Life Product Management

Exam ILALPM

Date: Wednesday, November 6, 2024

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 7 questions numbered 1 through 7 with a total of 60 points.

   The points for each question are indicated at the beginning of the question. Questions 6 and 7 pertain to the Case Study.

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 unique candidate number in the filename. To maintain anonymity, please refrain from using your name and use your candidate number instead.

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:
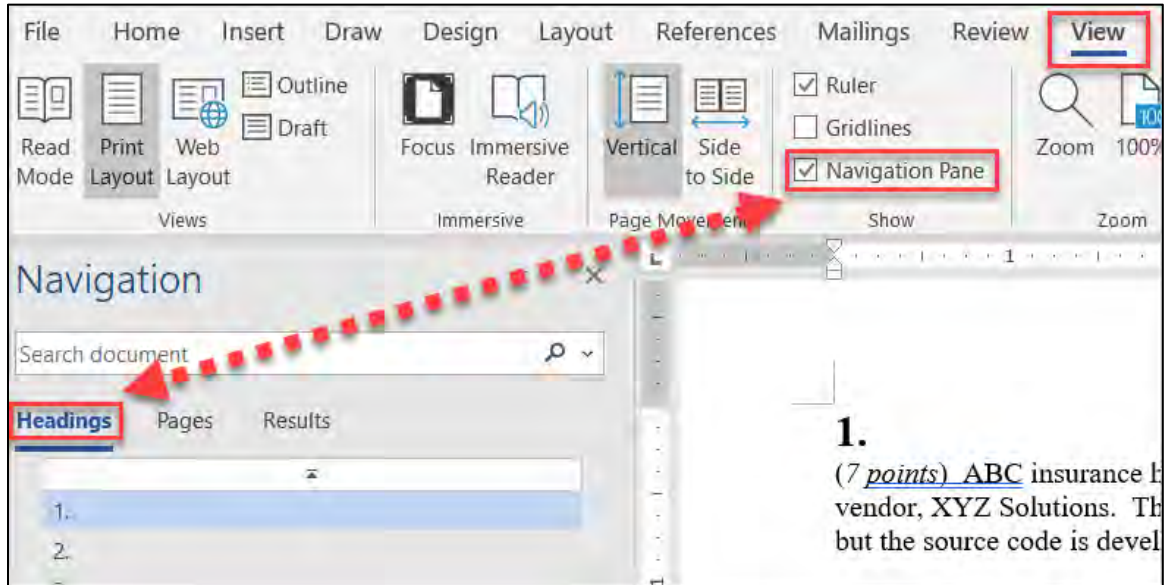
CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

1.

(*8 points*) You are an actuary at JET Life, a Canadian life insurance company. You have prepared the following illustration for an inforce whole life policy:

Policy Information:

Product	ExcelLife 2021
Prepared for	Jane Doe
Policy Number	12345EX
Issue Age	40
Class	Female, Standard Non-Smoker
Issue Date	1/1/2022
Inforce Illustration Date	1/1/2024
Death Benefit	100,000
Initial Monthly Premium	500
Dividend Option	Paid-Up Additions
Policy Loan Used	Yes

Policy Values (in thousands):

Policy Year	Age	Premium	CSV	Death Benefit	Annual Dividend
1	40	6	0.00	100	0.10
2	41	6	0.00	100	0.15
3	42	6	0.23	100	0.20
…					
25	64	6	22.95	100	1.50
26	65	0	25.33	100	1.70
27	66	0	28.01	100	2.00

Illustration Scenarios (in thousands):

Policy Year	Age	Primary Scenario		Second Scenario	
		Cash Surrender Value	Annual Dividend	Cash Surrender Value	Annual Dividend
1	40	0.10	0.10	0.20	0.20
2	41	0.25	0.15	0.51	0.30
3	42	0.46	0.20	0.92	0.40
…					
25	64	22.95	1.50	45.89	3.00
26	65	25.33	1.70	50.67	3.40
27	66	28.01	2.00	56.19	4.00

1. **Continued**

(a) (*3 points*) Identify two missing or incomplete elements of each of the following sections of the illustration in accordance with CLHIA Guideline G-6:

(i) Policy Information

ANSWER:

(ii) Policy Values

ANSWER:

(iii) Illustration Scenarios

ANSWER:

(b) (*2 points*) Critique the following excerpts from JET Life's illustration in accordance with CLHIA Guideline G-6:

A. *The illustrated scenarios above represent reasonable projections of possible scenarios. The actual value of your policy may vary but will likely be higher than the primary scenario.*

ANSWER:

B. *Illustrated dividends are based on the current dividend scale as of the date of this illustration and cannot be guaranteed.*

ANSWER:

C. *Dividend accumulations will be credited an interest rate to be determined by the insurer annually.*

ANSWER:

1.   Continued

D.   *The scenarios shown in this illustration are consistent with those developed at the time of the pricing of your policy.*

ANSWER:

(c)   (*3 points*) Contrast how the following elements of an illustration differ between Canada and the US.

(i)   The role of the actuary preparing an illustration

ANSWER:

(ii)   Illustration of non-guaranteed elements

ANSWER:

(iii)   Mortality assumptions

ANSWER:

2.

(*9 points*) SLAC Life offers a Registered Index-Linked Annuity (RILA) product with a 1-year term crediting structure, featuring a 10% buffer rate and a 15% cap rate on the S&P 500 index. SLAC sets these rates once a month.

SLAC has previously outsourced the hedging of the RILA product to an external firm due to small production and is setting up a hedging program internally to support anticipated growth.

(a)   (*3 points*)

(i)   Describe two potential challenges SLAC will face in implementing effective hedging strategies.

ANSWER:

(ii)   Describe the hedge position(s) SLAC may or would need to take to fully immunize market risk under each of the following:

- The crediting structure being currently offered
- A 10% floor instead of the buffer

ANSWER:

(b)   (*3 points*) Critique the following statements from the SLAC pricing report:

A.   *SLAC is required to perform an interim value calculation on RILA contracts only to determine the death benefit and annuitization amount at any time.*

ANSWER:

2. **Continued**

      B.   *The market value approach to the interim value calculation is preferable because it provides a method that is easier for advisors, contract holders, and regulators to understand. However, because of its simplicity it maximizes the volatility in financial statements of the company.*

> ANSWER:

      C.   *The interim value lock feature can either automatically lock a prespecified target interim value set when the contract is issued or give an option to the contract holder to manually lock the interim value as of the last market close.*

> ANSWER:

      D.   *There is no risk to SLAC to offer a value lock feature since all the information is known regarding the timing or target of the interim value to lock.*

> ANSWER:

(c)   (*3 points*) You are given the following information for four policies:

Policy	Product Type	Investment Option
1	Fixed Indexed Annuity	70% participation strategy only, annual point-to-point
2	Variable Annuity	100% index fund
3	Fixed Indexed Annuity	4% cap, annual point-to-point
4	Registered Index-Linked Annuity	15% cap and 10% buffer, annual point-to-point

2. **Continued**

- All investment options are tied directly to the S&P 500 Index
- Assume no charges

Year	S&P 500 Index
0	1,000
1	1,160
2	1,200
3	1,085
4	1,130
5	900

Calculate the account value progression through the end of year 5 for each of the four policies, assuming an initial deposit of 1,000. Show all work.

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

3.

(*6 points*) EFG Life Insurance Company would like to use predictive analytics to improve its underwriting risk selection and its experience studies.

You are reviewing a consultant's report on the potential value of predictive analytics.

(a)   (*2 points*) Critique each of the following statements from the consultant's report:

A.   *Predictive analytics will allow EFG to introduce new factors in underwriting without having to rely on traditional A/E results.*

ANSWER:

B.   *Predictive analytics will help EFG deal with the lack of experience data at older ages.*

ANSWER:

C.   *The refined assumptions from predictive analytics may be applied easily in both the pricing models and the valuation models.*

ANSWER:

(b)   (*2 points*) EFG is developing a predictive model to improve its underwriting process. They have begun the model building process by collecting and organizing the data.

Describe the four activities in the data preparation process.

ANSWER:

(c)   (*2 points*) EFG is concerned about anti-selection from applicants and their advisors when predictive modeling is used for underwriting.

Describe two actions EFG can take to guard against anti-selection.

ANSWER:

4.

(*8 points*) ORD Life is looking to improve profitability on their inforce business.

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

A.   *ROE is an accounting-based metric that provides a product level view of earnings performance. It is less volatile than book value per share. There is a strong correlation between ROE and price-to-book ratio.*

> ANSWER:

B.   *Operating margin is an accounting-based metric and captures the general trends in earnings. It reflects the timing of profits and losses and the relative riskiness of the business. Statutory operating margins vary by country due to product mix and regulatory regimes.*

> ANSWER:

C.   *Market Consistent Embedded Value (MCEV) values liabilities using book value and assets on a market-consistent value basis. The MCEV consists of two components: value of in-force business (VIF) and required capital.*

> ANSWER:

(b)   (*3 points*) Describe two methods to improve consumer value or long-term profitability within each of the following areas of inforce management:

(i)   Steering liability portfolios

> ANSWER:

4. Continued

    (ii)   Increasing persistency

> ANSWER:

    (iii)   Improving claims management

> ANSWER:

(c)   (*3 points*) ORD Life's term products have a level premium period followed by increasing premiums in the post-level term (PLT) period.

    A.   Describe three approaches to improve profitability during the PLT period.

> ANSWER:

    B.   Discuss the advantages and disadvantages of each approach.

> ANSWER:

5.

(*11 points*) ABC Life, a US insurance company, issues a whole life policy:

Face amount	750,000
Annual premium rate per 1,000	15
Annual policy fee	25

Assume:

- Premium tax rate is 2% for all years
- There are no surrenders, lapses, or deaths
- The accounting is on a US statutory basis

You are given:

ABC Statutory Gain from Operations (no reinsurance)	Year 1	Year 2
Premiums	11,275	11,275
Investment Income on Surplus	80	40
Investment Income on Reserves	0	36
Total Revenue	**11,355**	**11,351**
Claims	0	0
Surrenders	0	0
Reserve Increase	450	4,050
Total Benefits	**450**	**4,050**
Commissions	10,148	1,128
Acquisition	1,000	0
Maintenance	30	30
Premium Tax	226	226
Total Expenses	**11,403**	**1,383**
Gain from Operations	**-498**	**5,918**

ABC is evaluating two reinsurance proposals from XYZ Re:

- Proposal 1:   80% Coinsurance

- Proposal 2:   YRT with an initial ceded face amount of 600,000

5. **Continued**

You are given:

- XYZ Re acquisition expenses are 40 per ceded policy
- XYZ Re maintenance expenses are 20 per ceded policy annually
- ABC and XYZ Re each have an initial surplus of 1,000 and an investment rate of return of 8% in all years
- The reserves per unit are the same for the ceding company and the reinsurer
- NAAR is defined as face amount – mean reserves

	Year 1	Year 2
Mean Reserves per 1,000	0.60	6.00
YRT Mean Reserves per 1,000	0.70	0.90
YRT Reinsurance Premium Rate per 1,000	0.65	0.80

(a) (*2 points*) Explain the advantages and disadvantages of each reinsurance proposal for ABC.

ANSWER:

(b) (*1 point*) Explain why the change in XYZ Re's Gain from Operations in year 1 may not mirror the change in ABC's Gain from Operations in year 1 under either proposal. No calculations are required.

ANSWER:

(c) (*4 points*)

(i) Determine the minimum first year expense allowance as a percent of ceded premium that would be needed in Proposal 1 for ABC to avoid a negative Gain from Operations in year 1. Show all work.

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

(ii) Determine whether XYZ Re could afford to pay this first year expense allowance without exhausting all of its surplus in year 1. Show all work.

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

5. Continued

(d) (*4 points*) ABC would like to avoid additional surplus strain in the first two policy years. To help meet this objective, ABC plans to ask XYZ Re to offer a ZFT scale (zero first year YRT premium) instead of the proposed premium scale, which requires an increase in the YRT rates in subsequent years to offset the cost.

Determine the maximum increase that ABC could accept in the second year YRT premium, as a percent of ceded face per 1,000. Show all work.

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

6.

(*10 points*) You have been asked to reprice TTPD's 20-pay whole life product with competitive premiums and a return of premium rider to be marketed in the qualified market using an assumption of 60% male and 40% female.

(a)   (*4 points*) Critique each of the following statements:

A.   *There is no reason to worry about the product being lapse supported because it's a limited-pay whole life product.*

> ANSWER:

B.   *To determine relevant characteristics of the product, only the chief operating officer and chief actuary were interviewed on how the product will be administered. They were asked about limitations in administrative or valuation systems that could impact the product design or pose operational risks. There was no reason to interview the chief marketing officer.*

> ANSWER:

C.   *For a non-participating whole life product, cash values are fixed at issue, making current interest rates irrelevant to the consumer.*

> ANSWER:

(b)   (*3 points*) Calculate the duration 20 mortality rate for issue age 45 using the mortality rates provided in the case study (see the Excel spreadsheet.) Show all work.

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

(c)   (*3 points*) The chief actuary has proposed using indeterminate premiums in the product design to reduce the product's risk.

(i)   Explain how the proposal will reduce risk.

> ANSWER:

6. **Continued**

        (ii)   Describe three elements of ASOP 2, "Nonguaranteed Elements for Life Insurance and Annuity Products", that TTPD should consider in developing an indeterminate premium whole life product.

ANSWER:

Questions 6 and 7 pertain to the Case Study.
Information in the shaded region comes directly from the Case Study.
Each question should be answered independently.

7.

(*8 points*) You are given the following information with respect to the new end-to-end accelerated underwriting process:
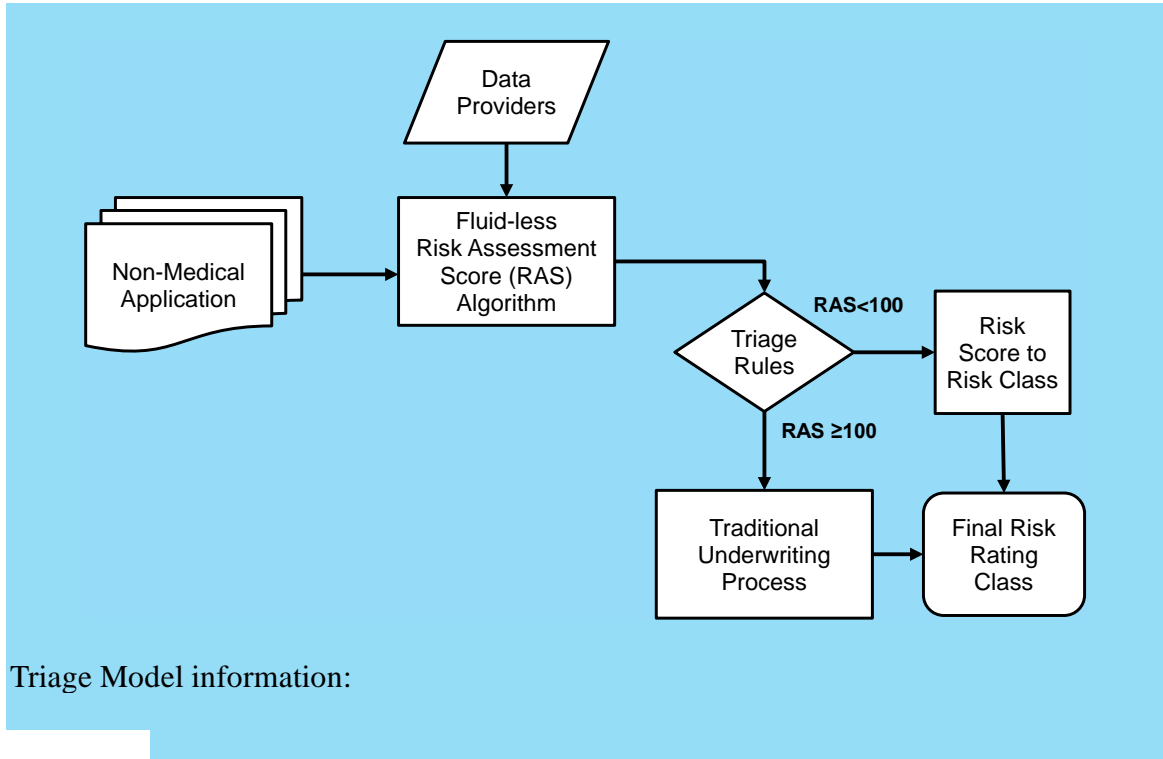
Triage Model information:

- RAS scores less than 75 are best preferred.

- RAS scores at least 75 and less than 100 are second best preferred.

- RAS results greater than or equal to 100 are triaged to the traditional underwriting process for assessment of standard or substandard extra risk classes (standard non-tobacco, standard tobacco, substandard non-tobacco, decline).

- The traditional underwriting process uses underwriters to assess the final risk classification.

- The traditional underwriting process uses a paramedical examination and fluids collected include blood, urine, and saliva tests.

You are given the following additional information:

7. **Continued**

- The Risk Assessment Score (RAS) algorithm uses a model to predict the expected mortality of the applicant based on the nonmedical application and, where available, input from various data providers as follows:

Nonmedical Application Questions	RAS Predictive Model's Reliance on Data Providers
Tobacco in the last twenty-four months	Uses population-level open data to validate tobacco use responses and predicts smoker propensity.
Hospitalized in the last 45 days	None; model will automatically decline
Hospitalized between 2020-22 due to Covid-19	Predicts comorbidities and associated mortality based on population-level open data from 7 major urban centers
Alcohol and drug use	Uses social media to verify

(a) (*2 points*)

(i) List three non-traditional data sources used in the life insurance underwriting process.

ANSWER:

(ii) Describe considerations for use of these non-traditional data sources according to the NAIC Life Accelerated Underwriting in Life Insurance Educational Report.

ANSWER:

(b) (*4 points*) With respect to the new end-to-end accelerated underwriting process:

(i) Explain how risk classes are determined by the triage process vs. the historical traditional underwriting process.

ANSWER:

7. Continued

    (ii)   Explain how regulatory considerations may impact the use of data inputs and predictive models/algorithms.

> ANSWER:

    (iii)   Critique the triage process of using only RAS scores to sort applicants into preferred risks or to be routed to the traditional underwriting process. Justify your response.

> ANSWER:

    (iv)   Critique the triage process of routing only applicants assessed as standard and below risk classes to the traditional underwriting process. Justify your response.

> ANSWER:

(c)   (*2 points*) Sales under the new program have been 20% less than expected. This is mainly due to fewer preferred risk class placements than expected. Early A/E studies reveal preferred classes overall are 110% of A/E mortality whereas the standard and substandard classes are exhibiting 99% A/E. A higher percentage of accidental deaths, anti-selective cancer claims and cardiovascular deaths has occurred than was experienced with the fully underwritten process.

Recommend changes to the accelerated underwriting process to improve preferred risk class placements and improve the mortality A/Es. Justify your answer.

> ANSWER:

END OF EXAMINATION