Life Product Management

Exam ILALPM

Date: Wednesday, November 9, 2022

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 11 questions numbered 1 through 11 with a total of 100 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 = component1 + 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:
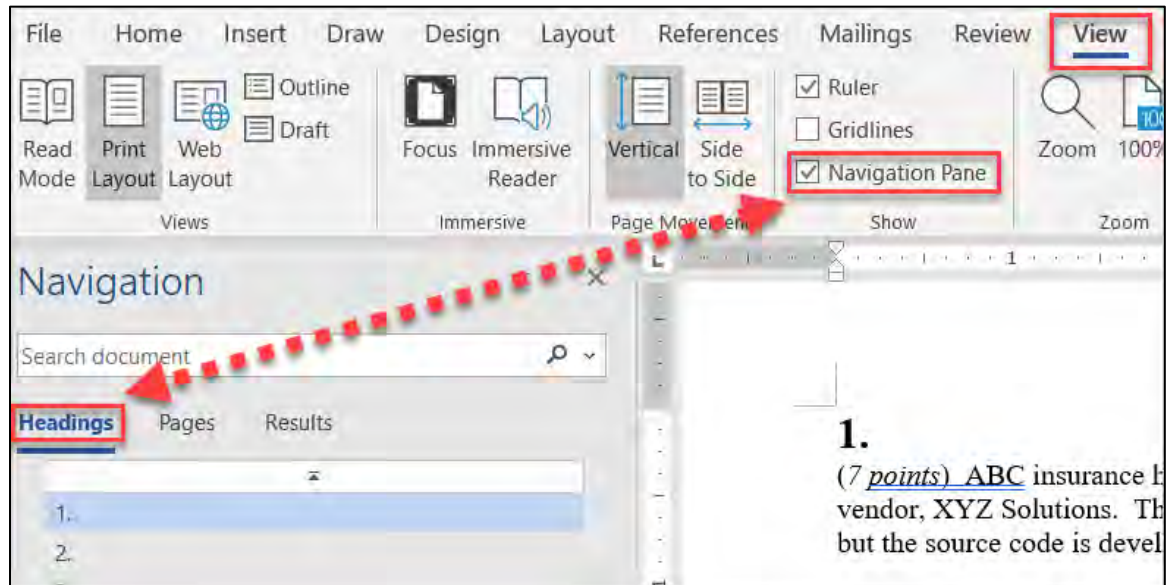
1

(*10 points*)

(a) (*1 point*) Assess the following statements based upon the Canadian Institute of Actuaries' (CIA) Standard of Practice.

> *A   An actuary should identify and select each assumption that is needed for the work including those that are prescribed or mandated by law.*

ANSWER:

> *B   The appropriate assumption for a matter, other than a model or data assumption, should be a continuation of the status quo.*

ANSWER:

(b) (*1 point*) Describe two considerations when determining premium persistency assumptions for a flexible premium Universal Life (UL) product.

ANSWER:

(c) (*3 points*) You are given the following three options for premium persistency assumptions for a new UL product with a No Lapse Guarantee rider:

- 100% premium persistency at all durations
- Premium persistency factors vary by duration
- Dynamic premium persistency assumptions that vary with the interest rate

(i) (*2 points*) Discuss advantages and disadvantages of the three structures for premium persistency assumptions above.

ANSWER:

(ii) (*1 point*) Recommend one of the three options. Justify your answer.

ANSWER:

1. Continued

(d)   (*4 points*) You are given the following information for a UL product:

Policies sold: 13,000
Discount Interest Rate: 3%
Average first year premium per policy: 4,000

| Duration | Beginning of Year Inforce Count | In Millions | | | | | Premium Persistency Ratio |
		Death Benefit	Surrender Benefit	Expenses	Reserve	Investment Income	
1	13,000	6.5	6.1	0.58	85	0.8	N/A
2	12,545	7.1	7.8	0.54	72	1.2	85%
3	12,106	8.4	11.2	0.23	61	1.0	95%
4	11,622	9.2	8.7	0.22	49	0.8	98%
5	11,100	7.2	9.1	0.21	38	0.7	100%

Simplifying assumptions:

- All policies were sold on the same issue date.
- Benefits and expenses occur at end of year.
- Premium is paid annually at beginning of year.
- There is no reinsurance.

Calculate the following items. Show all work.

(i)   (*1 point*) Total premium collected in years 1 through 5.

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

(ii)   (*2 points*) Total cash flows in years 1 through 5.

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

(iii)   (*1 point*) Present value of pre-tax solvency earnings.

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

1. **Continued**

(e)   (*1 point*)

(i)   Describe the differences between solvency earnings and pre-tax stockholder earnings.

> ANSWER:

(ii)   Explain the benefits of calculating profits based on earnings reserves instead of solvency reserves

> ANSWER:

2.

(*8 points*) A smoker propensity model has been developed by a third-party data analytics company.

The model relies upon data from social media, health and wellness programs, spending habits and other publicly available information in combination with the information provided from the insurance application.

The model will classify applicants as nonsmoker, smoker, or unknown.

(a)   (*2 points*) Outline potential benefits from using an accelerated underwriting model.

ANSWER:

(b)   (*3 points*) Explain key steps your company should take before implementing the smoker propensity model with confidence.

ANSWER:

(c)   (*3 points*) Your company would like to implement the use of a smoker propensity model to replace the smoking status question in the application and the urine sample.

(i)   (*1 point*) Explain the primary concerns with eliminating the use of the smoking status question and the urine requirement.

ANSWER:

(ii)   (*2 points*) Recommend an alternative that would address the primary concerns. Justify your answer.

ANSWER:

3.

(*9 points*) Your company has sold an Indexed Universal Life (IUL) product for several years. Lapses have been significantly lower than expected and profitability has not met projections. You are tasked with a review of the lapse-supportedness of this product.

(a)   (*1 point*) Describe a method for determining if the IUL product is lapse-supported.

> ANSWER:

(b)   (*1 point*) Explain why lapse-supported products have caused profitability issues for some companies.

> ANSWER:

(c)   (*4 points*) Critique each of the following statements with respect to ASOP 2 – Non-Guaranteed Elements for Life Insurance and Annuity Products:

A.   It is acceptable to increase non-guaranteed charges on in-force policies to recoup past losses of the IUL product.

> ANSWER:

B.   To ensure that the newly issued policies are profitable, the company may increase planned non-guaranteed charges on them.

> ANSWER:

C.   A good method to redesign charges on inforce policies is to evaluate each policy in terms of its past profitability, and create new policy classes with different non-guaranteed rates to rebalance product profitability.

> ANSWER:

D.   It is not necessary to document the determination of non-guaranteed elements because that documentation could be used against the company in future litigation.

> ANSWER:

3. **Continued**

(d) (*3 points*) You have been asked to analyze why lapse rates have not materialized as expected.

(i) (*1 point*) Describe two hypotheses for why life insurance policyholders decide to lapse a product.

ANSWER:

(ii) (*2 points*) Identify two reasons lapses may be lower than expected on the IUL product. Justify your answer.

ANSWER:

4.

(*10 points*) ABC Life currently has Universal Life products without secondary guarantees. The company is developing a new lapse-supported Universal Life product that has a secondary guarantee (ULSG).

(a)   (*1 point*) List four examples of guaranteed elements that are relevant to the new ULSG product.

ANSWER:

(b)   (*1 point*) The industry data shows there is an equal likelihood that the shock lapse could be 50% or 60%.

Recommend an appropriate shock lapse. Justify your answer.

ANSWER:

(c)   (*2 points*) The current Universal Life product used the Blended Method to end the mortality table at age 120.

(i)   Describe three other approaches that have been used to end a mortality table.

(ii)   Describe the impact of each approach on the shape of mortality rates at the oldest ages.

ANSWER:

4. Continued

(d)   (*3 points*) ABC life has adopted VM-20.

(i)   (*1 point*) Describe the VM-20 reserve calculation.

> ANSWER:

(ii)   (*2 points*) Explain how each of the following assumption changes will impact the reserve.

A. Emerging company experience for mortality will be higher than expected.

> ANSWER:

B. Emerging company experience for lapses will be lower than expected.

> ANSWER:

C. Prescribed mortality margins will decrease.

> ANSWER:

D. Actual Treasury yield rates up to the valuation date will increase.

> ANSWER:

4. **Continued**

(e) (*3 points*) The marketing department recommends adding an accelerated benefit chronic illness rider to the ULSG product.

(i) (*1 point*) Describe the chronic illness rider.

ANSWER:

(ii) (*2 points*) Recommend four ways that ABC Life can limit its risk of incurring significant losses on the chronic illness rider. Justify your answer.

ANSWER:

5.

(*8 points*)

(a)   (*1 point*) List the advantages and disadvantages of using predictive analytics over the traditional approach when setting assumptions.

ANSWER:

You are preparing the data for use in building a predictive model.

(b)   (*1 point*) Describe the steps you would take to collect and organize the data.

ANSWER:

5. Continued

(c)   (*3 points*) Explain how each of the following should be addressed during the preparation of the data for a study:

(i)   Administration systems were updated, fixing an issue where crediting interest rates for a small set of policyholders were not being updated from their original values.

> ANSWER:

(ii)   Annuity payout offering transitioned from 'Life with 10 years certain' to 'Life only' over the study period.

> ANSWER:

(iii)   Sales channels expanded to include internet sales.

> ANSWER:

(iv)   Target market shifted towards individuals with high net worth.

> ANSWER:

(v)   Charges were changed five years ago from front-end loading to back-end loads.

> ANSWER:

(vi)   For the last three years, the focus has been on sales campaigns offering deposit and persistency bonuses.

> ANSWER:

5. **Continued**

    (d)   (*3 points*) Interpret how policyholder behavior, using decision shortcuts, may impact each of the following possible scenarios:

        (i)   A change to tax policy that allows tax-free withdrawals from policies.

> ANSWER:

        (ii)   Advertising of fund performance highlights return volatility instead of historical returns.

> ANSWER:

        (iii)   Default annuitization options change from opt-in to opt-out at option dates.

> ANSWER:

6.

(*9 points*)

(a) (*2 points*) Describe four of the six areas identified by the Swiss Re Institute *sigma* publication that life insurers can leverage to effectively manage their in-force business.

> ANSWER:

(b) (*2 points*) Critique each of the following statements:

A. Protection-oriented products do not require repricing in a low interest rate environment.

> ANSWER:

B. There are limited benefits associated with offering buyouts of in-force policies.

> ANSWER:

C. Deviations in lapse experience from expectations can impact the insurer's ability to match the durations of their assets and liabilities.

> ANSWER:

D. Excess reserve financing is primarily used to free up trapped capital for term life (Regulation XXX) products.

> ANSWER:

6. Continued

(c)   (*5 points*) In order to improve the risk profile of new level-premium term product with annual renewable term (ART) rates after initial term, your team has been tasked with reducing post-level term lapsation.

        (i)   (*1 point*) Describe anti-selective mortality on a level-premium term plan.

ANSWER:

        (ii)   (*4 points*) Compare and contrast the four approaches companies are weighing to retain healthy lives after reaching their post-level term.

ANSWER:

7.

(*9 points*)

(a)   (*1 point*) Describe the four-step process a company follows in setting dividends.

> ANSWER:

(b)   (*4 points*) Assess the appropriateness of each of the following statements to ensure dividend allocations are "fair and equitable":

   A. *The insurer may introduce distinctions in the dividend scale that benefit "better" lives which contribute more earnings over other lives which produce less earnings.*

> ANSWER:

   B. *The insurer does not need to consider marketing materials and sales illustrations that were used to sell its participating policies since dividend scales should be based on actual results, not initial expectations.*

> ANSWER:

   C. *The insurer should reflect differences in experience between different classes of policyholders, even if those differences result in complex formulas.*

> ANSWER:

   D. *With rising interest rates, the company has suggested that switching the interest rate strategy from portfolio yield to new money would not cause issues with the regulator.*

> ANSWER:

7. Continued

(c) (*4 points*) Evaluate how each of the following scenarios are likely to affect the dividend scale of a company that uses the three factor formula (Contribution Method or Asset Share Method formula):

A. Mortality experience has been higher than normal for the last year but is not anticipated to be a long-term trend.

> ANSWER:

B. High inflation has caused allocated expenses to be substantially higher than in past five years.

> ANSWER:

C. The insurer has been reporting increasing earnings as its investment portfolio earned rate has been substantially higher than the reserve valuation interest rate.

> ANSWER:

D. The insurer has been reporting decreasing earnings as assets are invested at rates lower than the current portfolio rate. Management has decided to peg the dividend rate to avoid a loss in sales.

> ANSWER:

8.
(*12 points*)

(a) (*3 points*) Explain the benefits and/or limitations of the following types of reinsurance for a ceding company:

   (i)   Stop Loss

   (ii)   Catastrophe Coverage

   (iii)   Spread Loss

ANSWER:

(b) (*3 points*) An insurance company is considering the use of a Stop Loss agreement for a block of life insurance policies to provide protection from a future pandemic.

   A reinsurer has provided two options with the same price of 100,000 for one year.

   Assume that the specific individual life limit has been applied when calculating total claims for both options.

	Option A	Option B
Maximum Retention	100,000 per life	100,000 per life
Expected Claims	10,000,000	10,000,000
Attachment Point	105% of expected claims, subject to a minimum of 10,500,000	115% of expected claims, subject to a minimum of 11,500,000
Limits	90% of all covered claims in excess of the attachment point amount, up to a total maximum of 1,000,000, with a maximum on any single life of 100,000	90% of all covered claims in excess of the attachment point amount, up to a total maximum of 3,000,000, with a maximum on any single life of 100,000

8. Continued

      (i)   Calculate the net claims paid by the company under both options assuming actual claims for the year are 12,000,000.

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

      (ii)   Recommend which option the company should proceed with in preparing for a future pandemic. Justify your answer.

> ANSWER:

(c)   (*2 points*) Explain the issues and concerns a reinsurer will have with writing Stop Loss coverages for life insurance.

> ANSWER:

(d)   (*2 points*) Rather than proceeding with the Stop Loss options, the ceding company would like to use a coinsurance solution for an inforce block of Universal Life insurance policies.

      Explain the disadvantages that a ceding company would have in coinsuring an inforce block of interest sensitive life insurance policies.

> ANSWER:

(e)   (*2 points*) Explain how selling the block would be advantageous or disadvantageous over reinsurance.

> ANSWER:

9.
(*10 points*)

Your company sells Universal Life (UL) product with the following features:

- Current credited rate of 3%, guaranteed for 5 years
- Minimum guaranteed rate of 1%
- No surrender charges and no partial withdrawal fees

The current target asset mix for the investment portfolio is:

- 50% corporate bonds
- 25% real estate
- 25% equities

(a)   (*2 points*) List the principles that underlie the establishment of best practices for the management of liquidity risk within an insurance company.

> ANSWER:

9. Continued

(b) (*4 points*) Critique the following elements of the company's liquidity management policy:

(i) Corporate bond cash flows will be the primary source of liquidity for surrender benefits.

ANSWER:

(ii) Premiums received will be used to provide additional liquidity should surrender benefits exceed expected.

ANSWER:

(iii) The company will maintain a Liquidity Coverage Ratio of 100% over a 1-month time horizon under two stress scenarios:

A. Surrender benefits 20% higher than expected

ANSWER:

B. Death benefits 10% higher than expected

ANSWER:

(c) (*4 points*) Propose changes to the UL product design to address liquidity risks. Justify your answer.

ANSWER:

10.
(*10 points*)

(a)   (*2 points*) Define the following dedication strategies:

   (i)   Immunization

ANSWER:

   (ii)   Cash Flow Matching

ANSWER:

(b)   (*6 points*) You have the following performance report for an asset portfolio:

Asset Class	Book Value	Market Value	Duration	Dollar Duration
Short term bonds	125,000	100,000	1.50	1,500
Medium term bonds	175,000	200,000	5.25	10,500
Long term bonds	95,000	100,000	9.75	9,750
Liability dollar duration				8,000
Duration variance (%)				-6.6%

The objective is to manage the asset portfolio to within +/- 10% of the liability dollar duration.

10. Continued

Assess the effectiveness of each of the following proposed changes to the asset portfolio based on the objective:

(i) Replacing medium term bonds with 50/50 split of short and long term bonds on a book value basis.

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

(ii) Replacing 25% of the short-term bonds with long term bonds on a book value basis.

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

(iii) Rebalancing to an equal split among short, medium, and long-term bonds on a book value basis.

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

(c) (*2 points*) Explain how leverage can be used to increase an asset portfolio's rate of return.

ANSWER:

11.

(*5 points*) TPL Life is an institutional investor considering the following allocation of their assets backing their Universal Life (UL) products for the next five years to generate stable cash flows:

- A 30-year mortgage-backed security (MBS) issued by Fannie Mae that has been heavily refinanced in the past.

or

- A 30-year Corporate Bond paying a coupon rate of 8%.

(a)   (*1 point*) Calculate the Conditional Prepayment Rate (CPR) if the Single Monthly Mortality (SMM) rate is 0.008.

> ANSWER:

(b)   (*4 points*) Critique the following statements:

A.   If prevailing mortgage rates are 50bps lower, investing in the 30-year corporate bond is a better choice.

> ANSWER:

B.   If TPL Life wishes to minimize exposure to reinvestment risk, investing in the 30-year MBS is a better choice.

> ANSWER:

C.   The MBS is more likely to produce more volatile investment performance since it has been heavily refinanced in the past and it carries a higher risk for default.

> ANSWER:

END OF EXAMINATION