GI FREU Model Solutions
Fall 2016

1. 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"

Commentary on Question:

This question tests a candidate's knowledge of risk transfer testing of reinsurance contracts.

Solution:

(a) Define the risk measure Tail Value-at-Risk (TVaR).

TVaR is the average severity of the worst outcomes beyond a specified percentile.

(b) Describe the main advantage of using the risk measure Risk Coverage Ratio (RCR) over TVaR for risk transfer testing of reinsurance contracts.

The main advantage of RCR is that it uses the economic breakeven point as a cutoff point for risk whereas TVaR uses a selected percentile that may or may not coincide with economic breakeven.

(c) Calculate the corrected RCR for this reinsurance contract.

Commentary on Question:

Note that RCR = E[G]/(pT) where E[G] = expected economic gain across all possibilities, p = probability of net economic loss and T = average severity of net economic loss when it occurs. In the model solution, the corrected amounts use the subscript c.

1. Continued

RCR = 1.45 = E[G]/(pT)
E[G] = 1.45pT

Corrected RCR $\Rightarrow$ RCR_C
$RCR_C = E[G]/(p_c T_c)$
$= 1.45pT/[(p/0.9) \times (T/0.85)]$
$= 1.45 \times 0.9 \times 0.85$
$= 1.10925$

(d) Explain what may be implied by a reinsurance contract with an αRTD of 6,000,000.

Commentary on Question:
In order to obtain full credit for this part, the candidate needed to address the assumption required for α in order for the implication to be valid.

This would imply that any contract with a premium less than or equal to 6,000,000 should pass a test for risk transfer. This assumes that the selected multiple α is appropriate.

2. Learning Objectives:

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

Learning Outcomes:

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

Sources:

Facility Association, "Considerations for Residual Market Regulation"

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

Commentary on Question:

This question tests a candidate's knowledge of residual market mechanisms.

Solution:

(a) Explain why it may be difficult or impossible for some individuals to get the required automobile insurance from private insurers.

Commentary on Question:

There are a number of reasons why it may be difficult or impossible for some individuals to get the required automobile insurance from private insurers. The model solution represents an example of a full credit solution.

- The driver has had numerous claims; or
- The driver's vehicle is deemed unsafe and uninsurable.

(b) Describe the typical operational structure of a JUA.

- In a JUA, a limited number of large insurers are under contract with the government to issue residual market policies.
- Residual market risks are charged residual market premiums set by the JUA.
- The JUA rates are significantly higher than an individual insurer's voluntary market rates.
- The results of the residual market risks are pooled, and the pooled results are distributed among all insurers writing voluntary market risks for that line of business based on their proportion of voluntary market business.

2. Continued

(c) Describe four recommendations from the FAC's paper.

Commentary on Question:
The FAC's paper included seven recommendations. Any four of the seven were acceptable for full credit. The model solution represents an example of a full credit solution.

1. Regulators should monitor the automobile insurance markets to ensure that they continue to be competitive and that the residual market remains appropriately small.
2. Residual market rates should be monitored to ensure that they remain above those in the voluntary market.
3. Residual market rates should be based on all costs incurred to provide insurance coverage, including costs incurred both by the residual market mechanism itself and costs incurred by its members.
4. Non-monetary barriers to entry to residual markets should be eliminated or significantly reduced.

3. 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:

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

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

Sources:

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

- Chapter 7 (Statutory Loss Accounting and Schedule P)
- Chapter 13 (General Insurance Financial Ratings)

2015 NAIC Annual Statement Blanks, Property and Casualty

Commentary on Question:

This question tests a candidate's ability to discuss the type of information required of an insurer with respect to questions arising during an interactive meeting with a rating agency.

Solution:

Propose a response for SMIC management to use that addresses each of the rating analyst's concerns.

Commentary on Question:

The model solution is an example of a full credit solution. Other full credit responses are possible. In order to obtain full credit, the candidate must address all three concerns and convey the message (either implicitly or explicitly) in addressing these concerns that the company must be forthright in its responses. Note that the model solution included here conveys this message implicitly in addressing each of the three concerns.

The following should be noted by management in addressing the concerns of the rating analyst:

- The Schedule P summary was incorrectly calculated in the summary exhibit of the model by summing the individual line exhibits. Short-tailed lines do not show all years so the summation is not correct. The model is not the actual published accounting statements, and the erroneous summary exhibit does not affect any other amounts. The model will be corrected as soon as possible and resubmitted.

3. Continued

- The projected growth rate of 15% is reasonable for 2016 considering that a new inflation guard program was introduced and there was a rate level change. The inflation guard program should increase the exposure base by 10%. The rate level change should increase homeowners' premiums by 6%. Results-to-date for 2016 should support this level of increase and will be submitted as soon as possible. If the results-to-date indicate that the 15% increase is not likely to be achieved, the model will be adjusted and resubmitted.
- There was a change in contract limits for homeowners from replacement cost to 125% of the policy limit. Given the fact that this change appears to have lowered the aggregate exposure, this should allow an increase to the retention without increasing the risk of loss. The effect of this change can be estimated by a catastrophe model. This should be completed soon and will be submitted when available.

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.

Sources:

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

- Chapter 1 (Accounting Systems for General Insurers)
- Chapter 5 (Accounting Perspectives for Non-Admitted Assets)
- Chapter 9 (Measuring Total Income for General Insurers)

Commentary on Question:

This question tests a candidate's understanding of admitting agents' balances under U.S. statutory accounting and the ability to perform an investment income allocation procedure as used in the Insurance Expense Exhibit.

Solution:

(a) Calculate the non-admitted agents' balances as of year-end 2015 under U.S. statutory accounting.

Commentary on Question:

Agents' balances that are at least 90 days past due are non-admitted assets.

Policies with balances at year-end that are at least 90 days past due: A, E, and I. Therefore, the non-admitted agent's balances as of year-end 2015 are
300 + 2,600 + 900 = 3,800

(b) Calculate the investable assets portion of the UEPR for calendar year 2015 based upon the investment income allocation procedure used in the Insurance Expense Exhibit from U.S. statutory accounting.

Commentary on Question:

From the Insurance Expense Exhibit procedure:
Investable Assets Portion of the UEPR
= Mean UEPR × (1 – prepaid expense ratio) – mean admitted agents' balances.
Mean refers to the average value over the year calculated as the average of the value at the beginning of the year and the value at year-end. Note that the subtraction of mean agents' balances in the procedure is for the admitted portion only.

4. Continued

Investable Assets Portion of the UEPR = Mean UEPR × (1 – prepaid expense ratio) – mean admitted agents' balances (AB)

First, calculate the UEPR at year-end 2015:

Policy A:	8/12	×	600	=	400
Policy B:	10/12	×	1,200	=	1,000
Policy C:	9/12	×	4,000	=	3,000
Policy D:	10/12	×	12,600	=	10,500
Policy E:	9/12	×	13,600	=	10,200
Policy F:	5/12	×	12,000	=	5,000
Policy G:	11/12	×	2,400	=	2,200
Policy H:	8/12	×	3,000	=	2,000
Policy I:	3/12	×	2,000	=	500

Total UEPR at year-end 2015 = 34,800

Therefore, Mean UEPR
= (UEPR 2015 + UEPR 2014) / 2 = (34,800 + 25,000) / 2 = 29,900

Next, calculate the admitted AB as of year-end 2015:
Only policies D, F, and H have AB at year-end that are less than 90 days past due and, as such, are admitted.

Policy D: 9,500
Policy F: 900
Policy H: 200

Total admitted AB as of year-end 2015 = 10,600

Therefore, mean admitted AB
= (AB 2015 + AB 2014) / 2 = (10,600 + 2,400) / 2 = 6,500

Investable Assets Portion of the UEPR
= Mean UEPR × (1 – prepaid expense ratio) – mean admitted AB
= 29,900 × (1 – 0.35) – 6,500 = 12,935

5. 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.

(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, Second 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. 9, "Subsequent Events"

Commentary on Question:

This question tests a candidate's knowledge of U.S. statutory accounting and the responsibilities of the appointed actuary in the U.S.

Solution:

(a) Provide two ways that an appointed actuary's independence is preserved when the actuary issues a U.S. Statement of Actuarial Opinion.

Commentary on Question:

There are several ways that preserve the appointed actuary's independence. Only two were required for full credit. The model solution is an example of a full credit solution.

5. Continued

1) The appointed actuary must present a report directly to the Board of Directors.
2) The appointed actuary is subject to discipline by the actuarial societies.

(b) Describe three standards an actuary could consider in determining whether a particular item is material for opinion purposes.

Commentary on Question:
There exist a number of standards an actuary could consider in determining whether a particular item is material for opinion purposes. Only three were required for full credit. The model solution is an example of a full credit solution.

Set the standard based upon
1) A ratio of the item to statutory surplus; or
2) The effect of the item on a key IRIS ratio; or
3) The effect of the item on risk-based capital results.

(c) Compare the guidance from these two documents regarding handling a material data deficiency.

Commentary on Question:
This question asks for a comparison. In order to receive full credit, the candidate must address both standards with respect to a material data deficiency.

Both standards address the situation similarly in that the actuary should investigate the material data deficiency. However, there is a difference when the deficiency is not resolved.

- According to ASOP 36, the actuary should issue a "No Opinion" category opinion if the actuary cannot reach a conclusion due to material data deficiencies.
- ISAP 1 advises the actuary to take one of three options:
  1. Decline to undertake the actuarial services;
  2. Work with the principal to modify the actuarial services or obtain appropriate additional data; or
  3. Perform the actuarial services and disclose the data deficiencies in the report.

5. Continued

(d) ASOP No. 36 and ASOP No. 43 both note that an actuary should disclose the following three dates in an actuarial communication related to reserves:

(i) Accounting Date

(ii) Review Date

(iii) Valuation Date

Define each of these three dates in the context of an actuarial opinion report.

Commentary on Question:
There exist a number of acceptable ways to define the three dates. The model solution is an example of a full credit solution.

(i) Accounting Date
- This is the date used to separate paid vs. unpaid claim amounts in financial reports.

(ii) Review Date
- This is the cutoff date for including information known to the actuary.

(iii) Valuation Date
- This is the date through which transactions are included for the analysis.

(e) Explain how an estimate for the ice storm losses should be reflected in the NAIC Annual Statement for ICE Insurance as of December 31, 2015.

Commentary on Question:
The model solution is an example of a full credit solution.

An estimate for ice storm losses should not be included in the December 31, 2015 loss reserves because the occurrence date is after the accounting date. If the amount of the ice storm loss is material, the loss should be disclosed as a subsequent event in the Notes to the Financial Statements.

6. 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 EU.

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

(2h) Compare different solvency standards.

Sources:

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

- Chapter 12 (Solvency Monitoring)

Vaughan, T., "The Implications of Solvency II for U.S. Insurance Regulation"

Commentary on Question:

This question tests a candidate's understanding of Solvency II and the risks insurers assess for solvency monitoring.

Solution:

(a) Define the Three Pillars of the European Union's Solvency II initiative.

- Pillar 1: Quantitative measurement of capital requirements
- Pillar 2: Governance and risk management requirements of insurers and the standards for effective supervision
- Pillar 3: Supervisory reporting and public disclosure

(b) Assess how regulators in the U.S. address or are planning to address the issues raised by each of the Three Pillars of Solvency II.

Commentary on Question:

There are many possible full credit responses to this question. Achieving full credit relies upon the candidate demonstrating knowledge of each of the three Pillars of Solvency II and how it relates to U.S. regulation. The model solution is an example of a full credit solution.

- Pillar 1: This is currently addressed in the U.S. by regulators through the use of NAIC RBC requirements.
- Pillar 2: This is now being addressed in the U.S. with the emergence of NAIC ORSA and a move to a more principles-based regime.

6. Continued

- Pillar 3: The U.S. already has many public disclosure requirements and supervisory reporting requirements that may be comparable to that of Pillar 3.

(c) Describe one advantage and one disadvantage of internal capital models from the perspective of regulators.

Commentary on Question:
There are a number of advantages and disadvantages from the perspective of regulators. Only one of each was required for full credit. The model solution is an example of a full credit solution.

- Advantage: Once over the hurdle of trust and the learning curve of models, it allows efficient use of regulatory resources.
- Disadvantage: There is a high cost of learning about models that can vary from one company to another.

(d) Describe one advantage and one disadvantage of internal capital models from the perspective of insurance companies.

Commentary on Question:
There are a number of advantages and disadvantages from the perspective of insurance companies. Only one of each was required for full credit. The model solution is an example of a full credit solution.

- Advantage: It provides a customized characterization of the company and its measurement of risks.
- Disadvantage: The financial and human resource costs of setting up a model can be high.

(e) Provide two approaches for including a catastrophe component in a capital model.

- The implicit approach as used in the current NAIC RBC formula in which there is no specific catastrophe component but historical catastrophes are included in the losses that are used to calculate risk charges.
- The explicit approach as used in internal models in which there is a catastrophe component that specifically estimates catastrophic losses.

6. Continued

(f) Describe types of operational risk that insurance companies face.

Commentary on Question:
The model solution is an example of a full credit solution.

Operational risk considers risks from personnel/systems, inadequate internal processes and external factors not considered in other risk charges.

7. 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.

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

Learning Outcomes:

(2e) Understand the development and principles of solvency regulation, including that in the U.S., Canada and the EU.

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

Sources:

Insurance Regulation, The Institutes

- Chapter 11 (Solvency Regulation)

Commentary on Question:

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

Solution:

Assess the changes being considered by the DOI.

Commentary on Question:

There are many acceptable full credit responses for this question. In order to achieve full credit, the candidate response must assess each of the four changes and consider the fact that the DOI wishes to remain NAIC accredited. The model solution is an example of a full credit response.

A: Re-computing the NAIC IRIS ratios as indicated should not violate the terms of NAIC accreditation as long as the revised ratios are only used for informational purposes to identify companies needing further investigation. Companies must still have IRIS ratios calculated using the NAIC formula without revision in order to remain NAIC accredited.

B: An automatic doubling of the NAIC RBC capital requirements for general insurers in the first ten years of operations and for general insurers with under 25 million in premium volume in the state could be viewed as a barrier to entry in the market. This change should likely not be pursued in order to avoid challenges.

C: Restricting reinsurance accounting to reinsurance contracts provided by reinsurers with an A.M. Best Rating of A- or higher should not be pursued. NAIC accreditation would be at risk as this would violate the rules of statutory accounting and would likely violate the NAIC's model act regarding credit for reinsurance.

D: Diversity and liquidity investment requirements for general insurers licensed in the state is a requirement for NAIC accreditation. This change should not be pursued.

8. **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.

(5c) Discuss the issues of tort trends and tort reform as it applies to the general insurance industry.

Sources:

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

Commentary on Question:

This question tests a candidate's understanding of various rules of tort law and reforms enacted to modify them.

Solution:

Describe the following for two of the three tort reforms identified above:

(i) The rule of law prior to reform

(ii) The purpose of the rule of law

(iii) A shortcoming of the rule of law

(iv) A reform that has been enacted that addresses the shortcoming

Commentary on Question:

A full credit response required responding to (i) to (iv) for two of (A) to (C). For (iv), it was acceptable to describe either a type of reform in general terms or a specific reform actually enacted in a state. The model solution is an example of a full credit solution using (A) and (C).

(A) Joint and several liability

- (i) This rule spreads the damages across the remaining defendants when one or more is unable to pay.
- (ii) The purpose of this rule is to allow the plaintiff to be fully compensated even when one of the defendants is unable to pay.
- (iii) This rule can be unfair, particularly if a defendant minimally at fault must bear the entire cost.
- (iv) A reform might exclude it for noneconomic damages, or perhaps limit or exclude it for those less than a certain percentage at fault.

8. Continued

(C) Collateral Source

(i) This rule bars the admissibility of evidence at trial to show that a plaintiff's losses have been compensated from other sources.

(ii) The purpose of the rule is to ensure that at-fault defendants pay the full amount of damages for which they are responsible.

(iii) This rule potentially allows the plaintiff to make a double recovery (e.g., collect payment for the same loss from both the plaintiff's own health insurer and from the at-fault defendant).

(iv) A reform may permit awards to be reduced for collateral source payments within certain parameters (such as limiting the reduction to 50% of the full award).

9. **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 6 (Insurer Formation, Licensing and Marketing Regulation)

Commentary on Question:

This question tests a candidate's knowledge of insurer licensing in the United States.

Solution:

(a) Describe the location requirements for an insurer to be licensed as a domestic insurer in a state.

- The insurer retains books and records in the state.
- The insurer maintains an office in the state.

(b) Describe the difference between foreign insurers and alien insurers as defined by insurer licensing regulation in the United States.

- A foreign insurer is an insurer licensed to operate in a state but incorporated in another state.
- An alien insurer is an insurer licensed to operate in a state but incorporated in another country.

(c) Identify two state licensing requirements that apply specifically to alien insurers.

Commentary on Question:

There are several state licensing requirements that apply specifically to alien insurers. Only two were required for full credit. The model solution is an example of a full credit response.

- Evidence of the appointment of a U.S. manager that has authority in the U.S.
- Certificate of funds on deposit in the U.S. for a substantial amount

10. 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.

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

Sources:

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

- Chapter 7 (Statutory Loss Accounting and Schedule P)
- Chapter 8 (Notes to Financial Statements)

Commentary on Question:

This question tests a candidate's understanding of the effect of structured settlements on financial reporting with respect to Schedule P and the Notes to Financial Statements.

Solution:

(a) Explain how annuity-funded structured settlement payments to claimants affect Schedule P loss development patterns.

Commentary on Question:

The model solution is an example of a full credit solution. Other full credit responses are possible. In order to obtain full credit, the candidate must address the effect on both paid and incurred development.

- The annuity purchase represents a lump sum loss payment with a reduction in loss reserves in which the reduction in loss reserves is greater than the lump sum payment because the reserves are an undiscounted amount and the payment for the annuity is based on a discounted value.
- This would show as negative incurred loss development.
- This would show as a spike in paid loss development earlier than expected by the normal payment stream in the absence of a structured settlement.

(b) Construct MRH's required disclosures for Note 27 in the Notes to Financial Statements of its Annual Statement as of Dec. 31, 2015.

10. Continued

Commentary on Question:
The model solution is an example of a full credit solution. Other full credit responses are possible. In order to obtain full credit, the candidate must construct both disclosures from Note 27.

- *Disclosure Note 27(A) shows the total amount of reserves for all structured settlements with the claimant as the payee and shows the amount for which it is contingently liable (i.e., no release obtained).*
- *Disclosure Note 27(B) shows the amounts for annuities purchased from life insurance companies if the total amount, by life insurer, is greater than 1% of policyholders' surplus (PHS). This only includes annuities where the clamant is the payee where the company has not obtained a release of liability.*

The Note 27(A) disclosure requires the total amount of reserves at the valuation date for all structured settlements with the claimant as the payee and shows the amount for which it is contingently liable.

- Therefore we need the total reserves for (2), (4), (5), (6), (7) and (9).
  - $0.4 + 0.35 + 0.55 + 0.3 + 0.65 + 0.8 = 3.05$
- The contingently liable amount is the total amount of reserves less the amounts for which it obtains a release of liability (rated A- or higher).
  - Release obtained for (2), (4) and (9) $\Rightarrow 0.4 + 0.35 + 0.8 = 1.55$
  - Loss contingency of $3.05 - 1.55 = 1.50$

The Note 27(B) disclosure applies only to annuities where the clamant is the payee and the company has not obtained a release of liability. As such it can only apply to QT and YY as they are rated below A-. YY has only 0.65 million payable to the claimant which is < 1% of PHS (0.75 million) so there is no Note 27(B) disclosure. QT has 0.85 million payable to the claimant (0.55 + 0.3) which is > 1% PHS so it requires disclosure under Note 27(B).

Disclosure A:

Loss reserves eliminated by annuities in the amount of 3.05 million for which there are unrecorded loss contingencies in the amount of 1.5 million.

Disclosure B:

Life Insurance Co.	Licensed in Company's State of Domicile	Statement Value at 12/31/2015
QT Life Insurance Co.	NO	0.85 million

11. 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.

(5c) Discuss the issues of tort trends and tort reform as it applies to 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 tort law as it pertains to tort data and trends from the data that may be used to price liability insurance.

Solution:

Assess the applicability of the data indicated above for use in projecting insurance costs for the products liability policies under consideration in Newlandia. Your assessment should address four issues.

Commentary on Question:

There are a number of approaches that can be taken to achieve full credit for this question. To achieve full credit the response must address four distinct issues regarding the data as described. The model solution represents an example of a full credit solution.

- Direct tort costs (A) may not be a good proxy for insured liability since some tort costs are excluded through policy provisions, covered by self-insured retentions, or above policy limits.
- Newlandia tort costs to GDP [using (A) divided by (B)] may be considered, but one should recognize the limitations for (A) as well as the fact that the aggregate data in (A) includes low severity/high frequency torts (such as auto liability) that are likely not applicable to higher stakes torts from products liability.
- Bodily injury produces a significant component of the costs for liability insurance. Consumer inflation data (C) is not appropriate as it does not appropriately weight the medical costs of bodily injury liability compensation. Instead, one should look at medical cost inflation data for Newlandia.
- U.S. tort liability costs as a percentage of GDP (E) are the highest in the world and would not likely be applicable to Newlandia.

12. 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 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.

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)

NAIC Accounting Practices and Procedures Manual, Preamble

NAIC Statement of Statutory Accounting Principles

- No. 55, "Unpaid Claims, Loss and Loss Adjustment Expenses"

Commentary on Question:

This question tests a candidate's understanding of the accounting for loss adjustment expenses and the effects of using a third party administrator. The question also tests a candidate's ability to distinguish U.S. statutory accounting for the insurer and GAAP accounting for the non-insurer third party administrator.

Solution:

(a) Explain how the prepaid loss adjustment expense fee of 10,000,000 would be accounted for by:

(i) CHN in its 2015 financial statements; and

(ii) PGI in its 2015 statutory annual statement.

12. Continued

Commentary on Question:
For part (i), one needs to recognize that CHN is not an insurer. Its financial statements are in accordance with GAAP. There are a number of ways that CHN may report this amount under GAAP. The model solution provides one example of a full credit solution for (i). For part (ii), the statutory annual statement must follow the rules of U.S. statutory accounting. The model solution shows a full credit explanation for part (ii).

(i) On Jan. 1, 2015, the 10,000,000 is recognized as a liability on the balance sheet for services not yet provided. Cash assets on the balance sheet increase by 10,000,000.

(ii) On Jan. 1, 2015, cash assets on PGI's balance sheet would be reduced by 10,000,000 and a non-admitted asset would be established for prepaid LAE in the amount of 10,000,000. This would be reduced over time based on the incurred pattern for automobile bodily injury LAE from accident year 2015.

(b) Explain how the paid LAE and estimated unpaid LAE for this claim would be accounted for by:

(i) CHN in its 2015 financial statements; and

(ii) PGI in its 2015 statutory annual statement.

Commentary on Question:
For part (ii), even though PGI is not liable for the unpaid LAE, statutory accounting (SSAP 55) requires that a liability for unpaid LAE shall be established regardless of any payments made to third party administrators.

(i) As of Dec. 31, 2015, the unpaid LAE of 250,000 is a balance sheet liability for CHN. CHN records an expense incurred in the income statement in the amount of 325,000 which includes the 75,000 payment and the 250,000 estimated unpaid amount. Cash assets on CHN's balance sheet are reduced by 75,000 for the payment.

(ii) The 250,000 should be included as unpaid LAE on the liability side of PGI's balance sheet. The non-admitted asset for prepaid LAE should be reduced by the 75,000. PGI's statutory income statement shows incurred LAE of 325,000 for this claim including both the 75,000 payment by CHN and the 250,000 unpaid amount to be paid by CHN.

13. 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.

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

Sources:

Insurance Regulation, The Institutes

- Chapter 12 (Insolvency Regulation)

Commentary on Question:

This question tests a candidate's knowledge of guaranty plans and the effect of changes to them.

Solution:

Assess the changes to the guaranty plan being considered by the state.

Commentary on Question:

Widely varying responses are possible for full credit. A full credit response was required to assess all four changes by noting the effect of the change and whether or not the change should be pursued by the state. The model solution is an example of a full credit response.

- Change A: Large commercial policyholders should be knowledgeable in financial transactions. Personal lines policyholders are generally not knowledgeable in these matters and need protection. Extension of the plan beyond personal lines should be carefully considered as it would add significant costs to the plan in order to protect policyholders that may not require this protection. This change would not affect NAIC accreditation.
- Change B: Both of the coverage modifications proposed would add significant costs to the plan and eliminate all risk of insolvency from the covered policyholders. Policyholders should bear at least part of the cost of insolvency. The NAIC Model Act requires a stated deductible over any policy deductibles. This change should not be pursued as it would increase costs and risk NAIC accreditation.
- Change C: Including a buildup of a pre-insolvency assessment fund could be a good idea especially if these assessments are risk-based. The plan must be designed carefully to consider how to deal with companies that enter the market and exit the market. This change would not affect NAIC accreditation.

13. Continued

- Change D: This change would likely be challenged by some insurers as a barrier to entry in the market. The parameters proposed would likely be seen as arbitrary by the courts. This change may not affect NAIC accreditation but should be studied carefully before it is pursued.

14. 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:

(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, Second 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"

Commentary on Question:

This questions tests a candidate's understanding of the responsibilities of the actuary with respect to the Statement of Actuarial Opinion.

Solution:

(a) State the type of opinion you would issue for EZ Insurance.

- Deficient opinion (or Inadequate opinion)

(b) Draft part C of the Opinion section, relating to reserve adequacy, for inclusion in the Statement of Actuarial Opinion for EZ Insurance.

Commentary on Question:

Part C notes the type of opinion. Since this is a deficient opinion, part C must include the amount of deficiency from the minimum amount within the range of reasonable estimates.

Make an inadequate provision for the unpaid loss and loss adjustment expense obligations but a reasonable provision on a gross of reinsurance basis. The provision for unpaid loss and loss adjustment expenses is $X less than the minimum amount I consider necessary to be within the range of reasonable estimates.

(c) Describe three ways to analyze the collectibility of reinsurance recoverables.

Commentary on Question:

There are a number of ways to analyze the collectibility of reinsurance recoverables. Only three were required for full credit. The model solution is an example of a full credit solution.

14. Continued

- Review past collectibility data;
- Speak with relevant company officers about collectibility problems; and
- Check financial strength ratings of reinsurers.

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:

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

(2e) Understand the development and principles of solvency regulation, including that in the U.S., Canada and the E.U.

Sources:

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

- Chapter 12 (Solvency Monitoring)

Commentary on Question:

This question tests a candidate's understanding of the use of implicit risk margins in U.S. statutory accounting.

Solution:

Describe an implicit risk margin used in U.S. statutory accounting for each of the following risk types:

(i) Reserving

(ii) Written premium

(iii) Credit

(iv) Asset

15. Continued

(i) The use of undiscounted loss reserves for most lines of business. The amount of the discount for these reserves is the implicit margin.

(ii) The use of unearned premiums as a liability reserve. The pre-paid acquisition cost (gross unearned premiums less unpaid losses) is the implicit margin.

(iii) The Schedule F provision for reinsurance creates an implicit margin for the risk of reinsurance uncollectibility.

(iv) Booking real estate at depreciated value when it is lower than market value. The difference is an implicit margin.

16. 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 polices for financial reporting.

Sources:

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

Commentary on Question:

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

Solution:

Calculate the total premium asset on retrospectively rated policies as of December 31, 2015 arising from policy years 2011 to 2014.

Amounts are in thousands.

First, calculate the Cumulative PDLD Ratios:

$CPDLD_1 = (1.75 \times 60\% + 0.75 \times 25\% + 0.45 \times 10\% + 0.35 \times 5\%) / (60\% + 25\% + 10\% + 5\%) = 1.3$

$CPDLD_2 = (0.75 \times 25\% + 0.45 \times 10\% + 0.35 \times 5\%) / (25\% + 10\% + 5\%) = 0.625$

$CPDLD_3 = (0.45 \times 10\% + 0.35 \times 5\%) / (10\% + 5\%) = 0.417$

$CPDLD_4 = (0.35 \times 5\%) / (5\%) = 0.35$

Second, calculate the Expected Future Premium:

Expected Future Premium = Σ_{PY} Expected future loss emergence × CPDLD
$= 1.3 \times 280 + 0.625 \times 50 + 0.417 \times 20 + 0.35 \times 15 = 408.8$

Third, calculate the Expected Total Premium:

Expected Total Premium = Premium booked from prior adjustment + Expected Future Premium = (455 + 335 + 325 + 0) + 408.8 = 1,523.8

16. Continued

Finally, calculate the Premium Asset:

Premium Asset = Expected Total Premium – Current Premium Booked
= 1,523.8 – (460 + 340 + 330 + 320) = 73.8

17. 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.

(4d) Discuss market conduct regulation.

Sources:

Insurance Regulation, The Institutes

- Chapter 7 (Underwriting Regulation)

Edmonds, T., "Insurance and the discrimination laws: motor and travel insurance"

Commentary on Question:

This question tests a candidate's knowledge of several concepts regarding underwriting regulation and the issue of using gender as an insurance rating factor.

Solution:

(a) Compare fair and unfair discrimination with respect to insurance rating.

- Fair discrimination takes place when insurers in their underwriting decisions take into account characteristics of an applicant that are expected to affect claim costs and are allowed by law. Fair discrimination is not only permitted but necessary for insurance ratemaking and underwriting.
- Unfair discrimination would be to take into account characteristics of an applicant that are prohibited by law or have no relation to costs incurred by the policy.

(b) Compare the terms actuarial equity and social equity with respect to insurance rating.

- The concept of actuarial equity is founded in cost-based pricing; that is insurance rating that attempts to identify and factor in every variable that has a significant effect in quantifying differences between otherwise identical risks.
- The concept of social equity in insurance rating is that all consumers have equal access to insurance at affordable rates. Insurance regulators must balance insurers' desire for actuarial equity with the need for social equity.
- To help achieve social equity, legislators and the public have identified unacceptable variables for rating and underwriting even if loss experience differs based on these variables.

17. Continued

(c) Provide the reasoning behind this assertion.

According to some insurers:

- Banning gender would result in less accurate pricing because gender is correlated with loss experience. This would expose insurers to greater risk since they would be unable to price accurately.
- The increased risk would mean that insurers would have to hold more capital and the extra costs associated with this would have to be passed on to all consumers (both men and women) in higher insurance premiums or reduced benefits.

18. 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:

General Insurance Financial Reporting Topics, Second 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

Commentary on Question:

This question tests a candidate's understanding of details with respect to the SAO.

Solution:

Write a memo to Avery outlining:

(i) changes to the draft SAO that you believe are indicated; and

(ii) actions that should be completed by JKL relating to the environmental liability loss that was omitted.

Commentary on Question:

There are a number of changes indicated for (i) and actions that should be completed for (ii). Widely varying full credit responses are possible. However, a full credit solution should include the materiality standard, relevant comments for the SAO and the environmental liability loss for (i) and revision of the annual statement for (ii). The model solution is an example of a full credit solution. It does not address all issues that could be addressed.

18. Continued

(i) Changes to the draft SAO:

- For 2013 and 2014 the materiality standard at 10% of statutory surplus was 4 million and 3.8 million respectively. Using this basis of selection for 2015 would yield a materiality standard of 3 million. Using a basis of selection at 5% of net recorded loss and LAE reserves yields a materiality standard of 8.5 million. This selection represents 28.3% of statutory surplus and 32.7% of the ACL. This is much too high for a materiality standard. It needs to be lowered closer to the standard used in the past. It is recommended that the materiality standard in the SAO be changed so that it continues to be set at 10% of statutory surplus so the materiality standard is 3 million for 2015.
- The environmental liability loss should be considered to be material at 10% of statutory surplus. The actuarial estimate, Actuarial Report, and SAO must be revised to include this claim and any IBNR estimated for it using an appropriate methodology.
- According to the NAIC SAO Instructions, the SAO must provide Relevant Comment paragraphs to address the following topics: Risk of Material Adverse Deviation, Other Disclosures in Exhibit B, Reinsurance, IRIS Ratios, Methods and Assumptions. The SAO must be revised to include these relevant comments paragraphs. Note that "Other Disclosures in Exhibit B" includes asbestos and environmental liabilities which is relevant to JKL and must be addressed.
- While the "Determination of Reasonable Provision" opinion appears to be correct, this could change depending on the level of IBNR for the environmental claim and whether or not JKL revises its Annual Statement to record the proper reserves for this claim. This could also be in question if it is likely that a material amount of the reinsurance recoverables are uncollectible.

(ii) Actions to be completed by JKL regarding the environmental liability loss:

- JKL must revise the Annual Statement to include the environmental liability claim plus any IBNR estimated for it.
- JKL should provide you with an explanation as to why the environmental liability claim was omitted from both the Annual Statement and the data provided to you. It must also provide a complete description of the claim and the exposures for the claim.

19. 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:

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

Sources:

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

- Chapter 11 (Measuring Insurer Financial Strength)

Commentary on Question:

This question tests a candidate's understanding of financial health ratios.

Solution:

(a) Identify four desirable characteristics of a set of financial ratios that are used to predict insolvency, bankruptcy or profitability.

Commentary on Question:

There are a number of desirable characteristics for a set of financial ratios. Only four were required for full credit. The model solution is an example of a full credit solution.

- orthogonal to each other
- disaggregated
- complete
- not easily manipulated

(b) Describe the three key variables used in liquidity ratios.

- Current assets – Defined several ways, cash ratios use cash and marketable securities, quick ratios also include accounts receivable, and current ratios also include accounts receivable plus current inventories that will convert to cash in the current year.
- Current liabilities – payments over the coming year (or business cycle if longer) including business accounts, debt coupons, maturing debt principal and claims.
- Time horizon – typically one year for general insurance business, but might extend to the length of the business cycle.

19. Continued

(c) Provide the following with respect to A.M. Best's quick ratio:

(i) Definition of the ratio

(ii) Shortcoming of the ratio

(i) A.M. Best quick ratio is investment income for the coming year divided by all policyholder reserves.

(ii) Shortcoming is that cash outflows for all years can sometimes be of long duration and should be funded by long-term assets.

(d) Calculate the maximum surplus relief as a percentage of surplus for this insurer from the proportional reinsurance agreement being considered.

Maximum surplus relief
= (ceding commission %) × (proportional reinsurance %) × (unearned %) × (premium to surplus ratio)
= 30% × 20% × 50% × 2
= 6% of surplus.

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 understanding of the issues regarding asbestos mass torts in the United States.

Solution:

(a) Explain why the workers' lawsuits were permitted to proceed.

- A California State Supreme Court decision expanded the ability for employees to sue employers in addition to collecting workers compensation when an employer aggravates an existing condition that it is already aware of.
- This decision was from a case that involved an asbestos manufacturer that performed chest screenings on employees but did not inform its employees if the screenings indicated potential asbestos related disease.
- This decision opened the door for more of these suits against employers since there was evidence that firms that used asbestos knew of the dangers of asbestos but did not act on this information to protect their workers.

(b) Describe the court interpretation of insurance policies that essentially exposed insurers to unlimited liability for asbestos claims.

- Coverage for asbestos claims was handled through product liability coverage that includes a set aggregate policy limit.
- Courts then ruled that asbestos claims were covered under premises and operations liability coverage.
- Premises and operations liability coverage has occurrence limits but no aggregate policy limit essentially exposing insurers to unlimited liability on the policy.

(c) Describe two reasons for the surge in new asbestos cases.

Commentary on Question:

There are several reasons for the surge in new asbestos cases. Only two reasons were required for full credit. The model solution is an example of a full credit solution.

20. Continued

- Actions were now allowed for cases where disease had not manifested.
- There was a push to get cases filed because many defendants were filing for bankruptcy.

(d) Identify two factors that caused a significant drop in the number of new asbestos cases from the high levels experienced in the period from 2001 to 2005.

- Tort reforms enacted by state legislation restricted liability suits or awards (e.g., venue reform, noneconomic damages reform, joint and several liability reform).
- Courts were actively investigating fraud in newer asbestos cases (related to a court decision to dismiss thousands of manufactured claims for silicosis).

(e) Assess the contribution of the following three factors to the different level of liability costs:

(i) Exposure

(ii) Regulation

(iii) Rules of tort law

(i) The use of asbestos was actually higher in the UK. This was not the reason the UK experienced lower costs than the US.

(ii) Regulation of asbestos use was generally not more effective in the UK than in the US in restricting the use of asbestos. However, the UK workers compensation system did begin providing compensation to employees harmed by asbestos earlier with fewer restrictions than in the United States. This was not the main reason the UK experienced lower costs than the United States.

(iii) The main reason the UK experienced lower costs than the United States was the different rules of tort law that restricted the number of cases. In the UK tort system contingency fees are not permitted, unsuccessful parties must pay legal costs of the successful party and there are more strict rules of discovery. Furthermore, the UK tort system limits the level of awards by using trial by judge not jury and prohibiting punitive damages awards.

21. 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 Account Principles (SAP), U.S. Generally Accepted Accounting Principles (GAAP), Canadian Generally Accepted Accounting Principles (CGAAP), Solvency II and International Financial Reporting Standards (IFRS).

(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:

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

- Chapter 1 (Accounting Systems for General Insurers)
- Chapter 2 (Accounting for Insurance Contracts)
- Chapter 7 (Statutory Loss Accounting and Schedule P)
- Chapter 8 (Notes to Financial Statements)
- Chapter 12 (Solvency Monitoring)
- Chapter 14 (Overview of the General Insurance Statement of Actuarial Opinion)
- Chapter 15 (Federal Income Taxes for General Insurers)

Commentary on Question:

This question tests a candidate's understanding of insurance accounting and discounting under different accounting standards.

Solution:

Describe the four elements for discounting loss reserves, as noted above, for each of the following accounting standards:

(i) Canadian accounting as used in the Canadian Annual Return;

(ii) U.S. IRS tax accounting; and

(iii) U.S. statutory accounting principles.

21. Continued

1. Types of business
   (i) All lines of business.
   (ii) All lines of business.
   (iii) Only lines where it is permitted for tabular (WC indemnity for wage replacement on pension or long-term disability claims) and non-tabular (sometimes medical malpractice when permitted by a state's statutory accounting).

2. Discount rate
   (i) Based on insurer's investment yield, updated annually.
   (ii) Prescribed by the Secretary of the Treasury as the Treasury mid-term market rate based on a 60-month moving average that is not updated for the accident year as claims mature.
   (iii) For non-tabular discounting, the NAIC prescribes the maximum permitted rate; limited by the lower of Treasury security yields with matched duration and the insurer's own investment yields less 1.5 percentage points. For tabular discounting, the discount rate is set by statute.

3. Payment pattern
   (i) Uses aggregate payment patterns by line of business developed from paid loss triangles and ultimate amounts.
   (ii) Selected by line from industry Annual Statement Schedule P Part 1 paid to incurred ratios by accident year, although the company may elect to compute this using its own Annual Statement data.
   (iii) Tabular payment patterns are based upon mortality/morbidity in the tables selected. Non-tabular payment patterns use aggregate payment patterns for the line of business developed from paid loss triangles and ultimate amounts.

4. Risk margins
   (i) Three provisions for adverse deviation are added to the discounted amount for the discount rate, loss development and reinsurance recoverables.
   (ii) No risk margin is added.
   (iii) There is no specific margin for tabular discounting unless the statutory discount rate is set conservatively to work as a margin. For non-tabular discounting, the margin is from the limit on the discount rate which works as a margin.

22. 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 the reasons for government involvement in the provision of insurance and understanding of how social insurance programs differ from private insurance.

Solution:

(a) Provide four public policy reasons for the government provision of insurance.

- Residual market needs: government provides insurance for risks deemed uninsurable in competitive market.
- Compulsory insurance: for certain risks, governments require purchase of insurance protection.
- Efficiency and convenience: government insurer, as monopolistic entity, should have marketing and sales expenses considerably less than for private insurers in competitive market.
- Collateral social purpose: it may be against societal goals to not have insurance for certain risks so government can establish insurance programs such that they include benefits to society as a whole.

(b) Describe four features that differentiate social insurance programs from private insurance.

Commentary on Question:

There are a number of features that differentiate social insurance programs from private insurance. Only four were required for full credit. The model solution is an example of a full credit solution.

- Administered or closely supervised by government
- Program defined by statute
- Mandatory or minimum level of participation (required for a substantial portion of population)
- Funded by premiums or taxes paid by participants (or paid on their behalf)