
CURATED PAST EXAM ITEMS

- Questions -

CP 321– Disability, Long-Term Care, and Long-Duration Health Contracts

Important Information:

- These curated past exam items are intended to allow candidates to focus on past SOA fellowship assessments. These items are organized by topic and learning objective with relevant learning outcomes, source materials, and candidate commentary identified. We have included items that are relevant in the new course structure, and where feasible we have made updates to questions to make them relevant.
- Where an item applies to multiple learning objectives, it has been placed under each applicable learning objective.
- Candidate solutions other than those presented in this material, if appropriate for the context, could receive full marks. For interpretation items, solutions presented in these documents are not necessarily the only valid solutions.
- Learning Outcome Statements and supporting syllabus materials may have changed since each exam was administered. New assessment items are developed from the current Learning Outcome Statements and syllabus materials. The inclusion in these curated past exam questions of material that is no longer current does not bring such material into scope for current assessments.
- Thus, while we have made our best effort and conducted multiple reviews, alignment with the current system or choice of classification may not be perfect. Candidates with questions or ideas for improvement may reach out to education@soa.org. We expect to make updates annually.

CP 321 - Disability, Long Term Care,
and Long Duration Health Contracts

Course CP 321

Curated Past Exam Questions

Learning Objective 1: Plan and Product Provisions

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1. Fall 2023 DP #4a-c

Skwire 25 – Disability Claim Costs

Leida 2 – The Products

Skwire 12 – Group Disability Benefits

(3 points) You are a long term disability (LTD) actuary for PQR Insurance.

- (a) (1 point) Describe the advantages to employees and employers of PQR assisting employees in applying for Social Security disability benefits.

ANSWER:

- (b) (1 point) List and describe the three major renewability clauses for individual disability products by completing the following table:

Financial Risk to Insurer	Renewability Clause	Description
Least		
Middle		
Most		

- (c) (1 point) Explain adverse selection concerns for the following optional Group LTD benefit features:

- (i) Portability

ANSWER:

- (ii) Conversion Option

ANSWER:

2. Spring 2024 DP #2a-b

Critical Illness Turns 40!

(5 points) You are an actuary working on critical illness products.

You are given the rate manual for a critical illness policy issued to a 40-year-old:

Annual Discount Factor	4%
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10-year Critical Illness Rating Manual		
Age	Claim Costs per 1,000	Lapse Rate
40	3.6869	30.0%
41	4.1144	20.0%
42	4.6027	10.0%
43	5.1402	10.0%
44	5.6784	10.0%
45	6.2865	10.0%
46	6.9788	10.0%
47	7.7689	10.0%
48	8.7133	10.0%
49	9.7366	10.0%
50	10.9319	10.0%

(a) (4 points)

- (i) Calculate the lifetime present value of claim costs. Show your work.
- (ii) Create a sensitivity test for the lapse rate.
- (iii) Explain the relationship between the lapse rate and the cost of providing coverage.
- (iv) Describe considerations when setting lapse rate assumptions for policies sold at the employees' worksite.

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

Your client has a group policy that will be renewed next year.
You are given:

Group Credibility	35%
Actual to Expected Loss Ratio	130%

- (b) (1 point) Calculate the rate increase based on historical experience. State your assumptions. Show your work.

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

3. Fall 2022 SPC #4a-b

Eaton 2 – History of LTC Products

(7 points)

- (a) (1 point) Identify why long-term care insurance assumptions have typically resulted in underpricing the product.

ANSWER:

- (b) (3 points) Evaluate the accuracy of the following statements. Justify your response.

- (i) Higher than expected lapse rates contributed to the insolvency of some long-term care insurers.

ANSWER:

- (ii) Lower than expected interest rates in the future can be problematic for long-term care insurers.

ANSWER:

- (iii) A long-term care insurer entering into rehabilitation can put a policyholder in a bind.

ANSWER:

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Learning Objective 2: Manual Rates

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1. Fall 2020 DP-A #3

CP321-102-25 – Short Term Disability

(5 points) You are evaluating experience for a block of short-term disability policies.

- (a) (1 point) Describe rating factors used in a short-term disability renewal rate development.

ANSWER:

You are given:

Pricing Retention Factors (% of Premium)

Administration	13.0%
Premium Taxes	2.0%
Risk & Profit	5.0%

Age/Gender Premium Adjustments

Males under 25	0.50
Males 25-39	0.75
Males 40 and over	1.50
Females under 25	0.50
Females 25-39	1.75
Females 40 and over	1.25

Area Adjustments

Northeast	1.10
Southeast	0.90
Midwest	0.90
West	1.10
Southwest	1.00

2019 Experience ('000s)

Premiums	\$10,000
Claims	\$7,500
Administration	\$1,100
Premium Taxes	\$200

2019 Experience by Age/Gender ('000s)

Age/Gender	Premiums	Claims
Males under 25	\$1,500	\$1,125
Males 25-39	\$1,500	\$1,125
Males 40 and over	\$1,500	\$1,125
Females under 25	\$2,000	\$1,500
Females 25-39	\$2,000	\$1,500
Females 40 and over	\$1,500	\$1,125

2019 Experience by Area ('000s)

Area	Premiums	Claims
Northeast	\$2,000	\$1,500
Southeast	\$2,000	\$1,600
Midwest	\$2,000	\$1,500
West	\$2,000	\$1,400
Southwest	\$2,000	\$1,500

- (b) (1 point) Compare the actual 2019 profit results to the assumed 2019 profit. Show your work.

To develop the 2021 premium, you apply 50% weight to the prior rating factors and 50% weight to the 2019 experience.

- (c) (3 points) Recommend factors for 2021 for:
- (i) Retention
 - (ii) Base rate increase
 - (iii) Age/gender and area factors

Show your work. Justify your response.

2. Fall 2020 DP-A #5a-c
Best Estimate Assumption for Expenses

Question pertains to the Case Study.

(5 points) You are the consulting actuary at Skyfall assigned to Royale Health.

Le Chiffre asks you to review the current general administration fee assumption.

(a) (1 point) List the steps involved in revising this assumption.

ANSWER:

(b) (2 points)

(i) List the administration activities you should consider based on the business structure of Royale Health.

ANSWER:

(ii) Describe considerations for each of these activities.

ANSWER:

(c) (2 points) Describe the categories of corporate and overhead expenses that should be considered in your expense study.

ANSWER:

3. Fall 2020 DP-A #7

Leida 4 – Managing Antiselection

(8 points) You are the pricing actuary for an individual health line of business.

- (a) (2 points) Compare and contrast the Cumulative Antiselection (CAST) Model with the Minnesota Antiselection (MNAM) Model.

ANSWER:

- (b) (2 points) Describe how the CAST model has improved over time.

ANSWER:

You are given the following for a closed block of individual health policies:

Insured Population	Number of lives	Annual Rate Increase	Annual Trend	Elasticity Factor
Healthy lives	223	7.0%	5.0%	1.3
Impaired lives	777	22.0%	5.0%	0.8

- (c) (2 points) Calculate the expected number of lives remaining after the rate increase. Show your work.

ANSWER:

Your company has decided to maintain the overall rate increase.

- (d) (2 points) Propose a rate increase scenario that minimizes lapses. Show your work. Justify your response.

ANSWER:

4. Fall 2020 DP-A #9

Issues in Applying Credibility - LTD

(4 points) You are evaluating experience for a block of long-term disability (LTD) policies.

- (a) (1 point) Describe the 2012 GLTD valuation standard.

ANSWER:

You are given:

LTD Claim Duration	Selected Variance Factor
4 to 24 months	4.0
25 to 120 months	2.5
More than 120 months	2.0

The actual experience is 250 terminations within durations 4 to 24 months.

- (b) (1 point)
- (i) Calculate the number of expected terminations required for LTD claims within durations 4 to 24 months to be considered fully credible. Show your work.

ANSWER:

- (ii) Calculate the partial credibility factor for this experience. Show your work.

ANSWER:

- (c) (2 points) List and describe four challenges in applying credibility in LTD.

ANSWER:

5. Fall 2021 DP-A #1

Best Estimate Assumption for Expenses

(8 points)

(1 point) List the steps for completing an expense review.

ANSWER:

(a) (2 points)

(i) Describe the categories of expenses to consider in expense studies.

ANSWER:

(ii) Describe unit measurements that can be used for each expense category.

ANSWER:

(b) (1 point) Describe considerations when allocating expenses for underwriting activities.

ANSWER:

(c) (2 points) Compare and contrast considerations for applying expenses when setting premium rates for:

- Individual disability insurance
- Group health insurance

ANSWER:

You are reviewing the premium rates for PQR Insurance. You are given the following loss ratios and retention assumptions as a percent of premium:

- Target loss ratio 70%
- Actual loss ratio 75%

	Current	Proposed
Administration	10.0%	11.0%
Claim adjudication	3.0%	2.8%
Commissions	10.0%	10.0%
Premium Taxes	2.0%	2.0%
Risk and Profit	5.0%	5.0%

- (d) (2 points) Calculate the required adjustment to premium. Show your work. State your assumptions.

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

6. Fall 2021 DP-A #3

Leida 4 – Managing Antiselection

(6 points)

(a) (1 point) Describe the following types of antiselection:

(i) External

ANSWER:

(ii) Internal

ANSWER:

(iii) Durational

ANSWER:

(b) (2 points) List and describe measures included in the Affordable Care Act (ACA) to control antiselection.

ANSWER:

Your company currently offers Plan A and will be introducing Plan B. Members will be able to choose either plan.

You are given the following for Plan A:

Annual Deductible	\$250
Premium PMPM	\$75
Enrollment	80% healthy members; 20% unhealthy members
Claims Cost PMPM	\$100 per healthy member; \$200 per unhealthy member
Expected Premium Increase	20%

You are given the following for Plan B:

- Plan B has a \$500 annual deductible, which produces expected savings for an average member equal to 5% of premium
- All healthy members move to Plan B
- All unhealthy members remain in Plan A

(c) (2 points) Calculate the premium leakage. Show your work. State your assumptions.

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

(d) (1 point) Develop a plan to reduce premium leakage. Justify your response.

ANSWER:

7. Fall 2021 DP-A #5

Issues in Applying Credibility - LTD

(9 points)

- (a) (2 points) Describe dynamics that make it difficult to apply credibility when pricing group long term disability (LTD) insurance.

ANSWER:

You are reviewing the credibility applied to group LTD insurance by two insurers: ABC and XYZ. The credibility formulas used when quoting a group with n lives are:

n	ABC	XYZ
0 – 249	0	$(n/500)^{(2)}$
250 – 500	$(n/500)^{(0.5)}$	$(n/500)^{(2)}$
501+	1	1

- (b) (1 point) Create a table comparing the credibility level for ABC and XYZ for groups with 50, 100, 300, and 500 lives.

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

- (c) (2 points) Explain reasons why ABC and XYZ may have developed different credibility curves.

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

You are given the following information on group LTD policies for seven groups:

Policy	Manual Claims	Prior Experience Claims	Blended Expected Claims	Group Size	Actual Claims
1	3,518	4,561	3,622	221	2,048
2	5,123	4,955	5,073	435	5,544
3	3,055	2,018	2,537	1,088	3,183
4	2,354	2,498	2,455	1,539	2,789
5	4,005	4,210	4,210	1,857	4,699
6	3,579	3,365	3,365	2,158	3,487
7	2,154	2,235	2,195	1,158	2,005

(d) (2 points) Describe reasons actual claims may deviate from:

(i) The insurer's manual rates.

ANSWER:

(ii) The group's prior experience claims.

ANSWER:

(e) (2 points) Recommend adjustments to the credibility formulas used by ABC and XYZ. Justify your response.

ANSWER:

8. Spring 2021 DP-A #1
Issues in Applying Credibility – LTD

(6 points)

(a) (3 points) Explain how each of the following complicate the application of traditional credibility models to Long Term Disability (LTD) Coverage:

(i) Non-independence of claims

ANSWER:

(ii) Heterogeneous risk classes

ANSWER:

(iii) Claim duration

ANSWER:

You a reserving actuary for Insurer ABC. You are given:

LTD Claim Duration	Selected Variance Factor
4-24 Months	4.0
25-60 Months	3.0
61-120 Months	2.5
Greater Than 120 Months	2.0

Duration Year	Expected Claim Terminations	Policy A Experience Rate	Manual Rate
1	3,450	\$50,000	\$45,000
2	3,500	\$52,500	\$45,200
3	2,750	\$52,500	\$49,900
4	2,250	\$55,000	\$42,900
5	1,750	\$35,000	\$34,000
6	1,500	\$35,000	\$33,300
7	1,250	\$35,000	\$32,600
8	1,000	\$35,000	\$31,500
9	850	\$30,000	\$30,100
10	800	\$27,500	\$25,200
11	750	\$22,500	\$24,300
12	650	\$20,000	\$23,400
13	600	\$17,500	\$23,100
14	550	\$15,000	\$20,600
15	500	\$12,500	\$19,800

- (b) (2 points) Calculate the Credibility Adjusted Reserve for Policy A. Show your work.

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

- (c) (1 point) Explain the risks associated with reserve setting if credibility is not properly considered.

ANSWER:

9. Spring 2021 DP-A #7

GH101-137-20 – Short Term Disability

(7 points)

- (a) (1 point) Explain how short term disability (STD) claims may trend due to utilization.

ANSWER:

You are an actuary for Insurer X and are calculating the 2021 STD renewal rates for MNO Company. Insurer X is not updating its STD manual base rate from the current value, but you will need to consider X's 2019 STD experience (provided below).

MNO is in the manufacturing industry and Northeast region. You are given:

- MNO pays 60% of the STD premium for employees who elect STD coverage
- MNO has nine eligible employees
- Seven employees participate in the STD plan:

# of Participating Employees	Age	Gender
3	23	Male
2	30	Male
2	55	Female

- Insurer X uses the following STD pricing factors:

Retention	% of Premium
Administration	10%
Claim Adjudication	3%
Commissions	10%
Premium Taxes	2%
Risks and Profit	5%

Age/Gender	Factor
Males under 25	0.50
Males 25-40	0.75
Males 40+	1.50
Females Under 25	0.50
Females 25-40	1.75
Females 40+	1.25

Group Size	Factor
5-9	1.10
10-19	1.05
20-49	1.00
50-74	0.95
75-100	0.90

Area	Factor
Northeast	1.15
Southeast	0.90
Midwest	0.90
West	1.10
Southwest	1.00

Industry	Factor
Hospitals, home health, doctors	1.5
Retail, sales, marketing	0.8
Finance, accounting	0.9
Construction and manufacturing	1.5
All other	1.0

Employer Contribution		Factor
Employer Subsidy	Employee Participation	
0-49.9%	0-49.9%	2.00
50-100%	0-49.9%	1.50
0-49.9%	50-100%	1.00
50-100%	50-100%	0.75

- Insurer X's 2019 STD experience:

Premiums and Expenses ('000s)

Premiums	\$10,000
Incurred Claims	\$7,500
Administration costs	\$1,100
Claim adjudication costs	\$280
Commissions	\$1,000
Premium taxes	\$200

Age/ Gender

Age/ Gender	Premium ('000s)	Claims ('000s)
Males under 25	\$1,500	\$1,125
Males 25-40	\$1,500	\$1,125
Males 40+	\$1,500	\$1,125
Females Under 25	\$2,000	\$1,500
Females 25-40	\$2,000	\$1,500
Females 40+	\$1,500	\$1,125

By Group Size

Age/ Gender	Premium ('000s)	Claims ('000s)
5-9	\$1,000	\$900
10-19	\$2,000	\$1,575
20-49	\$2,000	\$1,500
50-74	\$2,000	\$1,425
75-100	\$3,000	\$2,100

By Area

Area	Premium ('000s)	Claims ('000s)
Northeast	\$2,000	\$1,500
Southeast	\$2,000	\$1,600
Midwest	\$2,000	\$1,500
West	\$2,000	\$1,400
Southwest	\$2,000	\$1,500

By Industry

Industry	Premium ('000s)	Claims ('000s)
Hospitals, home health, doctors	\$500	\$550
Retail, sales, marketing	\$1,500	\$900
Finance, accounting	\$1,500	\$1,000
Construction and manufacturing	\$500	\$550
All other	\$6,000	\$4,500

By Contribution/ Participation

Employer Subsidy	Employee Participation	Premium ('000s)	Claims ('000s)
0-49.9%	0-49.9%	\$1,000	\$700
50-100%	0-49.9%	\$1,000	\$750
0-49.9%	50-100%	\$2,000	\$1,500
50-100%	50-100%	\$6,000	\$4,550

- (b) (4 points) Calculate the renewal rate change for MNO. Show your work.

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

Two years have passed. MNO's actual claims for 2021 are:

Employee	Gender	Age	Expected Claims	Actual Claims
1	male	23	\$30,000	\$0
2	male	30	\$50,000	\$20,498
3	male	30	\$50,000	\$0
4	male	23	\$30,000	\$50,248
5	female	55	\$20,000	\$0
6	female	55	\$20,000	\$87,186
7	male	23	\$30,000	\$30,158

- (c) (2 points) Propose changes, if any, to the pricing factors to be applied to MNO's next policy renewal. Justify your response.

10. Spring 2021 DP-C #3

Eaton 10 – LTCI Rate Increases

Eaton 4 – Hybrid Life & LTC Products

Question pertains to the Case Study.

(10 points) The Thunderball Corporation is a large insurance company operating in the United States. Thunderball offers Group Long-Term Disability, Group Life, and Group and Individual Long-Term Care (LTC). Thunderball offers 3 LTC plans with different elimination periods and benefit periods with monthly premiums. The benefits and claim costs are seen below:

Thunderball has retained Skyfall to evaluate its LTC business.

You are given:

- Valuations are performed as of 12/31/2020
- Exhibits 1 – 3 (*in the case study*)
- Odd numbered policies were issued to females
- Even numbered policies were issued to males
- All premium and claim payments occur at mid-year
- Discount rate is 3.50% per year
- Lapse rate is 1.00% per year
- Deaths and lapses occur at mid-year
- The following mortality rates:

Attained Age	Sex	
	Female	Male
<60	0.002	0.004
60-64	0.005	0.007
65-69	0.008	0.010
70-74	0.012	0.015
75-79	0.020	0.027
80-84	0.037	0.047
85-89	0.071	0.086
90-94	0.121	0.153
95-99	0.200	0.240
100-104	0.304	0.343
105-109	0.391	0.400
110+	1.000	1.000

- (a) (4 points) Calculate for policy numbers 9 and 10 using a 5-year projection period, the:
- (i) Present value of future earned premium
 - (ii) Present value of future incurred claims
 - (iii) Loss ratio

Show your work. State your assumptions.

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

- (b) (1 point) Identify Actuarial Standards of Practice to be considered when projecting and communicating the loss ratio to Thunderball management.

ANSWER:

- (c) (2 points) Describe steps that should be taken to evaluate the financial condition of Thunderball's LTC business.

ANSWER:

Thunderball's management believes a rate increase is justified if the projected future loss ratio exceeds the lifetime loss ratio assumed in the original pricing of the business.

- (d) (1 point) Evaluate Thunderball's assertion. Justify your response.

ANSWER:

Thunderball's management is considering ways to grow its LTC book of business.

- (e) (2 points)
- (i) Compare and contrast the premium and benefit structures of:

- stand-alone LTC products
- the LTC portion of life and LTC combination products

ANSWER:

- (ii) Describe characteristics of LTC combination products that incentivize a consumer to purchase a combination product over a stand-alone LTC product.

ANSWER:

11. Fall 2020 DP-C #1

CP321-101-25 – Pricing Med. Supp.

(8 points)

- (a) (2 points) List and describe factors that impact Medicare Supplement pricing.

ANSWER:

- (b) (1 point) Describe the different loss ratio standards which must be met as part of a Medicare Supplement annual filing.

ANSWER:

- (c) (1 point) Explain how insurers are prevented from recouping past Medicare Supplement losses.

ANSWER:

You are given the following rating assumptions for Medicare Supplement policies. All policies in this book of business were issued to 80-year-old male non-smokers.

Policy Year	Attained Age	Lapse Rate	Mortality Rate	Survivors	Unadjusted Claim Cost per Life	Sex Adjustment Factor	Smoker/Non-Smoker Adjustment Factor
1	80	18%	0.098	1,000	\$1,600	0.077	-0.03
2	81	15%	0.107	740	\$1,650	0.080	-0.03
3	82	15%	0.118	560	\$1,690	0.082	-0.03

- Discount rate: 5%
- Premiums are paid at the beginning of the policy year
- Claims are paid in the middle of the policy year
- Active life reserves and investment income are excluded from the calculation

- (d) (4 points) Assess whether or not a \$2,400 annual premium satisfies the 65% loss ratio requirement for each of the loss ratio standards. Show your work.

ANSWER:

12. Fall 2021 DP-C #3

CP321-101-25 – Pricing Med. Supp.

(9 points)

- (a) (1 point) Describe pricing methodologies for Medicare Supplement plans and explain reasons why each would be selected.

ANSWER:

- (b) (2 points)

- (i) Describe policy standardization requirements reflected in the National Association of Insurance Commissioners (NAIC) Medicare Supplement Model Regulation.

ANSWER:

- (ii) Describe the purpose of this regulation.

ANSWER:

You are the Medicare Supplement pricing actuary for LMN Insurance. You are given:

- Broker commissions are 20% for the first year, 10% for years 2-10, and 0% after year 10
- The combined smoker/non-smoker factor for LMN's book of business is -3%
- Administrative and tax load is 15% of premium
- Discount factor is 5% per year
- No investment income
- Premiums are paid at the start of each year
- Claims occur halfway through each year
- LMN's target loss ratio is 65%

Policy Year	Attained Age	Mortality Rate per 1,000 Lives	Lapse Rate	Unadjusted Claim Cost	Sex Factor Adjustment
1	80	95.00	20%	1,644.73	0.077
2	81	104.37	15%	1,707.43	0.080
3	82	114.94	15%	1,726.77	0.082
4	83	126.66	15%	1,745.30	0.084
5	84	139.30	15%	1,801.06	0.086
6	85	152.57	10%	1,819.93	0.089
7	86	166.30	10%	1,839.58	0.091
8	87	180.28	10%	1,859.29	0.093
9	88	195.82	10%	1,879.49	0.096
10	89	214.77	10%	1,899.91	0.096
11	90	240.12	10%	1,921.29	0.096
12	91	279.05	10%	1,942.91	0.096
13	92	349.97	8%	1,965.11	0.096
14	93	470.08	8%	1,987.33	0.096
15	94	670.00	8%	2,010.48	0.096
16	95	1,000.00	8%	2,034.17	0.096

- (c) (4 points) Calculate the annual premium for an 80-year-old policy holder. Show your work.

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

- (d) (2 points) Calculate the expected profit margin over the lifetime of the policy. Show your work.

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

13. Fall 2021 DP-C #4a-c,e

Skwire 25 – Disability Claim Costs
Skwire 12 – Group Disability Benefits

(6 points)

(a) (1 point) Describe ways a group long term disability (LTD) insurer mitigates:

(i) Moral hazard

ANSWER:

(ii) Financial risks

ANSWER:

(b) (1 point) Evaluate the advantages and disadvantages to an insurer of offering both short term disability and LTD with respect to:

(i) Financial risk

ANSWER:

(ii) Claims management

ANSWER:

You are an LTD actuary at The Thunderball Corporation. The Thunderball Corporation is a large insurance company operating in the United States and Canada. The corporate vision is to be a comprehensive provider of long term insurance products. Thunderball seeks to offer competitive products earning reasonable return for stockholders while growing at a financially sustainable rate.

Thunderball offers Group LTD, Group Life, and Group and Individual Long-Term Care.

(c) (1 point) Describe considerations for developing LTD interest rate assumptions.

ANSWER:

Thunderball is developing a group LTD quote for a prospective client with 10 employees. You are given:

- Exhibit 1 (see below)
- Exhibit 2 (see below)
- 6 month elimination period
- \$50,000 annual benefit
- All employees are 27 year old males
- 5 year benefit maximum
- Interest rate of 5% per year
- No offsets
- Benefits are paid at the end of each year of disability

(e) (3 points) Calculate the monthly net manual premium per employee for the client. Show your work.

<i>The response for this part is to be provided in the Excel spreadsheet.</i>

Long-Term Disability (Rating Exhibits)

Thunderball has experienced steady growth in LTD sales. Exhibit 1 lists the incidence rates by gender. Exhibit 2 list the death and recovery rates assumed for males in the LTD plans with a 6 month elimination period.

Exhibit 1 – Claim Incident Rate Table			
		Elimination Period = 3 Months	Elimination Period = 6 Months
Sex	Age	Claim Incident Rate (per 1,000 lives)	Claim Incident Rate (per 1,000 lives)
F	Under 30	1	0.5
F	30-39	1.6	1
F	40-49	2.5	2.1
F	50-59	3	2.6
F	60-64	4	3.7
F	65-66	5	4.8
M	Under 30	1	0.5
M	30-39	1.4	1
M	40-49	2.6	2.1
M	50-59	3.4	3
M	60-64	4.5	4.2
M	65-66	5.5	5.3

Exhibit 2 Death & Recovery – Males (6-month Elimination Period (EP))									
Duration of Disablement after EP	Age at Disablement								
	22	27	32	37	42	47	52	57	62
1st year	0.4	0.36	0.33	0.31	0.25	0.22	0.19	0.15	0.1
2nd year	0.37	0.34	0.29	0.24	0.2	0.14	0.1	0.08	0.08
3rd year	0.22	0.19	0.17	0.17	0.13	0.12	0.1	0.08	0.08
4th year	0.16	0.12	0.1	0.09	0.08	0.07	0.07	0.06	0.06
5th year	0.14	0.08	0.08	0.07	0.07	0.07	0.06	0.06	0.06
6th year	0.07	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.06
7th year	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.06
8th year	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.06
9th year	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.07
10th year	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.07

14. Fall 2022 DP #2

Leida 4 – Managing Antiselection

(8 points) You are the individual medical pricing actuary for Insurer M.

- (a) (1 point) Describe ways insurers manage antiselection.

ANSWER:

- (b) (2 points) Insurer M wants to reduce expenses for performing routine underwriting tasks.

- (i) Identify four types of underwriting tools that would best serve Insurer M's needs.

ANSWER:

- (ii) Identify four types of underwriting tools that would not address Insurer M's needs.

ANSWER:

You are given:

- Company N has traditionally offered Plan A.
- A large rate increase for Plan A has been approved for 2021.
- Company N will begin to offer a new higher-deductible plan, Plan B, in 2021.

	Plan A	Plan B
2020 Annual Premium	\$9,000	n/a
2020 Low risk members	500	n/a
2020 High risk members	700	n/a
2021 Low risk members	100	400
2021 High risk members	630	70

2020 loss ratio	90%
Annual Trend	0%
Annual Lapse	0%
Annual change in enrollment	0%
Benefit buy-down from Plan A to Plan B	5% for low-risk members 20% for high-risk members
2021 Average Annual Premium	\$8,000

- Low-risk members in each plan had 10% lower claim costs than high-risk members.
- (c) (3 points) Calculate the amount of premium leakage that occurs in 2021. Show your work.

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

You are given:

- Lapse is 0%
 - No new entrants to the plan
- (d) (2 points) Evaluate the effectiveness that different ACA-prohibited techniques would have at addressing premium leakage.

ANSWER:

15. Fall 2022 DP #6

Eaton 10 – LTCI Rate Increases

Eaton 9 – LTCI Experience Monitoring

(8 points)

(a) (2 points) Explain how variances from the following pricing assumptions may result in the need for a rate increase on a block of long term care (LTC) policies:

(i) Morbidity

ANSWER:

(ii) Persistency

ANSWER:

(iii) Interest

ANSWER:

You are an actuary at DEF Insurance Company tasked with completing an experience review for a block of LTC policies issued 10 years ago and priced at a lifetime loss ratio of 63%. You find:

- 10,000 policies originally sold
- 5,900 policies currently in force
- 4,100 policies were assumed to remain in force after 10 years based on original pricing assumptions
- No changes required to morbidity or interest rate assumptions
- Cumulative actual historical loss ratio of 20% equals the projected loss ratio over the first 10 years based on original pricing assumptions.

(b) (2 points) Assess whether the block needs a rate increase. Justify your response.

ANSWER:

You are given:

- 20% rate increase was implemented four years ago
- Current active life reserve balance is \$210M
- The following present value (PV) data:

(\$ Millions)	Incurred Claims	Original Earned Premium	Rate Increase Earned Premium
PV Historical	\$69.5	\$384.5	\$23.0
PV Future	\$558.5	\$263.0	\$52.5

- (c) (2 points) Calculate the maximum rate increase permitted under the 2014 NAIC LTC Model Regulations. Show your work.

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

- (d) (2 points)

- (i) Describe the impact of shock lapses from a rate increase.

ANSWER:

- (ii) Explain the impact shock lapses have on projected future experience.

ANSWER:

16. Fall 2022 DP #13

Skwire 25 – Disability Claim Costs

Question pertains to the Case Study.

(8 points)

- (a) *(1 point)* List and describe the steps of the disability claim process.

ANSWER:

- (b) *(1 point)* Describe tools used in the disability claim process to reduce risk for the insurer.

ANSWER:

- (c) *(1 point)* Describe the two significant reserves in disability income insurance.

ANSWER:

- (d) *(1 point)* Describe risks and considerations when reviewing group long term disability insurance industry morbidity data.

ANSWER:

You are an actuary evaluating Thunderball's long term disability book of business.

You are given:

- Exhibit 1
- All members are Males age 40-49
- 6-month elimination period

Year	Paid Claims	Change in Claim Reserves for all Incurral Years Combined	Present Value (PV) Claims Made to Date Discounted to the Year of Incurral	Present Value (PV) of Current Claim Reserve Discounted to the Year of Incurral	Earned Premium	Incident Rate
Year 3	\$200,000	\$7,000,000	\$344,500	\$9,225,000	\$12,500,000	1.1
Year 4	\$350,000	\$8,808,400	\$435,000	\$8,362,500	\$11,500,000	2.3
Year 5	\$600,000	\$10,005,500	\$760,000	\$7,800,000	\$11,000,000	2.8
Year 6	\$820,000	\$6,450,000	\$732,000	\$7,260,000	\$10,500,000	3.4
Year 7	\$850,000	\$7,050,000	\$900,000	\$7,050,000	\$10,250,000	3.6

(e) (2 points) Evaluate the experience for Years 3 - 7 using:

- (i) Calendar year loss ratio study
- (ii) Incurral year loss ratio study
- (iii) Actual-to-expected claim incident rate study

Show your work.

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

Management wants to understand historical trends to use in financial forecasts.

- (f) (1 point) Recommend one of the study approaches from part (e) to share with management. Justify your response.

ANSWER:

Thunderball management is concerned about the emerging experience compared to the incident rate pricing assumptions. The CEO recommends using the latest Canadian LTD study instead of company experience for rate development.

- (g) (1 point) Critique the CEO's recommendation. Justify your response.

ANSWER:

17. Fall 2023 DP #1

Eaton 2 – History of LTC Products

Eaton 9 – LTCI Experience Monitoring

Eaton 10 – LTCI Rate Increases

(6 points)

- (a) (1 point) Describe the evolution of long-term care (LTC) products.

ANSWER:

- (b) (1 point) List the Actuarial Standards of Practice an actuary should consider when performing an LTC experience study.

ANSWER:

You are a consulting actuary and have been hired by LMN Insurance Company to study their LTC block. The last policy in LMN's LTC block was issued in 2010 and all policies were issued with unlimited benefit periods. LMN has provided the following experience data:

Calendar Year	Active Exposure	Disabled Exposure	Voluntary Lapse Count	Active Death Count	New Claims Count	Disabled Death Count	Claim Recovery Count
2018	12,479	2,439	149	674	649	85	4
2019	11,011	2,999	154	639	551	96	3
2020	9,670	3,451	131	571	522	124	3
2021	8,450	3,845	111	541	465	131	3
2022	7,336	4,177	138	477	425	155	2

- (c) (2 points) Calculate for each calendar year the experience-based:

- (i) Voluntary lapse rate
- (ii) Active mortality rate
- (iii) Disabled mortality rate
- (iv) Claim incidence rate

Show your work.

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

- (d) (1 point) Evaluate whether the experience-based voluntary lapse and mortality rates are reasonable compared to LTC industry experience. Justify your response.

ANSWER:

- (e) (1 point) Recommend a lapse assumption for LMN to use in projecting the 2023 experience for their LTC block. Justify your response.

ANSWER:

18. Fall 2023 DP #9

CP321-101-25 – Pricing Med. Supp.

(7 points)

- (a) (1 point) List and describe types of Medicare Supplement reserves.

ANSWER:

You are a Medicare Supplement pricing actuary for issue-age rated products. You are given:

- Annual discount factor of 5%
- Expected life-time loss ratio of 65%
- Premiums are paid at the beginning of the year
- Claims occur halfway through each year

Policy Year	Attained Age	Mortality Rate per 1,000	Plan Lapse Rate	Unadjusted Claim Cost	Gender Factor Adjustment for Male	Non- Smoker Adjustment Factor
1	80	56.24	23.0%	\$1,809	7.7%	-2.9%
2	81	62.36	20.0%	1,833	8.0%	-2.9%
3	82	69.23	20.0%	1,856	8.2%	-2.9%
4	83	76.88	20.0%	1,878	8.4%	-2.9%
5	84	85.45	20.0%	1,899	8.6%	-2.9%
6	85	95.06	15.0%	1,920	8.9%	-2.9%
7	86	105.83	15.0%	1,940	9.1%	-2.9%
8	87	117.84	15.0%	1,961	9.3%	-2.9%
9	88	131.14	15.0%	1,981	9.6%	-2.9%
10	89	145.75	15.0%	2,002	9.6%	-2.9%
11	90	161.68	12.0%	2,024	9.6%	-2.9%
12	91	178.91	12.0%	2,045	9.6%	-2.9%
13	92	197.41	12.0%	2,067	9.6%	-2.9%
14	93	217.15	12.0%	2,090	9.6%	-2.9%
15	94	238.08	12.0%	2,113	9.6%	-2.9%
16	95	258.82	9.0%	2,137	9.6%	-2.9%
17	96	278.97	9.0%	2,162	9.6%	-2.9%
18	97	298.09	9.0%	2,186	9.6%	-2.9%
19	98	315.76	9.0%	2,212	9.6%	-2.9%
20	99	1,000.00	9.0%	2,238	9.6%	-2.9%

- (b) (4 points) Calculate the annual premium for an 80 year-old non-smoker male. State your assumptions. Show your work.

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

Your company's research team released a revised experience study for age-specific claim costs and 5-year lapse rates:

Policy Year	Plan Lapse Rate	Attained Age	Unadjusted Claim Cost
1	13.0%	80	\$1,920.06
2	15.6%	81	\$2,307.58
3	15.3%	82	\$2,553.67
4	12.8%	83	\$2,804.44
5	10.5%	84	\$2,950.31

- (c) (2 points)
- (i) Interpret the impact of the revised experience study on the future expected life-time loss ratio projections.

ANSWER:

- (ii) Assess the impact of the revised experience study on the different types of reserves.

ANSWER:

19. Spring 2022 DP #1b-c
Eaton 10 – LTCI Rate Increases

(4 points)

(b) (2 points) Explain how the following contribute to a LTC rate increase:

(i) Age-rating structure

ANSWER:

(ii) Renewal provisions

ANSWER:

(iii) Low loss ratios in early durations

ANSWER:

(iv) Assumption updates between original pricing and current experience

ANSWER:

You are an actuary at The Thunderball Corporation. The Thunderball Corporation is a large insurance company operating in the United States and Canada. The corporate vision is to be a comprehensive provider of long term insurance products.

Thunderball offers Group LTD, Group Life, and Group and Individual Long-Term Care.

You are told that state regulators are accepting proposals to change the Group Long Term Care product design. Your company is going to propose they loosen product design regulations for group LTC.

The current plan sold has the following provisions:

- Issue Age Rated
- Guaranteed Renewable
- Guaranteed Issue for active employees
- Inflation Protection
- There are no other additional benefits or optional provisions

The state regulators are concerned about some of your historical double and triple-digit rate increases. They understand why those were necessary, but they want to reduce the likelihood of future, large rate increases. They would like LTC plans to be more similar to other Supplemental Health Plans.

You will need to work with the regulators to address their concerns and propose some new regulations.

(c) (2 points)

- (i) Propose two product design changes assuming product design regulations are loosened.

ANSWER:

- (ii) Explain how the changes will support the regulator's objectives.

ANSWER:

20. Spring 2022 DP #3a-c,e
CP321-101-25 – Pricing Med. Supp.

Question pertains to the Case Study.

(6 points)

- (a) (1 point) Describe Medicare Supplement pricing methods.

ANSWER:

- (b) (1 point) Compare and contrast plan design restrictions for:

- (i) Affordable Care Act (ACA) individual major medical
- (ii) Medicare Supplement

ANSWER:

You are an actuarial consultant assigned to develop manual rates for Goldfinger Medicare Supplement filings.

You are given:

- Exhibits 1 - 3
- (c) (2 points) Calculate the annualized claims trend for the Medicare Supplement experience from Year 2 to Year 4. Show your work.

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

You are given:

- Goldfinger targets expenses and profit to be 25% of gross premiums
 - Premiums did not change from Year 4 to Year 5
- (e) (2 points) Calculate the Year 6 rate increase. State your assumptions. Show your work.

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

21. Spring 2022 DP #8

Leida 4 – Managing Antiselection

(7 points) You are an actuary for Lucky 7 Insurance and are responsible for pricing individual medical plans. You are evaluating antiselection models.

(a) (1 point) Define:

(i) Antiselection acuity

ANSWER:

(ii) Involuntary lapse rate

ANSWER:

(iii) Lapse elasticity

ANSWER:

(iv) Partition models

ANSWER:

(b) (1 point) Compare and contrast deterministic and stochastic antiselection models.

ANSWER:

(c) (1 point) State the formula for defining lapses in the Cumulative Antiselection Theory (CAST) model.

ANSWER:

You are given:

- Target loss ratio: 70%
- Product duration: 7 years
- Involuntary lapse rate: 5% per year
- k_1 : 0.1
- Claims trend assumption for healthy individuals: 2% per year
- Claims trend assumption for unhealthy individuals: 7% per year
- The following table:

Duration	# of Healthy Lives	# of Unhealthy Lives	Average Cost for Healthy Lives	Actual Claims	Actual	Actual	Projected	Projected	Average Cost for Unhealthy Lives	iq_t
					$q^{(ai)}_t$	aq_t	$q^{(ai)}_t$	aq_t		
0	10,000	0	95.00	900,000	0.100	0.20				
1	7,000	1,000	95.50	1,200,000	0.090	0.15				
2	5,320	1,630	96.30	1,300,000			0.03	0.15		
3							0.03	0.10		
4							0.03	0.09		
5							0.03	0.09		
6										

- (d) (3 points) Calculate the gross premium per member per year (PMPY) by applying the CAST model. Show your work.

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

- (e) (1 point) Critique Lucky 7's CAST model assumptions and propose revisions to the assumptions. Justify your response.

ANSWER:

22. Spring 2022 DP #10

Skwire 25 – Disability Claim Costs
Issues in Applying Credibility - LTD
CP321-102-25 – Short Term Disability

(8 points) You are an actuary developing factors for long-term disability (LTD) and short-term disability (STD) pricing.

(a) (2 points) Describe:

(i) Factors used to analyze LTD experience.

ANSWER:

(ii) Ways to estimate the credibility of experience used to develop LTD manual rates.

ANSWER:

For the LTD block of business, you are given:

- LTD experience is considered fully credible for ratemaking if observed claims are within 5% of expected claims 95% of the time.
- Expected claims: \$100,000
- Standard deviation: \$40,000
- Expected number of claims: 1,000

(b) (1 point) Calculate the credibility weight. Show your work.

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

You are evaluating 2020 experience from the STD block of business to develop rating factors for 2022 pricing. You plan to credibility weight 2020 experience 50% with current factors.

You are given:

Administration	10% of premium
Claims Adjudication	3% of premium
Commissions	2% of premium
Premium Taxes	2% of premium
Risk & Profit	3% of premium

Area	Current Rating Factors	2020 Experience Loss Ratio
East	1.10	0.75
Central	1.00	0.80
West	0.90	0.70

Industry	Current Rating Factors	2020 Experience Loss Ratio
Hospitals	1.10	0.85
Retail	1.00	0.65
Finance	0.90	0.70

Age/Gender	Current Rating Factors	2020 Experience Loss Ratio
Males <25	0.50	0.77
Males 25-40	0.75	0.77
Males 40+	1.50	0.77
Females <25	0.50	0.77
Females 25-40	1.75	0.77
Females 40+	1.25	0.77

(c) (3 points) Calculate the 2022 area rating factors. Show your work.

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

Your experience review of the block of business demonstrates that 90% of the Finance industry is male under 40, and in the West region.

(d) (2 points)

(i) Describe rating factor discrimination concerns.

ANSWER:

(ii) Recommend an action to reduce discrimination concerns.

ANSWER:

23. Spring 2023 DP #2

Eaton 2 – History of LTC Products

Eaton 10 – LTCI Rate Increases

(5 points)

- (a) (1 point) Describe the key provisions of long term care (LTC) products included in the NAIC LTC Insurance Model Act and Model Regulation.

ANSWER:

- (b) (2 points) Complete the table below. For each of the assumptions:

- (i) Describe how LTC industry experience has been different from what was originally expected in the 1990s.
- (ii) Explain why the differences may lead to the need for a rate increase.

Assumption	Variance in Experience	Reasons may lead to rate increase
Mortality		
Voluntary Lapse		
Interest Rates		
Morbidity		

- (c) (2 points) Describe how the behavior of LTC policyholders in response to a rate increase should be considered in projections of future experience.

ANSWER:

24. Spring 2023 DP #6

CP321-102-25 – Short Term Disability
Skwire 12 – Group Disability Benefits

(8 points)

- (a) (1 point) Describe the primary differences between Short-term Disability (STD) and Long-term Disability (LTD) coverage.

ANSWER:

- (b) (2 points) Recommend changes to stand-alone STD and stand-alone LTD offerings under the following scenarios. Justify your response.

- (i) The state recently passed legislation implementing statutory disability plans.

ANSWER:

- (ii) The Sales team decides to package STD and LTD benefits into one offering.

ANSWER:

You are given the following for UVW Insurance Company's group disability business:

20X1 Experience and Rating Factors

Non-Claim Expenses	
Admin Costs	\$1,100,000
Claim Adjudication Costs	\$280,000
Commissions	\$1,000,000
Premium Taxes	\$200,000
Expected Risk Profit (% of Premium)	5%

20X1 Experience by Area			
	Factor	Premium ('000s)	Claims ('000s)
NE	1.00	\$2,300	\$1,400
SE	1.10	\$1,700	\$1,400
MW	0.95	\$2,000	\$1,900
West	1.10	\$1,250	\$1,100
SW	1.00	\$2,750	\$1,700
Total		\$10,000	\$7,500

20X1 Experience by Group Size			
	Factor	Premium ('000s)	Claims ('000s)
<=25	1.05	\$1,000	\$850
26 - 50	1.00	\$1,500	\$1,500
51-100	1.00	\$2,000	\$1,600
101-500	0.95	\$2,000	\$1,700
500+	1.10	\$3,500	\$1,850
Total		\$10,000	\$7,500

- 20X2 Premiums are \$10,500,000

20X3 Rating Assumptions

Experience Weight Prior Rating Factors	90%
Credibility on 20X1 Claims	100%
Expected Claims Trend	3%

- (c) (3 points) Calculate the 20X3 premium change needed for a 75-member group in the MW region. Show your work.

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

- (d) (2 points)

- (i) Critique the appropriateness of the experience weight of the prior rating factor assumption.

ANSWER:

- (ii) Describe the implications of placing less weight on the prior rating factors for a 75-member group in the MW region.

ANSWER:

25. Fall 2024 DP #5

Skwire 12 – Group Disability Benefits
CP321-102-25 – Short Term Disability

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

(6 points) You are a Short-Term Disability (STD) pricing actuary working for Company ABC.

(a) (1 point) Describe:

(i) The Family and Medical Leave Act (FMLA)

ANSWER:

(ii) The impact of FMLA on STD insurance.

ANSWER:

(b) (1 point) Explain the drivers of STD premium changes.

ANSWER:

In the Excel spreadsheet, you are given 20X1 experience to develop rating factors for 20X3 pricing.

(c) (3 points) Calculate revised group size and employee participation factors for 20X3. Show your work.

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

The Sales Lead of Company ABC is in aggressive pursuit of providing STD insurance to Big Fish Corp., a fast-growing company with 75 employees. The Sales Lead is anticipating a wave of new sales to smaller groups of 5-9 employees and asks you to price those groups at a higher rate to subsidize offering a lower rate to Big Fish Corp.

(d) (1 point) Critique the Sales Lead's request.

ANSWER:

26. Spring 2024 DP #4b-f

ASOP #18 – LTC Insurance

Eaton 2 – History of LTC Products

Eaton 9 – LTCI Experience Monitoring

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

(8 points)

- (b) (1 point) Describe common LTC plan design characteristics that policyholders can choose at time of policy purchase.

ANSWER:

You are an LTC actuary working for the publicly traded company GHI on their experience study team.

In the Excel spreadsheet, you are given pricing assumptions and benefit amounts.

- (c) (2 points) Calculate the total utilization rates by care setting. Show your work.

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

- (d) (2 points)

- (i) Develop an actual to expected analysis for the utilization rates for 20X1 and 20X2 combined. Show your work.

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

- (ii) Interpret the results of the actual to expected analysis.

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

(e) (2 points)

- (i) Develop an actual to expected analysis for the claims termination rates. Show your work.

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

- (ii) Interpret the results of the actual to expected analysis.

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

GHI leadership comments that “because paid claims were higher than anticipated, GHI should file a rate increase to ensure shareholders feel comfortable with our revenue.”

- (f) (1 point) Critique leadership’s comments based on the actual to expected analyses.

ANSWER:

27. Spring 2024 DP #5

CP321-102-25 – Short Term Disability
Skwire 12 – Group Disability Benefits

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

(11 points)

- (a) (2 points) Contrast Short-Term Disability (STD) and Long-Term Disability (LTD) insurance by completing the following table.

ANSWER:

	STD	LTD
Elimination periods		
Incidence rates		
Claim causes		
Claim payment timing		
Claim volatility		
Benefit periods		
Maximum benefit amounts		
Exclusions		

- (b) (1 point) Describe optional benefits commonly available on STD plans.

ANSWER:

You are a pricing actuary for an insurance company specializing in STD insurance.

In the Excel spreadsheet, you are given rating factors and 20X1 experience.

(c) (4 points)

- (i) Calculate 20X1 profit. Show your work.
- (ii) Create an actual to expected study for each assumption by completing the following table in the Excel file. Show your work.

Assumption	Experience	Pricing	Difference
Loss Ratio			
Risk & Profit			
Claim Adjudication Costs			
Commissions			
Premium Taxes			
Other Administration			
Claims			

- (iii) Interpret the results for each assumption.

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

You are pricing a renewal for a high-profile Northeast construction company. The same employees participate in the plan as the prior year.

In the Excel spreadsheet, you are given rating factors, experience, and guidance from Lead Actuary on setting 20X2 rates.

(d) (3 points) Calculate the renewal percentage increase. Show your work.

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

The sales representative is concerned with losing this high-profile, high-revenue client and believes it will be difficult to sell the renewal increase.

(e) (1 point) Justify the rate increase with three supporting statements to the sales representative.

ANSWER:

28. Spring 2024 DP #8

Skwire 12 – Group Disability Benefits

Skwire 25 – Disability Claim Costs

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

(9 points)

- (a) (1 point) List and describe group characteristics that impact Long Term Disability (LTD) insurance rates.

ANSWER:

- (b) (1 point) Describe ways group disability insurance products limit moral hazards.

ANSWER:

You are a disability actuary reviewing the experience of a large transport company that is about to renew its long-term disability (LTD) plan. The employees in the transport company are categorized into drivers and non-drivers. Leadership has proposed the following plan design for next year:

Covered employees	All employees
Definition of disability	Any occupation to age 65
Benefit amount	90% of monthly earnings
Elimination period	One month
Benefit period	To age 65
Benefits offsets	Not applicable
Tax Status	Non-Taxable
Optional benefits	Cost of Living Adjustment benefit: 6% per year
Payer of premiums	Employer

(c) (4 points)

(i) Critique the plan design.

ANSWER:

(ii) Propose 4 plan design changes.

ANSWER:

(iii) Evaluate the premium impact for each plan design change.

ANSWER:

In the Excel spreadsheet, you are given company premium and assumptions.

(d) (1 point) Calculate the change in the 20X2 company cost for:

(i) Drivers

(ii) Non-drivers

Show your work and state your assumptions.

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

(e) (1 point) Explain why the changes in company cost may differ between drivers and non-drivers.

ANSWER:

(f) (1 point) Critique the changes to employee contributions in 20X2.

ANSWER:

29. Fall 2024 DP #8

Eaton 2 – History of LTC Products

Eaton 9 – LTCI Experience Monitoring

Eaton 10 – LTCI Rate Increases

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

(9 points) You are an actuary for XYZ Insurance Company supporting their block of long-term care (LTC) business. A new employee asks about the benefit triggers used to determine eligibility for LTC benefits.

- (a) (1 point) Describe the tax-qualified benefit triggers defined within HIPAA and the benefit triggers used prior to HIPAA.

ANSWER:

XYZ's existing block of LTC policies uses an expense reimbursement benefit design.

In the Excel spreadsheet, you are given utilization data for the existing block of policies.

- (b) (3 points)
- (i) Calculate the experience-based aggregate days utilization and dollars utilization rates by site of care. Show your work.
 - (ii) Recommend days utilization and dollars utilization assumptions by site of care to be used for projecting XYZ's existing LTC block. Justify your response.

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

XYZ is considering alternate benefit types as part of a new LTC product. You are given:

- No change in policyholder behavior
- No exhaustion of benefits

(c) (3 points) Calculate the difference in aggregate historical paid claims for each site of care between the existing expense reimbursement benefit design and:

- (i) Indemnity benefit payment
- (ii) Cash disability benefit payment

Show your work.

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

Utilization, lapse, and active mortality historical experience were lower than pricing expectations, while other assumptions align with original expectations.

Your updated projections indicate the need for a rate increase. However, the Chief Marketing Officer said that premiums have been higher than expected and paid claims have been lower than expected, so a rate increase cannot be justified.

(d) (2 points)

- (i) Critique the Chief Marketing Officer's position.

ANSWER:

- (ii) Explain how a rate increase may be justified.

ANSWER:

30. Fall 2024 DP #10

Leida 4 – Managing Antiselection

(6 points) Company ABC has offered the following major medical plans in 20X1 with splits of healthy and unhealthy members shown below:

	Plan A	Plan B	Plan C
Premium (PMPM)	\$ 500	\$ 350	\$ 200
Deductible	\$ 100	\$ 250	\$ 500
Healthy Member Count	600	500	400
Unhealthy Member Count	500	400	300
Healthy Member Loss Ratio	70%	70%	70%
Unhealthy Member Loss Ratio	90%	90%	90%

(a) (1 point) Calculate:

- (i) 20X1 total premium PMPM
- (ii) 20X1 total claim cost PMPM

Show your work.

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

In 20X2, Company ABC will be instituting the following rate increases by plan:

	Plan A	Plan B	Plan C
20X1 to 20X2 Rate Increase	5.0%	2.5%	2.0%

Due to these rate increases, the healthy members in each plan transition to new plans in 20X2 shown in the following grid:

Healthy Member Transitions		20X2		
20X1		Plan A	Plan B	Plan C
Plan A		160	330	110
Plan B		-	140	360
Plan C		-	-	400

No unhealthy members transition plans.

(b) (2 points) Calculate the buydown effect on premium for 20X2 as a PMPM due to member transition. Show your work.

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

The claim costs for all members who transition plans follow the loss ratio of their new plan in 20X2.

- (c) (2 points) Calculate the buydown effect on claims for 20X2 as a PMPM due to member transition. Show your work.

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

- (d) (1 point) Explain the difference in the changes calculated in (b) and (c).

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

CP 321 - Disability, Long Term Care,
and Long Duration Health Contracts

Course CP 321

Curated Past Exam Questions

Learning Objective 3: Reserving

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1. Fall 2023 VR #3

Leida chapter 6 – Reserves and Liabilities

(6 points)

- (a) (1 point) List and describe three key types of premium reserves.

ANSWER:

You are given a block of policies that is currently holding Gross Unearned Premium reserves.

Policy Number	Premium Mode	Date Premium Last Paid	Valuation Date	Premium Amount	Gross Unearned Premium
#001	Single Premium	1/1/20X1	6/1/20X1	\$4,000	?
#002	Annual	1/1/20X1	7/1/20X1	?	\$550
#003	Quarterly	7/1/20X1	?	\$3,000	\$1,000
#004	Annual	?	3/1/20X1	\$12,000	\$8,000

- (b) (1 point) Calculate the four missing (?) cells. Justify your answers.

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

You are given a block of active policies.

Policy Number	Premium Mode	Total Annual Premium	Policy Effective Date	Valuation Date	Premium Received as of Valuation Date	Premium Liability / Asset	Premium Reserve Account Type
#005	Annual	\$20,000	1/1/20X1	1/1/20X1	\$25,000	?	?
#006	Monthly	\$6,000	7/1/20X1	9/1/20X1	?	\$1,000 Asset	?
#007	Quarterly	\$12,000	7/1/20X1	?	\$3,000	\$3,000 Asset	?
#008	Monthly	\$15,000	3/1/20X1	3/1/20X1	\$1,250	?	?

Assume all modal premiums are fully earned once the modal period has begun

- (c) (1 point) Calculate the eight missing (?) cells. Justify your answers.

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

(d) (3 points) Assess the accuracy of the following statements by identifying which are true or false. Justify your answer.

(i) An insurer can calculate its profits and losses by subtracting paid claims and paid administrative expenses from premium received.

ANSWER:

(ii) Liabilities are for obligations which have not yet been incurred or not yet accrued.

ANSWER:

(iii) Reserves are for obligations that are already incurred and accrued.

ANSWER:

(iv) The goal of statutory statements is to match profit streams with revenue streams with some conservatism.

ANSWER:

(v) Mid-terminal reserves are the average of the reserves held on the first and last days of the year.

ANSWER:

(vi) For premium due and unpaid, all unpaid premium can be booked as an asset according to statutory accounting.

ANSWER:

2. Fall 2023 VR #4

Leida chapter 6 – Reserves and Liabilities

(5 points) You are provided the following information for a group of 1,000 policies written on 1/1/20X1:

Year	Policies In Force	Per Policy Claims	Net Level Premium Policy Reserve	Net Level Premium
20X1	E	D	\$824,071.11	A
20X2	700	\$5,830	C	A
20X3	300	\$6,430	B	A
20X4	100	\$6,830	\$141,094.55	A
20X5	0	\$7,250	\$0	A

Assume the following:

- Policies in force are as of the end of the year
- Premiums are paid at the beginning of the year
- Claims are paid in the middle of the year
- Lapses occur at the end of the year
- Reserves are calculated as of the end of the year
- Interest rate is 5% per year

- (a) (4 points) Calculate the missing values A through E in the above table using prospective and retrospective formulas as necessary. Show your work.

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

- (b) (1 point) Calculate the two-year full preliminary term liability (2YFPT) as of 12/31/20X3. Show your work.

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

3. Fall 2023 VR #9

CP321-104-25 – Preparing Health Contract Reserves

(5 points) You are assisting the accounting department in reviewing your company's insurance products. You determine that a contract reserve will need to be booked.

- (a) (2 points) Compare and contrast the SAP and GAAP guidance on contract reserves.

ANSWER:

- (b) (1 point) Describe the tax implications for contract reserves.

ANSWER:

- (c) (2 points) Describe different methods of modifying contract reserve factors.

ANSWER:

4. Spring 2021 FV-A #3b

Skwire 40 – Claim Reserves for Long-Term Benefits

(3 points) You are the reserving actuary for a startup insurer.

The startup insurer is about to make its first offer of short-term disability insurance to a company with two employees, as follows:

- 50-year-old with an annual salary of \$72,000
- 60-year-old with an annual salary of \$96,000

The benefit terms of this sale are as follows:

- 3-month elimination period
- 3-month benefit period
- Benefits are paid at the beginning of the month to disabled individuals.
- Benefit payments will be a fixed percentage of the disabled employee's monthly salary. The percentage will be the same for both employees.

The assumed annual interest rate is 4%.

Reserves are set using the following continuance table:

Claim Duration (in months)	Number of Disabled Individuals by Claim Duration	
	Age 50 at claim	Age 60 at claim
0	1,000	1,000
1	950	980
2	900	960
3	850	940
4	800	920
5	750	900
6	700	880

Your manager has requested that the maximum possible tabular claim reserve for both employees at any point in time equal \$30,000.

- (b) (3 points) Calculate the fixed percentage of salary that will be offered as a benefit based on your manager's request. Show your work.

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

5. Spring 2023 VR #2a

Leida chapter 6 – Reserves and Liabilities

(5 points) You are a valuation actuary for a company selling individual Long-Term Care (LTC) policies. You are given the following information for the LTC block:

Year (t)	Mortality at Year (t)	Annual Claims
0	0.0000	\$0.00
1	0.0113	\$120.74
2	0.0135	\$146.38
3	0.0162	\$168.19
4	0.0194	\$190.02
5	0.0221	\$209.85

Assume the following:

- Annual lapse rate is 5%
- All claims, deaths, and lapses occur at the end of the year
- Interest rate is 0%
- Net level premiums are paid at the start of the year

(a) (3 points) Calculate the reserve per in-force policy for each year, using the prospective method for years 1 and 2, and the retrospective method for years 3 and 4. Show your work.

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

6. Spring 2023 VR #7b-e

Leida chapter 6 – Reserves and Liabilities

CP321-104-25 – Preparing Health Contract Reserves

CP321-107-25 – Health Insurance Accounting Basics

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

(6 points) You are the Appointed Actuary at Mockingbird Corporation.

The company's new CEO believes that Contract Reserves are unnecessary for Mockingbird's individual Long-Term Disability (LTD) products, as the company holds Unearned Premium Reserves.

- (a) (1 point) Contrast the purposes of an Unearned Premium Reserve and a Contract Reserve.

ANSWER:

- (b) (1 point) Describe circumstances in which Mockingbird would not need to hold a Contract Reserve.

ANSWER:

- (c) (1 point) Explain why having appropriate Claims Reserves, Unearned Premium Reserves, and Contract Reserves may not always be sufficient to demonstrate reserve adequacy under Statutory Accounting Principles (SAP)

ANSWER:

You are provided with the following information on four employees insured by Mockingbird.

Gender	Age	Eliminati on Period	Policy Start Date	Status	Months Disabled	Premium Mode	Gross Monthly Premium	Gross Monthly Benefit
Male	35	3 months	6/1/2010	Disabled	60	Monthly	\$5.00	\$4,000
Female	28	6 months	1/1/2015	Disabled	4	Annual	\$3.50	\$2,500
Male	37	3 months	1/1/2012	Disabled	48	Annual	\$6.00	\$3,000
Female	44	3 months	1/1/2020	Active	n/a	Five-year prepaid	\$4.50	\$1,500

You are given the following assumptions:

- Coverage includes waiver of premium upon disability
- Premiums are due at the beginning of the month

In the Excel worksheet, you are provided with reserve factors for various ages and durations.

(d) (3 points) Calculate the following:

- Disabled Life Reserve as of 1/31/2022
- Unearned Premium Reserve as of 1/31/2022

Show your work.

<i>The response for this part is to be provided in the Excel spreadsheet.</i>

7. Spring 2024 VR #5

Leida chapter 6 – Reserves and Liabilities

CP321-107-25 – Health Insurance Accounting Basics

(4 points) TRT Insurance Company is adding the following new products:

- Issue age individual Medicare Supplement business
- Attained age individual Medicare Supplement business
- Individual long-term care (LTC)
- Individual long-term disability (LTD)
- Group LTD
- Individual Medicare Advantage plans

(a) (2 points) Explain how each of the new products will affect the overall size of contract reserves held by the company. Justify your answer.

ANSWER:

Additionally, TRT issues a new block of 10,000 individual policies. Assume the following:

- The policies charge a net level premium
- Policies are in force for eight years
- Premiums are paid at the beginning of each year
- Lapses occur at the midpoint of each year
- Claims occur at the end of each year

Persistency for year 1	100%
Persistency for years 2-8	85%
Claims in year 1, in millions	\$10
Annual claims trend for years 2+	5%
Non-claims expenses	\$0
Annual interest rate	4%

(b) (2 points) Calculate the net level premium for the block. Show your work.

<i>The response for this part is to be provided in the Excel spreadsheet.</i>

8. Fall 2022 FV #3

Skwire 40 – Claim Reserves for Long-Term Benefits

(7 points)

- (a) (1 point) Describe studies and considerations for evaluating the adequacy of claim reserves for long-term benefits.

ANSWER:

You are determining long-term benefit reserves for your company and are given the following information regarding one of your members:

Date Of Birth	October 1, 1957
Member Disabled Since	April 1, 2022
Monthly Benefit	\$2,500
Annual Interest Rate	4%
Number Of Months In Elimination Period	3
Benefit Ends At Age	65
Benefit Payment Timing	Middle Of The Month

Continuance Table

Claim Duration (Months)	Age At Claim		
	63	64	65
0	1,000	1,000	1,000
1	975	950	900
2	950	900	800
3	925	850	700
4	900	800	600
5	875	750	500
6	850	700	400
7	825	650	300
8	800	600	200
9	775	550	100

- (b) (3 points) Calculate the tabular claims reserves for the member above as of
- a. June 30, 2022
 - b. July 31, 2022
 - c. August 31, 2022

Show your work.

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

- (c) (1 point) List common data integrity issues associated with long-term benefit reserves.

ANSWER:

You discover that the member has been disabled since February 1, 2022.

- (d) (1 point) Calculate the sufficiency or deficiency of the reserve for this member as of July 31, 2022. Show your work.

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

You are given the following pending factors:

Durations	Pending Factor
1-4	90%
5-9	72%

- (e) (1 point) Calculate the pending reserve for this member as of July 31, 2022, assuming the claim is reported and unpaid on July 31, 2022. Show your work.

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

9. Spring 2022 FV #2a

Skwire 40 – Claim Reserves for Long-Term Benefits

(3 points)

- (a) (3 points) You are an actuarial manager at a Long Term Disability (LTD) insurer. You receive the following email from your direct report.

Hi, I was asked to help calculate the pending reserve for one of our members, age 40. We were informed of the claim one month after the end of the three-month elimination period. This member has a \$1000 monthly benefit payable for six months. I used our normal assumptions (interest rate at 4%, pending factor of 60%) and came up with a pending reserve of \$2747.27. Can you help review this to make sure I'm coming up with the correct answer?

- (i) Critique the accuracy of your direct report's calculated pending reserve using your own estimate from the continuance table provided. Show your work.

Claim Duration (months)	Age 40 at Claim
0	1000
1	960
2	920
3	880
4	845
5	815
6	790
7	765
8	745
9	725
10	0

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

You receive a follow-up email from your direct report.

Hi, it turns out I had it backwards on when we were informed of the claim. Rather than one month after the end of the elimination period, it's supposed to be one month before the end of the elimination period. Sorry about that!

- (ii) Evaluate how the pending reserves may change based on the follow-up email.

ANSWER:

10. Spring 2022 FV #3a,c-e

Skwire 40 – Claim Reserves for Long-Term Benefits

(6 points) You are the valuation actuary for a Canadian insurer specializing in Group health and disability.

- (a) (2 points) Describe challenges facing actuaries valuing Group health and disability business.

ANSWER:

- (c) (1 point) List factors to consider for setting termination rate assumptions for Group Long Term Disability (LTD).

ANSWER:

You are given the following information on your block of Group LTD policies:

Claim duration	Reserve at 2021-01-01	Actual 2021 payments	Reserve at 2021-12-31
11	281,000	48,000	241,000
10	71,000	13,000	62,000
9	79,000	15,000	67,000
8	83,000	16,000	73,000
7	94,000	19,000	80,000
6	113,000	18,000	99,000
5	120,000	16,000	102,000
4	135,000	18,000	117,000
3	169,000	23,000	146,000
2	218,000	38,000	172,000
1	285,000	60,000	219,000
Current year	n/a	23,000	400,000

- The valuation interest rate is 2%
- Payments occur at the midpoint of the year.

(d) (2 points) Calculate the gain/loss by duration and in total. Show your work.

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

(e) (1 point) Assess the adequacy of the reserve as of 2021-12-31. Justify your answer.

ANSWER:

11. Spring 2021 FV-A #4

Skwire 40 – Claim Reserves for Long-Term Benefits

Question pertains to the Case Study

(5 points) You are a long-term disability (LTD) reserving actuary for Thunderball Corporation.

- (a) (2 points) List and describe common policy provisions that should be considered in LTD claim reserving.

ANSWER:

Mary Smith is a female LTD claimant with a monthly benefit of \$3,000. To set the reserve for her policy, Thunderball Corporation uses the factors from Exhibit 4 of the case study.

Mary is age 35 and her claim duration is 48 months. The present value of Mary's next 12 monthly payments, discounted for interest and continuance probability, is \$34,465.

- (b) (3 points) Calculate the probability that Mary will still be an active claimant in one year. Show your work.

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

12. Spring 2022 FV #11a-e

CP321-104-25 – Preparing Health Contract Reserves

(10 points) You are an actuary at “Live Laugh Love” Insurance Company (LLL).

- (a) (1 point) Describe the ultimate test of reserve adequacy according to Statutory Accounting Principles (SAP).

ANSWER:

- (b) (1 point) Describe the purpose and implications of the test in part (a).

ANSWER:

You are given the following projected monthly claims at the start of the year.

Time Period	Projected Claims (Millions)
1/31/2021	\$14.0
2/28/2021	\$19.0
3/31/2021	\$17.0
4/30/2021	\$20.0
5/31/2021	\$18.0
6/30/2021	\$22.0
7/31/2021	\$15.0
8/31/2021	\$16.0
9/30/2021	\$12.0
10/31/2021	\$21.0
11/30/2021	\$27.0
12/31/2021	\$28.0

- Contract Reserves at 1/1/2021 = \$5.0M
 - Expected monthly expenses = \$2.0M
 - Monthly premium = \$20.0M
 - Annual interest rate = 5.0%
 - All payments are made at the end of the month.
- (c) (2 points) Calculate whether extra reserves, as of 1/1/2021, need to be recorded based on SAP. Show your work. Justify your answer.

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

- (d) (3 points) Compare and contrast the test in part (a) with Generally Accepted Accounting Principles (GAAP) loss recognition testing.

ANSWER:

A new regulation is passed that requires all insurers to cover out-of-network emergency room visits at 100% for all customers. This is a significant benefit change that will materially impact costs.

- (e) (3 points) Recommend three methods of modifying the reserve factors that would be appropriate for GAAP reporting. Justify your recommendations.

ANSWER:

13. Fall 2020 FV-A #2a,c-d

Skwire 40 – Claim Reserves for Long-Term Benefits
ASOP #23 – Data Quality

(5 points) You are a Long-Term Care (LTC) actuary for an insurance company.

- (a) (1 point) Describe data sources and considerations for creating an LTC claim continuance table.

ANSWER:

- (c) (1 point) Describe your ASOP 23 responsibilities regarding the review of data.

ANSWER:

You will develop claim reserves for an LTC policy consisting of the following benefits:

- \$103,000 payable after 1 year of benefit eligibility
- \$103,000 payable after 2 years of benefit eligibility
- \$103,000 payable after 3 years of benefit eligibility

As of 12/31/2019:

- 100 policyholders first became eligible for benefits.
- You held a reserve of \$10,043,736 for these policyholders.
- The interest rate assumption was 3% per annum.
- The probability that a policyholder newly eligible for benefits would still be eligible for benefits after one year was 60%.

On 12/31/2020, 50 policyholders were still eligible for benefits.

- (d) (2 points) Calculate the claim reserve at 12/31/2020 after the first benefit payment. Show your work.

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

14. Fall 2020 FV-A #6

Leida chapter 6 – Reserves and Liabilities

ASOP #22 – Statements of Opinion for Asset Adequacy

(7 points) You are a consulting actuary who works with a variety of clients on valuation and financial reporting projects.

(a) (2 points)

(i) Define cash flow testing.

(ii) List the six risks identified by the National Association of Insurance Commissioners (NAIC) as being important to cash flow testing.

ANSWER:

You are the appointed actuary for a company that sells accident insurance. You do not have the staff to develop a full cash flow projection for this block, but you believe the conservatism in the policy reserve assumptions is more than adequate to handle moderately adverse deviations.

(b) (1 point) Describe asset adequacy analysis testing methods, other than cash flow testing, that you can apply.

ANSWER:

You performed a year-end gross premium valuation on a client's projected future results for the in-force book. The results were as follows (in \$M):

Net Present Value (NPV) of Premiums	121
NPV of Claims	109
NPV of Premium Tax	3
NPV of Maintenance Expenses	8
NPV of Commissions	22
Current Statutory Reserves	90

- (c) (1 point) Evaluate whether a gross premium reserve is necessary. Show your work and justify your answer.

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

One of your clients sells an accident policy with the following assumptions:

- The deferrable initial costs of selling, underwriting, and issuing the policy were \$1,000.
- Premium is due at the beginning of each year.
- Projected lapse is 8% at each of the first 4 anniversaries and 100% at the 5th anniversary.
- Interest is 3% annually.

- (d) (3 points) Calculate the projected value of the deferred acquisition cost (DAC) asset per original policy after 3 years, immediately prior to recognition of the premium payment. Show your work.

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

15. Fall 2021 FV-A #1

Leida chapter 6 – Reserves and Liabilities

(5 points) You are the actuary for an individual insurance company.

- (a) (1 point) Identify and explain the four major categories of reserves.

ANSWER:

You have been asked to review the pricing for individual policies sold on 1/1/21. There were 120 individual policies sold on 1/1/2021 on an issue age basis with the following characteristics:

- Premiums are paid annually at the beginning of the year.
- Claims are paid out at the end of the year.
- Lapses occur at the midpoint of each year.
- Claims in year 1 start at \$1,500 and increase annually at 8% thereafter.
- Each year there is an 80% chance that each person will persist except there is a 0% chance each person will persist to Year 5.
- Interest is 2.0% annually.

- (b) (2 points) Calculate the total net level annual premium for the block. Show your work.

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

- (c) (2 points) Calculate the total policy reserves for the block at the end of year 2 per policy still in force in year 2. Show your work.

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

16. Spring 2021 FV-A #1

Leida chapter 6 – Reserves and Liabilities

(5 points)

- (a) (2 points) List and describe the types of insurer financial statements that use different reserve bases.

ANSWER:

- (b) (1 point) List and describe the types of premium reserves.

ANSWER:

You are given the following policy information, including the latest coverage date through which premium has been paid.

Policy Number	Annual Premium	Premium Mode	Issue Date	Paid-Through Date
001	\$2,400	Monthly	01 Jan 2019	31 Jan 2021
002	\$2,000	Annual	01 Jan 2021	31 Dec 2021
003	\$4,000	Semi-annual	01 Oct 2017	30 Sep 2021
004	\$2,400	Annual	01 Nov 2018	31 Oct 2020

- (c) (2 points) Calculate each type of premium reserve that should be held as of 12/31/2020 for each policy. Show your work.

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

17. Spring 2021 FV-A #2a,c

Skwire 40 – Claim Reserves for Long-Term Benefits

(3 points) You are the reserving actuary for Northern Insurance Company, a small Canadian insurance company offering long-term disability (LTD) group insurance.

- (a) (2 points) Describe challenges you may face in the valuation of Northern Insurance Company's group and health business.

ANSWER:

Employer B has been a policyholder for several years. You are given the following information on Employer B's claim reserve development during 2020. Amounts are in thousands of dollars.

Claim Duration	Reserve at 1 Jan 2020	Actual Claim Payments	Valuation Interest Amount	Reserve at 31 Dec 2020
5+	300	50	10.0	260
4	140	25	4.6	130
3	180	20	6.4	160
2	230	50	7.2	190
1	300	65	9.4	240

- (c) (1 point) Evaluate the adequacy of the claim reserves:
- (i) For each individual claim duration.
 - (ii) For the lifetime of the policy..

Show your work and justify your answer.

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

CP 321 - Disability, Long Term Care, and
Long Duration Health Contracts

Course CP 321

Curated Past Exam Questions

Learning Objective 6: Retiree Group Benefits

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1. Fall 2020 FV-C #2

CP321-113-25

(13 points) You are a consulting actuary for Company X, tasked with the review of its retiree plan accounting.

- (a) (2 points) Explain how long term assumptions factor into the development of retiree benefit obligations.

ANSWER:

- (b) (2 points) Explain factors that can increase and/or decrease health care trend rates.

ANSWER:

The company's controller tells you that the Net Periodic Postretirement Benefit Cost (NPPBC) for 2019 was calculated to be \$1,357,000 using a 5% discount rate, but at year end you're made aware of errors in the assumptions originally used to develop the NPPBC and told the following:

- On average, total active service to retirement eligibility of 20 years was off by 1 year
- The annuity factor applied was off by 0.7%
- Discount rate used in the Interest Cost calculation was 30 basis points off
- There is no return on assets
- The amortization of unrecognized amounts is zero
- The accumulated postretirement benefit obligation is assumed to be correct
- Expected benefit payments are unchanged
- Standard retirement age is 65

(c) (7 points)

(i) (2 point) Describe the components of the NPPBC.

ANSWER:

(ii) (5 points) Calculate the maximum impact of all known errors in the restatement of the Company X 2019 NPPBC. Show your work.

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

The company Controller is concerned about the tax implications of its retiree plan funding.

(d) (1 point) Identify characteristics of an ideal funding vehicle that specifically pertain to the Controller's concerns.

ANSWER:

(e) (1 point) Recommend a funding vehicle with the characteristics identified in (d) above. Justify your answer.

ANSWER:

2. Fall 2021 FV-C #5

CP321-111-25 – IAS19

CIA Educational Note – Health Care Trend Rate

(8 points) You are advising the CFO on her concerns regarding the high employer cost of the company's retiree benefit program.

(a) (2 points)

(i) (1 point) List the accounting standards applicable to retiree plans.

ANSWER:

(ii) (1 point) Describe how the standards in part (i) above affect retiree health accounting.

ANSWER:

Your office of human capital provides you with a summary of active employees as of January 1, 2020 showing the remaining years of service prior to full retirement eligibility. (See Table in Excel workbook)

The expected postretirement benefit obligation (EPBO) for active employees in groups A-T is \$1.8M and the attribution factor is 0.37.

- (b) (4 points) Due to a significant benefit design change effective January 1, 2020, the accumulated postretirement benefit obligation (APBO) increases 25%.
- (i) (1 point) Calculate the unrecognized loss due to the change in benefit design. Show your work.

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

- (ii) (3 points) Create an amortization schedule showing the annual balance to recognize the loss in part (i) above for all active employees over all of their years until retirement. Show your work.

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

The CFO would like to consider a scenario to recognize the loss more rapidly and consistently.

- (c) (1 point) Compare the amortization schedule for this scenario, showing the annual balance for the unrecognized loss, to the schedule developed in part (b)(ii) above. Show your work.

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

- (d) (1 point) Recommend an approach to Medicare Integration that will address the CFO's concerns over the rising cost of health care. Justify your response.

ANSWER:

3. Spring 2022 FV #9

CP321-113-25

(11 points) You are the actuary tasked with company ABC's retiree group health plan valuation and have been provided with the information below.

Assumptions:

- Discount rate: 5.0% per annum
- Trend rate: 6.0% in year one, decreasing by 0.25% per year to an ultimate 4.0% rate
- Current annual claims cost per capita reflects individual coverage only
- Pre-retirement annual termination rate: 3% at every age
- Pre-retirement mortality rate: assumed 0%
- Retirement rate: assumed 100% at age 65
- Age 65 annuity factor (including trend and post-retirement mortality): 13

Plan Details:

- 100% Company paid
- No unamortized balances
- No plan assets

Active Employee and Retiree Data:

ID number	Status	Claims	Age	Years of Service
1341209	Active	\$3,055.00	40	5
1358335	Active	\$5,385.00	35	5
1358385	Active	\$3,076.00	50	20
1358468	Active	\$2,793.00	38	18
1358474	Active	\$3,673.00	42	12
1358535	Active	\$3,291.00	45	8
1358622	Active	\$1,074.00	55	25
1358650	Retiree	\$3,364.00	65	30
1358687	Retiree	\$2,666.00	66	40
1358754	Retiree	\$2,796.00	69	35
1358812	Retiree	\$4,132.00	72	25
1358842	Retiree	\$2,130.00	68	20

- (a) (4 points) Calculate the total aggregate APBO. Show your work.

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

Without access to a computer, your actuarial supervisor approximates the APBO by averaging costs, ages and years of service, resulting in a different APBO result that he believes will be “close enough.”

(b) (4 points)

- (i) (2 points) Calculate the difference between your detailed approach in part (a) and your supervisor’s approach. Show your work.

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

- (ii) (1 point) Explain the main drivers of the difference between your supervisor’s approximation and your calculation.

ANSWER:

- (iii) (1 point) Describe factors unaccounted for in your valuation that may still lead to your APBO calculation being overly simplistic.

ANSWER:

Your supervisor provides you with his calculation of the Net Periodic Postretirement Benefit Cost (NPPBC) using his simplified approach.

(c) (3 points)

- (i) (1 point) Explain the difference between the service cost and interest cost components of the NPPBC.

ANSWER:

- (ii) (2 points) Calculate the total aggregate NPPBC and the difference from your supervisor’s estimate. Show your work.

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

4. Spring 2023 VR #6a-b,d

CP321-107-25 – Health Insurance Accounting Basics
CP321-113-25

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

(7 points) As of January 1, 20X1, Oculus Inc. has decided to terminate its self-funded retiree medical plan. While active employees will receive a lump-sum payout, current retirees will continue to receive coverage until December 31, 20X3. You are evaluating the impact of these changes and assisting the accounting department with the financial reporting.

In the Excel spreadsheet, there are assumptions and exhibits with cost and demographic information for this group.

(a) (2 points) Describe the accounting treatment(s) applied to the recognition of the plan change for the Accumulated Postretirement Benefit Obligation (APBO) and Net Periodic Postretirement Benefit Cost (NPPBC).

(i) For active employees

ANSWER:

(ii) For retired employees

ANSWER:

(b) (2 points) Calculate the APBO as of January 1, 20X1 under the new plan. Show your work.

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

Oculus Inc. is headquartered in the United States, and it is being acquired by a company headquartered in the United Kingdom that will assume Oculus's contracts as a U.S. insurer. You are working with the accounting team preparing financial statements for the acquiring company, and the team is concerned about how to group and measure liabilities for the acquirer.

(d) (3 points)

- (i) Compare and contrast the various approaches the team could use to measure the liabilities under US GAAP.

ANSWER:

- (ii) Recommend an approach for preparing the financial statements. Justify your response.

ANSWER:

5. Fall 2023 VR #5

CP321-113-25

(6 points) You are given the following information for a postretirement benefit program:

Plan Design	
Annual Benefit Amount	\$250 per year of post-age 40 service Maximum of 20 years
Benefit Duration	Last payable age is 75

Assumptions	
Termination Rates	4% per year, stops at full eligibility
Retirement Rates	50% at 62; 100% at 65
Mortality	None
Disability	None
Discount Rate	4.5% per year
Service Cost	Calculated at the beginning of year

Calculate the following for an employee, hired at age 35, and currently age 45. Show your work.

- (i) (3 points) EPBO
- (ii) (1 point) APBO
- (iii) (1 point) Service Cost
- (iv) (1 point) Interest Cost

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

6. Spring 2024 VR #8

Skwire 8 (8th ed.)

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

(5 points) You are a consulting actuary advising Company XYZ on its retiree medical benefits program. XYZ currently offers its Medicare-eligible retirees a traditional plan with full coordination of benefits with Medicare, such that retirees generally have no out-of-pocket costs, other than a \$50 per month retiree premium contribution.

- (a) (1 point) List the reasons why an employer would offer a retiree medical group benefits program.

ANSWER:

XYZ is considering offering an account-based subsidy and access to a private exchange where retirees can select a Medicare Supplement (Medigap) or Medicare Advantage plan. You have been asked to review the impact of the change on the retiree population.

The private exchange has three plan options available to these retirees:

- Standard Medigap Plan F
- Standard Medigap Plan G
- Medicare Advantage Plan with the following design:
 - \$500 copayment per inpatient admission
 - \$30 copayment per PCP office visit
 - \$60 copayment per specialist office visit

The current Medicare Part B deductible is \$226.

In the Excel spreadsheet, you are given Medigap plan design information.

Consider two newly eligible Medicare beneficiaries with the following assumed claims for the upcoming year:

Retiree A (unhealthy):

- 4 inpatient hospital admissions at a cost of \$20,000 per admission
- 12 specialist office visits at a cost of \$300 per visit

Retiree B (healthy):

- 2 primary care provider (PCP) office visits at a cost of \$100 per visit

(b) (1 point) Calculate the annual expected out-of-pocket costs for each of the two retirees under each of the three plan options. Show your work.

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

(c) (1 point) Recommend a plan option for each retiree based on the results of part (b).

ANSWER:

The monthly premiums per retiree for the three exchange plan options are as follows:

- Medigap Plan F: \$350
- Medigap Plan G: \$335
- Medicare Advantage Plan: \$100

XYZ intends to provide a monthly subsidy that will at least cover the premium of the cheapest plan option. Any subsidy that exceeds the premium of the plan chosen by a particular retiree will be forfeited.

You determine that 20% of the participants are in the “unhealthy” category and 80% are in the “healthy” category. For modeling purposes, you assume that retirees will choose the plan option recommended in part (c) based on their health category.

(d) (2 points) Calculate the monthly subsidy amount such that the total out-of-pocket cost (including premiums) to XYZ’s retirees will be the same as under the current traditional plan. Show your work.

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

7. Fall 2024 DP #9

CP321-111-25 – IAS19

CIA Educational Note – Health Care Trend Rate

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

(6 points)

- (a) (1 point) List healthcare assumptions used to calculate the Accumulated Postretirement Benefit Obligation (APBO) and Service Cost.

ANSWER:

You are the retirement health benefit plan actuary for Company DEF.

DEF is offering retiree health benefits based on the following strategic objectives:

- Motivate the workforce by offering the richest retiree benefit that DEF can afford
- DEF's annual budget for retiree benefit expenses is \$3,000,000
- DEF's debt covenant limits the liability to \$150,000,000 and DEF wants to ensure that their APBO is within 10% of its maximum liability

DEF's benefit manager provided the following information on the valuation date 1/1/2024:

- DEF has 1,000 employees
- All employees are age 40
- All employees are hired on 12/31/2018
- All employees start taking retiree health benefits as soon as they are eligible
- Spouses are not eligible to receive the benefit

The benefit manager is considering one of the two plans with the following employee contributions:

	Pre-65 Employees	Post-65 Employees
Plan1	\$3,500	\$1,000
Plan2	20% Medical Claims	20% Medical Claims

In the Excel spreadsheet, an actuarial student provided you with the benefit tool based on two scenarios, Trend Scenario #1 and Trend Scenario #2, per each plan on the valuation date 1/1/2024.

Assume the following:

- Claim cost above age 90 are ignored due to materiality
- Mid-year retiree decrements appropriately account for retire, withdraw, and death rate
- Discount factor is based on 5% discount rate
- Claim costs are \$15,000 before age 65 and \$2,100 after age 65
- Employee participation is 100%

(b) (5 points)

(i) Recommend Plan 1 or Plan 2 based on DEF's objectives under:

- Trend Scenario #1
- Trend Scenario #2

Show your work. Justify your responses.

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

(ii) Evaluate the risk of using Trend Scenario #2.

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