Valuation & Advanced Product & Risk Management. – U.S

Exam ILA 201 U

Date: Tuesday, March 24, 2026

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 6 questions numbered 1 through 6 with a total of 50 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.

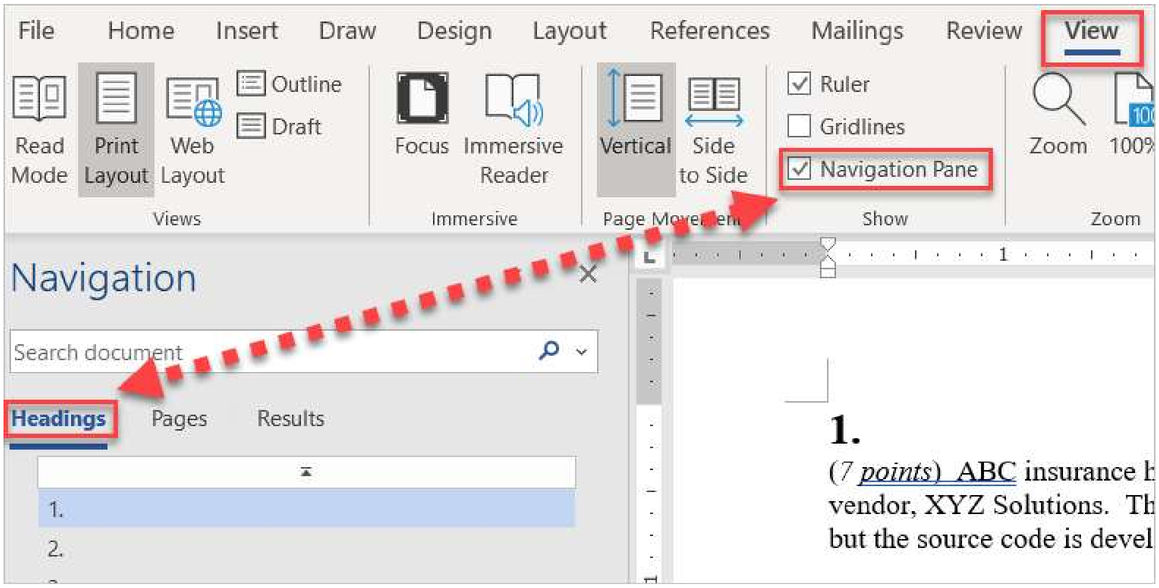
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your unique candidate number in the filename. To maintain anonymity, please refrain from using your name and instead use your candidate number.

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.

(*7 points*) The CEO at ABC Corp, a life insurance company that sells both individual life insurance and annuities, would like to implement an economic capital framework.

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

(i) (*1 point*) *The primary objective of implementing an economic capital framework is to maximize shareholder profits by holding the minimum possible capital.*

ANSWER:

(ii) (*1 point*) *Economic capital should only be calculated with prescribed assumptions and methodology to improve consistency for external stakeholders.*

ANSWER:

(iii) (*1 point*) *Economic capital should be used as a performance measure to compare profitability across product lines.*

ANSWER:

(iv) (*1 point*) *Economic capital would be adopted as the measure of capital for ABC. Because of this, intense pursuit of high diversification strategies should be implemented to lower the capital requirements.*

ANSWER:

1. Continued

(b) (*3 points*)

You are given:

Description	Value
Assets	500
Liabilities - Life	300
Liabilities - Annuities	100

- 100 simulated economic capital scenarios for the Life Insurance block, Annuities block, and the Combined Portfolio (provided in Excel)
- Economic return for each block of business is 10 annually
- Economic capital is calculated using a CTE 98 approach

Calculate the following at the company level:

(i) (*1 point*) Available capital

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

(ii) (*1 point*) Return on Risk-Adjusted Capital (RORAC)

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

(iii) (*1 point*) Economic capital diversification benefits

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

2.

(*11 points*) You are given the following information about a deferred-payout annuity contract:

- Issue age 70
- Gross premium of 100,000 at issue
- The policy provides a lifetime annuity payment of 200,000 per year starting at the beginning of the 11th policy year
- Mortality rates are provided in the spreadsheet
- The annuity cannot be surrendered
- The commission rate is 3%. There are no other acquisition expenses
- The upper-medium grade fixed-income investment yield is 5%
- The deferred profit liability is amortized over the present value of future benefits
- The deferred acquisition cost (DAC) asset is calculated for each individual contract

(a) (*9 points*) Calculate the following at the end of the 7th year:

(i) (*3 points*) GAAP reserve

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

(ii) (*3 points*) Deferred profit liability

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

(iii) (*3 points*) DAC balance

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

(b) (*2 points*) At the end of the eighth year, the upper-medium grade fixed-income investment yield changes to 4.8%.

Explain the impacts to the following items. No calculations are required.

(i) (*0.5 points*) GAAP reserve

ANSWER:

2. Continued

(ii) (*0.5 points*) Deferred profit liability

ANSWER:

(iii) (*0.5 points*) DAC

ANSWER:

(vi) (*0.5 points*) Net income

ANSWER:

3.

(*8 points*) You are the Qualified Life PBR Actuary at LFS Life Insurance Company, working on the VM-20 valuation for its Universal Life (with material secondary guarantees) block of business.

(a) (*2 points*) Contrast the methodologies for calculating the following between VM-20 and the Universal Life Insurance Model Regulation:

(i) (*1 point*) Guaranteed Maturity Premium

ANSWER:

(ii) (*1 point*) Expense Allowance

ANSWER:

(b) (*2 points*) Calculate the VM-20 Guaranteed Maturity Premium for the given policy, using information provided in Excel.

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

(c) (*3 points*) You are given information needed to perform the stochastic exclusion ratio test on this block of business in Excel.

(i) (*2 points*) Calculate the stochastic exclusion ratio.

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

(ii) (*1 point*) Identify the formula for the minimum reserve for this block based on the results of the stochastic exclusion test.

ANSWER:

3. Continued

(d) (*1 point*) Calculate the Deterministic Reserve.

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

4.

(*8 points*) For a group of variable annuity contracts with GMIB riders that falls within the scope of VM-21, you are given the following information at the valuation date:

Starting assets	90
Cash Surrender Value	135
Pre-tax Interest Maintenance Reserve	-5

- PVs of accumulated deficiencies with prudent and prescribed assumptions by scenario are provided in Excel

(a) (*7 points*) Calculate the following:

Show all work.

(i) (*2 points*) Stochastic reserve

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

(ii) (*3 points*) The additional standard projection amount

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

(iii) (*2 points*) VM-21 minimum reserve

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

(b) (*1 point*) The company implemented a hedging program to help manage the risks associated with GMIB. You are given the following CTE 70 amounts:

Hedge assets included in projection	**CTE 70 amount**
Only hedge assets currently held at the valuation date	160 million
Currently held hedge assets and future hedge assets projected based on the hedging strategy	140 million

- The hedging strategy is a clearly defined hedging strategy, and the error factor is 20%

Calculate the stochastic reserve. Show all work.

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

5.

(*7 points*)

(a) (*2 points*) Calculate the RBC ratio for XYZ Life Insurance Company using the following information.

XYZ Life Insurance Company	
Statutory Surplus	3,400,000,000
Asset Valuation Reserve (AVR)	600,000,000
Policyholder Dividend Liability	375,000,000
Total Risk-Based Capital before Covariance Adjustment	3,000,000,000
Covariance Adjustment	450,000,000

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

(b) (*2 points*) Compare and contrast the policyholder, shareholder and regulator perspectives related to capitalization levels.

ANSWER:

(c) (*3 points*) Describe the potential consequence of falling below capital thresholds for each of the following measures:

(i) (*1 point*) RBC

ANSWER:

(ii) (1 point) Best's Capital Adequacy Ratio (BCAR)

ANSWER:

(iii) (*1 point*) Economic capital

ANSWER:

6.

(*9 points*)

(a) (3 *points*) Critique each of these statements as they relate to the dividend framework described in "*Mechanics of Dividends, SOA Research Institute, Mar 2022*":

(i) (*1 point*) *When a segment of products experiences significantly elevated lapse, it permanently changes the dividend scale uniformly for all products to reflect the change in aggregate experience.*

ANSWER:

(ii) (*1 point*) *The effect of COVID-19 on mortality is an example of a temporary event where no change in dividend scale is necessary.*

ANSWER:

(iii) (*1 point*) *When a dividend scale reduction occurs immediately after a policy is issued, the insurer must use the reduced dividend scale and is not allowed to use the illustrated dividend scale for that policy.*

ANSWER:

(b) (*4 points*) You are given an Asset Share Report in the provided Excel spreadsheet.

Calculate the three-factor dividend using the Contribution Method for policy year 15. Show all work.

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

(c) (*2 points*) Due to much higher portfolio rates, the excess of interest rate used to distribute surplus over reserve valuation interest rate is updated to be 130bps greater than what is shown in the Asset Share Report beginning in policy year 15.

Calculate the revised three-factor dividend using the Contribution Method for policy year 15.

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

****END OF EXAMINATION****