

# Exam ILALPM

Date: Wednesday, May 8, 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.

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.

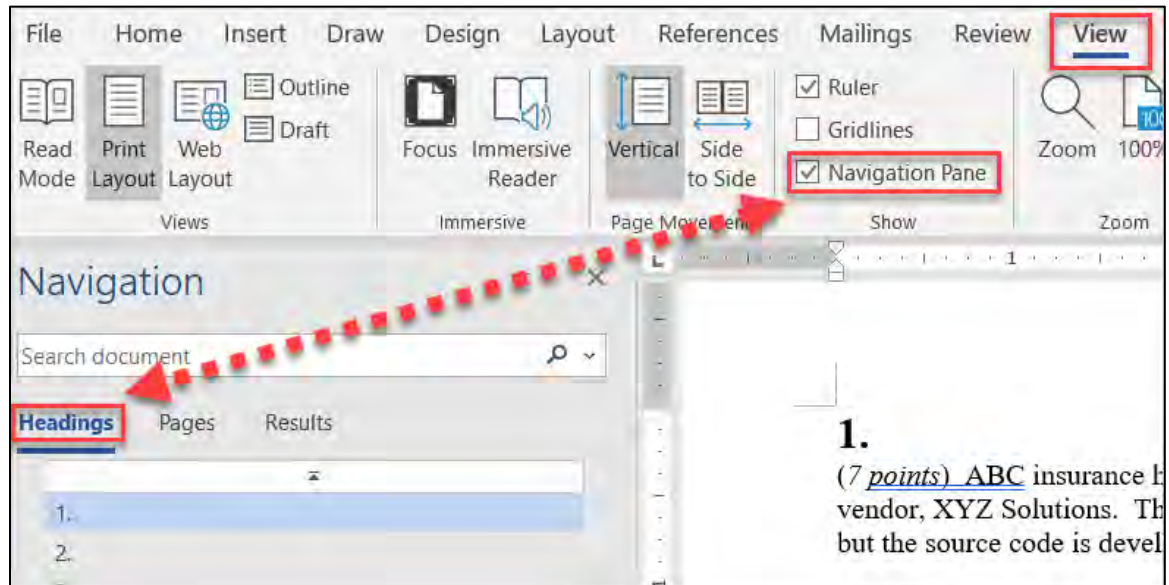
### Written-Answer Instructions

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,  $\beta_1$  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.

(10 points) ABC Life Insurance is a small insurance company that specializes in individual fixed annuities (FA), whole life (WL), and universal life (UL) products. ABC Life is evaluating expanding into the pension risk transfer (PRT) market or structured settlement market. The market is now entering a rising interest rate environment after a period of sustained low interest rates.

(a) (5 points) Compare and contrast the following pricing considerations for retirement annuities and structured settlements.

(i) Asset Return/Interest Rates

ANSWER:

(ii) Longevity/Mortality

ANSWER:

(iii) Annuitant Behavior

ANSWER:

(iv) Expenses

ANSWER:

(v) Liquidity

ANSWER:

## 1. Continued

(b) (3 points) Compare the impact of a sustained low interest rate environment against a rising interest rate environment for each of the following:

(i) ABC Life's inforce FA block

ANSWER:

(ii) ABC Life's inforce life insurance block

ANSWER:

(iii) Pricing of future PRT deals and structured settlements

ANSWER:

(c) (2 points) Recommend one of the following business strategies for ABC Life. Justify your response.

Strategy A: Enter the PRT market

Strategy B: Enter the structured settlement market

Strategy C: Focus on growing the WL business

Strategy D: Focus on growing the FA business

ANSWER:

## 2.

(11 points)

(a) (5 points) Recommend a method of reinsurance for each of the following. Justify your answers.

- (i) Company A is looking to free up surplus for the issuance of a new line of universal life (UL) products. Company A would like to run off its old whole life (WL) block and is looking to reduce the size of its balance sheet immediately.

ANSWER:

- (ii) Company B is looking to mitigate its lapse risk on the fixed annuity business by transferring 30% of its lapse risk exposure using reinsurance without reducing its total invested assets or reserves. Company B also prefers to have frequent cash flow settlements.

ANSWER:

- (iii) Company C would like to reduce 90% of its mortality risk on its UL business while retaining all other risk. Company C is looking for a fast and efficient solution.

ANSWER:

- (iv) Company D discovered if the surrender rate on their whole life block were to exceed 35% in any given year, the company may not have sufficient cash on hand to pay out the surrender benefits. The block has profitable experience with surrender rates around 3%, and Company D does not seek to give up much profit generated from the mortality and investment experience.

ANSWER:

## 2. Continued

- (v) Company E's investment yield ranks among the highest in the industry due to its aggressive investment strategy and utilization of alternative assets, but its mortality and lapse experience has been undesirable on its WL, term, and UL business. Company E would like to transfer 40% of its underwriting risk using reinsurance without altering its investment portfolio.

ANSWER:

UWU Life is looking to reinsure a block of business with the following information as of reinsurance effective date:

Reserve inforce	2,200,000,000
Total invested asset	2,400,000,000

You are given the following reinsurance quotes:

	Quota share	Structure	Initial allowance
<b>Quote 1</b>	80%	Modified Coinsurance	9% of reinsurance premium
<b>Quote 2</b>	75%	Coinsurance	10% of reinsurance premium
<b>Quote 3</b>	75%	Funds Withheld Coinsurance	10% of reinsurance premium

- (b) (4 points) Calculate the following for each of the three quotes above:

- (i) Initial reinsurance premium

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

- (ii) Initial amount due from UWU Life to the reinsurer

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

- (iii) UWU Life's net reserve as of the reinsurance effective date

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

## 2. Continued

- (iv) UWU Life's invested assets as of the reinsurance effective date

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

Show all work.

- (c) (2 points) XYZ is considering reinsurance to improve capital efficiency on their long term care block. XYZ is evaluating the use of the following reinsurance structure which combines modified coinsurance and coinsurance:

	<b>Modified Coinsurance Component</b>	<b>Coinsurance Component</b>
<b>Initial Quota Share</b>	90%	10%
<b>Initial Allowance</b>	10%	10%

Critique the following characteristics of the proposed reinsurance structure with respect to the NAIC's model regulations on acceptable risk transfer:

- (i) *Based on recent asset performance, XYZ will use a constant modified coinsurance interest rate of 5%.*

ANSWER:

- (ii) *XYZ will use assumption reinsurance to maximize the value of the transaction but seeks the option to recapture the business in 5 to 10 years if experience improves.*

ANSWER:

- (iii) *XYZ is looking to receive an experience refund at the end of every month, settled on a cash basis.*

ANSWER:

- (iv) *XYZ will adjust the quota shares of modified coinsurance and coinsurance to minimize the size of periodic cash settlements.*

ANSWER:

### 3.

(9 points) PQR has an inforce block of universal life (UL) business that is subject to annual illustration testing.

(a) (4 points) Critique each of the following statements with respect to ASOP 24: Compliance with the NAIC Life Illustrations Model Regulation.

A. *The illustration actuary can assume expense improvement into the future if the improvement is proved to be significant and ongoing.*

ANSWER:

B. *Any experience factor needs to be based on actual experience, either the company's own experience or a combination of industry experience and the company experience, and changes to the company's business practice may not be considered.*

ANSWER:

C. *The requirement for the self-support test is that, at every illustrated point in time starting at a policy anniversary specified by the NAIC Life Illustrations Model Regulation, the accumulated value of all policy cash flows, when using experience assumptions underlying the currently payable scale, should be equal to or greater than the illustrated policyholder value.*

ANSWER:

D. *Policy forms that can never develop nonforfeiture values are exempt from both the self-support test and the lapse-support test.*

ANSWER:

(b) (3 points) Describe three specific actions PQR could take to improve profitability of the inforce UL block.

ANSWER:



### 3. Continued

- (c) (2 points) PQR found that some inforce policies have been sold to life settlement companies. Describe two reasons such sales could negatively impact PQR's profitability.

ANSWER:

#### 4.

(7 points)

- (a) (2 points) DEF Life sells income payout annuities and term life insurance. DEF Life would like to leverage the mortality experience from their immediate annuity business to price structured settlements.

Evaluate this approach.

ANSWER:

- (b) (5 points) Explain how each of the following components of an accelerated underwriting (AUW) program helps to achieve mortality at a level closer to a fully underwritten process versus nonmedical underwriting:

- Smoker propensity model
- Risk score model
- Prescription (Rx) data
- Medical records
- Triage rules

ANSWER:

## 5.

(9 points) ONA Life specializes in long term care insurance, individual annuities, and the conversion of defined benefit pension plans to group annuities.

The partners at DNS, a small legal firm, wish to continue offering a pension benefit but would like to know more about converting it to a group annuity. They have asked ONA Life to develop a proposal to understand the process.

- (a) (2 points) List four reasons that the group annuity proposal could be advantageous to DNS.

ANSWER:

- (b) (3 points) Critique each of the following statements from the proposal to DNS:

- (i) *ONA Life plans to use individual annuity experience to price the group annuity.*

ANSWER:

- (ii) *The best way to mitigate longevity risk is to fully reinsure the business.*

ANSWER:

- (iii) *Since this is an established block of business for ONA Life, a deterministic model with a single set of assumptions would be sufficient.*

ANSWER:

**5. Continued**

(c) (4 points) DNS is interested in providing long term care insurance for their employees, but is concerned about recent premium increases.

(i) Describe four challenges that the long term care insurance industry has faced that has led to premium rate increases.

ANSWER:

(ii) Propose a strategy to address one of the challenges.

ANSWER:

**6.**

(7 points)

(a) (4 points) Critique the following statements on term conversions:

A. *The converted policy is perfectly priced if, at conversion, the slope of the expected mortality is less than the gross premium for a permanent policy.*

ANSWER:

B. *For a convertible term policy, the costs associated with the conversion are unrelated to the issue age.*

ANSWER:

C. *When conversion privileges are shortened, the premium for the convertible term product is expected to increase.*

ANSWER:

D. *There is no need to charge for a conversion option as part of the term premium, because the premium for the permanent products will already reflect the additional mortality experience due to conversions.*

ANSWER:

(b) (3 points)

(i) Describe two approaches for developing the mortality assumption for converted policies.

ANSWER:

(ii) List an advantage and a disadvantage of each of the above approaches.

ANSWER:

## 7.

(7 points) You are given the following information about your company's inforce block of individual life insurance:

	<b>Whole Life</b>	<b>Term Life</b>	<b>Universal Life</b>
Present value of future profits	3,000	1,500	2,000
Time value of financial options and guarantees (TVOG)	100	200	120
Required capital	900	500	700
Free surplus	200	500	300
Mortality risk costs	250	2,000	150
Long-dated equity option costs	50	500	50
Additional taxes and investment costs incurred by shareholders	40	20	30

Lapse experience has been adverse for all products.

- (a) (2 points) Evaluate the advantages and disadvantages of an Embedded Value (EV) approach to measuring profitability versus accounting-based metrics.

ANSWER:

- (b) (2 points) Calculate the Market Consistent Embedded Value (MCEV) of each product. Show all work.

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

- (c) (3 points) Critique each of the following proposals to improve profitability of the inforce products:

- (i) Increase persistency on the universal life block by sending annual reminders about all the benefits of holding a policy

ANSWER:

- (ii) Up-sell term life policyholders by providing annual reminders that they may convert to a permanent policy which will have higher premiums

ANSWER:

**7. Continued**

- (iii) Recapture whole life policies following a series of YRT reinsurance rate increases which have made the reinsurance more expensive than the benefit provided.

ANSWER:

**\*\*END OF EXAMINATION\*\***