GI FREU Model Solutions
Spring 2017

1. **Learning Objectives:**

2. The candidate will understand the analysis of a general insurer's financial health through prescribed formulas, ratios and other solvency regulation methods.

Learning Outcomes:

(2h) Compare different solvency standards.

Sources:

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 10 (Returns on Capital: Planning, Pricing and Performance)

Commentary on Question:

This question tests a candidate's understanding of regulatory capital and economic risk capital.

Solution:

(a) Compare regulatory capital to economic risk capital with respect to:

(i) Its purpose; and

(ii) The manner in which it is determined.

- Regulatory capital is an amount of risk capital (or economic capital) needed to conform to regulation. It is determined by regulation as a set amount or by formula.
- Economic risk capital is the target capital used to optimize insurance operations. Insurers normally set economic risk capital using a risk measure, target ratings from a ratings agency or some multiple of regulatory capital.

(b) Rank, from high to low, the relative size of economic risk capital to be held by XYZ for the following stakeholders of XYZ. Justify your ranking.

(i) Policyholders

(ii) Stockholders

(iii) Management

(iv) Regulator

1. Continued

Commentary on Question:
Grading for this question was not based on the ranking provided but for the justification of the ranking. Ranking is not clear cut and involves opinion. This question tests a candidate's ability to justify a ranking of relative capital size. There are many acceptable full credit responses for this question. The model solution is one example of a full credit solution.

- Regulators and policyholders are most concerned with solvency requiring higher levels of risk capital. However, policyholders may not want as much risk capital as regulators since this will increase the cost of insurance.
- Management is concerned with competing interests on capital; reducing the likelihood of insolvency with higher risk capital and increasing return on capital by lowering risk capital. They will likely seek to hold less risk capital than policyholders would like.
- Stockholders focus on short term return on capital and to a much lesser extent solvency. They seek the minimum level of capital for short term solvency to ensure a high return on capital.
- Therefore the ranking is best represented by (iv) > (i) > (iii) > (ii)

2. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.

Learning Outcomes:

(1b) Understand and compare different financial reporting standards for general insurers including: U.S. Statutory Accounting Principles (SAP), U.S. Generally Accepted Accounting Principles (GAAP), Canadian Generally Accepted Accounting Principles (CGAAP), Solvency II and International Financial Reporting Standards (IFRS)

Sources:

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 3 (Accounting for Financial Instruments)

Commentary on Question:

This question tests a candidate's understanding of accounting rules for bonds.

Solution:

(a) Compare the U.S. statutory accounting treatment of the change in reported value for IG bonds versus BIG bonds.

Investment grade bonds have amortization flowing through the income statement. Bonds below investment grade have the change in market value treated as direct charges and credits to surplus.

(b) Explain the reasoning for using amortized cost for IG bonds under U.S. statutory accounting.

U.S. statutory accounting uses amortized value for investment grade bonds to better match underwriting income and to avoid random fluctuations in statutory surplus.

(c) Describe the two conditions that must be met for a debt security to be valued at amortized cost under IFRS.

1. The bonds are intended to be held to collect the contractual cash flows; and
2. The bonds cash flow consists of repayment of principle and payment of interest on the principle.

2. Continued

(d) Describe the three categories for bonds as specified under ASC 320.

1. Trading securities: If a security is acquired with the intent of selling it within hours or days.
2. Available-for-sale securities: Investments in debt securities and equity securities that have readily determinable fair values not classified as trading securities or as held-to-maturity securities.
3. Held-to-maturity securities: Investments in debt securities in which the reporting entity has the positive intent and ability to hold those securities to maturity.

(e) Identify which of the categories described in part (d) are permitted by U.S. GAAP to be carried at amortized cost.

Held-to-maturity securities

3. Learning Objectives:

3. The candidate will be able to apply the standards of practice regarding the responsibilities of the actuary as defined by regulators and the American Academy of Actuaries.

Learning Outcomes:

(3a) Describe, interpret and apply the applicable Standards of Practice.

(3b) Describe, interpret and apply the responsibilities of the actuary with respect to the Statement of Actuarial Opinion and the Actuarial Report.

Sources:

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 14 (Overview of the General Insurance Statement of Actuarial Opinion)

Commentary on Question:

This question tests a candidate's knowledge of actuarial reserve estimates and the Statement of Actuarial Opinion.

Solution:

(a) Describe the difference between "good and sufficient" reserves and "reasonable" reserves.

Commentary on Question:

The model solution is an example of a full credit response. Other valid responses were acceptable for full credit. For example, an alternative description for reasonable reserves is an estimate of reserves using accepted actuarial standards and principles.

Good and sufficient reserves have margins so they meet obligations even in adverse scenarios. Reasonable reserves are an estimate of reserves within the actuary's range of reasonable estimates.

(b) Select a range of reasonable reserves for BRI. Justify your selection.

Commentary on Question:

This question tests a candidate's ability to select a range of reasonable reserves using knowledge of applicable Actuarial Standards of Practice. Widely varying full credit responses were possible. There are many valid approaches that can be taken. In order for a candidate to receive full credit, the response must indicate knowledge of the considerations an actuary should make in selecting a range of reasonable reserves. The model solution is an example of a full credit response. Other ranges can be selected for full credit with appropriate justification.

3. Continued

The range selected should represent a range of reasonable possibilities and not include remote outcomes. The range should be based on multiple methods and not consider the explicit risk margin.

Method C should not be used as it is not in common use and it is too sensitive from parameter uncertainty and alternative assumptions. The 10% likely estimates from Methods A and B should be used to construct a range since it is a reasonable possibility. This results in a range of 45 million to 95 million.

(c) Determine the type of Statement of Actuarial Opinion (SAO) that the Appointed Actuary should issue using your selection in part (b).

Commentary on Question:
The response for (c) is dependent on the response given for (b). The model solution for (c) represents a full credit response based upon the range in the model solution for (b).

The type of SAO is Reasonable since the booked amount (45 million) is just in the reasonable range of 45 million to 95 million.

(d) Determine if there is a risk of material adverse deviation with respect to the SAO using your selection in part (b).

Commentary on Question:
The response for (d) is dependent on the response given for (b). The model solution for (d) represents a full credit response based upon the range in the model solution for (b).

The materiality standard plus the carried reserves is equal to 55 million (10 million + 45 million) which is in the reasonable range. Therefore, RMAD clearly exists.

4. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.

Learning Outcomes:

(1a) Understand and apply the concepts of insurance accounting.

(1d) Complete and interpret selected pages/schedules in the NAIC Annual Statement as included in the resources.

(1e) Understand and apply the concepts of reinsurance accounting.

Sources:

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 6 (Schedule F, Statutory Credit for Reinsurance)

Commentary on Question:

This question tests a candidate's understanding of U.S. statutory accounting regarding reinsurance and the completion of the Schedule F provisions for reinsurance.

Solution:

Calculate Omicron's 2016 provision for reinsurance for each of Schedule F Parts 5 to 8.

Commentary on Question:

For full credit, a candidate was required to calculate the provisions for reinsurance from the three reinsurers and indicate the total provision for each of Schedule F Parts 5 through 8. There are many possible valid ways to organize the calculations required for this question. The model solution is one example of a full credit solution.

Parts 5 and 6 are for unauthorized reinsurers, so the provision is zero for both of these since all three of the reinsurers are authorized.

Part 7 is for Overdue Authorized on non-slow paying, Part 8 is for Slow Paying Authorized.

First, determine if each reinsurer is slow paying for Omicron.
Let:

X = Reinsurance recoverables on paid loss and LAE more than 90 days overdue
Y = Total reinsurance recoverables on paid loss and LAE
Z = Amounts received prior 90 days
X and Y exclude amounts in dispute (i.e. C09 for Gamma)

If the ratio X / [Y+Z] is > 20%, the reinsurer is slow paying.

4. Continued

	Alpha	Beta	Gamma
X	C03 = 9,700	C04 = 2,100	C07 = 2,200
Y	C03 = 9,700	C04 = 2,100	C07 = 2,200
Z	C01+C02 = 14,200+1,300	C06 = 12,400	C08 = 9,900
Ratio	9,700/(9,700+15,500) = 38.5%	2,100/(2,100+12,400) = 14.5%	2,200/(2,200+9,900) = 18.2%
Slow Pay	Yes	No	No

Part 7 provision is for Beta and Gamma.

Provision is 20% of recoverables more than 90 days past due [X above] plus 20% of amounts in dispute.

	Beta	Gamma
X	C04 = 2,100	C07 = 2,200
In dispute	0	C09 = 16,300
Provision	20% × 2,100 = 420	20% × (2,200 + 16,300) = 3,700

The total Part 7 provision is 4,120,000 (= 3,700,000 + 420,000)

Part 8 provision is for Alpha.

Provision is 20% of larger of the larger of (i) Total Unsecured Recoverables and (ii) Recoverables More Than 90 Days Past Due.

Total Unsecured Recoverables = Total recoverables less securing funds
= (3,500,000 + 9,700,000 + 600,000) – 3,000,000 = 10,800,000
Recoverables More Than 90 Days Past Due = 9,700,000
Provision for Alpha = 20% × MAX (10,800,000 and 9,700,000) = 2,160,000

The total Part 8 provision is 2,160,000

5. Learning Objectives:

4. The candidate will be able to describe the current and historical regulatory environment.

Learning Outcomes:

(4d) Discuss market conduct regulation.

(4e) Discuss the issues regarding usage based insurance and telematics in automobile insurance.

Sources:

Cappelletti, A., "Usage Based Insurance and Telematics"

Insurance Regulation, The Institutes

- Chapter 9 (Claim Regulation)

Commentary on Question:

This question tests a candidate's understanding of some of the key issues regarding telematics and the NAIC model act for unfair claim settlement.

Solution:

(a) Describe two potential benefits from the use of telematics usage-based insurance (UBI) for automobile insurance for each of the following stakeholders:

(i) Insurers

(ii) Consumers

(iii) Society

Commentary on Question:

There are many possible benefits for each of the three stakeholders. The model solution is one example of a full credit response.

(i) Insurers
- Provides more accurate pricing which improves profitability.
- Use of UBI data in claims adjusting may reduce fraudulent claims.

(ii) Consumers
- Rewards safe driving habits by lowering premiums.
- Allows consumers to control premium directly through driving behavior and amount of driving.

(iii) Society
- Encourages safer driving which creates safer roads.
- Encourages lower mileage driving which reduces traffic congestion.

5. Continued

(b) Describe the issue related to data ownership regarding telematics UBI.

Policyholder data from telematics UBI is owned by the insurer. There is a view from consumer groups that policyholders should own their driving behavior data from telematics or at least have the rights to use the data to market themselves to other insurers.

(c) Explain why young drivers have been the focus of automobile insurance companies for telematics UBI policies.

Young drivers tend to have some of the highest automobile insurance premiums so any discount represents a significant dollar savings for them. Furthermore, they are already accustomed to permitting applications on their smartphones access to personal information and GPS location.

(d) Explain a concern over the use of telematics UBI for claims handling.

Fairness should require that all parties involved have access to the telematics data from an accident if it is used in claims handling. The issue is the equal availability of information to both parties since the insurer owns and controls the data and may not make it available to the claimant.

(e) Describe two of these practices.

Commentary on Question:
There are fourteen practices considered as unfair that are listed in the NAIC Act. Only two were required for full credit. The model solution is one example of a full credit response.

1. Knowingly misrepresenting to claimants and insureds relevant facts or policy provisions relating to coverage at issue.

2. Refusing to pay a claim without conducting a reasonable investigation.

6. Learning Objectives:

5. The candidate will be able to understand tort law and insurance law with respect to its impact on the general insurance industry.

Learning Outcomes:

(5a) Describe and interpret the key elements of tort law and the underlying principles of insurance law.

Sources:

Excerpts from Business Law for Insurance Professionals, Institutes Custom Publishing, Assignment 1 (Contract Law: Insurance Applications)

Commentary on Question:

This question tests a candidate's knowledge of insurance contract law with respect to the distinction between representations and warranties.

Solution:

(a) Compare policyholder representations to warranties with respect to the ability of insurers to void policies.

Representations are made by the insurance applicant regarding loss exposure that induces the insurer to enter into the insurance contract. This requires an active statement or conduct. False representations with fraudulent intent make an insurance contract voidable. Warranties are statements (or promises) that, if untrue, could render a policy voidable. There are two requirements for a warranty breach to make the policy voidable: First, parties must have clearly and unmistakably intended the statement to be a warranty and second, the statement must form part of contract itself.

(b) Explain why claiming a breach of warranty on an insurance application may not be an effective basis for an insurer to void a policy. You should consider the following in your explanation:

(i) Court interpretation of policyholder noncompliance

(ii) State statutes

Courts interpret a policy as severable. If one policy provision is invalid, it need not invalidate the entire policy. This means that noncompliance with a warranty concerning one type of coverage in a policy will not invalidate another type of coverage in the same policy for which the warranty does not relate.

6. Continued

State statutes also lessen effect of warranties from, the following:

- While insurers want strict compliance, state laws specify only substantial compliance is necessary.
- Time of warranty breach is key as state laws indicate that the warranty must exist at the time of the loss.

7. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.

Learning Outcomes:

(1e) Understand and apply the concepts of reinsurance accounting.

Commentary on Question:

This question tests a candidate's understanding of reinsurance accounting and the ability to apply that understanding to a hypothetical reinsurance contract.

Solution:

(a) Describe these two tests.

Commentary on Question:

The model solution is an example of the descriptions required for full credit. Other variations of these descriptions were possible for full credit.

1. Positive and quantitative test: The reinsurance contract must transfer a material amount of underwriting risk. Risk transfer testing focuses on judging whether the risks transferred are material.

2. Negative and qualitative test: The reinsurance contract must not restrict the transfer of underwriting risk except for valid underwriting reasons. The qualitative tests require no material impairment of underwriting or timing risk that is not justified by valid underwriting reasons.

(b) Assess whether or not the quota share treaty transfers risk under U.S. statutory accounting.

Commentary on Question:

Full credit may be attained on this question with either assessment (i.e., it transfers risk or it does not transfer risk under U.S. statutory accounting). Credit is earned for the points raised in the assessment. Widely varying full credit responses are possible. The model solution presents <u>two</u> possible full credit solutions covering both assessments.

The loss ratios over the past three years make it appear that the quota share treaty will be profitable for Big Re. However, property insurance covers catastrophes and three years is limited in making a judgement about catastrophic losses. A catastrophe could cause significant losses for Big Re. Also, very poor underwriting results could develop for Small that would also cause Big Re to suffer a material loss. While it is possible that the carry forward portion of the quota share treaty restricts underwriting and timing risk, it is possible that it is justified by valid underwriting reasons. Due to the loss potential to Big Re, this contract transfers risk under U.S. statutory accounting.

7. Continued

OR

The loss ratios over the past three years make it appear that the quota share treaty will be profitable for Big Re. While Big Re can have an underwriting loss through catastrophic losses or very poor underwriting results from Small, the treaty calls for a three year carry forward of these losses. This feature restricts both underwriting risk and timing risk without any apparent valid underwriting reason. Due to the carry forward feature, this contract does not transfer risk under U.S. statutory as it fails the qualitative test.

(c) Describe the U.S. statutory accounting treatment of this quota share treaty based upon your assessment in part (b).

Commentary on Question:
The response for part (c) was dependent on the response given in part (b). The model solution provides a full credit response for both assessments given in the model solution for part (b).

Since the quota share treaty transfers risk under U.S. statutory accounting, it is accounted for as reinsurance and provides surplus relief.

OR

Since the quota share treaty does not transfer risk under U.S. statutory accounting, it is accounted for as a deposit and does not provide surplus relief.

8. Learning Objectives:

4. The candidate will be able to describe the current and historical regulatory environment.

Learning Outcomes:

(4f) Describe the development of general insurance programs controlled by government or collective insurance industry organizations.

Sources:

Cappelletti, A., "Government Provision of General Insurance"

Commentary on Question:

This question tests a candidate's knowledge of issues regarding government involvement in the provision of workers compensation.

Solution:

(a) Describe three legal defenses against liability that employers used in the U.S. prior to the introduction of workers compensation laws.

Commentary on Question:

There are three legal defenses that were used by employers. Only two of the three were required for full credit. The model solution provides all three legal defenses.

Contributory negligence: If the employee contributed to the injury in any way, the employer may be ruled to be not at fault.

Negligent acts of fellow servants: The employer will not be liable if the employee's injury resulted from a fellow employee's negligence.

Assumption of risk: The employer will not be liable when the employee accepts the risks from the employment.

(b) Explain how workers compensation laws benefit both employers and employees.

Commentary on Question:

There are a number of possible valid answers for full credit. The model solution is one example of a full credit response

There is a benefit to the employer as the employee gives up the right to sue reducing the exposure to large tort awards. There is a benefit to the employee as they receive prompt no-fault compensation and do not have to spend time and money on the tort system. There is a benefit to both employer and employee since workers compensation laws promote workplace safety.

8. Continued

(c) Describe four issues that have recently generated upward pressure on U.S. workers compensation rates.

Commentary on Question:
There are many issues that have recently generated upward pressure on U.S. workers compensation rates. The model solution is an example of a full credit solution.

- Aging work force: The average employee age is rising over time and duration of claims tends to be longer for older workers.
- Low investment portfolio yield from low interest rate environment: Reduced investment income creates pressure to improve underwriting results by increasing rates.
- Obesity epidemic: Obese workers' claim frequency is double that of non-obese workers. Also, medical costs (i.e. claim severity) are significantly higher for obese workers. Given the increase in the prevalence of obesity, claims will increase.
- Overuse of narcotic pain killers: Narcotic pain killers are being prescribed more frequently. The long-term use of narcotic pain killers for pain management increases the likelihood that the employee will not return to work due to drug addiction/dependency. This will increase claim severity.

(d) Compare the level of government involvement in the provision of workers compensation in the U.S. to that in Canada.

In Canada, all provinces have government run insurance monopolies for workers compensation. In the U.S., all states use the private market for workers compensation. However, some states have government run residual markets.

9. **Learning Objectives:**

3. The candidate will be able to apply the standards of practice regarding the responsibilities of the actuary as defined by regulators and the American Academy of Actuaries.

Learning Outcomes:

(3e) Discuss the International Actuarial Association position on the function of the actuary in prudential supervision.

Sources:

International Actuarial Association, "The Function of the Actuary in Prudential Supervision"

Commentary on Question:

This question tests the candidate's understanding of the International Actuarial Association's position on the function of the actuary in prudential supervision.

Solution:

(a) Describe the four other key areas of actuarial involvement in prudential supervision as noted by the IAA.

- Monitoring the expectations of policyholders and potential policyholders where policies allow the management of insurance companies to exercise discretion over contractual terms and conditions.
- Establishing aggregate policy and claim liabilities.
- Determining compliance with legal or regulatory capital requirements when applicable and recommending appropriate capital levels.
- Reporting directly to the Board and, if statutorily required, to regulators.

(b) Identify these four elements of cost.

- Policy obligations,
- Capital required to support the operation of the policy,
- Any policy options against the insurer, and
- Front and back office operations

(c) Describe what is necessary to be demonstrated, according to the IAA position paper, if the premiums are estimated to not be capable of covering the estimated cost.

It is necessary to demonstrate that the organization can absorb such subsidized pricing without impairing its overall financial soundness.

9. Continued

(d) Explain what effect actuaries participating in product design and pricing may have on the level of rate regulation.

Actuaries' participation in product design and pricing may allow regulators to dispense with the process of requiring prior approval of premium rates.

10. Learning Objectives:

2. The candidate will understand the analysis of a general insurer's financial health through prescribed formulas, ratios and other solvency regulation methods.

Learning Outcomes:

(2a) Evaluate the financial health of a general insurer using information contained in the Annual Statement.

(2c) Calculate and interpret the results of financial health ratios.

(2h) Compare different solvency standards.

Sources:

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 12 (Solvency Monitoring)
- Chapter 13 (General Insurance Financial Ratings)

Commentary on Question:

This question tests a candidate's understanding of various insurer financial health measurement issues including IRIS ratios for reserves.

Solution:

(a) Calculate NAIC IRIS ratio 13, estimated current reserve deficiency to policyholders' surplus.

Commentary on Question:

The calculation can be displayed in a number of different ways. The model solution is an example of a full credit solution.

Developed reserves to premium ratio, 2nd prior year:

(17,500 + 6,000) / 17,000 = 1.38

Developed reserves to premium ratio, prior year:

(22,500 + 4,500) / 19,000 = 1.42

Reserves to premium ratio (average of ratios for prior year and 2nd prior year):

(1.38 + 1.42) / 2 = 1.40

Estimated reserves required (current earned premium × reserves to premium ratio):

28,500 × 1.40 = 39,900

Estimated reserve deficiency (estimated reserves required minus current reserves):

39,900 – 34,500 = 5,400

IRIS ratio 13 (estimated reserve deficiency / policyholders' surplus):

5,400 / 18,000 = 30%

10. Continued

(b) Identify two other possible reasons.

Commentary on Question:
There are a number of different possible reasons. Only two were required for full credit. The model solution is an example of a full credit solution.

- Changes in business volume growth (or decline) can distort the results.
- IRIS Ratio 13 uses all lines combined, which is a heterogeneous mixture that can cause distortions due to a mismatch of losses and premiums.

(c) Compare the scoring process for IRIS ratios to the scoring process for FAST financial ratios.

Commentary on Question:
There are a number of ways that the comparison may be made. The model solution is an example of a full credit solution.

- Acceptable ranges for IRIS ratios are publicly available. FAST ranges are not disclosed in order to mitigate manipulation of the financial ratios.
- IRIS scoring gives a pass/fail result for each ratio. FAST scoring gives a numerical score for each ratio.

(d) Explain the use of stability factors in calculating BCAR reserve risk.

Commentary on Question:
The model solution is an example of a full credit solution. The model solution shows the depth of response required for full credit.

BCAR uses stability factors to differentiate reserve volatility by insurer. They are based on the stability of the insurer's reported loss development patterns compared to the industry's reported loss development pattern.

(e) Compare the treatment of asbestos and pollution risk charges in A.M. Best's BCAR with NAIC Risk Based Capital (RBC).

Commentary on Question:
The model solution is an example of a full credit solution. The model solution shows the depth of response required for full credit.

The RBC formula has no asbestos and pollution charge. BCAR uses three generic factor-based methods to estimate required reserves. BCAR complements this with information from meetings with the insurer. Deficiencies in these reserves are added to any core reserve deficiency which increases the BCAR capital charge.

11. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.

Learning Outcomes:

(1a) Understand and apply the concepts of insurance accounting.

(1b) Understand and compare different financial reporting standards for general insurers including: U.S. Statutory Accounting Principles (SAP), U.S. Generally Accepted Accounting Principles (GAAP), Canadian Generally Accepted Accounting Principles (CGAAP), Solvency II and International Financial Reporting Standards (IFRS)

Sources:

General Insurance Financial Reporting Topics, Second Edition, Society of Actuaries

- Chapter 1 (Accounting Systems for General Insurers)
- Chapter 2 (Accounting for Insurance Contracts)
- Chapter 5 (Accounting Perspectives for Non-Admitted Assets)

Commentary on Question:

This questions test a candidate's understanding of the computation of accounting income and the premium receivable asset.

Solution:

(a) Determine the nonadmitted asset for the premium receivable from Policy A for Cheese Head on December 31, 2016 using U.S. statutory accounting principles (SAP).

For the Sunny billing system, the October 1 installment will be more than 90 days past due at year-end. Under U.S. statutory accounting this installment and all subsequent installments are not admitted.

On December 31, the premium receivable asset is 900, of which 300 is more than 90 past due and 600 is not yet due. Therefore, the nonadmitted asset is 900.

(b) Determine the accounting income in 2016 from Policy A for Cheese Head under SAP.

Commentary on Question:

Note that under SAP, earned premiums are not affected by the admissibility of the premiums receivable. A change in agent's balances causes a change in nonadmitted assets, which is a direct charge or credit to surplus, not an income statement item. The model solution is an example of a full credit solution.

11. Continued

Statutory income is the earned premium minus the acquisition expenses:

$$50\% \times 1{,}200 - 20\% \times 1{,}200 = 360$$

(c) Determine the accounting income in 2016 from Policy A for Cheese Head under GAAP.

Commentary on Question:
The model solution is an example of a full credit solution. The model solution shows all steps distinctly for clarity. This was not required for full credit.

GAAP income is SAP accounting income plus the change in the deferred acquisition cost (DAC) asset.

SAP accounting income is 360 from part (b).

The DAC asset is:

- 0 at the beginning of the calendar year, January 1, 2016,
- $20\% \times 1200 = 240$ at the beginning of the policy term on June 30, 2016, and
- $50\% \times 240 = 120$ midway through the policy term at December 31, 2016.

The DAC increases from 0 to 120 during 2016.

Therefore, the 2016 GAAP accounting income is

$$360 + 120 = 480.$$

12. Learning Objectives:

5. The candidate will be able to understand tort law and insurance law with respect to its impact on the general insurance industry.

Learning Outcomes:

(5b) Discuss the influence of the U.S. tort law environment in other countries.

Sources:

Cappelletti, A., "Tort Law - Topics for General Insurance Actuaries"

Commentary on Question:

This question tests a candidate's understanding of the influence of U.S. tort law in other countries.

Solution:

(a) Explain how the following issues in tort law contribute to a perception that the U.S. is an extremely litigious society.

(i) Legal expense awards

(ii) Contingency fees

Commentary on Question:

The model solution is an example of a full credit solution.

(i) The U.S., unlike most other common law countries, does not generally have a "loser pays" rule. Under a loser pays rule, the winning party is awarded the amount it paid for legal expenses and this award is to be paid by the losing party. In most states in the U.S., each party is responsible for their own legal expenses. A loser pays rule can reduce the filing of weak and frivolous suits. There are increased filings of torts in the U.S. due to the lack of a loser pays rule.

(ii) Contingency fees represent an arrangement used by plaintiffs' lawyers whereby the legal fees are calculated as a percentage of any award. Contingency fees may encourage exaggeration of claims by plaintiffs' lawyers. Most countries restrict the use of contingency fees. The U.S. permits contingency fees with few restrictions which may increase the size of amounts sought and ultimately the amounts awarded.

12. Continued

(b) Describe two ways that U.S. tort law may have influenced the development of tort law in other countries.

Commentary on Question:
There are a number of ways that U.S. tort law may have influenced the development of tort law in other countries. The model solution is an example of a full credit solution.

U.S. tort law may have influenced the development of tort law in other countries by:

1. the use of precedent cases from the U.S. in developing areas of tort law when local case law is lacking; and
2. a review of U.S. tort law procedures when considering the modification or creation of local tort law procedures.

13. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.

Learning Outcomes:

(1e) Understand and apply the concepts of reinsurance accounting.

Sources:

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 4 (Accounting for Reinsurance Contracts)

NAIC Statement of Statutory Accounting Principles

- No. 62 Revised, "Property and Casualty Reinsurance"

Commentary on Question:

This question tests a candidate's understanding of reinsurance accounting under the rules of U.S. statutory accounting.

Solution:

(a) Describe two ways that the U.S. statutory accounting treatment by the ceding company of retroactive reinsurance differs from that of prospective reinsurance.

Commentary on Question:

There are a number of ways that the accounting treatment differs. Only two were required for full credit. The model solution is an example of a full credit solution.

For retroactive reinsurance, the ceding company records loss and loss expense reserves on a gross basis (i.e., without recognition of the retroactive reinsurance) on the balance sheet and in all schedules and exhibits. For prospective reinsurance, these amounts are net of reinsurance.

(b) Explain how a reinsurance contract is to be recorded under U.S. statutory accounting by the ceding company when it contains both prospective and retroactive provisions.

Prospective and retroactive provisions included within a single agreement shall be accounted for separately. If separate accounting for prospective and retroactive provisions included within a single agreement is impracticable, the agreement shall be accounted for as a retroactive agreement.

14. Learning Objectives:

4. The candidate will be able to describe the current and historical regulatory environment.

Learning Outcomes:

(4a) Describe the functions of key regulatory bodies in the U.S. including the NAIC and SEC.

(4b) Describe and interpret the current state of general insurance regulation in the U.S. and its development.

Sources:

Insurance Regulation, The Institutes

- Chapter 4 (Roles of State Regulators and the NAIC in Insurance Regulation)

Commentary on Question:

This question tests a candidate's understanding of key NAIC functions.

Solution:

(a) Describe the following with respect to NAIC model laws:

(i) The NAIC process used to create them; and

(ii) A benefit to your client from the existence of them.

Commentary on Question:

There are a number of benefits that may be described for part (ii). The model solution is an example of a full credit response.

(i) Process

- Committee of NAIC members studies an insurance regulatory issue and holds hearings to gather testimony from interested parties.
- Committee takes a position on the issue and NAIC membership votes to adopt committee's recommendation. If the vote was in favor, a model law is drafted.
- Model law includes guidance on how to make the model law compatible with existing state law.
- States determine whether or not to enact the model law, in whole or in part.

(ii) Benefit

- Legal uniformity among the states through adoption of model laws makes understanding the laws of insurance in the U.S. less complicated.

14. Continued

(b) Describe the four major steps involved in the NAIC accreditation process for a state department of insurance (DOI).

1. State insurance commissioner submits a request for a review to the NAIC.
2. The Accreditation Committee of the NAIC chooses a review team.
3. A review is completed that includes the following regarding the state DOI: interviewing personnel, reviewing laws and regulations, reviewing prior examination reports reviews.
4. The NAIC makes a decision based upon the recommendations from the review team's report. To receive accreditation, the DOI must meet NAIC standards in three areas: state laws and regulations, regulatory methods, and DOI practices.

(c) Explain the benefits and criticisms of NAIC accreditation.

Commentary on Question:
There are a number of benefits and criticisms that may be noted of NAIC accreditation. A full credit solution was required to include a minimum of three benefits/criticisms in total. Furthermore, a full credit solution was required to include both a benefit and a criticism. The model solution is an example of a full credit response. It includes two benefits and one criticism.

(i) Benefits
- It improves the quality and quantity of insurer solvency regulation.
- It creates more uniform solvency regulatory standards in the country.

(ii) Criticism
- NAIC accreditation requirements may be viewed as usurpation of a state's legislative authority.

15. Learning Objectives:

2. The candidate will understand the analysis of a general insurer's financial health through prescribed formulas, ratios and other solvency regulation methods.

Learning Outcomes:

(2i) Discuss the function of credit rating agencies and their impact on general insurers.

Sources:

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 13 (General Insurance Financial Ratings)

Commentary on Question:

This question tests a candidate's understanding of certain rating agency operations and the discount rate used in capital adequacy models.

Solution:

(a) Explain what additional cost for rating agency services would be incurred by BLI if it elects to issue catastrophe bonds.

A.M. Best rates insurers, not bonds. BLI will require a bond rating for any catastrophe bond it issues. BLI would incur the additional cost for obtaining this bond rating from a different rating agency.

(b) Describe two considerations to be addressed in interactive meetings with respect to reinsurance.

Commentary on Question:

There are a number of considerations that are addressed. Only two were required for full credit. The model solution is an example of a full credit solution.

- Evaluation of catastrophe covers for property exposures in catastrophe-prone areas using the results of catastrophe modeling.
- Examination of the level of risk transfer provided by reinsurance since arrangements limiting risk transfer are potential warning signs of financial difficulty.

(c) Compare (i) to (ii) with respect to the discount rate used to determine the present value.

- Rating agency capital adequacy models derive the values of assets and liabilities using simulated investment yields based on the assets held.
- Insurer discounted cash flow models for pricing determine present values of uncertain loss payments using rates appropriate for the liabilities.

16. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.

3. The candidate will be able to apply the standards of practice regarding the responsibilities of the actuary as defined by regulators and the American Academy of Actuaries.

Learning Outcomes:

(1a) Understand and apply the concepts of insurance accounting.

(1c) Describe the elements of the NAIC Annual Statement.

(3a) Describe, interpret and apply the applicable Standards of Practice.

(3b) Describe, interpret and apply the responsibilities of the actuary with respect to the Statement of Actuarial Opinion and the Actuarial Report.

(3d) Describe and apply the concept of materiality.

Sources:

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 14 (Overview of the General Insurance Statement of Actuarial Opinion)

AAA, Committee on Property and Liability Financial Reporting, "A Public Policy Practice Note, Statements of Actuarial Opinion on Property and Casualty Loss Reserves"

AAA, Task Force on Materiality, "Materiality, Concepts on Professionalism"

Actuarial Standards Board, Actuarial Standard of Practice

- No. 36, Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves
- No. 43, Property/Casualty Unpaid Claim Estimates

NAIC Statement of Statutory Accounting Principles

- No. 5 Revised, "Liabilities, Contingencies, and Impairment of Assets"
- No. 55, "Unpaid Claims, Loss and Loss Adjustment Expenses"

Commentary on Question:

This question tests a candidate's ability to analyze a situation regarding asbestos reserves utilizing knowledge from various resources of accounting and actuarial guidance.

16. Continued

Solution:
Respond to each of the three management proposals giving consideration to:

- Statements of Statutory Accounting Principles;
- Actuarial Standards of Practice; and
- NAIC Statement of Actuarial Opinion (SAO) Instructions.

Commentary on Question:
Widely varying full credit responses were possible for this question. For each of the three proposals, in order to earn full credit the candidate was expected to raise a point of consideration specific to the proposal and note a potential outcome for adoption of the proposal. The model solution is an example of a full credit solution.

Proposal (i)

Statement of Statutory Accounting Principles (SSAP) 5 requires a liability to be established if the event has occurred and it can be estimated. Both are true in this case. Uncertainty doesn't mean it can't be estimated. If this proposal were adopted, I would issue a Qualified Opinion and disclose the implications of the asbestos reserve within the Risk of Material Adverse Deviation (RMAD) and Relevant Comments sections of the Opinion.

Proposal (ii)

Under this proposal, management's selection for this business would be outside the range of reasonable estimates. If this also caused total aggregate reserves to fall outside my range of reasonable estimates, I would issue an Inadequate Opinion. Regardless of Opinion type, I would disclose the implications of the asbestos reserve variability in the RMAD and Relevant Comments sections of the Opinion.

Proposal (iii)

If management agrees that no amount within the range is a better estimate than any other, SSAP 5 requires they select the midpoint of the range as their best estimate. Management should follow SSAP 5. However, I would be willing to issue an Adequate Opinion for any best estimate of total aggregate reserves within my range, including the low end.

17. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.

Learning Outcomes:

(1c) Describe the elements of the NAIC Annual Statement.

(1h) Estimate the premium asset for retrospectively rated polices for financial reporting.

Sources:

Teng, M. and Perkins, M., "Estimating the Premium Asset on Retrospectively Rated Policies"

General Insurance Financial Reporting Topics, Third Edition, Society of Actuaries

- Chapter 7 (Schedule P, Statutory Loss Accounting)

Commentary on Question:

This question tests a candidate's ability to estimate the premium asset for retrospectively rated polices for financial reporting.

Solution:

(a) Demonstrate that PLI's premium development to loss development (PDLD) ratio for the second retrospective adjustment is 0.55.

Commentary on Question:

One may calculate this amount as an average of the PDLD ratios for each quarter or calculate a total PDLD ratio for the year by summing the amounts from each quarter. The key is selecting the right periods and using the incremental amounts. The model solution is an example of a full credit solution.

Second retro adjustment (amounts in millions)			
	Loss	Premium	PDLD Ratio
Period	18-30	27-39	[Loss / Premium]
2012.1	2.8 [=45.2 – 42.4]	2.0 [=66.3 – 64.3]	0.714 [=2.0/2.8]
2012.2	2.3	0.5	0.217
2012.3	2.5	2.0	0.800
2012.4	4.0	1.9	0.475
Total	11.6	6.4	0.552

17. Continued

(b) Calculate PLI's premium asset for the policy period subject to the second retrospective adjustment as of December 31, 2015.

Commentary on Question:
This calculation can be displayed in several different ways. The model solution is an example of a full credit solution.

Calculate CPDLD at 2nd retro adjustment as the weighted sum of PDLDs by expected percentage of loss emerged from 1st to 6th adjustment:

$$CPDLD_2 = [(0.552 \times 0.10) + (0.45 \times 0.08) + (0.4 \times 0.06) + (0.35 \times 0.03) + (0 \times 0.01)] / (0.10 + 0.08 + 0.06 + 0.03 + 0.01)$$
$$= 0.449$$

Premium Asset = Estimated total premium – Premium booked
= [Expected future loss emergence × $CPDLD_2$ + Premium booked from prior adjustment] – Premium booked
= 70.0 × 0.449 + 285.0 – 275.0 = 41.4 million

(c) Explain why Schedule P Part 7A (Primary Loss Sensitive Contracts) is not generally used to select a company's experience-based PDLD ratios.

Commentary on Question:
There are a number of valid reasons why Schedule P is not generally used for this purpose. The model solution describes two and it is an example of a full credit solution.

Retro adjustments begin after a year for a policy year. Furthermore, the premium adjustments occur after the losses used for the adjustment due to reporting/processing lags (9 months for PLI). Annual data, as is in Schedule P Part 7A, cannot properly capture the timing of losses and premiums to measure PDLD ratios. Quarterly policy level data is required.

Also, Schedule P Part 7A groups together all loss sensitive polices. A proper analysis should be conducted on policies that have similar retro rating parameters so as not to have results affected by data heterogeneity.

18. Learning Objectives:

5. The candidate will be able to understand tort law and insurance law with respect to its impact on the general insurance industry.

Learning Outcomes:

(5a) Describe and interpret the key elements of tort law and the underlying principles of insurance law.

(5d) Understand mass torts/class action suits and discuss their impact on the general insurance industry.

(5e) Describe and interpret legal cases/issues included in the syllabus resources.

Sources:

Cappelletti, A., "Tort Law: Topics for General Insurance Actuaries"

Commentary on Question:

This question tests a candidate's understanding of various tort law concepts.

Solution:

(a) Assess the likelihood of *res ipsa loquitor* being applied in this case.

Commentary on Question:

In order to earn full credit, the assessment should review the three conditions for application of res ipsa loquitor against the facts provided. One may make an assessment either way to earn full credit. The model solution is an example of a full credit response in which it is assessed that res ipsa loquitor applies.

For res ipsa to apply the following must hold true:

(1) The event must be of a kind which ordinarily does not occur in the absence of someone's negligence. In this case cranes do not usually fall without some form of negligence.
(2) It must be caused by an agency or instrumentality within the exclusive control of the defendant. In this case, the crane is generally in exclusive control of the construction company.
(3) It must not have been due to any voluntary action or contribution on the part of the plaintiff. In this case, there does not appear to be any way that the plaintiffs contributed to the event

It would appear that all three of the conditions are true so *res ipsa loquitor* should apply.

(b) Describe the consequence of *res ipsa loquitor* being applied.

The burden of proof for negligence shifts from the plaintiff to the defendant. The defendant needs to prove it was not negligent otherwise negligence is assumed.

18. Continued

(c) State two of the four prerequisites for a class action under Federal Rules of Civil Procedure (FRCP) Rule 23(a).

Commentary on Question:
Only two of the four prerequisites were required for full credit. The model solution is an example of a full credit response.

- The class is so numerous that joinder of all members is impracticable.
- There are questions of law or fact common to the class.

(d) Evaluate the admissibility of the proposed expert witness using the criteria outlined in *Daubert v. Merrell Dow Pharmaceuticals*.

Commentary on Question:
In order to earn full credit, the evaluation should review the Daubert factors as it applies to this case. One may make an evaluation either way in order to earn full credit. The model solution is an example of a full credit response in which the evaluation is that the witness would not be admitted.

The Daubert factors to review are as follows:
1. Is the science generally accepted?
2. Is the science tested?
3. Is the science subject to peer review and publication?
4. Does the science have a known or potential rate of error?

It is clear that the answer is no for the first two factors. It is also no for the third factor as newspaper advertisements should not be considered peer review and publication. It is also no for the fourth since interviews could contain significant bias and errors that would make it difficlut to estimate a potential rate of error. This proposed expert witness would likley not be admitted by the court.

19. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.

Learning Outcomes:

(1a) Understand and apply the concepts of insurance accounting.

(1c) Describe the elements of the NAIC Annual Statement.

(1e) Understand and apply the concepts of reinsurance accounting.

Sources:

General Insurance Financial Reporting Topics, Second Edition, Society of Actuaries

- Chapter 2 (Accounting for Insurance Contracts)
- Chapter 7 (Schedule P, Statutory Loss Accounting)

Commentary on Question:

This questions tests a candidate's understanding of how premiums are reported in different annul statement exhibits when there is intercompany pooling.

Solution:

(a) Determine the following amounts for each of DGI, CGI and BGI, to be reported on the 2016 Underwriting and Investment Exhibit Part 1B:

(i) Direct + Assumed written premium

(ii) Ceded written premium

(iii) Net written premium

Commentary on Question:

This calculation can be displayed in different ways. The model solution is one possible display of the calculation that would earn full credit.

For this exhibit, intercompany pooling is treated as reinsurance. (M denotes million.)

- BGI writes 90 M
  - Cedes 90 M to the pool
- CGI writes 80 M
  - Cedes 10% (8 M) to external reinsurers
  - Cedes 90% (72 M) to the pool

19. Continued

- DGI writes 30 M
  - Assumes 90 M from BGI
  - Assumes 72 M from CGI
  - The pool is now 30 M + 90 M + 72 M = 192 M
  - Cedes 48 M (25% of 192 M) to CGI (CGI assumes from DGI)
  - Cedes 38.4 M (20% of 192 M) to BGI (BGI assumes from BGI)
- Through external reinsurance of the pool, the pool cedes 67.2 M externally (35% of 192M) split among the companies according to pool participation [DGI: 55% = 36.96, CGI: 25% = 16.8, and BGI: 20% = 13.44]

Amounts in M	DGI	CGI	BGI
Direct + Assumed	192 = 30+90+72	128 = 80+48	128.4 = 90+38.4
Ceded	123.36 =48+38.4+36.96	96.80 = 8+72+16.8	103.44 = 90+13.44
Net	68.64	31.2	24.96

(b) Determine the following amounts for each of DGI, CGI and BGI to be reported on the 2016 Schedule P Part 1.

(i) Direct + Assumed earned premium

(ii) Ceded earned premium

(iii) Net earned premium

Commentary on Question:
This calculation can be displayed in different ways. The model solution is one possible display of the calculation that would earn full credit.

Schedule P does not distinguish direct from intercompany pooling. Earned premium is equal to written premium since the unearned premium remained unchanged over the year. (M denotes million.)

- BGI writes 38.4 M (20% of 192 M pool) and cedes 13.44M (35% of 38.4M)
- CGI writes 56 M (8 M not in pool and 25% of pool (48M)) and cedes 24.8 M (8M pre pool cession + 16.8M (35% of 38M))
- DGI writes 105.6 (55% of pool) M and cedes 36.96 M (35% of 105.6M)

Amounts in M		DGI	CGI	BGI
Direct + Assumed		105.6	56	38.4
Ceded		36.96	24.8	13.44
Net		68.64	31.2	24.96

20. Learning Objectives:

2. The candidate will understand the analysis of a general insurer's financial health through prescribed formulas, ratios and other solvency regulation methods.

Learning Outcomes:

(2g) Demonstrate knowledge of ORSA and its implementations.

Sources:

NAIC, "NAIC Own Risk and Solvency Assessment (ORSA) Guidance Manual"

Commentary on Question:

This question tests a candidate's understanding of NAIC ORSA guidance.

Solution:

(a) Identify the key principles for an effective ERM framework.

Commentary on Question:

There are five key principles. Four of the five was sufficient to earn full credit. The model solution shows all five key principles.

- Risk culture and governance
- Risk identification and prioritization
- Risk appetite, tolerances and limits
- Risk management and controls
- Risk reporting and communication

(b) Explain why the NAIC ORSA guidance manual indicates that each material risk category is to be identified independently in Section 2 of the ORSA Summary Report.

Reporting stressed and normal conditions for each risk category independently makes it better for management and the commissioner to evaluate risk combinations that could cause the insurer to fail. Also, determining statistical relationships between risk categories is often difficult.

(c) Explain what the prospective solvency assessment should demonstrate.

It should demonstrate that the insurer has the financial resources necessary to execute its multi-year business plan within its risk appetite. If the insurer does not have the necessary available capital, it should demonstrate that it has a plan to remedy capital adequacy concerns either by identifying additional capital sources or by modification of the business plan.

21. Learning Objectives:

4. The candidate will be able to describe the current and historical regulatory environment.

Learning Outcomes:

(4a) Describe the functions of key regulatory bodies in the U.S. including the NAIC and SEC.

(4b) Describe and interpret the current state of general insurance regulation in the U.S. and its development.

Sources:

Vaughan, T., "The Economic Crisis and Lessons from (and for) U.S. Insurance Regulation"

Mayer Brown, "Understanding the New Financial Reform Legislation: The Dodd-Frank Wall Street Reform and Consumer Protection Act"

Commentary on Question:

This question tests a candidate's understanding of the U.S regulatory system generally and Dodd-Frank specifically.

Solution:

(a) Describe two of these characteristics.

Commentary on Question:

There are a number of characteristics. Only two were required for full credit. The model solution is an example of a full credit response.

- Duplication: The state-based system creates duplicative regulatory oversight. This duplicative effort, while creating additional costs, creates greater scrutiny whereby more regulators have a chance to detect problems.
- Peer Review and Peer Pressure: The state-based system has a peer review system (e.g., NAIC accreditation program) to promote sound insurance regulation. Peer pressure from other state regulators also provides a state regulator with incentives for effective insurance regulation.

(b) Describe two administrative functions of the FIO as established in Dodd-Frank.

Commentary on Question:

There are a number of administrative functions of the FIO. Only two were required for full credit. The model solution is an example of a full credit response.

- Assist in the administration of the terrorism insurance program.
- Coordinate federal efforts and develop federal policy on prudential aspects of international insurance matters.

21. Continued

(c) Identify the Dodd-Frank condition for a state regulator to be solely responsible for regulating the financial solvency of reinsurers domiciled in its state.

NAIC accredited or have financial solvency requirements substantially similar to those imposed by the NAIC.