

CP 321 Model Solutions

March 2026

1. Learning Objectives:

1. The candidate will understand how to describe benefits typically offered under long duration contracts (disability income, long term care, critical illness, Medicare Supplement).

Learning Outcomes:

- (1b) Describe each type of contract listed above.
- (1c) Evaluate the potential moral hazards and financial and legal risks associated with each contract.

Sources:

Critical Illness Turns 40

Commentary on Question:

The article “Critical Illness Turns 40”, while limited, concisely hits on the learning objectives and outcomes without having to bring in additional content.

Candidates receiving full credit for part (a) listed the 100% triggers, the partial triggers and at least one emerging trigger. Candidates who received full credit for part (b) listed the three primary critical illness types and described many of the actuarial, regulatory, marketing and operational differences.

Solution:

- (a)
 - (i) List the most common “100 percent benefit” triggers for critical illness policies.
 - (ii) List the most common partial benefit triggers for critical illness policies.
 - (iii) List two emerging benefit triggers for critical illness policies.

Commentary on Question:

Many candidates only recalled the 100% triggers, or knew some of each category, and received partial credit.

1. Continued

Answer:

- (i) heart attack, stroke, terminal/invasive cancer, major organ failure, end-stage renal disease/ESRD
 - (ii) Cancer in situ (or “less serious cancer”), Coronary artery bypass graft/coronary artery disease/CAD
 - (iii) Mental health, infertility
- (b) Describe the key actuarial, regulatory, marketing, and operational differences among the three primary types of critical illness policies available in the United States.

Commentary on Question:

While several candidates received full credit for this question, most received only partial credit. Successful candidates identified the three types of policies and accurately described multiple differences across the various categories (actuarial, regulatory, marketing, operational).

As examples of full-credit responses, below are lightly-edited samples of responses from candidates that received full credit.

Answer (Sample 1):

- 1) Agent-sold individual policies,
 - a. It usually has a waiting period and pre-existing condition exclusions.
 - b. The key actuarial assumptions are morbidity, mortality, lapse rate, interest/discount rate, benefit amount
 - c. It's usually issue-aged rating. This means that a contract reserve is set up to prefund future claim costs
 - d. It's usually conditionally issued, requiring an individual underwriting
 - e. The benefit face amount is richer than other types of CI policies
 - f. Agent sales is the primary marketing method; the market is quite mature
 - g. Regulation is strict as the individuals are not deemed as knowledgeable of critical illness insurance by regulators.
- 2) Worksite individual policies
 - a. Waiting period and pre-existing condition exclusions are usually waived.
 - b. The key actuarial assumptions are similar to agent-sold policies: morbidity, mortality, lapse rate, interest/discount rate, benefit amount
 - c. It's usually issue-aged rated. This means that a contract reserve is set up to prefund future claim costs
 - d. The benefit face amount is usually lower than individual sold, like \$50k
 - e. It is usually a part of Employer benefit package

1. Continued

- f. Regulation is less strict since it's usually part of benefit package and the groups are deemed as knowledgeable of critical illness insurance by regulators.
- 3) Worksite Group policies
- a. Waiting period and pre-existing condition exclusions are usually waived.
 - b. The key actuarial assumptions include additional factors such as industry, occupation, besides the assumptions mentioned above (morbidity, mortality, lapse rate, interest/discount rate, benefit amount)
 - c. For very large group, the customized rating may be used; for smaller group, usually offering a set of shelf policies to avoid customization and for quick quoting.
 - d. The plan provision are highly variable
 - e. It is usually a part of Employer benefit package
 - f. Regulation is least strict since the groups are deemed as knowledgeable of critical illness insurance by regulators.

Answer (Sample 2):

Three primary types of CI policies include:

Individual Policies (The "Kitchen Table" Policy)

Worksite Policies

Group Policies

Individual policies are sold to individuals through direct marketing, hence the name "kitchen table" policies, where the insurance company salesperson sits down with the future policyholder at their home and goes through the CI policy. Such policies can have relatively high face amounts, are most commonly non-cancellable or guaranteed renewable, are most commonly issue age rated, and require significant individual underwriting, including medical underwriting. From the insurer's perspective, anti-selection is a key concern as those who purchase such policies tend to be those that believe they need it. Lapses are a key actuarial assumption, given the-prefunding that comes with issue age rating. From the regulatory perspective, protecting policyholders and claimants is a top concern. This includes ensuring that these policies truly provide coverage to ensuring that the insurance companies that issue them will remain solvent years or decades in the future when benefits are actually incurred. Contract reserves are required for issue age rated policies and regulators pay close attention to how such reserves are calculated and held.

1. Continued

Worksite policies are individual policies issued at a worksite setting. While they share a lot with truly individual policies, because they are offered at a worksite which often leads to higher participation, some of the underwriting rules are relaxed, and are often guaranteed issue. Medical underwriting may be required for late entrants or those that request higher coverage amounts. Worksite policies usually come with lower face amounts.

Group policies are issued typically to employer groups, through a master policy, and employees are issued individual certificates. Group policies tend to have lower benefit amounts than the other two types. They are most often attained age rated, where the rates are based on current age. Participation percentage and employee contribution are two key actuarial considerations. With high participation, underwriting rules are relaxed even further. Group policies are typically guaranteed issue and conditionally renewable. From a regulatory perspective, Group policies are of less concern than individual policies since the buyers of the coverage, the employer group typically, are considered to be more sophisticated than individual buyers of insurance.

Answer (Sample 3):

1. Agent Sold (kitchen table) policies
 - Markets towards individual policyholders
 - Underwriting typically involved
 - Larger Benefit amount – given there is underwriting to review policyholder risks
 - Issue-age; premium is based on the age of the policyholder at issue
 - Typically guaranteed renewable
 - Lapse-supported; need policyholders to lapse early on to be profitable (i.e. insurer receives premiums but no CI claims are made early on)
 - Given this is issue-age and guarantee renewable, holding reserves and having accurate actuarial assumptions is very important to match revenue to expense and account for CI claims that may occur later on
 - Regulators are more restrictive on these policies than the other types
2. Workplace individual policies
 - Markets towards individuals within a worksite
 - the policyholder is the employee
 - Less common to have underwriting
 - Smaller benefit amount
 - Typically includes minimum participation requirements to help protect against anti-selection

1. Continued

- Lapse supported; need policyholders to lapse early on to be profitable (i.e. insurer receives premiums but no CI claims are made early on). There are additional considerations with the lapse assumption given it is offered within a group; when policyholders leave the group, the higher risk may choose to keep their policy and this can lead to anti-selection.
- 3. Workplace group policies
 - Markets towards overhead group (companies) – the policyholder is the employer (usually), the employees hold the certificates
 - Less common to have underwriting
 - Coverage is provided to the entire group so less risk of anti-selection
 - Smaller benefit amount
 - Lapse supported; need policyholders to lapse early on to be profitable (i.e. insurer receives premiums but no CI claims are made). There are additional considerations with the lapse assumption given it is offered within a group; when policyholders leave the group, the higher risk may choose to keep their policy and this can lead to anti-selection.
 - Workplace group policies can offer additional flexibility dependent on the size of the group
 - Larger groups can be more flexibility in their offering and be customizable (triggers, plan design, etc.)
 - Smaller groups typically have a standard design given the administrative requirements for it to be flexible

2. Learning Objectives:

5. The candidate will understand how to evaluate asset matching and asset adequacy standards for long duration contracts.

Learning Outcomes:

- (5a) Understand the principles of Asset-Liability Management (ALM).
- (5c) Describe asset adequacy approaches commonly applied to long-duration health contracts.
- (5d) Describe cash flow projections and interactions between asset and liability cash flows.

Sources:

ASOP 22: Statements of Actuarial Opinion Based on Asset Adequacy Analysis for Life Insurance, Annuity, or Health Insurance Reserves and Other Liabilities (excluding appendices)

Chapter 3 of Modelling in Life Insurance – A Management Perspective, 2016

Commentary on Question:

This question was meant to test a candidate's understanding of the standards of practice and qualitative considerations in the context of asset liability management. Candidates who were familiar with the relevant readings performed well.

Solution:

- (a) Describe the key assumptions and decisions involved in modeling:
 - (i) Asset cashflows.
 - (ii) ALM interactions.

Commentary on Question:

Candidates generally fared poorly on this question.

Answer:

- Decide the granularity of the assets the model will project
- Determine the target asset allocation and consider how the model will select assets to buy and sell to meet the target allocation
- Develop asset turnover assumptions for assets that do not have a specific maturity (i.e. equities and real estate)
- Determine how liability cash flows will be invested
- Determine the level of assumed policyholder profit sharing, considering the relevant local regulatory rules
- Develop surrender and switch assumptions based on the selected policyholder profit sharing rules

2. Continued

- (b) Describe inputs from key non-actuarial teams that are important to the success of the ALM model build.

Commentary on Question:

Most candidates were able to identify finance as a key non-actuarial team to consult, however there are at was not enough to receive full points on this question.

Answer:

- Accountants should be consulted to understand the regulatory standards, including any specific rules regarding reserves, projections and necessary outputs for required disclosures
 - Finance should be consulted to understand the impact on P&L of the structure of the own funds
 - Management or corporate accounting should be consulted to understand the costs or expenses to model and the company overhead that is expected to be reflected in the model
 - Top management or executive leadership should be consulted to understand the business questions that need to be answered by model output as well as to ensure that assumptions in the model align with leadership's goals
 - Tax experts should be consulted to understand the tax regulatory framework, corporate tax, rate to model and any specific tax implications for the asset classes being modeled
- (c) For each of your company's blocks of business:
- (i) Identify and describe an analysis method used to evaluate the adequacy of the reserves and liabilities.
 - (ii) Explain whether an ALM model is needed for each analysis method identified in (c)(i).

Commentary on Question:

Candidates performed the best on this part of the question. To receive full points candidates had to not only identify an analysis method but also explain whether an ALM model was needed – which some candidates did not address.

For the attained age Medicare Supplement block of business, the primary liabilities are premium reserves and incurred but not reported claim liabilities. This block has limited investment rate risk. I recommend using a loss-ratio method to demonstrate that the liabilities are sufficient to cover moderately adverse deviations related to morbidity costs. Output from the ALM model is not needed to support this analysis method.

2. Continued

For the group long-term disability block of business, the primary reserve and liabilities are disabled life reserves and incurred but not reported claim liabilities. This block of business has moderate investment rate risk related to the disabled life reserves. I recommend demonstrating that the degree of conservatism in the reserves and liabilities is sufficient to cover moderately adverse deviations in the actuarial assumptions and discount rates. While output from the ALM model is not needed to support this analysis method, it could be leveraged to help inform the degree of sensitivity testing used for the discount rates.

For the individual long-term care block of business, the reserves and liabilities are active life reserves, disabled life reserves, incurred but not reported claim liabilities, and possibly additional asset adequacy testing reserves. This block has significant investment rate risk. I recommend using a cash flow testing method for this block of business. Output from the ALM model will be needed to perform the testing on this block of business.

3. Learning Objectives:

6. The candidate will understand how to design and perform valuations of retiree group benefits.

Learning Outcomes:

- (6b) Determine appropriate demographic, economic, and benefit assumptions and apply to a retiree health valuation'
- (6c) Determine employer liabilities, service cost, and expense for post-retirement and post-employment benefits and prepare disclosure information for financial reporting purposes'
- (6f) Propose ways to manage the range of risks faced by plan participants and retirees through retiree health and life plan designs.
- (6g) Advise a plan sponsor regarding the choice of design elements for their retiree health program given situational context.

Sources:

CP321-113-25: A Primer on Non-Pension Benefit Accounting

Commentary on Question:

Overall, candidates did well on this question. Many were able to calculate the DBO but struggled with parts like applying the yield curve.

Solution:

- (a) Calculate the defined benefit obligation (DBO) for the employee's life insurance benefit as of December 31, 20X5. State any assumptions made and show your work.

Commentary on Question:

Most candidates effectively set up the calculation correctly to determine the DBO. Common mistakes included not calculating survival correctly, not understanding that the benefit was only payable when the retiree dies, and not recognizing that the benefits were payable between retirement age and death.

Answer:

See Excel spreadsheet

- (b) Calculate the maximum annual HCSA contribution for the employee that achieves your client's objective. State any assumptions made and show your work.

Commentary on Question:

Most candidates correctly understood the difference between this benefit (payable when the retiree was alive) and the benefit in part (a).

3. Continued

Answer:

See Excel spreadsheet

- (c) Using your client's yield curve:
- (i) Calculate the revised life insurance DBO. Show your work.
 - (ii) Calculate the revised maximum annual HCSA contribution that would achieve your client's objective. Show your work.

Commentary on Question:

Many candidates calculated the discount factor incorrectly. The factor at duration n should be the rate at year n to the n th power, not the product of all prior duration factors.

Answer:

See Excel spreadsheet

- (d) Describe two other strategies the employer may consider to end their retiree obligations earlier.

Commentary on Question:

Credit was given for any two appropriate strategies. If both strategies involved settling the obligation, credit was only awarded for one strategy.

Answer:

- Eliminate the benefit, which could typically only be done for future retirees
- Increase eligibility requirements for the benefit, reduce the number of eligible retirees in the future
- Limit the duration of eligibility (e.g., benefits only payable until age 70)
- Settle the obligation, either through a buy-out or a third-party insurance contract

4. Learning Objectives:

5. The candidate will understand how to evaluate asset matching and asset adequacy standards for long duration contracts.

Learning Outcomes:

- (5a) Understand the principles of Asset-Liability Management (ALM).
- (5b) Evaluate techniques for addressing mismatched assets and liabilities.

Sources:

ALM for life, Annuities, and Pensions, Section 6

Commentary on Question:

This question was meant to test a candidate's understanding of the fundamentals of ALM.

Solution:

- (a) Describe risks in the asset manager's recommendation if interest rates change over the next 10 years.

Commentary on Question:

Most candidates were able to identify the solvency risk. However this alone was not enough to earn full credit for this question.

Answer:

Risks to the balance sheet (i.e. solvency) – if interest rates decrease far enough, the company's equity will become negative and the company will be insolvent.

Risks to the level of earnings – if the crediting rate the company is providing to the insurance liabilities exceeds the yields that the company can receive on the available assets, the company will not be making enough investment income to fund reserve increases or pay claims and will be posting losses.

Risks to the volatility of earnings – under certain accounting regimes, changes in the interest rates impact reported earnings, because the assets and liabilities are revalued based on the changes in interest rates. The decreases in interest rates will lead to income statement volatility when the company reports the changes to these values as losses.

Risks to liquidity – the cost of purchasing replacement private bonds in 10 years will be greater, so the maturity value of the original assets may not be sufficient to fund the purchase of the replacement bonds.

4. Continued

- (b) Calculate the leverage ratio and the equity duration for each block of business based on:
- (i) A proportional asset allocation.
 - (ii) A disproportional asset allocation that meets the company's goals for ALM.

State any assumptions made and show your work.

Commentary on Question:

Candidates familiar with the calculations performed well on this part of the question with many receiving full points.

Answer:

See Excel solution

- (c) Recommend an allocation of assets to the IDI and LTC blocks of business based on your calculations from part (b). Justify your responses.

Commentary on Question:

Solutions could vary depending on the answer to (b), but as many performed well on part (b), this followed into part (c).

Answer:

Based on my analysis, I recommend that assets be allocated to the two blocks disproportionately, with a larger proportion allocated to LTC. I specifically recommend 1,250 be allocated to LTC and 1,500 be allocated to IDI.

My reasoning is as follows:

- First, the LTC block has a much larger mismatch in duration between assets and liabilities than the IDI block. As a result, extra assets should be allocated to the LTC block to decrease the leverage for LTC block and minimize large changes in LTC equity.
- Second, the duration of the liabilities for the LTC block is significantly longer than the duration of the liabilities for the IDI block, suggesting there is a greater risk of misestimation in the liabilities, and warranting a larger proportion of assets be allocated.
- Third, our ALM team is confident that we can maintain a close match in the duration of the assets and liabilities for the IDI block, thereby keeping the duration of the equity relatively low and justifying a smaller allocation of assets.

5. Learning Objectives:

2. The candidate will understand how to calculate rates for each of the contracts described in Learning Objective 1.
3. The candidate will understand how to apply valuation principles for long-duration contracts.
4. The candidate will understand how to prepare and interpret insurance company financial statements for long duration contracts.

Learning Outcomes:

- (2b) Calculate and recommend assumptions.
- (2c) Calculate and recommend a manual rate (includes base rate development and applying a rating manual) and describe the role of data credibility used to calculate the rate.
- (2f) Describe the purpose and objectives of Guaranty Associations and the multi-state framework for long term care rate increases.
- (3a) Describe and calculate types of non-claim reserves held for long duration health contracts: policy reserves, unearned premium reserves, and premium deficiency reserves.
- (4d) Project financial outcomes and recommend a strategy.

Sources:

Insuring Long-Term Care Chapter 8

Insuring Long-Term Care Chapter 10

CP321-103-25: LTCI MSA Framework

CP321-107-25: Health Insurance Accounting Basics for Actuaries (PDR)

Commentary on Question:

The intent of this question was to test whether candidates understood how to calculate a premium deficiency reserve, understood the 58/85 test, and understood how changes in lapse assumptions impact future projected liabilities.

Solution:

- (a) Calculate the Premium Deficiency Reserve (PDR) on a standalone basis. State any assumptions made and show your work.

5. Continued

Commentary on Question:

Candidates did very well on this part of the question. The most common mistake was not including all of the reserves in the calculation.

Successful candidates were able to correctly calculate the PDR while showing their work.

Answer:

See Excel workbook

- (b)
- (i) Calculate the maximum justified rate increase under the 58/85 Test. State any assumptions made and show your work.
 - (ii) Calculate the PDR assuming the rate increase calculated in (b)(i) is implemented. State any assumptions made and show your work.

Commentary on Question:

Candidates did moderately well on this part of the question. A common mistake in part (i) was not correctly segmenting future premium into original and rate increase premium. A common mistake on part (ii) was not explicitly stating that the PDR is \$0 if the GPV test produces a sufficiency.

Successful candidates were able to correctly calculate the additional rate increase justified with the 58/85 test, determine the amount of additional future premium, and adjust their calculation of the PDR. Credit was given for part (ii) if the PDR was appropriately recalculated using the response from part (i), even if the candidate did not correctly calculate part (i).

Answer:

See Excel workbook

- (c)
- (i) Propose changes to the expected voluntary lapse rate assumptions. Justify your proposal.
 - (ii) Assess how the proposed assumption from (c)(i) would impact the justified rate increase calculated in (b)(i).

5. Continued

Commentary on Question:

Candidates did well on this part of the question. Common mistakes in part (i) included providing a recommended assumption, but without a justification. The most common mistake in part (ii) was candidates not recognizing that all policies are now in duration 10+, so changes to the assumption for durations <10 have no impact on the future projections.

Successful candidates proposed reasonable lapse assumptions, with appropriate justification, described how the change in the duration 10+ lapse rate would impact future projected liabilities, and translated that to an impact on a justified rate increase.

Answer:

(i)

I propose lowering the assumed lapse rate for duration 10+ to 0.85%. These LTC policies are all in duration 10 or later, so while the overall A/E fit of the lapse assumption is currently close to 1.0, it is not close to that for the applicable duration of the business. No change is necessary for durations <10 because there is no business remaining that would use that assumption. While actual lapse rates are 0.84%, I avoided assuming that exact value to avoid specificity and to account for credibility.

(ii)

A decrease in the lapse rate will increase both future premiums and future claims. Because there are more claims in the future, the decrease in lapse will make experience worse overall in the future (i.e., change in future benefits will be greater than the change in future premiums and will increase the future loss ratio). Thus, a larger rate would be justified.

- (d) List four key considerations for the Multistate Actuarial committee's review of LTC rate increases.

Commentary on Question:

Most candidates did not perform well on this part of the question. Common mistakes included listing the MSA's general review approach rather than the actuarial considerations of the MSA team.

Candidates listing at least four key actuarial considerations received full credit.

5. Continued

Answer:

- Ensure request that remaining policyholders do not make up for losses associated with past policyholders.
- Review insurer experience, insurer narrative explanation, and relevant industry studies.
- Assess reasonability of assumptions for lapse, mortality, morbidity, and interest rates.
- Consider how to reflect differences in the histories of states' rate approvals.
- Consider if there are concerns regarding an insurer's financial solvency and the impact of rate increases on future solvency.

6. Learning Objectives:

2. The candidate will understand how to calculate rates for each of the contracts described in Learning Objective 1.

Learning Outcomes:

- (2b) Calculate and recommend assumptions.
- (2c) Calculate and recommend a manual rate (includes base rate development and applying a rating manual) and describe the role of data credibility used to calculate the rate.

Sources:

CP321-102-25: Short Term Disability Example

Commentary on Question:

Many candidates did well on part (a) but only a few candidates received full credit on part (b) by recalling that independently-derived factors can have covariances which one other (such as Midwest and Manufacturing) that leads to double-counting of risks in the manual rate, and in this case could make the rate uncompetitive. Candidates who received full credit on part (a) calculated the manual rate correctly, calculated credibility correctly, applied the credibility of the experience and the new manual rate, and then compared that to the old rate.

Solution:

- (a) Calculate the required renewal increase for this group. State any assumptions made and show your work.

Commentary on Question:

Common errors that led to partial credit were applying the new rate manual factors on the experience data also (the experience data already inherently has those factors reflected inherently), applying credibility on the new versus old manual rate factors, forgetting that the lives were for 5 years' worth of experience when arriving at the credibility, and forgetting to calculate the rate increase after arriving at the new rate.

Answer:

See Excel for solution.

- (b) Explain how your company could modify its pricing methodology to increase its competitiveness for this group.

6. Continued

Commentary on Question:

Full credit was given to candidates who mentioned the potential flaws in independently-derived factors that are likely not independent of one another. Many candidates received partial credit. For example, partial credit was given to candidates who suggested a change to the credibility formula, either broadly or for this specific case, and to candidates who suggested reviewing the accuracy of the revised factors that are very high now. Some candidates reflected that the rate increase would still be very high, and still likely uncompetitive, even with the increase in credibility.

Answer:

Below is a lightly-edited candidate response that received full credit:

Revise credibility assumptions

After adjusting the base rate for area and industry, the manual is higher than the experience. If the company can justify a higher credibility on its experience than it can offer a lower/ more competitive rate.

Additionally, given both area/industry have high adj factor, company may want to explore if there are compounding factors that are double counting rates. If the Midwest has a disproportionate amount of manufacturing then the factors may be excessive and not reflect interaction with one another.

7. Learning Objectives:

5. The candidate will understand how to evaluate asset matching and asset adequacy standards for long duration contracts.

Learning Outcomes:

- (5a) Understand the principles of Asset-Liability Management (ALM).
- (5b) Evaluate techniques for addressing mismatched assets and liabilities.
- (5c) Describe asset adequacy approaches commonly applied to long-duration health contracts.

Sources:

ASOP 22: Statements of Actuarial Opinion Based on Asset Adequacy Analysis for Life Insurance, Annuity, or Health Insurance Reserves and Other Liabilities (excluding Appendices)

Commentary on Question:

Candidates generally performed poorly on this question, seemingly unfamiliar with ASOP 22.

Solution:

- (a) Describe the process an actuary should follow when performing asset adequacy analysis.

Commentary on Question:

The process for performing an asset adequacy analysis is described in Section 3.1 of ASOP 22. Many candidates did not provide the correct steps. All four steps were required for full credit.

Answer:

When performing asset adequacy analysis, the actuary should:

1. Choose a block of assets such that the statement value of these assets is no greater than the statement value of the reserves and other liabilities being tested.
2. Determine whether additional assets are needed to support the reserves and other liabilities being tested
3. Use moderately adverse conditions
4. If additional assets needed, then establish an additional reserve equal to the statement value of those additional assets and test that total assets, including additional assets, are adequate to support reserve and other liabilities

7. Continued

- (b) Identify an appropriate asset adequacy analysis method for each of the following products. Justify your response.
- An issue-age rated Medicare Supplement plan. Assets backing the products are separated from other lines of business.
 - A group short-term disability plan for a small-sized organization. The block of business is backed by short-duration, low-risk assets.
 - An accidental death and dismemberment plan. The company has set up a high provision for adverse deviation in the reserves and liabilities.

Commentary on Question:

Six analysis methods (including cash flow testing) are listed in Section 3.1.1 of ASOP 22. To receive full credit, candidates must have chosen a method for each product with justification that made sense, including how to handle moderately adverse conditions. Examples for each product are listed below.

Answer:

1. This product can be tested under the Gross Premium Reserve Method. It is appropriate when the testing would emphasize the sensitivity of cash flows arising from liabilities under moderately adverse conditions.
2. This product can be tested under the Loss Ratio Method. It is appropriate when cash flows are of short duration. For this product, morbidity risk may be tested under moderate adverse conditions.
3. This product can be tested under the Demonstration of Conservatism Method. It is appropriate when the degree of conservatism in the reserves and other liabilities is so great that the cash flows are covered under moderately adverse conditions.

8. Learning Objectives:

2. The candidate will understand how to calculate rates for each of the contracts described in Learning Objective 1.
3. The candidate will understand how to apply valuation principles for long-duration contracts.

Learning Outcomes:

- (2d) Identify critical metrics to evaluate actual vs. expected results.
- (3a) Describe and calculate types of non-claim reserves held for long duration health contracts: policy reserves, unearned premium reserves, and premium deficiency reserves.
- (3b) Describe and calculate types of claim reserves held for long duration health contracts: PVANYD (present value of amounts not yet due), ICOS (in course of settlement), and IBNR (incurred but not reported).
- (3d) Calculate appropriate claim reserves given data.
- (3e) Describe, calculate, and evaluate the impact of environmental factors on reserve calculations (trend, seasonality, claim processing changes, etc.).

Sources:

CP321-101-25: Pricing Medicare Supplement Benefits
Individual Health Insurance, Ch. 6: Reserves and Liabilities

Commentary on Question:

This question tested the candidates' understanding of how to calculate an IBNR given data, and how two materially different reserve methods compare. Candidates were also asked to demonstrate an understanding of how the many statutory policyholder protections for Medicare Supplement drive rates, design and eligibility. These requirements in turn could play a role in missing expected results such that a premium deficiency reserve (PDR) may be needed. Candidates generally did well on parts (a) and (b), but not parts (c) and (d).

Solution:

- (a) Calculate the IBNR under the Loss Ratio method. State any assumptions made and show your work.

Commentary on Question:

Most candidates received full credit for this part. A few erred in applying a lag or combination method for responding to this question.

8. Continued

Answer:

$\$8,000,000 \times 0.75 = \$6,000,000$ expected annual claims

$\$6,000,000 - \$2,500,000$ (already paid) = $\$3,500,000 = \text{IBNR}$

- (b) Describe the differences between the Loss Ratio method and the Bornhuetter-Ferguson method.

Commentary on Question:

Candidates generally did well on this part. Below are some lightly-edited candidate responses as examples that received full credit.

Answer:

Sample 1

The LR method does not take into account historical lag factors. The BF method combines the lag development method and the LR method. For months incurred, a completion factor for each month is developed, which is the progression of all paid claims for one incurral month. The completion factor is the credibility factor for which the lag method is used, the complement of the credibility is applied against the LR method. This method addresses the drawback that the development method is poor fit for recent months.

Sample 2

The Loss Ratio method will calculate reserves based on the original loss ratio at issue. This means that the reserve hold will always be driven by the total expected claims based at the issuance of the policies. The LR method does not use completion factors. Instead, it relies on the assumption on expectations used to price the product. The B-F method will use completion factors based on the patterns of the claims of the older periods to project the remaining claims. But for more recent months, the B-F will take into account the loss ratio method claims to establish that portion of the reserve.

Sample 3

The LR method does not incorporate the magnitude of claim development, whereas the BF method blends the LR method with the development method. BF therefore factors in anticipated LR, while also being susceptible to losses that are developing higher or lower than anticipated.

- (c) Describe Medicare Supplement consumer protections commonly found in state laws and the NAIC Model Act.

8. Continued

Commentary on Question:

Candidates struggled with this part. Successful candidates listed multiple protections and provided descriptions of each. Common mistakes included listing protections without providing descriptions and providing a small number of protections.

Below is a lightly-edited sample response from a candidate who received full credit for this part. Other answers were accepted, such as equal pricing during open enrollment, guaranteed renewability, no pre-existing limitations applied to anyone who has had 6 months of "creditable coverage" prior to purchasing Medicare Supp, commission limitations to prevent "churning", prohibition on duplicate coverage - cannot sell to those already covered by Medicare Advantage, Medicaid, or existing Medicare Supplement (unless replacing), standards for advertising and marketing, and many more accepted responses.

Answer:

Policy standardization – lettered plans, making plans comparable across insurers

The decision to no longer offer a policy from requires notifying the state regulator and potential regulator approval. The goal is to prevent the practice of selling at low rates to buy market share and then closing that block of business and hitting it with large rate increases to help recoup prior losses.

Open Enrollment Periods with guarantee issue – policies have an open enrollment period that typically starts at age 65, but with other caveats that protects consumers.

Minimum Loss Ratios – NAIC regulation introduced minimum loss ratio standards that new pricing must meet.

Rebates possible if loss ratio too low.

Rate Filings – rate filings must be approved and show rate increase appropriateness.

- (d) Describe situations in which your company may need to recognize a premium deficiency reserve for its Medicare Supplement block.

Commentary on Question:

Candidates generally fared poorly with this part. Many provided a generic description of using a GPV test to assess the need for a PDR, without providing any justification or background related to Medicare Supplement business or the characteristics of Medicare Supplement business that could lead to reserve insufficiencies. These candidates received partial credit.

Below are some lightly-edited sample responses that received full credit for this part.

8. Continued

Answer:

Sample 1

A PDR is needed if $PV(\text{claims} + \text{expenses}) > PV(\text{future prem}) + \text{reserves}$

For issue-age Medicare Supplement (“med supp”), if policy reserves are insufficient, a PDR may be necessary. Issue-age med supp is lapse-supported so if more people stay on and particularly if their experience deteriorates, then the company will need to establish PDR. PDRs are necessary even if there is a period of profits if it is followed by losses in later years.

For attained-age med supp, a PDR is necessary if a loss is projected. There could be an issue with the manual approach leading to a premium deficiency.

Sample 2

Medicare Supplement is priced using 3 rate constructs by state:

- Issue-age
- Attained age
- Community-rates

Issue-aged is priced so that that lifetime LR reach a target. It is prefunded usually for duration and aging but may not be enough for inflationary trends.

Rate increase required for inflationary trend is so high that regulators demand a reduced rate increase

Rate increase required would create a severe rate spiral and too many PH would lapse, undermining the solvency of the product

There is a pattern of profits followed by losses, could be due to bad pricing or intense inflationary trends.

Sample 3

If assumptions change significantly after issue, the policy reserve plus future premiums may not be sufficient to cover future claims and expenses. For instance, widespread changes due to inflation, attitudes toward health, government offsets through Medicare, changes to GDP (and health as a proportion of GDP), aging of the population/Boomers retiring, more access to healthcare through transportation and the Internet, and education of the population on the benefits of healthcare could result in health costs going up significantly.

8. Continued

In addition, there are plan changes that could result in insufficient premiums, like changes in plan provisions, compensation definitions (or whether benefits are tied to compensation), and union negotiations.

9. Learning Objectives:

1. The candidate will understand how to describe benefits typically offered under long duration contracts (disability income, long term care, critical illness, Medicare Supplement).
2. The candidate will understand how to calculate rates for each of the contracts described in Learning Objective 1.

Learning Outcomes:

- (1b) Describe each type of contract listed above.
- (1c) Evaluate the potential moral hazards and financial and legal risks associated with each contract.
- (2b) Calculate and recommend assumptions.
- (2c) Calculate and recommend a manual rate (includes base rate development and applying a rating manual) and describe the role of data credibility used to calculate the rate.

Sources:

Insuring Long-Term Care Chapter 2
Insuring Long-Term Care Chapter 9
Insuring Long-Term Care Chapter 10

Commentary on Question:

The overall intent of this question was to assess candidate's understanding of key LTC benefit characteristics and assumptions, along with testing their understanding of the general shape of the premium and claim curves the interaction with historical, future, and lifetime loss ratios.

Solution:

- (a)
 - (i) List the activities of daily living typically included in a Long-Term Care (LTC) insurance policy.
 - (ii) Describe the benefit triggers for a tax-qualified LTC policy under HIPAA.

Commentary on Question:

Candidates did very well on this part of the question.

Candidates able to list all six activities of daily living and describe both types of benefit triggers received full credit.

9. Continued

Answer:

(i)

1. Bathing
2. Continence
3. Dressing
4. Eating
5. Toileting
6. Transferring

(ii)

Inability to perform at least 2 of 6 ADLs without substantial supervision or a severe cognitive impairment that requires substantial supervision. These conditions must be expected to continue for at least 90 days.

(b) Describe:

- Key assumptions used to project LTC experience.
- How decreasing each assumption would impact the future loss ratio.

Commentary on Question:

Candidates did well on this part of the question. The most common mistakes were listing, rather than describing, the assumptions, and not explicitly stating the impact on the future loss ratio, but instead on the experience generally.

Successful candidates were able to identify at least four key assumptions and describe how and why changes in each assumption impact the projected loss ratio (lapse, mortality, morbidity and interest rate / asset returns were among the most common answers). Candidates also received credit for listing and describing the key assumptions within the morbidity category (incidence, claim termination, and utilization).

Answer:

- Mortality – the rate at which policyholders die. A decrease to this assumption would increase the future loss ratio because more policyholders will persist to late attained ages, where claims are higher.
- Voluntary Lapse – the rate at which policyholders give up their coverage. A decrease to this assumption would increase the future loss ratio because more policyholders will persist to late attained ages, where claims are higher.
- Interest / Asset Returns – the rate used to discount future experience to calculate present values. A portion of premiums are set aside to fund reserves. If asset returns are lower than expected, those reserves will not grow as much as expected and may not be sufficient to fund future claims. In the loss ratio, a lower interest rate results in less discounting, so the impact of future claims is larger and the loss ratio increases.

9. Continued

- Morbidity – morbidity is the expected cost of a claim and is made up of 3 main components: claim incidence (the rate at which policyholders go on claim), claim termination (the rate at which policyholders on claim may terminate, either through death or recovery), and utilization (the portion of available benefit that will be used on covered services). A decrease to overall morbidity would decrease the future loss ratio, as it decreases claims.
- (c) You are a pricing actuary analyzing experience for a 10-year-old LTC insurance block. New members of your team make the following statements:
- Statement 1: “*We need to increase premium rates for this block. However, waiting to increase them in the future will have the same financial impact.*”
 - Statement 2: “*The historical loss ratio is well below 60%, so the block is generating profits.*”
 - Statement 3: “*We are unable to update assumptions for future claims until we have more credible historical incurred claims data.*”

Critique each statement.

Commentary on Question:

Candidates did very well on this part of the question. The most common mistake was not adequately justifying their assessment of the statements. Successful candidates identified that each statement was false and provided appropriate justification for their assessment.

Answer:

- Statement 1 – False. Waiting to implement a rate increase will lead to larger increases in the future, all else equal. The future premium has lower value because of interim policy voluntary lapse and mortality, loss of interest credits/asset returns, and less overall premium collected. A regulator may not approve very large rate increase requests, especially if it is too much of a shock to policyholders or knowingly delayed.
- Statement 2 – False. Premiums are greater than expected claims in early years, but the excess premiums are put into reserves to help pay for claims in later years.
- Statement 3 – False. Industry data can be used to support experience studies when data is limited or not credible.