

GI FREU Model Solutions

Fall 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:

- (2e) Understand the development and principles of solvency regulation, including that in the U.S., Canada and the E.U.
- (2h) Compare different solvency standards.
- (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 12 (Solvency Monitoring)
- Chapter 13 (General Insurance Financial Ratings)

Commentary on Question:

This question tests a candidate's understanding of issues in insurer solvency regulation.

Solution:

- (a) Compare the use of internal company models for regulatory capital purposes in the U.S. with their use in the European Union (EU).

Commentary on Question:

There are a number of different possible ways to make the comparison. The model solution is an example of a full credit solution.

In the U.S., internal models are typically used to address a risk that is not otherwise well-captured in the standard factor-based formula. In contrast, in the EU under Solvency II, internal models are encouraged for all risks.

1. Continued

- (b) Identify the statistical risk measure used for required capital under each of the following systems:
- (i) NAIC RBC
 - (ii) Solvency II in the EU
 - (iii) A.M. Best's Capital Adequacy Ratio (BCAR)
 - (iv) Canadian Minimum Capital Test (MCT)

Commentary on Question:

The model solution is an example of a full credit solution. Note that for (i), stating that "NAIC RBC uses the worst year over the past 8 years" was acceptable.

- (i) In the U.S., NAIC RBC does not have a set statistical standard. However, some risks reflect an approximate 87.5% VaR.
 - (ii) The Solvency II statistical standard is set to a 99.5% VaR by stochastic modeling of risks.
 - (iii) BCAR uses a 1% Expected Policyholder Deficit measure for most risks
 - (iv) Canadian MCT uses a 99% Conditional Tail Expectation for most risks
- (c) Explain why rating agencies use insurer size and age as variables in computing required capital while the NAIC RBC does not.

Commentary on Question:

A full credit response needed to address both why the NAIC RBC does not include it and why rating agencies do include it. The model solution is an example of a full credit solution.

- NAIC RBC does not have higher capital standards for small or recently formed insurers because it is believed that a regulatory capital formula should not set barriers to entry or discriminate based on insurer size.
- Rating agencies are less constrained than regulators and are more likely to follow the actuarial evidence. Insurer's size and age are important explanatory variables so rating agencies raise capital standards for small insurers and young insurers.

1. Continued

- (d) Describe how the BCAR formula leads to greater required capital for each of the following:
- (i) A recently formed general insurance company
 - (ii) A small general insurance company

Commentary on Question:

There are number of ways that BCAR increases required capital for both (i) and (ii). Only one example for each of (i) and (ii) was required for full credit. The model solution is an example of a full credit solution.

- (i) A minimum 10% reserve deficiency factor to insurers with fewer than eight years of experience in the line of business.
- (ii) An increase to the reserving risk factor for small insurers by up to 50%.

2. 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.
- (5b) Discuss the influence of the U.S. tort law environment in other countries.

Sources:

Excerpts from Business Law for Insurance Professionals, Institutes Custom Publishing, Assignment 2 (Tort Law)

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

Commentary on Question:

This question tests a candidate's knowledge of tort law and the influence of tort law in the U.S. to that in other countries.

Solution:

- (a) Identify these two major categories of tort law systems.

Commentary on Question:

Note that this question asked for major categories of tort law systems. Some candidates included criminal law in their response. Criminal law was not an acceptable response as it is not a category of tort law.

Common Law, Civil Law

- (b) Compare the two categories of tort law systems identified in part (a) with respect to:
 - (i) Function of the judge
 - (ii) Use of jury trials

Commentary on Question:

Each response to both (i) and (ii) must note the difference between the two tort categories from part (a). The model solution is an example of a full credit response based upon a correct response in part (a).

- (i) Under common law the judge interprets facts of the case, examines precedents and makes a decision based on these facts. Under civil law, the judge is to find the applicable legislative provision for a case and apply it.
 - (ii) Generally, civil law does not make use of jury trials while common law makes some use of them.
- (c) Describe two reasons why tort law in most Commonwealth countries has not been significantly influenced by U.S. tort law.

Commentary on Question:

There are many reasons that can be given. Only two were required for full credit. The model solution is an example of a full credit response.

- Commonwealth countries have strong historical ties to England and have no issues relying on English case law.
- The social safety net in the U.S. does not appear to be as great as in many commonwealth countries (e.g., universal health care is not included in the U.S. social safety net; many other countries include it).

- (d) Describe three reasons why tort law in the Commonwealth country of Canada has been significantly influenced by U.S. tort law.

Commentary on Question:

There are many reasons that can be given. Only three were required for full credit. The model solution is an example of a full credit response.

- Due to geographical proximity, there is significant interaction between the legal professions of each country.
- The U.S. and Canada are major trade partners.
- The same news and entertainment programs are broadcast to both countries.

2. Continued

- (e) Compare awards for punitive damages under U.S. tort law with those under Canadian tort law.

Commentary on Question:

There are many different ways that they can be compared. For full credit, the comparison must address both the U.S. and Canada. The model solution is an example of a full credit response.

The U.S. tort law system is known for its large punitive damages awards. Punitive damages awards under Canadian tort law have in the past been more similar to those in countries like England and Australia that limit punitive damages to exceptional cases with amounts that tend to be modest. Punitive damages awards under Canadian tort law have recently been trending upwards.

3. Learning Objectives:

1. The candidate will understand the elements of financial reporting for general insurance companies.
4. The candidate will be able to describe the current and historical regulatory environment.

Learning Outcomes:

- (1c) Describe the elements of the NAIC Annual Statement.
- (1d) Complete and interpret selected pages/schedules in the NAIC Annual Statement as included in the resources.
- (4i) Understand the regulation of reinsurance.

Sources:

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

- Chapter 6 (Schedule F, Statutory Credit for Reinsurance)
- Chapter 8 (Notes to Financial Statements)

NAIC, “The U.S. National State-Based System of Insurance Regulation and the Solvency Modernization Initiative”

Commentary on Question:

This question tests a candidate’s understanding of the regulation and accounting for certified reinsurance.

Solution:

- (a) Describe the following as outlined in the NAIC SMI:
 - (i) The process for a state to designate a jurisdiction as “qualified” with respect to certified reinsurers.
 - (ii) The criteria for a reinsurer to be designated as a certified reinsurer.

Commentary on Question:

The model solution is an example of a full credit response. Other criteria are possible for (ii).

- (i) The state must consider the list of qualified non-US jurisdictions maintained by the NAIC. If the jurisdiction is not on this list, then the state must thoroughly document its justification in accordance with the standards for approving qualified jurisdictions contained in the model regulation.

3. Continued

- (ii) Financial strength, timely claims payment history and be domiciled and licensed in a qualified jurisdiction
- (b) Identify the main benefit to a reinsurer of being designated as a certified reinsurer.

Commentary on Question:

Note that it is the benefit to the reinsurer, not the ceding insurer, which is required here.

The reinsurer is eligible for a collateral requirement reduction that makes it more competitive with domestic reinsurers.

- (c) Describe Note 23I in the NAIC Annual Statement, Notes to Financial Statements, which applies specifically to insurers making use of certified reinsurers.

Commentary on Question:

For full credit the candidate must indicate that the note is for disclosure of when a change in status or financial rating occurs and the effect of this change.

If an insurer makes use of certified reinsurers and their rating or status changes, the Note requires full disclosure of the change and its effect on the insurer.

- (d) Calculate FGI's Annual Statement Schedule F provision for reinsurance with respect to reinsurance from Ply Re.

Commentary on Question:

There are a number of ways that this provision can be calculated. The model solution is an example of a full credit solution.

- The reinsurer is given a state rating based upon rating agency ratings. It is required to use the lowest rating from among two or more ratings. Therefore, Ply Re state rating is Secure-4 due to the S&P rating. The required collateral percentage is then 50% and the required collateral is 5,000 (50% of 10,000).
- Ply Re has provided collateral in the amount of 3,000 for a 30% [3,000/10,000] collateral provided percentage. The percentage credit allowed is 60% [minimum of 100% and collateral provided % (30%) divided by collateral required % (50%)]. Therefore the credit allowed is 6,000 [percentage credit allowed (60%) of net recoverables (10,000)].
- The provision is 4,000 [net recoverables (10,000) less credit allowed (6,000)].

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.
- (1b) Compare different financial reporting standards for general insurers including: U.S. Statutory Account Principles (SAP), U.S. Generally Accepted Accounting Principles (GAAP), Canadian Generally Accepted Accounting Principles (CGAAP), Solvency II and International Financial Reporting Standards (IFRS).
- (1c) Describe the elements of the NAIC Annual Statement.
- (1d) Complete and interpret selected pages/schedules in the NAIC Annual Statement as included in the resources.

Sources:

NAIC Accounting Practices and Procedures Manual, Preamble

NAIC Statement of Statutory Accounting Principles

- No. 3, “Accounting Changes and Corrections of Errors”
- No. 53, “Property Casualty Contracts-Premiums”
- No. 65, “Property and Casualty Contracts”

Commentary on Question:

This question tests a candidate’s understanding of some rules within U.S. statutory accounting and some elements in the Annual Statement.

Solution:

- (a) Describe the accounting treatment of a financial transaction under U.S. statutory accounting if its treatment is not specified by the Statements of Statutory Accounting Principles (SSAPs).

Commentary on Question:

A full credit solution should include at least two alternative sources of established accounting principles that could be used in consideration of the accounting treatment. The model solution is an example of a full credit solution. It does not include all possible alternative sources that are acceptable.

Preparers of statutory financial statements should consider whether the accounting treatment is specified by another source of established statutory accounting principles such as U.S. GAAP adopted by the NAIC, consensus positions adopted by the NAIC and NAIC Annual Statement Instructions.

4. Continued

- (b) Describe the losses that are specifically covered by an insurance contract on an extended reporting basis.

Commentary on Question:

For full credit, a response must make note that it is for losses to an endorsement on a claims made policy and the timing of events covered. The model solution is an example of a full credit solution.

Losses from an endorsement to a claims-made policies covering insured events reported after the termination of a claims-made contract but subject to the same retroactive dates where applicable.

- (c) Describe the circumstances under which an insurer should establish a premium deficiency reserve under SSAP 53.

Commentary on Question:

The model solution is an example of a full credit solution. Not all of the information in the model solution was required for full credit (e.g., candidates did not need to include “and any future installment premiums on existing policies” in their response for full credit.)

When the anticipated losses, loss adjustment expenses, acquisition costs, and maintenance costs exceed the recorded unearned premium reserve, and any future installment premiums on existing policies. Acquisition costs need not be considered in the premium deficiency analysis to the extent they have previously been expensed.

- (d) Describe this SSAP 3 treatment for the restatement of prior years in the event of a merger for the following Annual Statement (AS) schedules:
- (i) Balance Sheet and Income Statement (column 4 of AS page 2; column 2 of AS pages 3 and 4)
 - (ii) Five Year Historical Summary (columns 2 to 5 of AS page 17)

Commentary on Question:

The model solution for (ii) includes a statement about the footnote in the Summary. This statement was not required for full credit.

4. Continued

- (i) Prior years' amounts are restated as if the merger had occurred as of January 1 of the prior year.
- (ii) The two most recent years included in the Summary are restated as if the merger had occurred as of January 1 of the prior year. The Summary is to include a footnote indicating that the other three years have not been restated.

5. Learning Objectives:

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

Learning Outcomes:

- (4b) Describe and interpret the current state of general insurance regulation in the U.S. and its development.
- (4c) Compare different forms of rate regulation.

Sources:

Insurance Regulation, The Institutes

- Chapter 8 (Rate Regulation)

Commentary on Question:

This question tests a candidate's understanding of rate regulation and its interaction with the underwriting cycle.

Solution:

- (a) Describe the inherent difficulty encountered by insurance regulators in evaluating an insurer's rates for reasonability.

Commentary on Question:

A full credit response required addressing the fact that the concept of what is reasonable is not an objective measure and is inherently subject to interpretation. The model solution is one example of a full credit response.

The criteria for "reasonability" varies by state regulator because it is a subjective process.

- (b) Describe two possible actions that an insurance regulator may take if their evaluation determines that a submitted rate schedule is not reasonable.

Commentary on Question:

There are a number of possible actions that may be taken. Only two were required for full credit. The model solution is one example of a full credit response.

If the regulator has approval authority, and the company does not agree to revise their rates, the regulator may not approve proposed rates, and the company will not be able to market the policies.

If the regulator does not have approval authority, the regulator may call a public hearing and require the company to publicly justify their proposed rates.

5. Continued

- (c) Describe how the underwriting cycle contributes to rate volatility.

Commentary on Question:

There are many different ways to describe the underwriting cycle and its contribution to rate volatility. A full credit response needed to demonstrate an understanding of the underwriting cycle and its contribution to rate volatility. The model solution is one example of a full credit response.

An underwriting cycle is a cyclical pattern of insurance pricing in which a soft market (low rates, relaxed underwriting, and underwriting losses) is eventually followed by a hard market (high rates, restrictive underwriting, and underwriting gains) before the pattern repeats itself. This pattern creates rate volatility in addition to the uncertainties inherent in general insurance pricing and reserving.

- (d) Describe how insurance regulators attempt to mitigate rate volatility arising from underwriting cycles.

Commentary on Question:

There are a number of ways that insurance regulators attempt to mitigate rate volatility. Only one was required for full credit. Note that capping rate increases is not an acceptable response since this is only a temporary measure that exacerbates the effects of the underwriting cycle. The model solution is one example of a full credit response.

Reducing the lag time in the rate approval process.

6. Learning Objectives:

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

Learning Outcomes:

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

Sources:

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

Commentary on Question:

This question test a candidate's ability to calculate the premium asset on retrospectively rated policies.

Solution:

- (a) Demonstrate that the ILCR for the second retrospective adjustment is correctly displayed in the table above as 44.3%.

Commentary on Question:

There are many ways that this demonstration can be made. The model solution is an example of a full credit solution.

First calculate cumulative loss capping ratio for the 1st and 2nd retro adjustments as in the table below:

Retro Adj	EPLE	Emerged LR	Entry ratio max	Entry ratio min	Table M IC at retro max	Table M IS at retro min
First	84%	0.63	1.90	0.16	0.080	0.060
Second	94%	0.705	1.70	0.14	0.120	0.050

Where: Emerged LR = USLR × EPLE, Entry ratio max = LR_{max} / Emerged LR, and Entry ratio min = LR_{min} / Emerged LR.

Then calculate the cumulative loss capping ratio (CLCR) for the 1st and 2nd retro adjustments as in the table below:

Retro Adj	Loss % eliminated by max/min from Table M	Per Acc. Loss elimination	CLCR
First	2.0% = 0.08 – 0.06	2.0%	100% – 2.0% – 2.0% = 96.0%
Second	7.0% = 0.12 – 0.05	2.5%	100% – 7.0% – 2.5% = 90.5%

Finally calculate the ILCR for the second retrospective adjustment as follows:

$$\text{ILCR} = [(\text{CLCR} \times \text{Emerged LR}) - (\text{prior CLCR} \times \text{prior Emerged LR})] / [\text{Emerged LR} - \text{Prior Emerged LR}]$$

$$\text{ILC}_2 = [(90.5\% \times 0.705) - (96.0\% \times 0.630)] / (0.705 - 0.630) = 0.443$$

6. Continued

- (b) Calculate the implied Cumulative Premium Development to Loss Development (CPDLD) ratio for the first retrospective rating adjustment using the formula approach.

Commentary on Question:

There are several ways to calculate this amount. The model solution is an example of a full credit solution.

$$\begin{aligned} \text{PDL}_1 &= \text{BPF} \times \text{TM} / (\text{ELR} \times \text{EPLE}) + \text{TM} \times \text{LCF} \times \text{Loss Capping Ratio} \\ &= (0.2 \times 1.03 / (0.75 \times 84\%)) + (1.03 \times 1.25 \times 96.0\%) = 1.563 \end{aligned}$$

$$\text{PDL}_2 = \text{TM} \times \text{LCF} \times \text{Loss Capping Ratio} = 1.03 \times 1.25 \times 44.3\% = 0.570$$

$$\text{PDL}_3 = \text{TM} \times \text{LCF} \times \text{Loss Capping Ratio} = 1.03 \times 1.25 \times 15.5\% = 0.200$$

$$\begin{aligned} \text{CPDLD}_1 &= \text{weighted sum of PDLs by expected percentage of loss emerged} \\ &\text{from 1}^{\text{st}} \text{ to 3}^{\text{rd}} \text{ adjustment} \\ &= (1.563 \times 84\% + 0.570 \times 10\% + 0.200 \times 6\%) / (84\% + 10\% + 6\%) = 1.382 \end{aligned}$$

- (c) Calculate the premium asset for the policy period subject to the first retrospective adjustment.

$$\begin{aligned} \text{Premium Asset} &= \text{Estimated Total Premium} - \text{Premium Booked} \\ &= \text{Expected Future Loss Emergence} \times \text{CPDLD}_1 - \text{Premium Booked} \\ &= 145 \text{ million} \times 1.382 - 155 \text{ million} = 45.4 \text{ million} \end{aligned}$$

7. **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 understanding of insurance contract law.

Solution:

- (a) Compare the concepts of concealment and misrepresentation in insurance contracts.

Commentary on Question:

A full credit response requires showing an understanding of both concealment and misrepresentation in insurance contracts. The model solution is an example of a full credit solution.

Courts have held that to establish concealment they must prove both that the failure to disclose was intentional and that it was a material fact.

Misrepresentation is a false statement and the insurer does not need to prove that it was intentional.

- (b) Explain how court rulings on disputes between insurers and policyholders are affected by insurance contracts being considered contracts of adhesion.

Commentary on Question:

A full credit response was required to show an understanding of adhesion and its application to an insurance contract dispute. The model solution is an example of a full credit solution.

A contract of adhesion is drafted by one party (the insurer), and the other party (the insured) must accept all terms and conditions. In a dispute over the meaning of certain words or phrases in an insurance contract, the courts will generally apply the interpretation that favors the insured.

7. Continued

- (c) Explain the legal principle which may obligate the insurer to pay this claim.

Commentary on Question:

A full credit solution needs to explain the principle and apply the principle to the facts presented. The model solution is an example of a full credit solution.

The principle of estoppel may apply. Estoppel is a legal principle that prohibits a party from asserting a claim or right that is inconsistent with its past statements or conduct and that another party has relied upon such past statements or conduct.

All the elements for estoppel are present in this case:

- The insurer, through its producer, made false representation regarding coverage.
- The insured relied upon this representation by accepting the policy and purchased no other insurance.
- If denied coverage, the insured is harmed by the amount of the claim.

For this reason, the insurer would likely be estopped from denying the claim.

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.
- (4g) Describe the mechanisms of operation for government and/or collective insurance industry controlled programs as included in the resources.

Sources:

AAA Flood Insurance Work Group, "The National Flood Insurance Program: Challenges and Solutions"

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

Commentary on Question:

This question tests the candidate's understanding of insuring flood risk, government involvement in insuring flood risk and some of the NFIP mechanisms of operation.

Solution:

- (a) Explain why flood risks usually require some form of government involvement to be considered insurable.

Commentary on Question:

There are a number of reasons why flood risks usually require some form of government involvement to be considered insurable. The model solution is an example of a full credit solution.

There is frequent widespread flooding in flood plains. Those risks most likely to be flooded (potentially repetitively) would be the ones most likely to purchase flood insurance. Those with low flooding potential would tend not to insure for this risk. Without government involvement, those needing it would likely find it unavailable and/or unaffordable.

It is also in the interest of governments to be involved in the management of development in flood plains as a means of reducing loss exposure. This type of government oversight can be made more efficient when integrated with a flood insurance plan.

8. Continued

- (b) Describe three differences between the capital structure of the National Flood Insurance Program (NFIP) and that of private insurers.

Commentary on Question:

There are a number of differences. Only three were required for full credit. The model solution is an example of a full credit solution.

- The NFIP does not operate with owner or investor capital; Private insurers have owners and initial investment capital.
- The NFIP may run a negative surplus by borrowing funds with the promise of future repayment; Accounting rules preclude private insurers from doing this.
- The NFIP has line of credit from the U.S. Treasury when deficits occur from revenue falling short of losses and expenses; Private insurers do not have a credit line from US Treasury although they may have some credit access from private lenders.

- (c) Describe two risks to an insurer by participating as a WYO carrier.

Commentary on Question:

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

- When implementing large NFIP rate increases, the policyholder may blame the WYO carrier.
- Writing WYO policies precludes a company from offering its own flood policies due to the non-compete clause.

- (d) Describe two challenges an insurer must consider when evaluating a potential move into writing private flood coverage.

Commentary on Question:

There are many challenges. Only two were required for full credit. The model solution is an example of a full credit solution.

- Unless flood insurance becomes mandatory for all mortgage holders or all property owners, the people most likely to buy are those at risk of flooding.
- Most insurance companies currently have little or no access to granular data on historical flood insurance exposures and claims.

9. Learning Objectives:

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

Learning Outcomes:

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

Sources:

Case Study, Fall 2017, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

NAIC Annual Statement

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

- Chapter 9 (Measuring Total Income by Line of Business)

Commentary on Question:

This question tests a candidate's understanding of the Annual Statement, the Insurance Expense Exhibit (IEE) and IEE surplus allocation by line of business. The model solution indicates sources for the data used. This was not required for full credit but if the candidate's response included it, it assisted in the grading process if the numbers presented by the candidate were incorrect.

Solution:

- (a) Calculate R-Dan General Insurance Company's (R-Dan's) investment gain ratio for the 2016 Insurance Expense Exhibit (IEE).

Commentary on Question:

There are several ways that this calculation can be presented. The model solution is one example of a full credit presentation of the calculation. AS = Annual Statement.

The insurer's investment gain ratio (IGR) is its net investment gain divided by investable assets, or Net investment gain divided by [Mean net loss and LAE reserves (LR) + Mean net UEPRs - Mean net agents' balances (AB) + Mean policyholders' surplus (PHS)]

	Current	Prior	Mean	
Net LR	289,500	248,900	269,200	AS Page 3 lines 1, 2
Net UEPR	208,800	179,600	194,200	AS Page 3 line 9
Net AB	54,700	48,000	51,350	AS Page 2 lines 15.1, 15.2
PHS	209,400	209,100	209,250	AS Page 3 line 37
Net IG	33,600			AS Page 4 lines 9, 10 plus capital gains tax
IGR	5.4%			= 33.6/(269.2+194.2-51.35+209.25)

9. Continued

- (b) Calculate R-Dan's 2016 mean surplus for the Private Passenger Auto Liability line of business using the IEE method of allocation.

Commentary on Question:

There are several ways that this calculation can be presented. The model solution is one example of a full credit presentation of the calculation. PHS = policyholders' surplus, UPR = unearned premium reserve, LR = loss and LAE reserves, PP = private passenger.

Allocate the company's mean surplus to line of business in proportion to:
Mean net loss and LAE reserves + Mean net UPR + Earned premium (EP) for the year.

$$\begin{aligned} \text{PHS Ratio} &= \text{mean PHS} / \text{mean net LR} + \text{mean net UPR} + \text{current EP} \\ &= 209,250 / (269,200 + 194,200 + 578,500) = 20.08\% \end{aligned}$$

For PP Auto Liability:

$$\begin{aligned} \text{mean net LR} &= \text{current LR (IEE page 4)} + \text{prior LR (item supplied)} \\ &= [(207,000+33,900+7,900)+(176,200+30,600+7,100)]/2 = 231,350 \end{aligned}$$

mean net UPR

$$\begin{aligned} &= \text{current UPR (IEE page 4)} + \text{prior UPR (item supplied)} \\ &= [62,500 + 56,900]/2 \\ &= 59,700 \end{aligned}$$

$$\text{EP (IEE page 4)} = 237,300$$

PHS for PP Auto Liability

$$= 20.08\% \times [231,350 + 59,700 + 237,300] = 106,111$$

- (c) Provide two reasons why IEE mean surplus may not be appropriate for calculating profit margins in the ratemaking process.

Commentary on Question:

There are a number of reasons why it may not be appropriate. Only two were required for full credit. The model solution is an example of a full credit solution.

- IEE allocation represents retrospective performance measurement of investment income whereas ratemaking should use a prospective measurement of investment income.
- IEE investment income is pretax. Measurement for ratemaking should be after tax.

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.
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:

- (2c) Calculate and interpret the results of financial health ratios.
- (3b) Describe, interpret and apply the responsibilities of the actuary with respect to the Statement of Actuarial Opinion and the Actuarial Report.

Sources:

Case Study, Fall 2017, SOA Exam: General Insurance, Financial and Regulatory Environment – U.S.

NAIC Annual Statement

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

- Chapter 11 (Measuring Insurer Financial Strength)
- 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"

Commentary on Question:

This question tests a candidate's understanding of the Annual Statement and IRIS Ratios, the ability to calculate IRIS Ratios, and the responsibility of the Appointed Actuary with respect to IRIS Ratio results. The model solution indicates sources for the data used. This was not required for full credit but if the candidate's response included it, it assisted in the grading process if the numbers presented by the candidate were incorrect.

Solution:

- (a) Determine whether or not each of the following 2016 NAIC IRIS Ratios are exceptional for R-Dan General Insurance Company (R-Dan):
 - (i) IRIS Ratio 6 (Investment Yield)
 - (ii) IRIS Ratio 13 (Estimated Current Reserve Deficiency)

10. Continued

Commentary on Question:

There are several ways that this calculation can be presented. The model solution is one example of a full credit presentation of the calculation. Note that for part (i), candidates need not have subtracted net investment income earned from the denominator to earn full credit as it was presented in error in the source material without this adjustment. PHS = policyholders' surplus.

- (i) Exceptional values for this test occur when the ratio is over 6.5% or under 3%.

Net investment income earned = 31,900 [Annual Statement (AS) page 4 row 9 column 1].

Average cash and invested assets = $((644,700+9,100) + (585,400+8,500)) / 2 = 623,850$ [AS page 2 rows 12 + 14, average of columns 3 and 4]

IRIS Ratio 6 = Net investment income earned / (Average cash and invested assets – net investment income earned) = $31,900 / (623,850 - 31,900) = 5.4\%$ so it is not exceptional.

- (ii) Exceptional values for this test occur when the ratio is over 25%.

From 5 year historical summary and Schedule P summary:

- Developed reserves to premium ratio (1st prior) = $[(203,200 + 45,700) + 36,200] / 511,600 = 55.7\%$
- Developed reserves to premium ratio (2nd prior) = $[(185,700 + 38,800) + 38,900] / 470,900 = 55.9\%$
- Reserves-to-premiums ratio = $0.5 \times [55.7\% + 55.9\%] = 55.8\%$

Estimated reserve deficiency = (Premiums earned (current year) \times reserves to premiums ratio) – loss & LAE reserves (current year)
 $= 578,500 \times 55.8\% - (238,800 + 50,700) = 33,484$

IRIS Ratio 13 = Estimated reserve deficiency / PHS
 $= 33,484 / 209,400 = 16.0\%$

This is less than 25% so it is not exceptional.

- (b) Provide one strength and one weakness of NAIC IRIS Ratio 13 in examining reserve deficiency.

Commentary on Question:

There are a number of strengths and weaknesses. Only one of each was required for full credit. The model solution is one example of a full credit solution.

10. Continued

Strength:

- It is a quick and objective measure based on a standard formula applied to audited data.

Weakness:

- It is a simplistic formula to test for reserve adequacy. It does not look at reserving principles underlying actuarial estimates.

- (c) Propose two additional items that could be included in this section that would increase its usefulness.

Commentary on Question:

There are a number of items that could be included that would increase its usefulness. Only two were required for full credit. The model solution is one example of a full credit solution.

This section could include:

1. Operational details on the company with respect to its influence on the IRIS Ratio results.
2. A sensitivity analyses for the unusual values.

11. 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.
- (3d) Describe and apply the concept of materiality.

Sources:

Case Study, Fall 2017, SOA Exam: General Insurance, Financial and Regulatory Environment – U.S.

NAIC Annual Statement

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”

Commentary on Question:

This question tests a candidate’s understanding of the Actuary’s responsibilities with respect to RMAD and the Statement of Actuarial Opinion.

Solution:

- (a) State two alternative materiality standards that may be appropriate for an RMAD.

Commentary on Question:

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

- Impact of item on NAIC IRIS ratio results
- Impact on NAIC RBC results

11. Continued

- (b) Select the materiality standard you would have used if you were the Appointed Actuary for R-Dan (whether the same or different from that selected by Sue Calvin). Justify your selection.

Commentary on Question:

Grading for this question was not based on the selected standard but for the justification of the standard. There are many acceptable materiality standards and, as such, many acceptable full credit responses for this question. One may agree or disagree with Sue's selection for full credit. The model solution is an example of a full credit solution in which there is agreement with Sue's selection.

I agree with the materiality standards selected by Sue for this company. Materiality determinations require professional judgement and should reflect the intended purpose of the actuarial opinion. The purpose of the RMAD in the Statement of Actuarial Opinion is to identify risks that are somewhat likely and have the potential to significantly change or threaten company surplus. Furthermore U.S. Statutory statements are focused on solvency. It is appropriate to evaluate the impact of an RMAD relative to surplus or reserves because material RMADs can cause significant changes in surplus or threaten solvency.

- (c) Critique Sue Calvin's opinion that the reserves are reasonable.

Commentary on Question:

Note that a critique is an evaluation or assessment. It does not necessarily mean that it must be critical; a critique can be supportive. One may agree or disagree with the opinion to obtain full credit. Full credit is based upon the facts presented for the assessment. Widely varying responses can earn full credit for this part. The model solution is one example of a full credit solution in which there is disagreement with Sue's opinion.

Using information from the Actuarial Opinion Summary, Sue's range of net estimates is approximately -19% to +20% from the point estimate. This equates to approximately -65 million to +69 million on a dollar basis. This is approximately 33% of statutory surplus, which is after a capital infusion of 10 million. This seems like an unusually wide range. I disagree with Sue's determination of a reasonable provision unless the basis for the range can be supported. This cannot be determined because the information in the Case Study did not include Sue's disclosure of the basis for the range.

- (d) Describe two steps Sue should take next.
- Determine the effect of the correction on the financial statements.
 - Notify the regulator of the correction.

12. Learning Objectives:

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

Learning Outcomes:

- (1f) Understand and apply the elements of discounting for general insurance loss reserves.
- (1g) Demonstrate knowledge of taxation for general insurers in the U.S.

Sources:

Case Study, Fall 2017, SOA Exam: General Insurance, Financial and Regulatory Environment – U.S.

NAIC Annual Statement

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

- Chapter 7 (Schedule P, Statutory Loss Accounting)
- Chapter 15 (Federal Income Taxes for General Insurers)

Commentary on Question:

This question tests a candidate's ability to apply the IRS discounting procedure on loss reserves for tax purposes using information from the annual statement.

Solution:

Calculate R-Dan's IRS tax accounting loss reserve discount factor for Private Passenger Auto Liability reserves at 48 months of development using 2016 annual statement data and the simplifying assumptions provided above.

Commentary on Question:

There are several ways that this calculation can be presented. The model solution is one example of a full credit presentation of the calculation. The model solution indicates sources for the data used. This was not required for full credit but assists in the grading process if the numbers presented by the candidate were incorrect.

Use the following data: Paid = Schedule Part 1B column 11,
Incurred = Sched P Part 1B column 28.

Calculate incremental paid as follows:

12. Continued

Accident Year	Months Developed	Paid (000)	Incurred (000)	Cumulative % Paid = (2)/(3) Rounded	Incremental % Paid = (4) differences (AY _x - AY _{x+1})
	(1)	(2)	(3)	(4)	(5)
2008 & prior	108 & beyond			Assume 100.00%	0.0%
2009	96	163,300	163,600	99.8% so assign 100.00%	0.5%
2010	84	169,000	169,900	99.5%	0.7%
2011	72	176,400	178,500	98.8%	1.7%
2012	60	197,600	203,500	97.1%	4.0%
2013	48	190,500	204,600	93.1%	7.0%
2014	36	180,900	210,100	86.1%	

IRS loss reserve discount factor at 48 months = B/A where

A = Sum of Table Column (5), Prior Years to 2013 = 13.9%

$$B = (7.0\% / 1.04^{0.5}) + (4.0\% / 1.04^{1.5}) + (1.7\% / 1.04^{2.5}) + (0.70\% / 1.04^{3.5}) + (0.50\% / 1.04^{4.5}) = 13.2\%$$

IRS loss reserve discount factor at 48 months = B/A = 13.2/13.9 = 95.0%

13. Learning Objectives:

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

Learning Outcomes:

- (1b) Compare different financial reporting standards for general insurers including: U.S. Statutory Account Principles (SAP), U.S. Generally Accepted Accounting Principles (GAAP), Canadian Generally Accepted Accounting Principles (CGAAP), Solvency II and International Financial Reporting Standards (IFRS).
- (1c) Describe the elements of the NAIC Annual Statement.
- (1d) Complete and interpret selected pages/schedules in the NAIC Annual Statement as included in the resources.

Sources:

Case Study, Fall 2017, SOA Exam: General Insurance, Financial and Regulatory Environment – U.S.

NAIC Annual Statement

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

- Chapter 2 (Accounting for Insurance Contracts)
- Chapter 8 (Notes to Financial Statements)
- Chapter 10 (Returns on Capital: Planning, Pricing and Performance)

Commentary on Question:

This question tests a candidate's ability to compare U.S. statutory surplus to GAAP equity and understand what is required in the Notes to Financial Statements in statutory accounting for changes to incurred losses.

Solution:

- (a) Calculate R-Dan's GAAP equity.

Commentary on Question:

The model solution indicates sources for the data used. This was not required for full credit but assists in the grading process if the numbers presented by the candidate were incorrect. UPR = unearned premium reserves, AS = Annual Statement.

GAAP Equity

$$\begin{aligned} &= \text{Statutory surplus} + \text{nonadmitted assets} - \text{bad debts} + \text{equity in UPR} \\ &= 209,400 \text{ (AS Page 3)} + 7,400 \text{ (AS Page 2)} - 0 + 20\% \text{ of } 208,800 \text{ (AS Page 3)} \\ &= 258,560 \end{aligned}$$

13. Continued

- (b) Calculate the amount that would be recorded in R-Dan's 2016 Note 25 on an all lines of business combined basis. Identify the data sources in your calculation.

Commentary on Question:

Prior years in this instance refers to years before the current accident year. It has no relation to the prior years' row as defined in the Schedule P development exhibits. It is the amount of contribution of prior years' results on the current income statement. The only effect is on losses because R-Dan does not have Accrued Retrospective Premiums. Therefore, the change in prior year losses is current calendar year losses minus the current accident year losses.

Income Statement (IS) for calendar year (CY) 2016:

- IS losses incurred = 482,100
- IS loss adjustment expenses incurred = 70,700
- IS losses and loss adjustment expenses incurred = 552,800

Current Accident Year (AY) losses and loss adjustment expenses incurred is 520,500 as in Schedule P Part 1 Summary column 28 line 11.

Therefore Note 25, Changes in Incurred Losses and Loss Adjustment Expenses amount is 32,300 (=CY 2016 Incurred – current AY 2016 Incurred = 552,800 – 520,500).

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.
- (4d) Discuss market conduct regulation.

Sources:

Insurance Regulation, The Institutes

- Chapter 2 (Development of Insurance Regulation)

Commentary on Question:

This question tests a candidate's knowledge of some of the issues in the development of U.S. insurance regulation.

Solution:

- (a) Summarize the two key points of the Supreme Court's *U.S. vs. SEUA* decision.
 1. Congress intended the Sherman Act to prohibit the kinds of conduct exhibited by the interstate fire insurers and SEUA.
 2. The Court determined that insurance was commerce under the Constitution's Commerce Clause and, as such, was subject to Congressional regulation.
- (b) Identify the Act of Congress that was enacted in 1945 as a reaction the Supreme Court's *U.S. vs. SEUA* decision.

McCarran-Ferguson Act
- (c) Describe two elements pertaining to the regulation of the business of insurance included within the Act identified in part (b).

Commentary on Question:

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

14. Continued

- No act of Congress shall be construed to invalidate, impair, or supersede any law enacted by any State for the purpose of regulating the business of insurance unless such Act specifically relates to the business of insurance.
 - Nothing contained in this Act shall render the said Sherman Act inapplicable to any agreement to boycott, coerce, or intimidate, or act of boycott, coercion, or intimidation.
- (d) State three criminal activities that were included in the indictments against the SEUA.

Commentary on Question:

There are a number of criminal activities included in the indictments. Only three were required for full credit. The model solution is an example of a full credit solution.

- Using boycott and other forms of coercion and intimidation to force non-SEUA members to comply with SEUA rules.
- Withdrawing agents' rights to represent SEUA members if the agents also represented non-SEUA companies
- Threatening insurance consumers with boycott and loss of patronage if they did not purchase their insurance from SEUA members

15. Learning Objectives:

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

- (1c) Describe the elements of the NAIC Annual Statement.
- (1d) Complete and interpret selected pages/schedules in the NAIC Annual Statement as included in the resources.
- (2c) Calculate and interpret the results of financial health ratios.

Sources:

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

- Chapter 7 (Schedule P, Statutory Loss Accounting)
- Chapter 11 (Measuring Insurer Financial Strength)

Commentary on Question:

This question tests a candidate's understanding of how pooling is recorded in the annual statement and the effect of pooling on NAIC IRIS ratios.

Solution:

- (a) Demonstrate that the pooling percentage is 40% for RGI.

Commentary on Question:

There are a number of ways that this can be demonstrated using the data provided. The model solution is an example of a full credit solution.

Since FSC does not have loss liabilities before accident year 2014, we can determine that the pooling percentage is 60% for FSC and 40% for RGI by comparing the 2015 to the pooled 2016 Schedule P for accident years 2012 and 2013 (e.g., accident year 2012 at year-end 2012 gives $4,350/7250 = 0.6$ for FSC).

- (b) Calculate RGI's underlying Schedule P-Part 2D amounts before pooling transactions as of year-end 2016 for accident years 2012 to 2016.

Commentary on Question:

Note that RGI's year-end 2016 underlying amounts before pooling transactions is obtained by dividing FSC's 2016 Sched. P data by 0.6 and subtracting FSC's underlying amounts before pooling transactions from this. There are a number of ways that this calculation can be shown. The model solution is an example of a full credit solution.

15. Continued

Accident Year	RGI underlying amounts before pooling at year-end 2016	
	Amount	Calculation
2012	8,500	= 5,100 / 0.6 – 0
2013	10,875	= 6,525 / 0.6 – 0
2014	12,125	= 13,575 / 0.6 – 10,500
2015	13,575	= 14,175 / 0.6 – 10,050
2016	12,975	= 15,975 / 0.6 – 13,650

- (c) Compare RGI's year-end 2016 Schedule P-Part 2D total two-year development (Column 12, Row 12 of a complete Schedule P Part 2) versus the comparable amounts using underlying data before pooling transactions.

Commentary on Question:

The comparison requires one to calculate the difference between the reported amounts at year-end 2016 to year-end 2014 for accident years with 2 or more years of development at year-end 2016 (i.e., 2012 to 2014) before and after pooling. There are a number of ways that this calculation can be shown. A full credit response must include a statement comparing the amounts before and after pooling. The model solution is an example of a full credit solution.

- RGI's two year development from Schedule P data is $(\text{FSC Schedule P} \times 0.4 / 0.6)$
 $[(5,100 + 6,525 + 13,575) - (3,975 + 4,500 + 13,650)] \times 0.4 / 0.6 = 2,050$
- RGI's two year development using underlying amounts before pooling transactions is
 $[(8,500 + 10,875 + 12,125) - (6,625 + 7,500 + 8,450)] = 8,925$
- RGI's actual underlying 2 year development is 4.35 times larger than RGI's Schedule P 2 year incurred loss development.

- (d) Calculate RGI's 2016 NAIC IRIS Ratio 12.

Commentary on Question:

Part (d) uses the amount calculated in part (c).

RGI only writes Commercial Auto so Part 2D represents the total for all lines. Using Schedule P data, RGI's NAIC IRIS ratio 12 is 6% (2.05/32.5).

- (e) Describe any potential regulatory scrutiny based on the results from parts (c) and (d).

Commentary on Question:

The key here is that there is a large difference in the ratio using before and after pooling data. The model solution is an example of a full credit solution.

15. Continued

RGI's NAIC IRIS ratio 12 is <20% so it is not exceptional. This would not ordinarily initiate any regulatory attention. However, using underlying amounts before pooling transactions, RGI's NAIC IRIS ratio 12 would have been 27% and exceptional. Despite passing IRIS ratio 12, it is highly likely that the results from the underlying amounts before pooling transactions would warrant regulatory scrutiny as the development is very large indicating a potential problem with reserving for RGI's business.

16. 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:

- (2b) Understand and apply the elements of the NAIC RBC formula.

Sources:

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

- Chapter 12 (Solvency Monitoring)

Commentary on Question:

This question tests a candidate's understanding of the elements in the "NAIC RBC formula for informational purposes."

Solution:

Describe the likely change to each risk charge within A1CC's "NAIC RBC formula for informational purposes" from 2015 to 2016 attributable to these transactions.

Commentary on Question:

No calculations were required for this. A full credit response was expected to address each of the elements of the "NAIC RBC formula for informational purposes." It should be noted that for some elements it can be argued in either direction. Credit was awarded for the validity of the argument provided. The model solution is an example of a full credit solution.

R₀: Off-balance-sheet items is zero and remains zero. Investments in insurance company subsidiaries will decrease as A1CC is selling HPGI. R₀ should reduce by the amount of the investment in HPGI RBC R₀ charge.

R₁: Fixed income securities RBC charge (asset risk) should likely increase from the increase in cash from the sale of HPGI less the cost of the MGA acquisitions.

R₂: Equities RBC charge (asset risk) should remain unchanged. Investment in HPGI is not included in this charge, it is in R₀.

R₃: Credit RBC charge (asset risk) may increase even though reinsurance is stable as it will apply to a larger premium base with the new MGA business.

R₄: Reserving RBC charge (underwriting risk) may change as the company reserving factors were on a pooled basis. Furthermore, the charge should grow since A1CC's reserves will increase by 5% with the new MGA business. There may also be excess growth charges from the addition of new MGA business. The total effect on this element cannot be determined exactly without more information on the pooling.

16. Continued

R_{5A}: Adjusted net written premium RBC charge (underwriting risk) will increase as AICC adds the MGA business. There may also be excess growth charges from the addition of new MGA business. The total effect on this element cannot be determined exactly without more information on the pooling.

R₆: Hurricane charge will increase due to the new exposure from the Florida MGA business.

R₇: Earthquake charge will increase due to the new exposure from the California MGA business.

Operational risk, wildfire catastrophes and pollution catastrophes are not included in the “NAIC RBC formula for informational purposes.”

17. 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) Compare different financial reporting standards for general insurers including: U.S. Statutory Account Principles (SAP), U.S. Generally Accepted Accounting Principles (GAAP), Canadian Generally Accepted Accounting Principles (CGAAP), Solvency II and International Financial Reporting Standards (IFRS).
- (1g) Demonstrate knowledge of taxation for general insurers in the U.S.

Sources:

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

- Chapter 5 (Accounting Perspectives for Non-Admitted Assets)
- Chapter 15 (Federal Income Taxes for General Insurers)

Commentary on Question:

This question tests a candidate's knowledge of tax loss carryovers and their treatment in U.S. statutory accounting.

Solution:

- (a) Determine B&D's tax loss carryover from the 2016 taxable operating loss.

Commentary on Question:

The key was to understand that the tax loss carryover involves both a carryback and a carryforward. The model solution is an example of a full credit solution.

Tax loss carrybacks are limited to taxable income in the previous two years (10 million + 8 million). Further operating losses cause a tax loss carry forward. B&D would have a tax loss carryback of 18 million. The remaining 22 million of tax basis operating loss is a tax loss carryforward that can be applied up to 20 years forward.

- (b) Determine the admitted and non-admitted assets created from B&D's 2016 tax loss carryover from part (a) under U.S. statutory accounting in 2017.

Commentary on Question:

The key to this question is understanding that a tax loss carryforward is a non-admitted asset if it is not expected to be used within 12 months. The model solution is an example of a full credit solution.

17. Continued

B&D would receive a refund of 6.3 million (35% of the tax loss carryback of 18 million). This would be an admitted asset of cash during 2017.

The tax loss carryforward would represent an asset of 7.7 million (35% of the tax loss carryforward of 22 million). Under U.S. statutory accounting, this would be accounted for as a non-admitted asset during 2017 because B&D is not expected to use it within 12 months due to the fact that they are likely to incur an operating loss in 2017.

18. 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:

Brehm, P. and Ruhm, D., "Risk Transfer Testing of Reinsurance Contracts"

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 the methods of risk transfer testing and its application for reinsurance accounting.

Solution:

- (a) Define the "10-10" rule.

The rule requires that there be at least a 10% probability of at least a 10% loss, relative to premium.

- (b) Describe a weakness of the "10-10" rule.

The rule is insufficient as it fails low frequency / high severity (i.e., catastrophe) reinsurance contracts that clearly transfer significant insurance risk.

- (c) Demonstrate that a reinsurance contract that passes the "10-10" rule has an expected reinsurer deficit (ERD) of at least 1%.

ERD = pT/P by definition =>

$p \times (T/P) > 10\% \times (10\%)$ in "10-10" rule = 1%:

Where p is probability of a loss and T/P = average severity of net loss divided by the premium.

18. Continued

- (d) Determine whether or not this reinsurance contract meets the requirement of risk transfer based on each of the following:
- (i) the “10-10” rule
 - (ii) ERD with a 1% threshold

Commentary on Question:

There are various ways to display the calculations required for (ii). The model solution is an example of a full credit solution. Note that for (ii), one only needs values from the distribution where there is a reinsurer NPV loss. To save calculation time, one should start at the high end of the distribution, and only calculate the amounts until the reinsurer shows an NPV gain.

- (i) The contract does not pass this test for risk transfer since the 90th percentile is a reinsurer gain.
- (ii) First calculate the net present value (NPV) of the reinsurer loss from the distribution. Amounts in the table are in millions. M = million.

Two-K direct loss	Prob.	Two-K LR	Reinsurance Commission	Sliding scale adj. %	Ceded loss + comm. adj.	NPV Ceded	NPV Gain/(Loss)
22.0	11%	78.6% =22/28	20.0% = Max[20%, 35% - (78.6%-60%)]	0.0% = 20% - 20%	4.40 = 20%×22M + 0%×5.6M	4.231= 4.40/1.04	0.249 = (5.6M-20%×5.6M)-4.231
28.0	7%	100.0%	20.0%	0.0%	5.60 = 20%×28M + 0%×5.6M	5.385= 5.60/1.04	(0.905) = (5.6M-20%×5.6M)-5.385
35.0	1%	125.0% =35/28	20.0%	0.0%	7.00 = 20%×35M + 0%×5.6M	6.731= 7.00/1.04	(2.251) = (5.6M-20%×5.6M)-6.731

In the table above:

Two-K LR = direct loss / direct premium

Reinsurance premium = 5.6M (= 20% of 28M)

Reinsurance commission = 20% + min (15%, max (0, 75% – LR))

Sliding scale adjustment = reinsurance commission – 20%

Ceded loss + commission adjustment = (20% of direct loss) + (sliding scale adjustment × 5.6M)

NPV ceded = (ceded loss + commission adjustment) / 1.04

NPV Gain/(Loss) = (reinsurer premium – minimum commission) – NPV ceded

18. Continued

$p = 8\%$ ($7\% + 1\%$) since reinsurer NPV loss occurs for direct loss of 28M and 35M.

$T = \text{severity of loss} = [(0.905\text{M} \times 7\%) + (2.251\text{M} \times 1\%)] / 8\% = 1.073\text{M}$

$\text{ERD} = pT/P = 8\% \times 1.073\text{M} / 5.6\text{M} = 1.53\%$

Therefore the contract passes this test for risk transfer since $\text{ERD} > 1\%$.

19. 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:

Actuarial Standards Board, Actuarial Standard of Practice

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

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

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

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

IAA, International Standard of Actuarial Practice 1A, Governance of Models

Commentary on Question:

This question tests a candidate’s knowledge of SAO requirements, ASOPs and ISAPs.

Solution:

- (a) Explain whether or not each of the four companies qualified for this exemption from the SAO requirement for 2016.

Commentary on Question:

A full credit response was required to consider the deadline for applying for the exemption in addition to the exemption reason.

- Company A applied before the deadline of Dec. 1 and has a reasonable SAO cost that is greater than 1% of capital. It would get the exemption based on Financial Hardship Exemption.
- Company B is in voluntary rehabilitation. This is not a reason for exemption so they would not get the Exemption for Insurers under Supervision or Conservatorship.
- Company C applied before the deadline of Dec. 1 and has an easily estimable coverage. It would get the exemption based on Exemption for Nature of Business.

19. Continued

- Company D with premium and reserves under 1 million is small enough to qualify for the exemption, but the request is beyond the deadline of Dec., 1 so it would not get the Exemption for Small Companies.
- (b) Describe two other items the Appointed Actuary should consider in making this determination.

Commentary on Question:

There are a number of items that the Appointed Actuary should consider. Only two were required for full credit. The model solution is an example of a full credit response.

- The amount of the reserves covered by another's analyses or opinions in comparison to the total reserves subject to the actuary's opinion.
 - The nature of the exposure and coverage.
- (c) Describe what is to be addressed in an appropriate model risk management framework based on ISAP 1A.

Commentary on Question:

There are several items that are to be addressed. Only two were required for full credit. The model solution is an example of a full credit response.

- Identification of model risks
 - Appropriate actions to mitigate these risks
- (d) Describe the ISAP 1A requirements specific to stochastic models.

Be satisfied that a sufficient number of runs of the model are made, and understand the material differences between different runs of the model.

20. 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:

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

Sources:

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

Commentary on Question:

This question tests a candidate's comprehension of the issues with respect to losses from potential class actions.

Solution:

Assess whether or not this CaliProp suit would meet the prerequisites for a class action.

Commentary on Question:

Widely varying responses are possible for full credit. In order to earn full credit, a candidate's response needed to address the Supreme Court's four prerequisites for a class action. The specific evaluation of each prerequisite in this case is, to a certain extent, a matter of interpretation. Credit was for the cogency of the arguments presented for each prerequisite. The model solution is an example of a full credit solution.

There Supreme Court of the U.S. outlined four prerequisites.

- 1) The class is so numerous that joinder of all members is impracticable;
- 2) there are questions of law or fact common to all the cases;
- 3) the claims or defenses of the representative parties are typical of the claims or defenses of the class; and
- 4) the representative parties will fairly and adequately protect the interests of the class.

The number of managers and unit owners appears to be numerous such that joinder of all members is impracticable.

The questions of law appear to be common as all damage is from the rot was caused by wet soil and failure to properly coat the supporting columns for wet soil. However, the management companies may have some questions of law that differ from unit owners. Also, the law for commercial interests may differ for those from private individuals. Furthermore, damage claimed by the management companies (structure) is different than damage for renters (contents) and individual unit owners (contents and structural).

20. Continued

The claims of the representative parties include both older and newer properties so their claims should be typical of the class. However, the representative parties do not include unit owners so the representative party claims may not be typical of the class.

There is nothing to suggest that the representative parties will not fairly protect the interests of the class. However, since they do not include any unit owners or renters, this could be questioned.

This potential class action may not meet the prerequisites. The question arises from the fact that the representative parties do not include unit owners and renters. If it included unit owners and renters, it would likely have no trouble meeting the prerequisites.

21. Learning Objectives:

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

Learning Outcomes:

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

Sources:

- Insurance Regulation, The Institutes
- Chapter 9 (Insolvency Regulation)

Commentary on Question:

This question tests a candidate's understanding of insolvency regulation.

Solution:

- (a) An insurance regulator may order an insurer in financial difficulty to take a number of actions under the NAIC's Model Hazardous Condition Regulation.

Identify four such actions.

Commentary on Question:

There are many actions that an insurance regulator may order. Only four were required for full credit. The model solution is an example of a full credit response.

- Increase capital and surplus.
 - Suspend or limit dividend payments to stockholders and/or policyholders.
 - Limit or withdraw from specified investments.
 - File reports concerning the value of its assets.
- (b) Describe two guaranty fund coverage limitations under this model act that apply in addition to policy terms.

Commentary on Question:

There are several coverage limitations under the model act. Only two were required for full credit. The model solution is an example of a full credit response.

- Lines covered: Most property-liability policies, if issued by insurers licensed to transact insurance in that state, are covered. Title, credit, mortgage, and ocean marine are almost always excluded, and all reinsurance and surplus lines contracts are excluded.
- Claim deductibles: The model act requires a stated deductible per covered claim over any policy deductibles.

21. Continued

- (c) Identify the source of funding for guaranty association claim payments in states that follow this model act.

Post-insolvency assessments on solvent insurers in the state to fund the claims of the insolvent insurer.

- (d) Identify an alternative source of funding for guaranty association claim payments in states that do not follow this model act.

Commentary on Question:

There are several alternative sources. Only one was required for full credit. The model solution is an example of a full credit response.

Pre-fund a reserve for potential future insolvencies through assessments on all insurers in the state.

22. Learning Objectives:

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

Learning Outcomes:

- (4d) Discuss market conduct regulation.

Sources:

Insurance Bureau of Canada, “Code of Conduct for Insurers’ use of Credit Information (CODE)”

Canadian Council of Insurance Regulators, “Use of Credit Scores by Insurers”

Commentary on Question:

This question tests a candidate’s understanding of the regulatory issues of an insurer’s use of credit-based scores in underwriting and rating insurance policies.

Solution:

- (a) Describe four risks to insurance customers from an insurance company’s use of credit-based scores.

Commentary on Question:

There a number of risks to insurance customers. Only four were required for full credit. The model solution is an example of a full credit response.

- Inadequate consent: Consumers may not know that they have given permission to an insurer to use their credit information or a credit score for determining a consumer’s eligibility for insurance and the premium to be charged.
 - Unreliable credit data: The underlying credit data from which the credit-based insurance score is derived may be unreliable.
 - Availability and affordability of insurance: Insurance may be unavailable or no longer affordable due to credit-based insurance scores charging more for those that can least afford it.
 - Insufficient disclosure: Consumers may not have sufficient information about how to modify their behavior in order reduce insurance costs.
- (b) Explain how two of the risks identified in part (a) can be mitigated by insurance companies.

Commentary on Question:

The response to part (b) was contingent on the risks identified in part (a). The model solution is an example of a full credit solution using the first two risks identified in the model solution for part (a).

22. Continued

- Inadequate consent: Prior to using the information, insurers should ask consumers for their permission. Consumers should know and understand the type of information the insurer is seeking to obtain, including how the insurer intends to use the information.
 - Unreliable credit data: Insurers should use current and accurate credit information and give consumers an opportunity to correct errors.
- (c) Explain how laws and regulations (in the U.S. or Canada) have mitigated some risks to insurance customers from the use of credit-based scores.

Commentary on Question:

There are many laws and regulations that have mitigated the risks from the use of credit scores. It was expected that a full credit response should explain at least two such laws / regulations. The model solution is an example of a full credit response.

- Inadequate consent: Some reporting statutes require that insurers obtain informed consent prior to using the credit information.
- Unreliable credit data: Some reporting statutes impose an obligation on credit reporting agencies to correct errors and notify all persons who have been supplied with an erroneous credit report.