excel spreadsheet.

- (b) (4 points) Using the financial information for the block of business given in the Excel spreadsheet:

- (i) Calculate the actuarial appraisal value. Show all work.

The response for this part is to be provided in the Excel spreadsheet.

- (ii) Calculate embedded value. Show all work.

The response for this part is to be provided in the Excel spreadsheet.

- (c) (1 point) Critique the decision to set the bid price for this block of business at the actuarial appraisal value.

ANSWER:

7.

(8 points)

(a) (4 points) Critique the following statements with respect to IFRS 17. Justify your response.

A. *For products with asymmetrical cash flows, the risk adjustment should include a provision to account for this risk.*

ANSWER:

B. *Cash flows that are assumed to vary with assumptions related to financial risk should be projected using returns on assets backing the cash flows.*

ANSWER:

C. *Insurance contracts have the same contractual service margin (CSM) at initial recognition when measured with either the variable fee approach or the general measurement model. The CSM will be different in subsequent periods under the two approaches.*

ANSWER:

D. *The ceded risk adjustment will always be proportional to the direct risk adjustment.*

ANSWER:

7. Continued

- (b) (4 points) You are given the following information for a potential 50% coinsurance arrangement.

Assume the net risk adjustment is calculated and apportioned between the direct and ceded amounts on the basis of the amount insured.

- (i) (3 points) Complete the following chart in the Excel spreadsheet:

	Direct	Ceded	Net
PV Premium		1,250	(1,695)
PV Claims		(1,250)	1,250
Best estimate liability		0	
Risk adjustment		(320)	320
CSM before reinsurance offset			125
Reinsurance offset (Loss Recovery Component)			
CSM after reinsurance offset			
CSM after zero floor			

The response for this part is to be provided in the Excel spreadsheet.

- (ii) (1 point) Recommend whether to proceed with the 50% coinsurance arrangement. Justify your response.

ANSWER:

8.

(10 points) MLL is a Canadian life insurance company.

(a) (6 points) You are given:

- Five years ago, MLL introduced a life insurance product, Super Life (SL), with high guaranteed cash surrender values, targeting the top 5% of income-earners in Canada.
- No other insurers offer a similar product to SL in the market.
- Approximately half of all Canadians in the target demographic have purchased an SL policy from MLL.
- MLL cedes 80% of SL's mortality risk to a single Canadian reinsurer and retains the remaining 20%.
- MLL follows a very low risk investment strategy with 70% invested in fixed income assets and the remaining 30% held in cash.

(i) Describe the three key exposures that can lead to systemic risk for MLL under the Holistic Framework from the IAIS.

ANSWER:

(ii) Recommend an approach for applying each of the three key elements of the Holistic Framework to manage systemic risk.

ANSWER:

8. Continued

(b) (4 points) MLL is launching a new participating whole life product.

- The launch date is January 1, 2025.
- MLL requires the project manager to secure reinsurance.
- The project manager has decided the following:
 - Reinsurers should provide quotes by the launch date
 - Reinsurers to be selected no later than January 31, 2025
 - Reinsurance treaties are to be fully executed by June 30, 2025
- Senior management will recommend to the Board a policy for determining dividends and managing the participating account
- As part of the annual year-end President's Report to the board, the CEO will include a disclosure on the fairness of proposed policyholder dividends and the allocation of investment income and expenses
- The Appointed Actuary will perform a triennial review of the fairness of any changes made to the participating product
- Policyholder disclosures on the management of the participating account will be based on excerpts taken from internal company documentation, with redactions from the legal team to remove proprietary details

Critique the proposed product development decisions with respect to the relevant OSFI guidelines. Justify your answer.

ANSWER:

9.

(8 points) XYZ Life previously sold only lapse supported whole life insurance and acquired a block of lapse sensitive term life insurance in 2024.

(a) (2 points)

(i) Describe the components of an economic capital calculation

ANSWER:

(ii) Describe the economic capital considerations pertaining to the term life acquisition.

ANSWER:

(b) (3 points) Critique each of the following statements pertaining to LICAT required capital. Justify your answer.

A. *XYZ's lapse risk required capital component will decrease due to the acquisition.*

ANSWER:

B. *For the purpose of determining the lapse designation, XYZ will test whole life and term life on a combined basis.*

ANSWER:

C. *XYZ is not allowed by regulation to acquire the term block if it would cause capital to decrease below the Internal Capital Target.*

ANSWER:

9. Continued

- (c) (3 points) Premium data, required capital components and capital factors are given in the Excel spreadsheet.

Calculate the Total Operational Risk Capital for XYZ as of December 31, 2024. Show all work.

The response for this part is to be provided in the Excel spreadsheet.

****END OF EXAMINATION****