GI FREU Model Solutions
Spring 2020

1. 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.

Sources:

NAIC Statement of Statutory Accounting Principles,

- No. 9, "Subsequent Events"
- No. 63, "Underwriting Pools and Associations Including Intercompany Pools"

Commentary on Question:

This question tests a candidate's understanding of SSAPs 9 and 63.

Solution:

(a) Provide one example each of a Type I and a Type II material subsequent event as defined in SSAP No. 9, *Subsequent Events*.

Commentary on Question:

Any reasonable example of an event was acceptable for full credit as long as it indicated the following:

- *For the Type I event—the event took place before the balance sheet date and the amount is recognized after the balance sheet date, but before financial statements are issued.*
- *For the Type II event—the event took place after the balance sheet date but before financial statements are issued.*

An example of a full credit solution is provided in the model solution.

Type I: Litigation settlement amount if the events that gave rise to the litigation took place before the balance sheet date, with settlement after the balance sheet date, but before the financial statements are issued.

Type II: Litigation settlement when the event giving rise to the claim took place after the balance sheet date, but before the financial statements are issued.

1. Continued

(b) Compare the treatment in statutory statements for a Type I versus a Type II material subsequent event.

Type I: They must be recognized in the financial statements. The nature and the amount of the adjustment should be disclosed in the notes to the financial statement, but only if necessary to keep the financial statements from being misleading.

Type II: They are not recorded in the financial statements. However, the nature and the estimate of the financial effect of the event must be disclosed in the notes to the financial statements.

(c) Explain why the reinsurance arrangement described above does, or does not, meet the definition of an intercompany pooling arrangement under SSAP No. 63, *Underwriting Pools*.

Commentary on Question:
SSAP No. 63 notes that all of the pooled business must be ceded for it to be recognized as intercompany pooling reinsurance. This does not mean that 100% of an insurer's business must be ceded to the pool. For example, intercompany pooling reinsurance can involve only one line of business for some insurance groups. While a situation as described in the question is not typical, it is feasible. Partial credit was granted for interpreting "all of the pooled business must be ceded for it to be recognized as intercompany pooling reinsurance" as meaning that "100% of an insurer's business must be ceded to the pool."

This arrangement does meet the definition of an intercompany pooling arrangement because it has the following features:

- All the pooled business is reinsured under a quota share to the lead entity.
- The lead entity is retroceding the pooled business back to the pool participants in accordance with their stipulated shares.

(d) Describe which party or parties are directly liable to the claimant if Subsidiary Z incurs a large claim.

Commentary on Question:
Insurance Company A and Insurance Subsidiary X are liable as reinsurers. They are not directly liable for Insurance Subsidiary Z's incurred claims.

Company Z is directly liable.

2. 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:

NAIC Statement of Statutory Accounting Principles,

- No. 36, "Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves"
- No. 38, "Using Models Outside the Actuary's Area of Expertise (Property/Casualty)"

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, Fourth Edition, Society of Actuaries

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

Commentary on Question:

This question tests a candidate's understanding of the responsibilities of the appointed actuary when making use of the work of others.

Solution:

(a) Identify one advantage and one disadvantage for the appointment of an internal actuary.

Commentary on Question:

There are several advantages and disadvantages. Only one of each was required for full credit. The model solution is an example of a full credit solution.

- Advantage: Internal actuary has greater knowledge of company details.
- Disadvantage: Internal actuary may be overly influenced by company management.

(b) Identify one advantage and one disadvantage for the appointment of an external actuary.

Commentary on Question:

There are several advantages and disadvantages. Only one of each was required for full credit. The model solution is an example of a full credit solution.

2. Continued

- Advantage: External actuary has greater independence from compnay management.
- Disadvantage: External actuary may be overly influenced to please a client to protect an income stream.

(c) Compare the SAO disclosure requirements for the AA under the following two scenarios:

(i) The AA made use of the work of a non-actuary who reports to the AA.

(ii) The AA made use of the work of a non-actuary who does not report to the AA.

Commentary on Question:
For part (ii), there are a number of disclosure requirements. Not all were required for full credit. The model solution is an example of a full credit solution. Refer to ASOP 36 for a full list of the disclosure requirements.

(i) There are no specific disclosure requirements if the person reports to the AA, because the work is under the control of the AA.

(ii) AA disclosure requirements include the following:

- Name and affiliation of the person that produced the work.
- A description of the type of analysis.
- Whether or not the AA reviewed this work, and, if so, the extent of the review.

(d) Identify four actions an actuary must take according to ASOP No. 38.

Commentary on Question:
There are more than four actions included in ASOP 38. Only four were required for full credit. The model solution is an example of a full credit solution

- Determine the appropriate reliance on such expert models.
- Have a basic understanding of the model
- Evaluate if the model is appropriate for the intended application.
- Determine whether or not appropriate validation of the model has occurred.

3. 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 2 (Tort Law)

Commentary on Question:

This question tests a candidate's understanding of strict liability under tort law and its applications.

Solution:

(a) Explain what is meant by the application of *strict liability* in a tort case.

Strict liability applies when there is a breach of an absolute duty of safety. Proof of either negligence or an intent to harm is not required under strict liability.

(b) Assess the potential for the application of *strict liability* for each of the following cases:

(i) ABC Toys manufactures a popular line of stuffed bears with moveable limbs. The limbs of these toys employ the use of thin metal parts. Failure of these parts may cause sharp pieces to break off. This occurred after a small child was chewing on the stuffed bear's arm and one of the sharp pieces caused serious injury to the child. The parents of the child are suing ABC Toys for damages.

(ii) The Clark family stores large quantities of chemicals to clean their pool. They have taken reasonable care to ensure the chemicals are stored safely. A lightning strike caused the storage container for these chemicals to fail. The chemicals spilled into the property of their neighbor, the Griswald family. The Griswald family sues the Clark family for damages to their property.

(iii) The Alpha family has a small dog which escaped from their yard by digging under the fence. The dog went over to the Beta family's property and chewed all four tires on their vehicle. This was the first time the dog had done anything like this. The Beta family sues the Alpha family for damages.

3. Continued

(iv) Beeline Accounting prepares the financial statements for a small business, Baubles, that sells handmade jewelry. A significant error was made in the financial statements which caused Baubles to pay a large tax penalty. Baubles sues Beeline for damages.

Commentary on Question:
There are many correct ways to respond to these four cases, given the information provided, and receive full credit. For each case, there is a particular element that is important to the assessment that should be addressed. The element that should be addressed for each of the cases is as follows:

(i) Product liability
(ii) Release of toxic substance
(iii) Actions of a domestic animal
(iv) Services provided

The model solution is an example of a full credit solution

(i) This case involves product liability. The product has a defect that makes it unreasonably dangerous, the defect was responsible for injury and the product was not modified by the consumer. Strict liability is likely to be successfully applied in this case.

(ii) This case involves escape of a toxic substance. Strict liability can be applied in these types of cases.

(iii) This case involves the actions of a domestic animal. Generally speaking, strict liability applies for damage from domestic animals. However, this does not usually apply to cats and dogs unless there is a history of the animal being a problem. It is not likely that strict liability would apply in this case.

(iv) This case involves a service. Strict liability does not apply to services. Baubles must prove negligence.

4. Learning Objectives:

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

Learning Outcomes:

(4e) Describe the development of general insurance programs controlled by government or collective insurance industry organizations and their mechanisms of operation.

Sources:

Cappelletti, A., "Government Provision of General Insurance," Society of Actuaries Study Note

Commentary on Question:

This question tests a candidate's knowledge of the government involvement in the provision of earthquake insurance in California.

Solution:

(a) Provide two reasons why standard actuarial ratemaking methodologies should not be used to price earthquake insurance.

Commentary on Question:

There are several different reasons why standard actuarial ratemaking methodologies should not be used. Only two were required for full credit. The model solution is an example of a full credit response.

- Standard ratemaking methodologies rely on historical claim costs. However, the claim cost experience for many years may be zero, due to not having had a major earthquake for many years.
- There exists an extreme dependency on reinsurers to accept most of the risk resulting from the sale of earthquake insurance policies. Standard ratemaking methodologies do not take extreme dependency on reinsurers into account.

(b) Identify two actions taken by insurance companies in California that led to this difficulty for customers.

Commentary on Question:

There were several different actions taken. Only two were required for full credit. The model solution is an example of a full credit response.

- They ceased writing new residential property policies in the state to limit exposure.
- They increased rates significantly.

4. Continued

(c) Describe the CEA's stated mission.

To ensure the continued availability and affordability of residential insurance.

(d) Explain why California legislators believed that the CEA would succeed in fulfilling its stated mission.

Commentary on Question:
There are many reasons why California legislators believed that the CEA would succeed. A full credit solution was required to include at least two distinct reasons. The model solution is an example of a full credit response that includes two distinct reasons.

- The CEA, because of its size, had the ability to secure reinsurer participation at more reasonable terms than those available to individual private insurers.
- The CEA had access to alternative sources of funding like requiring participating insurers to pay assessments following the occurrence of an earthquake. Individual private insurers writing earthquake insurance in California would not be able to access these alternative sources of funding.

(e) Describe two other activities that the CEA has engaged in other than those pertaining to the stated mission.

Commentary on Question:
There were several different activities that the CEA engaged in. Only two were required for full credit. The model solution is an example of a full credit response.

- Educate the public about earthquake safety and risk mitigation.
- Work with a number of organizations to make Californians better prepared for the next big earthquake.

(f) Provide the allocation of claim payments by source of CEA funds for such an earthquake event.

- $6 billion from CEA capital
- $9 billion from reinsurance and revenue bonds
- $1 billion from assessments on participating insurers

5. 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.

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

Sources:

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

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

NAIC Annual Statement

Commentary on Question:

This question tests a candidate's understanding of Schedule F in the NAIC Annual Statement.

Solution:

(a) Determine the *Restated (Gross of Ceded)* amount for Mando's 2018 Schedule F − Part 6, line 6, column 3 (*Net amount recoverable from reinsurers*).

Commentary on Question:

Candidates needed to show their work to obtain full credit.

Part 6, line 6, column (Col) 3 can be obtained from summing the following amounts from Part 6 Col 2 (amounts in millions):

(A) Recoverables loss and LAE payments [Line 3 Col 2= Line 3 Col 1] = 120
(B) Recoverables on unpaid loss and LAE [Line 9 Col 2 = Schedule F Part 3, sum of Col 9 to Col 12, total row] = 180 + 30 + 100 + 50 = 360
(C) Ceded unearned premiums [Line 11 Col 2 = Schedule F Part 3 Col 13, total row] = 60
(D) Ceded reinsurance premiums payable [Line 14 Col 2 = Line 14 Col 1 × (−1)] = −10
(E) Funds held by company under reinsurance treaties [Line 15 Col 2 = Line 15 Col 1 × (−1)] = −40
(F) Provision for reinsurance [Line 17 Col 2 = Line 17 Col 1 × (−1)] = −30

Sum of (A) to (F) = 460

5. Continued

(b) Determine the *Restated (Gross of Ceded)* amount for Mando's 2018 Schedule F − Part 6, line 21, column 3 (*Surplus as regards policyholders*).

Surplus as regards policyholders on a gross of ceded basis is the same as the amount for this on a net of ceded basis: $520 million.

(c) Explain why the Schedule F provision for reinsurance is formula-based.

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

Statutory accounting is focused on insurer solvency. A formula-based provision is viewed as an objective way to establish the potential credit losses on reinsurance recoverables and less susceptible to manipulation by financially weak insurers.

(d) Explain why the Schedule F provision for reinsurance does not result in a deferred tax asset.

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

DTAs are for timing differences. The provision for reinsurance is a policyholder safeguard, not a timing difference. A DTA for the provision would dilute this safeguard of the provision under statutory accounting.

6. Learning Objectives:

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

Learning Outcomes:

(4e) Describe the development of general insurance programs controlled by government or collective insurance industry organizations and their mechanisms of operation.

Sources:

American Academy of Actuaries, "The National Flood Insurance Program: Challenges and Solutions," Flood Insurance Work Group, Public Policy Monograph, April 2017

Cappelletti, A., "Government Provision of General Insurance," Society of Actuaries Study Note

Commentary on Question:

This question tests a candidate's understanding of flood insurance and the NFIP in the United States.

Solution:

(a) Compare NFIP policies with private insurance policies for each of the following:

(i) Coverage disputes

(ii) Policy limits

(iii) Valuation basis for claims

(iv) Underwriting

Commentary on Question:

A full credit response required a comparison for each of parts (i) to (iv). It was not sufficient to just list what the NFIP policy uses for each of (i) to (iv). There needed to be comparison to what is done in private insurance. The model solution is an example of a full credit solution.

(i) Coverage disputes

NFIP flood policy contract language is provided by federal statute and/or regulation. The insured cannot assert that he or she did not know or understand the policy in coverage disputes. The NFIP requires that coverage disputes arising under the program be litigated in federal courts. Private insurance policies are contracts of adhesion. Disputes are settled in state court and contract ambiguities are settled in the policyholder's favor.

6. Continued

(ii) Policy limits
NFIP has maximum coverage limits which are determined by statute and are generally low. Private insurance policy limits are only limited by property value and the insurer's underwriting preferences.

(iii) Valuation basis for claims
NFIP policies: actual-cash-value coverage.
Private insurance policies: May be actual-cash-value coverage, but replacement-cost-value coverage is also typically available.

(iv) Underwriting
NFIP is not allowed to refuse to cover to an "eligible" property, regardless of the property's loss history. Ineligible structures are few and are proscribed by the federal program. Private insurers can accept or reject applications for policies based on the underwriting guidelines of each company, subject to any constraints of applicable state statutes or regulations.

(b) Describe two benefits to private insurers in the U.S. for offering flood insurance coverage.

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

- Many private insurance customers do not purchase coverage from the NFIP because they believe they have protection as part of their homeowners' policies. By offering and selling flood policies, the insurance customers will understand whether or not they are covered and likely not blame the insurer if they are not covered if they declined coverage when it was offered.
- Many believe that the U.S. property insurance market and global reinsurance markets are overcapitalized. To the extent that this is true, flood insurance provides an application for an insurer's underused capital to back a distinct new risk that may diversify the insurer's risk profile.

(c) Describe two uncertainties that make private insurers in the U.S. wary of offering flood insurance coverage.

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

6. Continued

- It is difficult for private insurers to assess the validity of flood models because most companies have little or no access to granular data on historical flood insurance exposures and claims.
- Unless flood insurance becomes mandatory for all property owners, the customers most likely to buy it are those at risk of flooding.

7. Learning Objectives:

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

Learning Outcomes:

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

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

Sources:

General Insurance Financial Reporting Topics, Fourth 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, "Materiality, Concepts on Professionalism," Task Force on Materiality, Discussion Paper, Professionalism Series, 2006, No. 8

IAA, "International Standard of Actuarial Practice 1, General Actuarial Practice"

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 the NAIC SAO, materiality and actuarial standards to perform actuarial services.

Solution:

(a) Describe when an Appointed Actuary (AA) should issue a *Qualified Opinion* versus a *No Opinion* SAO.

A *Qualified Opinion* should be issued when the AA must limit the opinion to carried reserves excluding reserves for certain items.

A *No Opinion* should be issued when the AA cannot reach a conclusion on a company's carried reserves.

(b) Compare the required disclosures for a *Qualified Opinion* versus a *No Opinion* SAO.

7. Continued

For a *Qualified Opinion,* the AA should disclose the item to which the qualification relates, the reasons for the qualification, and the amount of the carried reserves for which the qualification relates.

For a *No Opinion,* the AA should disclose why no opinion could be given (e.g., limitations in data, analyses, assumptions, etc.).

(c) Select the opinion category the AA should use for XYZ. Justify your selection.

Commentary on Question:
There is no single correct answer here. Both opinion categories can be justified. A Qualified Opinion can be justified because an opinion could be given on the carried reserves excluding asbestos liabilities. However, a No Opinion can be justified on the basis that the asbestos liabilities could be a major contributor of total reserves – amounting to nearly 40% of the total reserves on the high end. No credit was given for a selection without a justification. The model solution is an example of a full credit solution justifying a Qualified Opinion.

A Qualified Opinion excluding the asbestos liabilities should be issued because the asbestos reserves are material to the overall opinion, but they cannot be opined on.

(d) Identify one potential drawback for each of the materiality standards listed above when used by an AA for an SAO.

Commentary on Question:
There are at least a couple of potential drawbacks for each of the standards listed. Only one for each of the four was required for full credit. The model solution is an example of a full credit solution.

(i) Percentage of reserves does not relate to financial strength or solvency.

(ii) Percentage of surplus may overstate materiality for companies with a large surplus relative to reserves.

(iii) Percentage of income may not be stable enough to be a consistent materiality standard.

(iv) Adverse deviation that reduces capital below minimum requirements would not be appropriate for financially strong companies who only have a remote chance of this occurrence.

7. Continued

(e) Describe the two other actions for resolving material data deficiencies recommended by ISAP 1.

- Decline to undertake or continue to perform the actuarial services.
- Perform the actuarial services, as well as possible, and disclose any data deficiencies in the report.

8. Learning Objectives:

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

Learning Outcomes:

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

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

Sources:

Insurance Regulation, The Institutes

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

Commentary on Question:

This question tests a candidate's knowledge of various regulatory topics for the U.S. insurance industry.

Solution:

(a) Describe the four key features of a typical state regulatory system.

Commentary on Question:

The four key features are as identified in the model solution. The descriptions provided for each are an example of what is required for full credit.

- Licensing requirements – The system provides for the issuing of licenses to both insurers and producers.
- Reporting and filing requirements – The system requires each insurer to file financial reports annually and quarterly. In addition, they must file other materials, such as policy forms and rates.
- Periodic examinations – The system provides for periodic examinations of all insurers and follow-up actions if an insurer is in financial difficulty.
- Power to impose sanctions – The system provides the regulatory authority the power to impose sanctions when an insurer or producer does not comply with regulatory requirements.

(b) Describe the following with respect to premium laws:

(i) Situations they are intended to cover

(ii) Typical requirements

8. Continued

Commentary on Question:
Note that premium laws refer to laws such as those pertaining to premium financing. Premium laws do not refer to insurer rate filing requirements. The model solution is an example of a full credit solution.

(i) Covers situations in which an insurer finances premium because the premium is large, or the insured doesn't want to pay it immediately.

(ii) The premium finance agreement must specify the length of the transaction, the timing and amount of payments, and consequences of non-payment.

(c) Identify two concerns that give rise to lobbying laws.

Commentary on Question:
There are more than two concerns. Only two were required for full credit. The model solution is an example of a full credit solution.

Conflict of interest and improper influence

(d) Describe two typical controls included in lobbying laws.

Commentary on Question:
There are more than two controls. Only two were required for full credit. The model solution is an example of a full credit solution.

- Prohibit people serving on state commissions while lobbying.
- Restrict lobbying by former state commissioners and employees.

(e) Identify two areas in which state DOI's must meet NAIC standards for NAIC accreditation.

Commentary on Question:
There are more than two areas. Only two were required for full credit. The model solution is an example of a full credit solution.

- State laws and regulations
- Regulatory methods

(f) Identify one concern that has been expressed about this accreditation program.

Commentary on Question:
More than one concern has been expressed. Only one was required for full credit. The model solution is an example of a full credit solution.

This may be viewed as a usurpation of state legislative authority.

9. 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:

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

Sources:

Cappelletti, A., "Tort Law: Topics for General Insurance Actuaries," Society of Actuaries Study Note

Commentary on Question:

This question tests a candidate's knowledge of the tort law rules for admitting expert testimony.

Solution:

Compare the standard for admitting expert evidence from *Daubert v. Merrell Dow Pharmaceuticals* with the prior standard from *Frye v. United States* and the reason for the change in the standard.

Commentary on Question:

A full credit response includes a description of both standards, highlighting the difference. A listing of all of the "Daubert Factors" was not required for full credit. However, a full credit response was expected to note that the court ruling in Daubert v. Merrell Dow introduced a number of factors that should be considered, and, at a minimum, state a couple of the factors to show the difference to the prior standard. Furthermore, a full credit solution was required to address the reason the standard was changed. The model solution is an example of a full credit solution.

Under the Frye standard, the requirement to admit expert evidence was general acceptance by the expert community. Expert evidence is often the key evidence in a case. The Frye standard was viewed was too narrow as it would deny novel techniques that are reliable, so the courts sought to change the standard.

The Daubert standard sets out a number of factors for a judge to consider in the determination of whether or not to admit the expert evidence. These factors include the Frye standard plus several other factors known as the Daubert factors.

Two considerations included in the Daubert factors are:

- whether the science supporting the evidence can and has been tested; and
- whether the science supporting the evidence has been subjected to peer review and publication.

Under the new standard, none of the Daubert factors are required to be met, but they should be considered by the judge.

10. Learning Objectives:

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

Learning Outcomes:

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

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

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

Sources:

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

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

NAIC Annual Statement

Case Study, Spring 2020, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

Commentary on Question:

This question tests a candidate's understanding of the calculations underlying the IEE exhibit.

Solution:

Calculate the following amounts for R-Dan's 2018 IEE, adjusting for the miscategorized *other underwriting expenses* wherever necessary.

(i) Mean policyholders' surplus (PHS) allocated to APD

(ii) Funds attributable to insurance transactions (FAIT) for APD

Commentary on Question:

There is more than one approach to displaying the calculation for the amounts asked for in the question. The model solution is just one approach to displaying the calculation. The following acronyms were used in the model solution:

AS = Annual Statement
LR = loss and loss adjustment expense reserves
WP = written premium,
EP = earned premium,
UPR = unearned premium reserves
AB = agents' balances
C&B = commissions and brokerage expenses incurred
TLF = taxes, licenses and fees expenses incurred

10. Continued

OTH = other acquisitions, field supervision and collection expenses incurred
GEN = general expenses incurred
PPE = prepaid expense ratio

A candidate was not required to identify where in the AS they obtained their input numbers. However, such identification can help earn partial credit if there are errors in a candidate's response. The model solution is an example of a full credit solution.

(i) Mean PHS allocated to APD = PHS_APD

PHS Ratio = mean PHS / mean net LR + mean net UEPR + current EP
Mean PHS = (209,400 + 209,100) / 2 = 209,250
Mean net LR = (238,800 + 50,700 + 203,200 + 45,700) / 2 = 269,200
Mean net UEPR = (208,800 + 179,600) = 194,200
Current EP = 578,500

PHS Ratio = (209,250 / (269,200 + 194,200 + 578,500) = 20.08%

PHS_APD
= PHS Ratio × [Mean net LR_APD + Mean net UEPR_APD + EP_APD]

Mean net LR_APD = [current LR_APD + prior LR_APD] / 2
= [(1,700 + 200 + 1,900) + (1,400 + 200 + 1,700)] / 2 = 3,550
Mean net UEPR_APD = [current UEPR_APD + prior UEPR_APD] / 2
= [46,000 + 40,500] / 2 = 43,250
EP_APD = 172,600

PHS_APD = 20.08% × [3,350 + 43,250 + 172,600] = 44,023

(ii) FAIT for APD = FAIT_APD
FAIT_APD =
[Mean net LR_APD + Mean UEPR_APD × (1 – PPE_APD) – Mean AB_APD]
= [3,350 + (43,250 × (1 – PPE_APD)) – ((16,000 + 14,000)/2)]

PPE_APD = [C&B_APD + TLF_APD + OTH_APD + GEN_APD / 2] /
WP_APD
= [5,300 + (3,900 + 40% × 9,800) + 10,000 + (60% × 9,800 / 2)] / 178,200
= 14.6%

FAIT_APD = [3,350 + (43,250 × (1 – 0.146)) – 15,000] = 25,275

11. 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.

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

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

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

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

Sources:

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

- Chapter 4 (Accounting for Reinsurance Contracts)
- Chapter 8 (Notes to Financial Statements)
- Chapter 10 (Returns on Capital: Planning, Pricing and Performance)
- Chapter 11 (Measuring Insurer Financial Strength)
- Chapter 12 (Solvency Monitoring)
- Chapter 13 (Financial Ratings)
- Chapter 14 (The General Insurance Actuarial Opinion)

NAIC Annual Statement

Case Study, Spring 2020, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

Commentary on Question:

This question tests a candidate's knowledge of a number of related topics. Topics of financial reporting, financial health, financial ratings and reinsurance are integrated in this question using the Case Study.

11. Continued

Solution:

(a) R-Dan's five-year plan anticipates additional paid-in capital from the parent company in 2019. However, management has commented that future capital infusions after 2019 will probably not be needed because their 2018 RBC ratio is currently very conservative at over 600%.

Critique management's comment.

Commentary on Question:

This part was worth three exam points. A short critique consisting of one or two simple sentences would not earn full credit. At least three different issues were expected to be addressed in the critique for full credit. There were many possible issues that could have been addressed. The model solution is an example of a full credit solution. It does not include all possible valid issues that could have been addressed. The model solution is indicative of the depth of response required for full credit for a response that addresses four issues.

R-Dan management should not assume that an RBC of 600% means that capital infusions will not be necessary. My reasoning for this is as follows.

- Although the RBC system does differentiate underwriting risk factors by Schedule P line of business, it is still a factor-based calculation based on past business and balance sheet entries at one point in time. It is not dynamic and does not relate to the planned business. Furthermore, an RBC ratio of 600% can be misleading if management doesn't understand the purpose of RBC. RBC is to calculate a minimum standard for capital and that the Company Action Level begins at 200%.

- The underwriting loss for 2018 was $16 million. R-Dan is in a growth phase in non-core territories using an aggressive pricing strategy. The underwriting loss for 2019 will likely be higher. The planned capital infusion for 2019 is only $10 million. The business plan may be overly optimistic regarding both the size of the underwriting loss and the investment gain.

- R-Dan's 2018 IRIS Ratio is 2.9, which is just under the exceptional limit. Any reduction of surplus will increase this ratio, which could cause a failed IRIS test. Furthermore, premium growth can also put additional strain on this ratio. It is possible that R-Dan may fail other IRIS ratio tests if there is a surplus decline.

- Finally, R-Dan has minimal reinsurance protection in place. They do not have any protection against any extraordinary losses.

11. Continued

(b) Recommend additional proportional or non-proportional reinsurance for R-Dan considering management's concern. Justify your recommendation.

Commentary on Question:
Points for this part were earned for the recommendation. Either form of reinsurance could be justified as they each have potential strengths and weaknesses. The recommendation should consider management's concerns. The model solution is an example of a full credit solution that recommends non-proportional reinsurance.

Non-proportional reinsurance is recommended. Given R-Dan's current strategy of aggressive pricing, loss ratios will be high making the likely terms of proportional reinsurance unfavorable. Non-proportional insurance will lower premiums, but typically less than proportional reinsurance. However, it should reduce expected losses, limit exposure to large losses and reduce volatility.

(c) Contrast the effect of proportional versus non-proportional reinsurance on each of the following risk charges in the NAIC RBC formula.

(i) Premium Risk

(ii) Reserve Risk

(iii) Credit Risk

Commentary on Question:
Given that no specifics were provided for the reinsurance, the response should have contrasted the typical effect on the NAIC formula for each of the three risks. There are a number of ways that this could have been done. The model solution is one example of a full credit solution.

(i) Premium Risk: Premium risk is measured by factors applied to net premium. Both types of reinsurance reduce net premium so both can reduce the premium risk charge. The factors would generally not change. However, proportional reinsurance premiums tend to be much greater, so its effect would tend be larger.

(ii) Reserve Risk: Reserve risk is measured by factors applied to net reserves. Proportional reinsurance would reduce reserves for all claims so it should have a greater risk reduction. Over time, company average development may be affected by non-proportional reinsurance, but the effect is dependent on the specifics to the agreement.

11. Continued

(iii) Credit Risk: Both proportional and non-proportional reinsurance would trigger a credit risk charge. Credit risk is a flat 10% of recoverables which does not vary by type of reinsurance used. However, proportional reinsurance includes ceded unearned premiums for the insurer so it would likely be a greater charge for credit risk.

12. 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, Fourth Edition, Society of Actuaries

- Chapter 12 (Solvency Monitoring)

NAIC Annual Statement

Case Study, Spring 2020, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

Commentary on Question:

This question tests a candidate's knowledge of the NAIC RBC calculation.

Solution:

(a) Calculate R-Dan's NAIC RBC basic net written premium (NWP) charge for the H/F line of business.

Commentary on Question:

The model solution displays the solution in a style that is easy to follow. This display style was not required for full credit. The model solution also includes references for all data used in the calculation. This was not required for full credit. However, inclusion of this information could aid graders in assigning partial credit when incorrect input numbers appear in the solution. The model solution uses the acronyms AS for Annual Statement and L&LAE for loss and loss adjustment expense. Answers in the model solution were rounded to 100,000's. Rounding was not required for full credit.

Basic NWP charge = Current year NWP × [Company adjusted adverse L&LAE ratio × Investment income factor + Company underwriting expense ratio – 1.0]

Current year NWP = 184,100,000 *from AS Page 6, Row 4, Column 1*
Investment income factor = 0.965 *from Case study 7.7, Table 1*

Company underwriting expense ratio = Other underwriting expenses incurred ÷ Total NWP = 98,200,000 (*from AS Page 4 Row 4, Column 1*) ÷ 607,700,000 (*from AS Page 6 Row 35, Column 1*) = 16.2%

Company adjusted adverse L&LAE ratio = [1.0 + Company adjustment factor] × 0.5 × Industry adverse L&LAE

12. Continued

- Industry adverse L&LAE = 92.0% *from Case study 7.7, Table 1*
- Company adjustment factor = Company average L&LAE ratio ÷ Industry average L&LAE ratio
- Company average L&LAE ratio = 83.5% *given using net ratio for H/F*
- Industry average L&LAE ratio = 70.0% *from Case study 7.7, Table 1*

Company adjusted adverse L&LAE ratio = [1.0 + (83.5%÷70%)] × 0.5 × 92.0%
= 100.9%

Basic NWP charge = 184,100,000 × [.1009 × 0.965 + .162 – 1]
= 24,900,000 (rounded to hundreds of thousands)

(b) Calculate R-Dan's NAIC *RBC total NWP charge*, R_5.

Commentary on Question:
Note that R-Dan has no loss-sensitive or claims-made policies. Therefore, the NWP charge after discounts equals the Basic NWP charge. The model solution also includes references for all data used in the calculation. This was not required for full credit. However, inclusion of this information could aid graders in assigning partial credit when incorrect input numbers appear in the solution.

RBC before excess growth = NWP charge after discounts × Premium concentration factor

- Premium concentration factor = 70% + 30% × [% of NWP from largest LOB to Total]
- Largest line by NWP is PPA with 242,900,000 *from AS Page 6, Column 1*
- Premium concentration factor = 70% + 30% × [242.9 ÷ 607.7] = 0.82

RBC before excess growth = 57,192,000 × 0.82 = 46,892,000

Excess growth = Sum of excess growth by LOB where excess growth for a LOB is the three-year gross written premium growth rate in excess of 10%, capped at 30%, times 22.5% times the NWP for the LOB. 10% growth was exceeded by only one LOB for R-Dan: H/F.

H/F NWP = 184,100,000 *from AS Page 6, Column 1*

R_5 = 46,892,000 + [22.5% × (25% − 10%) × 184,100,000]
= 53,100,000 (rounded to hundreds of thousands)

13. 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.

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

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

Sources:

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

- Chapter 4 (Accounting for Reinsurance Contracts)
- Chapter 7 (Schedule P, Statutory Loss Accounting)
- Chapter 11 (Measuring Insurer Financial Strength)
- Chapter 14 (Overview of the General Insurance Statement of Actuarial Opinion)

NAIC Annual Statement

Case Study, Spring 2020, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

Commentary on Question:

This question tests a candidate's understanding of Schedule P and the effects on an insurer from a reinsurer's insolvency.

Solution:

(a) Explain why the segmentation shown in the Underwriting and Investment Exhibit is not the same as that shown in Schedule P.

Commentary on Question:

In order to earn full credit, the candidate needed to explain why the line of business segmentation was different for each of the two exhibits. The model solution is an example of a full credit solution.

The Underwriting and Investment Exhibit divides the business written by insurers into segments that reflect underwriting and marketing whereas Schedule P segments the business by loss development characteristics.

13. Continued

(b) Explain how this overstatement affected R-Dan's reported paid and unpaid losses.

Commentary on Question:
The key here is that columns 10 and 23 are for informational purposes only. We are also given that columns 1 through 9 and columns 13 through 23 are stated correctly. Reported paid an unpaid loss are based on columns 1 through 9 and columns 13 through 23.

There is no effect on the paid and unpaid losses as the information in columns 10 and 23 are for informational purposes only.

(c) Explain the implications of this for R-Dan at year-end 2019.

Commentary on Question:
There are many implications for R-Dan from this reinsurer insolvency. In order to earn full credit, a response needed to address the materiality of this reinsurer insolvency on R-Dan's financials and at least two financial implications of this. The model solution is an example of a full credit solution. It is not an exhaustive list of all of the possible implications.

We first need to check if this is material for R-Dan. R-Dan's Schedule P Part 1B for 2018 shows ceded unpaid amounts in columns 14, 16, 18 and 20. The total is 15.3 million for accident years 2012 and prior. This represents over 5% of reported net reserves. This amount is material.

This will show a material jump in the 2019 Schedule P Part 2B development triangle from column 9 to column 10. This will likely cause R-Dan to fail the 2019 IRIS loss development tests. R-Dan has already been experiencing significant reserve development as indicated by columns 11 and 12 of the 2018 Schedule P Part 2B exhibit. R-Dan should recalculate the 2019 development ratios removing the effect of this take-down in ceded reserves.

This take-down in ceded reserves will reduce the net operating results for 2019 by 15.3 million which may cause R-Dan to fail the IRIS profitability test. R-Dan should recalculate the 2019 profitability ratio removing the effect of this take-down in ceded reserves.

14. Learning Objectives:

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

Learning Outcomes:

(4g) Outline the function and regulation of captives.

Sources:

Cappelletti, A., "Captive Insurance," Society of Actuaries Study Note

Commentary on Question:

This question tests a candidate's knowledge of captive insurers.

Solution:

(a) Explain three ways that captive insurers are subject to less regulation than traditional insurance companies.

Commentary on Question:

There are more than three ways. The key is that the difference stated must relate to how captives are subject to less regulation. Differences not directly from regulation did not earn credit. The model solution is an example of a full credit solution explaining three ways that captive insurers are subject to less regulation than traditional insurance companies.

- If a captive insurer fails, the claims become the responsibility of the captive owner. They are not subject to the guaranty funds for traditional insurers.
- Regulators are not concerned with captive insurer coverage forms and rates as these are negotiated to address the parent company's needs. Traditional insurer coverage forms and rates are subject to regulations.
- There are relaxed regulatory requirements for captive creation, as compared to traditional insurers, within areas such as licensing, investments, and lines of business.

(b) There are also several drawbacks to creating a captive insurer

Describe three drawbacks.

Commentary on Question:

There are more than three drawbacks. Only three were required for full credit. The model solution is an example of a full credit solution describing three drawbacks.

- Start-up costs may be high for both administrative costs and capitalization.
- Tax savings considered from current tax law could be reduced or eliminated with little warning.
- Parent company is exposed to the risk of carrying inadequate loss reserves.

14. Continued

(c) Define the following types of captive insurers:

(i) Diversified

(ii) Agency-owned

(i) Diversified: Captive that writes a limited amount of insurance business from entities unrelated to the owner(s) of the captive in addition to the business from risks of the captive owner(s).

(ii) Agency-owned: Captive owned by one or more entities that are licensed as insurance producers or managing general agents, only writing business produced by the owner(s).

15. Learning Objectives:

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

Learning Outcomes:

(2e) Demonstrate knowledge of the E.U. Solvency II standard formula solvency capital requirement.

Sources:

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

- Chapter 12 (Solvency Monitoring)

Commentary on Question:

This question tests a candidate's understanding of the standard formula for the Solvency II Solvency Capital Requirement. The following notation is used in the model solution:

$\rho_{X,Y}$ is the correlation between X and Y
GI is general insurance
PR is premium and reserve risk
CAT is catastrophe
INT is intangible asset
MKT is market
DEF is default
OP is operational

Solution:

(a) Demonstrate that the GI underwriting risk SCR is 1,019 million.

Commentary on Question:

The candidate was not expected to show the symbolic formula to earn full credit. However, the candidate must show the formula numerically to earn full credit.

$$SCR_{GI} = [\sum\sum \rho_{GIi,GIj} \times SCR_{GIi} \times SCR_{GIj}]^{(1/2)}$$
$$= [(SCR_{PR})^2 + (SCR_{CAT})^2 + 2 \times \rho_{PR,CAT} \times SCR_{PR} \times SCR_{CAT}]^{(1/2)}$$
$$= [950^2 + 200^2 + 2 \times 0.25 \times 950 \times 200]^{(1/2)} = 1{,}018.6$$

(b) Calculate the Solvency II Basic Solvency Capital Requirement (BSCR).

Commentary on Question:

The candidate was not expected to show the symbolic formula to earn full credit. However, the candidate must show the formula numerically to earn full credit.

15. Continued

$$BSCR = [\sum\sum \rho_{i,j} \times SCR_i \times SCR_j]^{(1/2)} + SCR_{INT}$$
$$= [(SCR_{MKT})^2 + (SCR_{DEF})^2 + (SCR_{GI})^2 + 2 \times \rho_{MKT,DEF} \times SCR_{MKT} \times SCR_{DEF} + 2 \times \rho_{DEF,GI} \times SCR_{DEF} \times SCR_{GI} + 2 \times \rho_{MKT,GEN} \times SCR_{MKT} \times SCR_{GI}]^{(1/2)} + SCR_{INT}$$
$$= [456^2 + 115^2 + 1{,}018.6^2 + 2\times0.25\times465\times115 + 2\times0.5\times465\times1{,}018.6 + 2\times0.25\times115\times1{,}018.6]^{(1/2)} + 50$$
$$= 1{,}283.6 + 50$$
$$= 1{,}333.6$$

(c) Calculate the Solvency II Standard Formula.

Commentary on Question:
The total adjustment for the loss-absorbing capacity of technical provisions and deferred taxes may be positive or negative. The total adjustment figure provided in the question did not explicitly state whether it was positive or negative. Full credit was earned on this question by either adding or subtracting the adjustment to calculate the Solvency II standard formula. The model solution is an example of a full credit solution that assumed that the adjustment was positive.

$$\text{Solvency II Standard Formula} = BSCR + \text{Adjustment} + SCR_{OP}$$
$$= BSCR + \text{Adjustment} + 30\%\ BSCR$$
$$= 1.3 \times BSCR + \text{Adjustment}$$
$$= 1{,}734 + 66 = 1{,}800$$

(d) Explain the rationale of including tail correlations instead of correlations in the Solvency II formulas.

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

Tail correlations are different from correlations in the body of loss distribution. Even if the correlation between two categories is low, tail correlation may be high if extreme results in one category tend to be linked with extreme results in another category. The risk of insolvency is from extreme events.

(e) Explain how Type 1 and Type 2 counterparty default risk are determined for the calculation of SCR_{DEF}.

Type 1 counterparty credit risk: based upon a default loss distribution for each counterparty/exposure derived from probabilities of default and the amount of losses given default.

Type 2 counterparty credit risk: 90% of the amounts due for more than 3 months and 15% of all other amounts.

16. 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.

Sources:

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

- Chapter 3 (Accounting for Financial Instruments)

Commentary on Question:

This question tests a candidate's knowledge of the accounting for bonds.

Solution:

(a) Describe the conditions required for bonds to be reported at amortized cost under each of the following accounting standards:

(i) U.S. statutory accounting

(ii) U.S. GAAP

(iii) International Financial Reporting Standards (IFRS)

Commentary on Question:

The model solution states the NAIC classes for bonds in part (i). This was not required for full credit.

(i) U.S. statutory accounting

- Investment grade bonds (NAIC classes 1 and 2); or
- Below investment grade bonds (NAIC classes 3 or greater) if amortized value is less than fair value.

(ii) U.S. GAAP

- Bonds categorized as held-to-maturity securities.

(iii) IFRS

- The following two conditions must be met:
  1. The bonds are intended to be held to collect the contractual cash flows; and
  2. The bonds cash flow consists of repayment of principle and payment of interest on the principle.

16. Continued

(b) Compare the U.S. statutory accounting treatment of the change in reported value for bonds reported at amortized cost versus bonds reported at market value.

For bonds reported at amortized cost, changes from amortization flow through the income statement.

For bonds reported at market value, changes in value are treated as direct charges/credits to surplus.

(c) U.S. statutory accounting is generally conservative. However, U.S. statutory accounting permits amortized cost for certain bonds even though this value may be higher than the market value.

Provide the reasons for this apparent contradiction.

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

A bond carried at amortized cost, where amortized cost is greater than market value, must be of investment grade. Thus, there is a low risk of default. Using amortized cost for investment grade bonds better matches to the reporting of underwriting income and it avoids random fluctuations in statutory surplus.

17. 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.

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

Sources:

Cappelletti, A., "Tort Law: Topics for General Insurance Actuaries," Society of Actuaries Study Note

Commentary on Question:

This question tests a candidate's knowledge of bad faith claims against insurers and the potential punitive damages in a bad faith claim.

Solution:

(a) Describe what is meant by a claim of *bad faith* against an insurer.

Insurance contracts are contracts of utmost good faith. An insured must rely on the insurers promise in this regard. Insurers breaching their duty of utmost good faith are acting in bad faith.

(b) Explain why ODM would likely win its suit against TACI for *bad faith*.

Commentary on Question:

There are many ways to explain this. The model solution is an example of a full credit response and indicates the depth of response required for full credit.

It has been held that failure to settle a third part liability claim within policy limits when it is reasonably possible to do so, subjecting the policyholder to liability above insurance policy limits, is an act of bad faith by an insurer.

In this case, TACI clearly could have settled within policy limits but declined to settle as it had "nothing to lose" in taking the case to trial. The most it could lose was the $4 million limit under the policy terms, which was the settlement offer. It did not have to worry about the $6 million above the policy limit. But the insured had much at stake. Losing the case would cost it the $6 million above the policy limit which would greatly harm the insured financially. For these reasons, ODM will likely win its suit against TAC for *bad faith*.

17. Continued

(c) Assess ODM's claim for this amount of punitive damages against TACI.

Commentary on Question:
There are many potential issues that could be raised in an assessment for this amount of punitive damages against TACI. A full credit response should have considered at least one decision from the Supreme Court of the United States that could apply in the assessment. The model solution is an example of a full credit response.

Acts of bad faith that include failure to settle often include an award for punitive damages, so an award is likely. The act of bad faith should also meet at least one of the reprehensibility factors for punitive damages to apply as indicated by the Supreme Court. In this case, the reprehensibility factor that applies is that the target of the conduct had financial vulnerability.

However, the Supreme Court, in State Farm v Campbell, has held that the ratio of punitive damages to compensatory damages should not exceed a single digit. In this case, the plaintiff is asking for a ratio of 8.3-to-1 which is close to the maximum of 9-to-1. The maximum ratio is usually reserved for the worst cases. It is unlikely that ODM will receive this high a ratio unless they can show that TACI has done this repeatedly to other insureds.

18. Learning Objectives:

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

Learning Outcomes:

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

Sources:

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

- Chapter 13 (General Insurance Financial Ratings)

Commentary on Question:

This question tests a candidate's understanding of the typical statistical measures used by financial rating agencies when determining an insurer's capital needs.

Solution:

(a) Estimate the amount of capital that the company would be required to hold at the beginning of a year in order to remain solvent with a 99% probability, based upon the rating agency model.

For a 99% probability level:

$$0.99 = 1 - \int_a^\infty 0.2e^{-0.2x}dx = 1 - e^{-0.2a}$$

So $-0.2a$ = Ln(0.01), or, a = 23.026 million *CU*.

The company holds 120% of E[x] in reserves which equals 1.2 × (1/0.2) or 6 million *CU*. The amount of capital required for a 99.0% probability of survival is a minus reserves [or 23.026 million *CU* – 6 million *CU*.]
This equals 17.026 million *CU*.

(b) Determine the following amounts for JEI based upon the rating agency model:

(i) TVaR threshold relating to 20 million of held capital

(ii) EPD relating to 20 million of held capital

Commentary on Question:

For part (i), it was not entirely clear as to whether the TVaR threshold referred to the TVaR amount or the TVaR probability level. Either response was acceptable for full credit. The model solution shows a full credit response assuming that TVaR threshold referred to the TVaR amount.

18. Continued

(i)

TVaR when the company holds capital of 20 million and reserves of 6 million is:

$$= \frac{\int_{26}^{\infty} xf(x)dx}{\int_{26}^{\infty} f(x)dx} = \frac{(\frac{1}{0.2} + 26)e^{-0.2\times 26}}{e^{-0.2\times 26}}$$

= 5 million *CU* + 26 million *CU*
= 31 million *CU*.

(ii)

EPD = [Probability payments < 26 million] times zero + [Probability payments >26 million] times [TVaR given 26 million in funds available for claim payments]
= $e^{-0.2\times 26}$ × (31 – 26) million *CU*
= 0.033 million *CU*

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:

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

Sources:

NAIC Statement of Statutory Accounting Principles,

- 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, Fourth Edition, Society of Actuaries

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

Commentary on Question:

This question tests a candidate's knowledge of some of the responsibilities of the appointed actuary.

Solution:

(a) State what is required of a state insurance department regarding receipt of an insurer's AOS.

The state demonstrates that it is able to preserve the confidentiality of the document.

(b) Identify the timing of an insurer's filing of the AOS to a non-domiciliary state insurance department.

Commentary on Question:

The model solution provides the full credit response. However, there is also a deadline of May 1 for the AOS to a non- domiciliary state insurance department. A response of May 1 would also earn full credit.

Within fifteen days of request, but no earlier than March 15.

(c) Provide a reason for and a reason against showing only a range in the AOS.

19. Continued

Commentary on Question:
There are a number of reasons for and against showing only a range. Only one of each was required for full credit. The model solution is an example of a full credit response.

FOR:
The range is the basis for the opinion on the carried reserves. Its inclusion permits users of the report to see how the opinion was formed.

AGAINST:
The range includes all reasonable estimates. A company reserving at the low end of the range may be viewed unfavorably. This would not be appropriate because any amount in the range is, by definition, reasonable.

(d) Describe what is required of the AA in this situation when completing the AOS.

The AOS should include both amounts and show how the point estimate and the range combine to form the Appointed Actuary's SAO.

(e) Describe what the AA is to report in the AOS in this situation.

Commentary on Question:
The description could be in words or in tabular form to earn full credit. The model solution shows a full credit solution in tabular form.

The actuary must show the following amounts for both the net and gross reserves:

	Point Estimate
Actuary's point estimate	B (for amount opined on)
Company carried reserves: TOTAL	$C_1 = C_2 + C_3$
Company carried reserves: portion excluded by opinion	C_2
Company carried reserves: covered by opinion	C_3
Difference between company carried reserves and actuary's estimate	$D = C_3 - B$

20. 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 understanding of the Teng and Perkins procedure to estimate the premium asset on retrospectively rated policies.

Solution:

(a) Demonstrate that the premium development to loss development (PDLD) ratio for the first retrospective adjustment using the formula approach is 1.75.

$$PDLD_1 = [BPF \times TM / (ELR \times EPLE_1)] + (LCR_1 \times LCF \times TM)$$
$$= [0.26 \times 1.04 / (0.60 \times 0.75)] + (0.75 \times 1.28 \times 1.04)$$
$$= 0.75 + 1.00$$
$$= 1.75$$

(b) Explain why one would choose the formula approach over the empirical data approach for selecting W-Nat's PDLD ratios.

Commentary on Question:

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

The empirical PDLD ratios are not stable having a clear upward trend over time. It is possible that this is due to changes in the retrospective rating parameters over time.

(c) Calculate W-Nat's premium asset for this policy that is subject to the first retrospective adjustment.

Commentary on Question:

In the model solution:
Expected future loss emergence = EFLE and
Premium booked prior to adjustment = PBPA.

20. Continued

$PDLD_2 = (LCR_2 \times LCF \times TM) = 0.3 \times 1.28 \times 1.04 = 0.3994$
$PDLD_3 = (LCR_3 \times LCF \times TM) = 0 \times 1.28 \times 1.04 = 0$

Calculate CPDLD at the1st retro adjustment as the weighted sum of PDLDs by expected percentage of loss emerged from 1st to 3rd retro adjustment:

$CPDLD_1$
$= [(1.75 \times 0.60) + (0.3994 \times 0.35) + (0 \times 0.05)] / (0.6 + 0.35 + 0.05) = 1.1898$

Premium Asset
= Estimated total premium – Premium booked prior to adjustment
$= EFLE \times CPDLD_1 - PBPA$
= 400,000,000 × 1.1898 – 440,000,000
= 35.9 million

21. Learning Objectives:

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

Learning Outcomes:

(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 issues in rate regulation.

Solution:

(a) Compare how loss experience is used to determine premiums under these two rating methods.

1. Experience rating is a rate making technique that adjusts the premium for the next policy period based on the insured's experience for the current period.
2. Retrospective rating is a ratemaking technique that adjusts the premium for the current policy period based on the insured's loss experience during the current period.

(b) Describe the typical method that actuaries use to account for profit and contingencies in premiums.

Profit and contingencies are usually set as a percent of resulting premium.

(c) Describe the alternative methodology preferred by state insurance regulators.

Profit should be set as a percent of capital needed to support a portfolio. This entails use of a model to determine the indicated rate to charge in order to earn an adequate return.

(d) Critique the practical application of this alternative methodology by an insurer.

Commentary on Question:

There are many different arguments both for and against practical use of the alternative methodology. A critique could have pointed out either side of the argument. The model solution is an example of a full credit solution that highlights a major weakness of the practical application.

There is no unambiguous standard for determining the amount of capital required to support a portfolio.

22. 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, Fourth 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 several issues regarding risk transfer and reinsurance accounting.

Solution:

(a) U.S. GAAP and U.S. Statutory Accounting define the risk transfer requirements of reinsurance contracts. In order for an insurer to receive reinsurance accounting, a reinsurance contract must satisfy at least one of two conditions.

State the two conditions.

1. The reinsurer must assume substantially all of the underlying insurance risk, or
2. The reinsurer must assume significant" risk. That is, it must be reasonably possible that the reinsurer can suffer a significant loss.

(b) List the two main features of ERD and RCR that distinguish them from VaR for risk transfer testing.

1. The cutoff point for risk in ERD and RCR is economic break-even, rather than an arbitrarily selected statistical percentile for VaR.
2. Frequency and severity of potential loss to the reinsurer are incorporated into ERD and RCR. These are not considered in VaR.

(c) Describe the drawback of using probability of ruin for gauging risk transfer.

Commentary on Question:

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

22. Continued

Probability of ruin is too limited to be used as a measure for risk transfer because non-ruin loss possibilities are not measured even though several years of poor (but non-ruin) results might precipitate ruin. Also, the possibilities of loss beyond ruin are not measured for their potential severity and resulting impact on policyholders.

(d) Define the 10-10 rule for measuring risk transfer.

10-10 rule requires at least a 10% probability of at least a 10% loss to the reinsurer.

(e) Provide the formula for the 10-10 rule in terms of VaR, defining each element of the mathematical expression.

VaR (90%) > 10% loss

- VaR (90%) is the VaR at a 90% confidence level of probability
- 10% loss is a loss to the reinsurer of 10% of the reinsurance premium.

(f) Provide the formula for the ERD risk metric in terms of Tail VaR (TVaR), defining each element of the mathematical expression.

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

ERD = pT/P
p = probability of a loss
P = expected premium
T = average severity of net economic loss when it occurs

T = TVaR(1−p) which is the TVaR of the total return distribution at the percentile where breakeven occurs, (1−p). Therefore, we have:

ERD = $p \times$ TVaR(1−p) / P