Disability, Long-Term Care, and Long Duration Health Contracts

EXAM CP 321

Date: Thursday, November 20, 2025

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This assessment has 7 questions numbered 1 through 7 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 file as directed. Graders will only look at work in the indicated file.

   a) In the Word document, answers should be entered in the box marked ANSWER. 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 ^ used to indicate a superscript).

   b) In the Excel document, formulas should be entered. 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.

4. The Word and Excel files that contain your answers must be uploaded before time expires.

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1.

(*5 points*)

(a) (*1 point*) Describe the circumstances that led to the advent of critical illness insurance.

ANSWER:

(b) (*2 points*) Describe the key assumptions an actuary should estimate and model when pricing critical illness insurance.

ANSWER:

A critical illness actuary proposes adding a return-of-premium (ROP) rider to their company's 20-year term cancer critical illness product. If this rider is purchased, aggregated historic premiums will be returned to the policyholder upon the earlier of death or the end of the policy term, if no cancer claim is incurred.

(c) (*2 points*) Describe additional assumptions and regulatory issues an actuary should consider in proposing this rider.

ANSWER:

The Excel spreadsheet has
additional data and information applicable to this question.

2.

(*8 points*) You are the pricing actuary for XYZ Insurance. The company has developed high confidence in its Long-Term Disability (LTD) manual rates. Management wants to limit year-to-year volatility in annual premium increases because they have noticed that more customers are self-funding their LTD coverage.

(a) (*2 points*) Describe challenges that arise for employers that self-fund LTD coverage.

ANSWER:

Your team is deciding between the following credibility formulas:

Option 1: Credibility = $\text{Life Years of Exposure} * \frac{1}{4000}$

Option 2: Credibility = $\begin{cases} 0 & ; \text{ if Life Years of Exposure} < 500 \\ \text{Life Years of Exposure} * \frac{1}{1500} & ; \text{ if Life Years of Exposure} \geq 500 \end{cases}$

(b) (*4 points*)

(i) (*2 points*) Describe how the two credibility formulas could affect an employer's decision to self-fund its LTD benefits.

ANSWER:

(ii) (*1 point*) Describe how the two credibility formulas could affect the performance of XYZ's LTD block.

ANSWER:

(iii) (*1 point*) Recommend which credibility formula XYZ should employ. Justify your response.

ANSWER:

2. Continued

Your team is looking into the credibility of its historical termination experience. In order to account for differences in claim volatility by duration, a selected variance factor approach is used within the limited fluctuation method of credibility.

In the Excel spreadsheet, you are provided with:

- The selected variance factors
- XYZ's recent termination rates
- Industry termination rates
- N(0,1) cumulative probabilities

XYZ's objective is to ensure that the number of observed terminations for each duration bucket has a 90% probability of being within 3% of its expected terminations.

(c) (*2 points*) Calculate, for each duration bucket:

(i) (*1 point*) The number of claims required for full credibility. State any assumptions made and show your work.

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

(ii) (*1 point*) The blended termination rate. State any assumptions made and show your work.

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

The Excel spreadsheet has
additional data and information applicable to this question.

3.

(*13 points*) You are a consulting actuary specializing in retiree group benefit valuations.

(a) (*2 points*) List and describe four reasons employers continue to provide retiree benefits.

ANSWER:

(b) (*2 points*) Describe four cost issues facing employers offering retiree benefits.

ANSWER:

In the Excel spreadsheet, you are provided with recent claims experience and other relevant assumptions.

(c) (*2 points*) Derive the annual per member claims cost assumption, expressed at age 65. State any assumptions made and show your work.

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

In the Excel spreadsheet, you are also provided with an employee profile and other relevant assumptions as of December 31, 20X5.

(d) (*7 points*) Calculate the following for the employee:

(i) (*5 points*) The defined benefit obligation as of December 31, 20X5. State any assumptions made and show your work.

(ii) (*1 point*) The service cost for fiscal year 20X6. State any assumptions made and show your work.

(iii) (*1 point*) The interest cost for fiscal year 20X6. State any assumptions made and show your work.

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

The Excel spreadsheet has
additional data and information applicable to this question.

4.

(*6 points*)

(a) (*1 point*) List four key considerations under ASOP 18 for setting Long-Term Care (LTC) morbidity assumptions.

ANSWER:

In the Excel file, you are provided with the results of an actual-to-expected LTC claim termination rate analysis.

(b) (*2 points*)

(i) (*1 point*) Interpret the results of the analysis.

ANSWER:

(ii) (*1 point*) Recommend updated claim termination rates. Justify your recommendation.

ANSWER:

In the Excel file, you are also provided with relevant information for a new claimant who has just become eligible for LTC benefits.

(c) (*3 points*) Calculate the change in the claim reserve based on your recommendation from part (b)(ii). State any assumptions made and show your work.

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

5.

(*5 points*) You are working for an insurance company offering life and health products for U.S. and international markets.

(a) (*1 point*) Describe general considerations in classifying insurance contracts as long duration versus short duration under U.S. GAAP.

ANSWER:

(b) (*1 point*) List the three accounting approaches under IFRS 17 and describe their applicability to long duration and short duration health products.

ANSWER:

(c) (*2 points*) Identify features of the following health products that would result in an insurance company classifying them as long duration or short duration.

(i) Group disability

(ii) Individual disability

(iii) Medicare Supplement

ANSWER:

(d) (*1 point*) Describe the criteria a reinsurance treaty must satisfy under U.S. GAAP to be deemed to transfer risk for:

(i) Long duration insurance contracts

(ii) Short duration insurance contracts

ANSWER:

The Excel spreadsheet has
additional data and information applicable to this question.

6.

(*5 points*) You are an actuary overseeing your company's long duration health insurance block. Management wants there to be closer alignment between the duration of the assets and liabilities for the block.

(a) (*2 points*) Describe the risks and benefits associated with rebalancing the company's asset portfolio versus purchasing derivatives to increase the asset duration for the block.

ANSWER:

In the Excel spreadsheet, you are provided with relevant information.

(b) (*2 points*) Calculate the upper and lower bounds that satisfy management's goals for asset duration and convexity. State any assumptions made and show your work.

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

You rebalance the company's asset portfolio such that the asset duration increased to 8.5. A short time later, interest rates increase by 100 basis points.

(c) (*1 point*) Calculate the change to the equity for the block. State any assumptions made and show your work.

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

The Excel spreadsheet has
additional data and information applicable to this question.

7.

(*8 points*)

(a) (*2 points*) Describe the types of Long-Term Care (LTC) reserves under Statutory Accounting Principles (SAP).

ANSWER:

(b) (*2 points*) Compare and contrast LTC reserve methods and assumptions under GAAP and SAP.

ANSWER:

In the Excel spreadsheet, you are provided with claim and policy information for two policyholders, along with relevant assumptions.

(c) (*4 points*) Calculate the claim reserve for each policy. State any assumptions made and show your work.

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

****END OF EXAMINATION****