

GI FREU Model Solutions

Fall 2018

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”

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

- Chapter 4 (Accounting for Reinsurance Contracts)

Commentary on Question:

This item tests a candidate’s understanding of the risk transfer test for reinsurance accounting.

Solution:

- (a) Describe these two conditions.
 1. The reinsurer must assume substantially all of the underlying insurance risk;
or
 2. The reinsurer must assume significant insurance risk. That is, it must be “reasonably possible” that the reinsurer can suffer a “significant loss.”
- (b) Describe the one rule and two of the risk metrics for determining risk transfer as reviewed by Ruhm and Brehm.

Commentary on Question:

Ruhm and Brehm describe the 10-10 rule and three risk metrics: expected reinsurer deficit, risk coverage ratio and right-tailed deviation. Only two of the three risk metrics, in addition to the 10-10 rule, were required for full credit. For completeness, the model solution includes all three risk metrics.

- Rule: 10-10 rule—It requires at least a 10% probability of a 10% loss, relative to the premium for a reinsurance contract to be considered as having risk transfer.

1. Continued

- Metric 1: Expected reinsurer deficit (ERD)—It is derived from the probability distribution of net economic outcomes. It is a risk / premium measure. ERD must exceed a set threshold for risk transfer. 1% is often used as this is what is provided by the 10-10 rule.
- Metric 2: Risk coverage ratio (RCR)—It measures risk relative to expected return (how many times the risk of losing money is covered by expected return). It is a risk / return measure.
- Metric 3: Right-tailed deviation (RTD)—Member of distributional transform family of measures. Uses a multiple of RTD as the maximum qualified premium as the risk transfer test. That is, if $\alpha\text{RTD} > \text{contract premium}$, then risk transfer exists.

(c) Define the basic formula for each of the two risk metrics described in part (b).

Commentary on Question:

Definitions for only two of the three risk metrics were required for full credit. For completeness, the model solution includes all three risk metrics.

- Metric ERD: $\text{ERD} = pt/P$, where p = probability of net income loss, t = average severity of net income loss and P = expected premium.
- Metric RCR: $\text{RCR} = E(G)/pT$, where p = probability of net economic loss, T = average severity of net economic loss, $E(G)$ = expected economic gains across all probabilities.
- Metric RTD: $\text{RTD}(x) = E^*(x) - E(x)$ where $E(x)$ is the expected value of the CDF $F(x)$, and $E^*(x)$ is the expected value of the transform function $F^*(x) = 1 - [1 - F(x)]^{0.5}$.

(d) Select an appropriate method (rule or risk metric) for the risk measurement of general insurance catastrophe reinsurance contracts. Justify your selection.

Commentary on Question:

No credit was given for the 10-10 rule because it is not appropriate. Any of the risk metrics can be selected. Sufficient detail in the justification was required for full credit. The model solution is an example of a full credit solution using ERD as the selection.

The ERD risk metric is an appropriate method for risk measurement in general insurance catastrophe reinsurance contracts. This is because ERD takes into account low frequency-high severity events that are covered by general insurance catastrophe reinsurance contracts. This method does not depend on selection of a statistical percentile from the loss distribution but considers the expected financial loss of the reinsurer using the entire tail of the distribution.

2. 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.
- (1d) Complete and interpret selected pages/schedules in the NAIC Annual Statement as included in the resources.
- (3b) Describe, interpret and apply the responsibilities of the actuary with respect to the Statement of Actuarial Opinion and the Actuarial Report.

Sources:

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

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

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 item tests a candidate’s understanding of a Qualified Opinion, the type of comments to be included in the Relevant Comments section of the Statement of Actuarial Opinion and the elements included within the Annual Statement net loss and loss adjustment expense reserves.

Solution:

- (a) Explain whether or not you should agree to issue a Qualified Opinion.

Commentary on Question:

For full credit, a candidate’s solution was required to note when Qualified Opinions are appropriate and why it would not be appropriate in this situation. The model solution is an example of a full credit solution.

No, I would not issue a Qualified Opinion. Qualified Opinions are for when the reserve cannot be reasonably estimated. In this case, the reserves for construction defect claims have been estimated and are material. These reserves shouldn’t be excluded from the opinion just because it has significant uncertainty.

2. Continued

- (b) Explain whether or not you should add this comment.

Commentary on Question:

An argument can be made that the comment should be excluded since the risk is a broad statement that would affect all insurers. An argument can also be made that the comment should be included because the risk can be tied to the company's auto bodily injury reserves. A full credit solution could make either assertion but must also note that materiality is required for the comment's inclusion. Examples of full credit solutions are included for both alternatives. Only one was required for full credit.

The Relevant Comments on risk factors should not include general, broad statements about risks that would affect all insurers. Medical inflation will have a material effect on PBM's auto bodily injury reserves. Therefore, it should be included in the Relevant Comments section.

Or

The Relevant Comments on risk factors should not include general, broad statements about risks that would affect all insurers. Medical inflation is a broad risk that will likely affect all insurers. Therefore, it should not be included in the Relevant Comments section even though it is material.

- (c) Calculate PBM's correct net L&LAE reserves.

Commentary on Question:

Note that the following amounts not included in the calculation: retroactive reinsurance, financial reinsurance (that does not meet the risk transfer test), estimates of uncollectible reinsurance and Schedule F provisions.

The correct formula is:

$$\begin{aligned} & [A + B - G] - F \\ & = 1,000,000 + 100,000 - 30,000 - 5,000 \\ & = 1,065,000 \end{aligned}$$

3. 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 1 (Introduction to Insurance Regulation)

Commentary on Question:

This item tests a candidate's understanding of the characteristics of insurance regulation and the forces that influence it.

Solution:

- (a) Describe three common characteristics of insurance market regulation.

Commentary on Question:

A full credit response needed to convey the three characteristics cited in the model solution.

1. Supervision and control of insurance market activity by an entity (DOI) not directly involved in the activity.
 2. Supervision and control of insurance market activity by an entity (DOI) for a stated purpose.
 3. Supervision and control that evolves with changes in the regulated activity (or changes in the general environment and that adjusts to unintended consequences from past regulation).
- (b) Describe the role that each of the following public institutions play in the regulation of insurers and the insurance market:
 - (i) Congress
 - (ii) State legislatures
 - (iii) Federal and State courts

3. Continued

- (i) U.S. Congress has the ultimate legislative authority. It clarifies insurer activities subject to state regulation and those that will be regulated by the Federal government.
 - (ii) State legislatures pass insurance laws governing the activities of insurers licensed to engage in insurance business in their states.
 - (iii) The judicial system – federal and state courts – establish the common laws used in court case decisions.
- (c) Rank, from greatest to least, the influence each of the following actors has in the development of insurance market regulation. Justify your ranking.
- A. Regulatory agencies (e.g., departments of insurance)
 - B. Regulated industries (e.g., insurers, other insurance industry-related organizations)
 - C. Non-insurance industry interests (e.g., consumer groups)
 - D. Political elites (e.g., legislators, elected officials)

Commentary on Question:

There is no “correct” ranking as it involves a subjective element. Grading was for the justification provided for the ranking. The model solution is one example of a full credit solution.

B [insurance industry] > A [regulatory agency] > D and C [political elites and non-industry groups]

When an issue is complex, only the actors with a deep knowledge of the issues – the regulated industry – have the knowledge to contribute the most to the discussion of regulation. Many issues of insurance regulation are complex.

Next in influence is the regulatory agency because they also have knowledge of the complex issues, though not necessarily as deep as the industry. They are also tasked with responsibility of protecting the public which gives them influence.

Political elites and non-industry groups have the least influence as they do not have a deep understanding of the issues. However, both do have some influence on the regulatory agency to address consumer issues with respect to insurance regulation.

4. 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

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

Commentary on Question:

This item tests a candidate's knowledge of tort awards and the Supreme Court's approach to assessing awards for punitive damages.

Solution:

- (a) Compare punitive damage amounts to compensatory awards.

Commentary on Question:

A full credit response needed to outline the basic difference between these amounts. A basic definition of each was sufficient for full credit. The model solution is an example of a full credit response.

Compensatory awards relate to the actual loss suffered and are predictable. They restore the harmed party to the pre-tort state.

Awards for punitive damages are intended to punish intentional (or malicious) misconduct and to deter such conduct in the future. They are determined by juries and can be unpredictable.

- (b) Describe the three guideposts for assessing punitive damages as identified by the U.S. Supreme Court in *BMW of North America v. Gore*.
- The degree of reprehensibility of the defendant's conduct.
 - The actual/potential harm suffered compared to the punitive damages award.
 - The difference between the punitive damages awarded and the civil penalties in comparable cases.

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:

- (1c) Describe the elements of the NAIC Annual Statement.
- (3b) Describe, interpret and apply the responsibilities of the actuary with respect to the Statement of Actuarial Opinion and the Actuarial Report.

Sources:

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

- Chapter 8 (Notes to Financial Statements)
- 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”

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 item tests a candidate’s knowledge of Notes to Financial Statements that are important to appointed actuaries and the considerations for a Statement of Actuarial Opinion when there are asbestos/environmental reserves

Solution:

- (a) Describe how this requirement is generally met by insurers without listing the premium amounts in the disclosure.

Commentary on Question:

For full credit, the candidate needed to specify where the amounts are located in the Annual Statement. The model solution specifies Schedule P Part 7A and represents a full credit solution. Full credit was also given for more generally specifying Schedule P Part 7.

This disclosure is generally met by including a notation to refer to Schedule P Part 7A.

5. Continued

- (b) Identify two disclosures required of insurers in Note 24, other than the net premiums written subject to retrospective rating and its percentage of total net premiums written.

Commentary on Question:

There are three other disclosures required of insurers. Only two were required for full credit. The model solution presents all three for completeness.

- Methodology for estimating accrued retrospective premium (ARP) adjustments.
 - Methodology for recording ARPs (through written premiums or by adjusting the earned premiums).
 - Calculation of the admitted and nonadmitted portions for the ARP asset.
- (c) Explain why it is important for the gross reserve amounts to be included in this note from a regulatory perspective.

Commentary on Question:

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

This disclosure is for liabilities from pre-1986 Commercial General Liability policies. These liabilities are very old. Many reinsurers of these old policies have ceased operations.

Also, some reinsurers have denied liability for certain asbestos/environment claims and some reinsurers subject to high asbestos/environment exposures have insufficient funds to meet all of their obligations.

- (d) Explain what a U.S. Appointed Actuary is required to include in the Statement of Actuarial Opinion (SAO) regarding asbestos/environmental reserves, other than in the RMAD discussion.

Commentary on Question:

For full credit, the candidate was required to indicate both the disclosure of amounts in Exhibit B and the disclosure of significance in the Relevant Comments section.

In Exhibit B, the Appointed Actuary is required to disclose the amount of net reserves for losses and loss adjustment expenses that the company carries for asbestos/environmental liabilities. Also, the Relevant Comments paragraphs of the SAO should describe the significance of these reserves.

5. Continued

- (e) Describe what a U.S. Appointed Actuary should do for the Opinion if the carried asbestos/environmental reserves are unreasonably low when compared to a material actuarial estimate of these reserves.

Commentary on Question:

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

The Appointed Actuary normally opines on the total reserves only. The Appointed Actuary would only change their opinion if this deficiency caused total reserves to be deficient.

- (f) Describe what a U.S. Appointed Actuary should do for the Opinion if it is determined by the actuary that the asbestos/environmental reserves are likely material but not reasonably estimable.

If the reserves are likely material, the Appointed Actuary must render a Qualified Opinion.

6. Learning Objectives:

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

Learning Outcomes:

- (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," Society of Actuaries Study Note

Commentary on Question:

This item tests a candidate's understanding of mass torts and their effect on the general insurance industry.

Solution:

- (a) Describe four similarities between the asbestos mass tort and the tobacco mass tort, other than the total cost of injury compensation.

Commentary on Question:

There are number of similarities between the asbestos mass tort and the tobacco mass tort. Only four were required for full credit. The model solution is an example of a full credit solution.

1. Both were toxic torts from product liability.
 2. Both involved injury to lungs from a product that involved years of exposure with a long latency period.
 3. Both involved exposure to millions of people creating many potential claimants.
 4. Both involved manufacturers that knew of the risks from their products, before it was known publicly, and that they did little to protect the public.
- (b) Explain why the asbestos mass tort has had a greater effect on the U.S. general insurance industry than the tobacco mass tort.

Commentary on Question:

There are a number of factors that contributed as to why the general insurance industry was affected by asbestos torts more than the tobacco torts. Not all were expected for full credit. The model solution is an example of a full credit solution.

For the asbestos mass tort, there were thousands of defendants involving many asbestos manufactures and manufacturers of products that used asbestos. The number of potential policies and insurers affected was large. The tobacco mass tort involved only four major tobacco companies. This limited the number of policies/insurers involved with tobacco.

6. Continued

Also, injury from asbestos mainly happened to those that worked in its manufacture and the manufacture of products that used it. This opened the door for courts to interpret asbestos liability as premises and operations liability and not product liability. Injury from tobacco happened only to those that had repeated exposure from using the product, so it was a products liability claim. Product liability policies have aggregate limits. Premises and operations policies only have occurrence limits without a limit on the number of occurrences, so liability is essentially unlimited.

- (c) Explain why the bankruptcies of asbestos defendants did not resolve the asbestos mass tort.

Commentary on Question:

There are several reasons why bankruptcies of asbestos defendants did not resolve the asbestos mass tort. Not all were expected for full credit. The model solution is an example of a full credit solution.

Under bankruptcy, the settlement for asbestos torts involves setting up a trust fund to cover tort claims at a fraction of their value. Asbestos is unique in that there are a great number of defendants; the fact that some defendants file bankruptcy and set up a trust fund does not create a final settlement for asbestos torts.

Also, in states with a rule of “joint and several liability,” a partially at fault defendant may be required to pay the full claim if other at fault defendants cannot meet their obligations.

7. 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.

(4d) Discuss market conduct regulation.

Sources:

Insurance Regulation, The Institutes

- Chapter 6 (Insurer Formation, Licensing, and Market Regulation)
- Chapter 7 (Underwriting Regulation)
- Chapter 8 (Rate Regulation)

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

Cappelletti, A., "Usage Based Insurance and Telematics," Society of Actuaries Study Note

Commentary on Question:

This item tests a candidate's understanding of insurance regulation regarding discrimination in rates, underwriting and marketing. Candidates were required to critique the IDLaP strategy in their response. Note that the verb critique does not mean criticize, it means a detailed analysis and assessment.

Widely varying full credit responses were possible for this item. The model solution is an example of a full credit solution.

Solution:

Critique the company's strategy of using the IDLaP subsidiary as a means of dealing with the European Court's ruling on gender discrimination.

The IDLaP strategy is an interesting one that may be somewhat successful. The European Court Ruling does not permit rating and underwriting by gender but does not prohibit targeted marketing as long as both genders have equal opportunity to purchase policies at rates that do not discriminate by gender. The IDLaP strategy does not rate by gender but markets to a specific gender. As long as both males and females can purchase policies, it would appear that this strategy would be acceptable under the law even though a certain percentage of young male drivers would be unwilling to be insured by IDLaP just because of the name. If it functions as predicted by the company, it could be very profitable.

7. Continued

However, there are several areas of concern with this strategy as presented:

- Regulatory authorities will likely not permit the cancellation of the current automobile insurance business. This should be changed to non-renewal with sufficient notice.
- The bumper sticker requirement will likely not be permitted through market conduct regulation. Making drivers advertise their insurer should not be a mandatory requirement for coverage. Without the bumper sticker requirement, the percentage of male drivers insured by IDLaP will be greater than without it. The strategy may not function as predicted.
- Gender is not a causative rating factor. It is a proxy for many other factors. Many insurers will implement rating systems with more causative factors to replace gender, such as those using telematics, to gain better drivers regardless of gender. IDLaP should consider the use of usage based insurance and telematics.

8. Learning Objectives:

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

Learning Outcomes:

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

Sources:

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

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

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

Actuarial Standards Board, Actuarial Standard of Practice

- No. 23, Data Quality
- No. 36, Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves

Commentary on Question:

This item tests a candidate’s knowledge of the responsibilities of an appointed actuary with respect to data quality and using the work of another.

Solution:

- (a) Describe the level of detail needed for each of the following two U.S. appointed actuary (AA) requirements:
 - (i) For the Statement of Actuarial Opinion (SAO), the AA must review the data for reasonableness.
 - (ii) For the Actuarial Report, the AA must reconcile data used to estimate reserves with the data reported in Schedule P.
 - (i) The data review is an informal examination of the obvious characteristics of the selected data to determine if such data appears reasonable and consistent for purposes of the assignment.
 - (ii) For the Schedule P reconciliation, the data used to estimate reserves must be reconciled and mapped at the segmentation of exposure or liability groupings from the analysis to Schedule P line of business reporting.

8. Continued

- (b) Draft your disclosure(s) related to *making use of the work of another* including where the disclosure(s) appear in your AA documents.

Commentary on Question:

This item asked for a draft of the disclosure. As such, there was an expectation that the response be worded appropriately for use as an opinion disclosure in order to earn full credit. The model solution is an example of a full credit solution.

The disclosure should be as follows:

In forming my Opinion, I made use of Sarah Brown, MAAA at Trustworthy Consulting to estimate asbestos and environmental liabilities of 100 million. I reviewed her methods for reasonableness.

This disclosure would be included in the Opinion Paragraph section of the Statement of Actuarial Opinion.

9. Learning Objectives:

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

Learning Outcomes:

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

Sources:

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

- Chapter 15 (Federal Income Taxes for General Insurers)

Commentary on Question:

This item tests a candidate's understanding of discounting loss reserves under U.S. statutory accounting and IRS tax law.

Solution:

Compare the discounting of loss reserves under U.S. tax accounting to that permitted under U.S. statutory accounting. In your comparison include the following:

- (i) Types of losses that may be discounted
- (ii) Discount rate selection
- (iii) Payment pattern selection

- (i) For U.S. tax accounting, all losses and LAE are to be discounted.

For U.S. statutory accounting, discounting of loss reserves is generally not permitted. It is only permitted for workers compensation indemnity claims (for wage replacement) using tabular discounting. Some states permit non-tabular discounting for medical malpractice loss reserves.

- (ii) For U.S. tax accounting, the rate is prescribed by the Secretary of the Treasury.

For U.S. statutory accounting:

- the discount rate is set by statute for tabular discounting, and
- the NAIC prescribes the maximum permitted rate for non-tabular discounting.

9. Continued

- (iii) For U.S. tax accounting, the payment pattern is selected by line from industry Annual Statement Schedule P Part 1 paid to incurred ratios by accident year.

For U.S statutory accounting:

- 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 loss amounts.

10. 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.
- (1d) Complete and interpret selected pages/schedules in the NAIC Annual Statement as included in the resources.
- (3b) Describe, interpret and apply the responsibilities of the actuary with respect to the Statement of Actuarial Opinion and the Actuarial Report.

Sources:

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

- Chapter 9 (Measuring Total Income by Line of Business)
- Chapter 14 (Overview of the General Insurance Statement of Actuarial Opinion)

NAIC Annual Statement

Case Study, Fall 2018, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

Commentary on Question:

This item tests a candidate's understanding of the different attributes of loss reserves and the computation of various items in the Insurance Expense Exhibit.

Solution:

- (a) Assess R-Dan General Insurance Company's (R-Dan's) recorded loss and loss adjustment expense (L&LAE) reserves against the following two attributes of reserves using your own judgement (not necessarily Sue Calvin's conclusion).
 - (i) Unbiasedness
 - (ii) Reasonableness

Commentary on Question:

The model solution is one example of a full credit solution. It does not reflect the only possible assessment. Different reasonable assessments can be made. Full credit was given as long as a reasonable assessment included appropriate support.

10. Continued

- (i) Unbiased – R-Dan booked reserves may be considered as unbiased because the booked reserves represent the expected level of obligations without any margins. However, we do not have any information as to how they were derived.
 - (ii) Reasonable – I do not consider R-Dan’s booked reserves to be reasonable. This is because booked reserves are 9% below the actuarial point estimate, I believe reserves are inadequate.
- (b) Calculate the effect on the following items for R-Dan’s 2017 IEE for this scenario:
- (i) Investment gain ratio
 - (ii) Mean surplus for the Homeowners line of business

All number in 000s

- (i) Investment gain ratio (IGR) = net investment gain (IG) divided by [Mean net loss and LAE reserves (LR) + Mean net UEPRs (UP) - Mean net agents' balances (AB) + Mean policyholders' surplus (PHS)] where all the amounts are as carried in the Annual Statement (AS).

We are given $IGR = 5.4\%$

We replace the LR in the IGR formula with the actuarial estimate LR_{ACT} . We must then also adjust PHS to PHS_{ACT} reflect this. Note that the increase to loss reserves is directly offset by a decrease in the PHS in the denominator of the IGR formula. Adjusting to the actuarial central estimate does not change the IEE IGR. Therefore, $IGR_{ACT} = IGR = 5.4\%$

- (ii) Mean surplus for the Homeowners (HO) line of business
Allocate the company's mean surplus to line of business in proportion to:
 $LR + UP + \text{Earned premium (EP)}$.

To adjust to the actuarial estimate, we must adjust both LR and PHS

$$\begin{aligned} PHS \text{ Ratio}_{ACT} &= PHS_{ACT} / (LR_{ACT} + UP + EP) \\ &= 178,030 / (300,420 + 194,200 + 578,500) = 16.6\% \end{aligned}$$

10. Continued

$$UP_{HO} = (81,800 + 98,700) / 2 = 90,250$$

$$EP_{HO} = 167,200$$

$$LR_{HO-ACT} = ((29,300 + 6,800 + 15,500) + (28,100 / (1 - 0.2))) / 2 = 43,363$$

$$PHS_{HO-ACT} = 16.6\% \times (90,250 + 167,200 + 43,363) = 49,904$$

If the actuarial reserve estimates were used instead of the carried reserve amounts, the mean surplus allocated to Homeowners using the IEE approach would decrease by approximately 8.5 million (58.4 – 49.9).

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:

- (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.
- (2a) Evaluate the financial health of a general insurer using information contained in the Annual Statement.
- (2c) Calculate and interpret the results of financial health ratios.

Sources:

Case Study, Fall 2018, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

NAIC Annual Statement

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

- Chapter 1 (Accounting Systems for General Insurers)
- Chapter 2 (Accounting for Insurance Contracts)
- Chapter 3 (Accounting for Financial Instruments)
- Chapter 9 (Measuring Total Income by Line of Business)
- Chapter 11 (Measuring Insurer Financial Strength)

Commentary on Question:

This item tests a candidate's ability to properly interpret items from the Annual Statement and communicate them in a memo.

Solution:

Write a memo to Yan including the following information:

- (i) A critique of Yan's calculation of the 2017 underwriting result from the table above.
- (ii) Limitations of using 2017 underwriting results to infer indicated rate increases.

11. Continued

- (iii) Your assessment of R-Dan's 2017 reported underwriting results with respect to current performance.
- (iv) Items required to properly estimate rate indications.

Commentary on Question:

There are many ways to organize a memo to addressing parts (i) to (iv). Bullet points were acceptable. The model solution is one example of a full credit solution.

To: Yan Laurel

Re: R-Dan's Underwriting Results

I have reviewed your analysis and have the following observations:

- Your calculation includes errors. Underwriting results should match earned premiums with incurred losses on a net of reinsurance basis. You have used direct written premium and direct losses. Furthermore, you added current unpaid losses to paid loss. You need to add the change in unpaid losses to paid loss in order to get incurred loss. Regarding the underwriting expense, you have taken paid plus current unpaid. You must use the incurred which is paid plus the change in unpaid. Also, item F is on Annual Statement Page 8 not Annual Statement Page 9.
- Even if your computation did not include the errors noted, the 2017 underwriting result is not necessarily a good metric for implying an indicated rate change. The underwriting result is a calendar year number, so the results include changes in incurred loss estimates from accident years prior to 2017. Furthermore, the earned premiums may not fully reflect all of the rate changes that have been implemented.
- As per Annual Statement Page 4, R-Dan's 2017 net underwriting result is a loss of 72.5million and the underwriting ratio is 113% ($651 \text{ million} / 578.5 \text{ million}$). This is a calendar year result. A better indicator of current performance should use accident year results. According to Schedule P Part 1, the net loss and loss adjustment expense ratio is 90%. Given an underwriting expense ratio of 17% ($98.2/578.5$) the accident year underwriting result is 107%. This would suggest that a rate increase may be necessary, but not of the magnitude indicated by the calendar year result.
- Even with a proper accident year underwriting result, it does not provide one with the proper basis for a rate indication. Rate indications need to take into account investment income generated by the funds held until claims are settled, any rate changes that have not yet been fully realized on renewals, and any trends in losses and expense costs. One needs to use data by line of business to calculate this properly.

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:

Case Study, Spring 2018, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

NAIC Annual Statement

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

- Chapter 12 (Solvency Monitoring)

Commentary on Question:

This item tests a candidate's knowledge of NAIC RBC calculations and where to retrieve some of the elements required in the calculation from the Annual Statement.

Solution:

- (a) Demonstrate that the RBC Basic Risk Charge for Reserves provided in the table above is computed correctly for Homeowners/Farmowners given that the company average development for this line of business is 0.966.

$$\begin{aligned} &\text{RBC Basic Charge for Reserves, Homeowners/Farmowners} \\ &= [\text{Net loss \& LAE reserves, gross of non-tabular} + \text{Other discount amount}] \times \\ &\quad \times [(\text{Industry loss \& LAE RBC \%} \times 0.5 \times (1 + \text{company adjustment factor}) + 1) \times \\ &\quad \text{Investment income factor} - 1) \end{aligned}$$

$$\text{Company adjustment factor} = \text{Company average development} / \text{Industry average development} = 0.966 / 0.97 = 0.996$$

$$\begin{aligned} &\text{RBC Basic Charge for Reserves, Homeowners/Farmowners} \\ &= 36,200 \times [(0.200 \times 0.5 \times 1.996 + 1) \times 0.95 - 1) \\ &= 5,054 \text{ which is equal to the value in the table.} \end{aligned}$$

- (b) Calculate R-Dan's RBC credit risk charge.

$$\begin{aligned} &\text{RBC credit risk charge for receivables for non-invested assets (AS page 2 Col 3)} \\ &= 1\% \text{ of investment income due and accrued} + 5\% \text{ of (tax recoverables, guaranty} \\ &\quad \text{receivables and recoverables from affiliates)} \\ &= (.01 \times 9,100) + (.05 \times (9,300 + 0 + 2,100)) = 91 + 570 = 661 \end{aligned}$$

12. Continued

RBC credit risk charge for reinsurance recoverables (Schedule F Part 3 Col 15)
= 10% of reinsurance recoverables
 $= .1 \times 30,900 = 3,090$

Total RBC credit risk charge = 3,751 (= 661 + 3,090)

(c) Calculate R-Dan's RBC Ratio.

$$\text{RBC} = R_0 + [R_1^2 + R_2^2 + R_3^2 + R_4^2 + R_5^2]^{0.5}$$

$$R_0 = 56$$

$$R_1 = 8,822$$

$$R_2 = 5,283$$

$R_3 =$ RBC credit risk charge for receivables for non-invested assets + 50% of
RBC credit risk charge for reinsurance

$$R_3 = 661 + 50\% \text{ of } 3,090 = 2,206$$

$R_4 =$ RBC reserving risk charge + 50% of RBC credit risk charge for reinsurance

[Note: no claims made or loss sensitive discounts apply]

$$R_4 = \text{Total Basic Charge} \times \text{Loss Concentration Factor} + \text{Excess Growth} + 0.5 \times 3,090$$

[Note: 45% excess growth applies to net loss & LAE reserves for a line of business where growth is >10%, with the excess capped at 30%. Reserves are from Schedule P Part 1 Columns 35 and 36 for each line of business schedule. For R-Dan, excess growth only applies to Homeowners/Farmowners]

$$R_4 = [33,619 \times 0.958] + [(0.25 - 0.10) \times 0.45 \times (29,300 + 6,900)] + 0.5 \times 3,090$$

$$R_4 = 32,207 + 2,444 + 1,545 = 36,196$$

$R_5 =$ RBC written premium risk charge

[Note: no claims-made or loss sensitive discounts apply]

$$R_5 = \text{Total Basic Charge} \times \text{Premium Concentration Factor} + \text{Excess Growth}$$

12. Continued

[Note: 22.5% excess growth applies to net written premium for a line of business where growth is >10%, with the excess capped at 30%. Premium is from Annual Statement page 6 Column 1. For R-Dan, excess growth only applies to Homeowners/Farmowners.]

$$R_5 = [57,192 \times 0.82] + [(0.25 - 0.10) \times 0.225 \times 184,100]$$

$$R_5 = 46,897 + 6,213 = 53,110$$

$$RBC = 56 + [8,822^2 + 5,283^2 + 2,206^2 + 36,196^2 + 53,110^2]^{0.5} = 65,182$$

RBC Ratio = Total Adjusted Surplus / Authorized Control Level

Total Adjusted Surplus = Policyholders' surplus for R-Dan because there is no discounting of reserves.

$$RBC \text{ Ratio} = 209,400 / (0.5 \times 65,182) = 643\%$$

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:

- (1a) Understand and apply the concepts of insurance accounting.
- (1b) Compare different financial reporting standards for general insurers including: U.S. Statutory Account Principles (SAP), U.S. Generally Accepted Accounting Principles (GAAP), Canadian Generally Accepted Accounting Principles (CGAAP), Solvency II and International Financial Reporting Standards (IFRS)
- (2i) Discuss the function of credit rating agencies and their impact on general insurers.

Sources:

Case Study, Fall 2018, SOA Exam General Insurance, Financial and Regulatory Environment – U.S.

NAIC Annual Statement

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

- Chapter 10 (Returns on Capital: Planning, Pricing and Performance)
- Chapter 13 (General Insurance Financial Ratings)

Commentary on Question:

This item tests a candidate's knowledge of different measurements of capital.

Solution:

- (a) Estimate R-Dan's capital under the following financial reporting systems:
 - (i) U.S. GAAP
 - (ii) IFRS
 - (iii) Market value

Commentary on Question:

The model solution indicates where the numbers are taken from in R-Dan's Annual Statement. This was not required for full credit.

13. Continued

“AS” refers to R-Dan’s 2017 Annual Statement.

GAAP Equity

= Statutory surplus + nonadmitted assets – bad debts + equity in UEPR

Statutory surplus = 209,400 (AS page 3 line 38 column 1)

Nonadmitted assets = 7,400 (AS page 2 line 28 column 2)

Bad debts = 500

Equity in UEPR

= Deferrable acquisition costs on UEPR

= 12% of 208,800 (AS page 3 line 9 column 1)

= 25,156

GAAP Equity = 209,400 + 7,400 – 500 + 25,156

= 241,356

IFRS 4 Capital

= GAAP equity + loss reserve discount – risk margins

Loss reserve discount

= Statutory loss reserves – Discounted unpaid net L&LAE using a rate based on the market for risk-free investments

Statutory loss reserves = 289,500 (AS page 3 lines 2 and 3 column 1)

Loss reserve discount = 289,500 – 275,000 = 14,500

Risk margins = 8,600

IFRS 4 Capital = 241,356 + 14,500 – 8,600

= 247,256

Market value = IFRS 4 capital + franchise value = 247,256 + 63,000

= 310,256

- (b) Explain why financial rating agencies in the U.S. do not use statutory surplus, GAAP equity, or market value capital for a financial strength rating.

Commentary on Question:

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

Rating agencies differentiate themselves from their competitors by developing their own proprietary economic capital models. These models generally include a diversification analysis. From the computed economic capital, they will infer a required surplus/GAAP equity to compare to the booked amounts.

14. Learning Objectives:

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

Learning Outcomes:

- (1d) Complete and interpret selected pages/schedules in the NAIC Annual Statement as included in the resources.
- (1e) Understand and apply the concepts of reinsurance accounting.

Sources:

NAIC Annual Statement

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

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

Commentary on Question:

This item tests a candidate's ability to calculate the Schedule F provision for reinsurance.

Solution:

Determine BDG's total Schedule F provision for reinsurance for the 2017 Annual Statement.

Commentary on Question:

The model solution represents a full credit solution.

PQ RE is authorized:

- Amounts in this calculation are in thousands.
- Determine if slow paying: Test ratio is loss recoverables on paid losses more than 90 days past due (claims not in dispute) divided by the total loss recoverables on paid losses (claims not in dispute) plus the payments received in the prior 90 days.
- Test Ratio = $(30 + 25) / (46 + 15 + 24 + 30 + 25 - 0 + 9) = 0.37 > 0.20$, therefore Q-Re is slow paying
- Provision = the greater of 20% of the unsecured total recoverables and 20% of the (loss recoverables more than 90 days past due and amounts in dispute)
= maximum of $[0.2 \times (46 + 15 + 24 + 30 + 25 + 48 + 24 + 28 - 150), 0.2 \times (30 + 25 + 0)]$
= 18
- This is less than the total recoverables of 240, so no capping is required.

14. Continued

UV Re is unauthorized, not certified:

- Amounts in this calculation are in thousands.
- Provision = total recoverables – collateral + minimum of [20% of (overdue recoverables + amounts in dispute), collateral]
= $40 + 23 + 30 + 25 + 12 + 55 + 19 + 0 - (16 + 85)$
+ minimum of [$0.2 \times (25 + 12 + 5)$, $(16 + 85)$]
= 111
- This is less than the total recoverables of 204, so no capping is required.

Therefore, BDG's total Schedule F provision for reinsurance for the 2017 Annual Statement is 129,000 (=18,000 + 111,000).

15. Learning Objectives:

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

Learning Outcomes:

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

Sources:

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

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

Commentary on Question:

This item tests a candidate's knowledge of flood risk and the involvement of government in its provision.

Solution:

- (a) Explain why flood risk is generally considered uninsurable without government involvement.

Commentary on Question:

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

There is frequent widespread flooding in areas close to the coast or rivers. Insurers would either charge unaffordable rates for those at the greatest risk or be subject to adverse selection (since those risks most likely to be flooded are most likely to purchase flood insurance). Governments have an interest in the properly managed development of flood plains to mitigate losses from floods.

- (b) State two purposes of the NFIP other than to provide flood insurance.
 - Identify flood risks
 - Manage flood risks
- (c) Describe a significant problem created by the NFIP's approach to extreme catastrophic events.

Commentary on Question:

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

15. Continued

For extreme events, the NFIP uses its borrowing authority against the U.S. treasury. Over time, this borrowing authority increased with each new disaster until there was a recognition that it could not be paid back in any reasonable timeframe.

- (d) Explain why homeowners insurance in Canada generally proved inadequate during the 2013 Calgary catastrophic flooding event.

Commentary on Question:

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

Homeowners policies do not cover flooding unless the policyholder purchases a special endorsement. This endorsement only covers sewage backup. This event mainly consisted of overland flooding which was not covered. Some losses were from sewer backup, but few homeowners had the endorsement.

- (e) Describe the French government's mechanism and conditions for these payments.

Commentary on Question:

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

A state-owned reinsurer offers subsidized and guaranteed coverage to insurers. Payments are made from this reinsurance protection if:

- The government declares a disaster;
- The property is covered by a policy; and
- There is a link between the disaster and the damage to the property.

16. Learning Objectives:

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

- (2d) Discuss the Canadian Minimum Capital Test and the Canadian Dynamic Capital Adequacy Test.
- (3b) Describe, interpret and apply the responsibilities of the actuary with respect to the Statement of Actuarial Opinion and the Actuarial Report.
- (3c) Compare the Statements of Actuarial Opinion in the U.S. and Canada.

Sources:

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

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

Commentary on Question:

This item tests a candidate's understanding of differences between the U.S. and Canada regarding the responsibilities of the appointed actuary.

Solution:

- (a) Compare the meaning of the following two attributes of an insurer's booked reserves:
 - (i) Sufficiency
 - (ii) Soundness

Commentary on Question:

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

Sufficiency of reserves refers to the ability of the reserves to provide an adequate amount to meet obligations. Soundness of reserves refers to the fact that sound reserves should be based on sound actuarial methods that may or may include a margin to meet obligations in adverse scenarios.

- (b) Compare the calculation of sufficient reserves in a Canadian insurer's Appointed Actuary's Report (AAR) to that in a U.S. Statement of Actuarial Opinion (SAO).

16. Continued

Commentary on Question:

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

In Canada, sufficient reserves are the actuary's estimate of the amount to meet the obligations. Canadian practice requires the discounting of all reserves with provisions for adverse deviation that reflect the level of uncertainty around the actuary's estimate. In the U.S., sufficient reserves are a reasonable amount to meet the obligations. They are generally not discounted and do not contain margins.

- (c) Compare what is required, if anything, for an actuarial peer review of opinions in the U.S. and Canada.

In Canada, the regulator requires an independent peer review of the AAR and the DCAT report by a fully qualified actuary. In the U.S., there is no mandatory peer review requirement.

- (d) Compare the purpose of the DCAT to the purpose of the actuarial reserve opinion.

Commentary on Question:

There are a number of ways that the comparison may be made. The model solution is one example of a full credit solution

The purpose of the DCAT is for the Appointed Actuary to opine on the future financial condition of the insurer. DCAT incorporates expected new business and investment strategy.

The purpose of the actuarial reserve opinion is to opine on reserve adequacy as they were at a point in time. As such, the actuarial reserve opinion only looks at current business

17. Learning Objectives:

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

Learning Outcomes:

- (1a) Understand and apply the concepts of insurance accounting.
- (1b) Compare different financial reporting standards for general insurers including: U.S. Statutory Account Principles (SAP), U.S. Generally Accepted Accounting Principles (GAAP), Canadian Generally Accepted Accounting Principles (CGAAP), Solvency II and International Financial Reporting Standards (IFRS)

Sources:

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

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

Commentary on Question:

This item tests a candidate's understanding of accounting for insurance contracts under both U.S. statutory accounting and U.S. GAAP.

Solution:

- (a) Provide NFAI's accounting entries for this policy on June 15, 2017 under U.S. GAAP if QCA did not remit the premium it owed on that date.

Cr credit record, Dr debit record, BS balance sheet, IS income statement

- Cr UEPR 2,400,000 (BS liability);
- Dr agents' balances 120,000 (BS asset);
- Dr premium receivable 1,800,000 (BS asset)
- Dr Deferred Acquisition Cost (DAC) 480,000 (BS asset)

- (b) Describe how the accounting entries provided in part (a) would differ under U.S. statutory accounting.

Instead of the Dr of 480,000 to a DAC asset on the BS, the agent's commission would be expensed immediately with a Dr to commission expense of 480,000 on the IS.

17. Continued

- (c) Determine the admitted and non-admitted amounts for the following assets of NFAI as related to this policy on December 31, 2017 under U.S. statutory accounting:
- (i) Agents' balances
 - (ii) Premium receivables

Commentary on Question:

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

- (i) Agents balances are for billed amounts still owing (the Sept. 15 and Dec. 15 instalments). The two installments total 1,200,000. At Dec. 31, the Sept. 15 instalment is over 90 days old, so it is not admitted. This also means all subsequent instalments are not admitted because it is an agency billing system. Therefore, the entire amount of 1,200,000 is nonadmitted.
 - (ii) Premium receivables are for the amount to be received from the policy that have not yet been billed. This would be for the March 15, 2018 installment of 600,000 and the audit premium of 100,000. However, because the Sept. 15 instalment balance is over 90 days old at Dec. 31, and it is an agency billing system, no subsequent installments are admitted. Therefore, the entire amount of 700,000 is nonadmitted.
- (d) Explain how NFAI should account for the deductible reimbursement receivable at the end of the policy period under U.S. statutory accounting.

Commentary on Question:

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

The 260,000 paid loss includes the deductible of 250,000. The recovery amount from the insured is 250,000. U.S. statutory accounting does not admit ten percent of unsecured receivables not yet due. The policy is unsecured so 10%, or 25,000, is a nonadmitted receivable asset and the remainder, 225,000, is an admitted receivable asset from the insured.

18. Learning Objectives:

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

Learning Outcomes:

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

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

Commentary on Question:

This item tests a candidate's knowledge of some of the elements of tort law and understanding the relevance of the U.S. Supreme Court decision in Wyeth v. Levine.

Solution:

- (a) Describe the two other categories of product defects.
 1. Defect in manufacture and assembly – the product does not correspond to the original design, and the injury has resulted from this fact.
 2. Defect in design - the product's design itself is faulty, and the injury has resulted from the design defect.
- (b) Explain the main difference between the application of strict liability and negligence to a tort law case.

Commentary on Question:

In order to get full credit, the response needed to address the fact that in a strict liability case there is no need to prove either the intention of the defendant or the degree of care used. This releases the plaintiff from the burden of proving that the defendant failed to take proper care. The model solution is an example of a full credit solution.

In a negligence lawsuit, the plaintiff has the burden to prove all elements of negligence, and the defendant has the burden of providing any defense. The defendant is presumed to have used due care until the plaintiff proves otherwise. The plaintiff needs to prove that the defendant failed to conform to the standard of care required in the situation that a reasonable cautious person would or would not do under similar situations.

18. Continued

Strict liability is the imposition of liability on a party without a finding of fault (such as negligence or tortious intent). The claimant need only prove that the tort occurred, and that the defendant was responsible. There is no need to consider how the defendant behaved (i.e. degree of care, intention of the defendant).

- (c) Explain the ruling of the Supreme Court of the U.S. regarding this argument.

Commentary on Question:

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

The Supreme Court ruled that the defendant misinterpreted the FDA requirements because the FDA does permit a manufacturer to strengthen its warning label without pre-approval from the FDA. Furthermore, the Supreme Court noted that it is ultimately the manufacturer, not the FDA, that bears primary responsibility for drug labeling.

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, Third Edition, Society of Actuaries

- Chapter 11 (Measuring Insurer Financial Strength)

Commentary on Question:

This item tests a candidate's knowledge of financial ratios as applied to general insurance companies.

Solution:

- (a) Define the following ratios for a general insurer:

- (i) Operating margin
- (ii) Underwriting leverage ratio

Commentary on Question:

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

- (i) Operating margin is the profit margin on operations. It is equal to $100\% - \text{operating ratio} = 100\% - [\text{loss ratio} + \text{expense ratio} - \text{investment ratio}]$. The ratios are relative to premiums.
 - (ii) Underwriting leverage ratio is a measure of capital support for written business. It is premium divided by capital. The higher the number, the more the insurer is leveraged.
- (b) Explain why the following operating margin strategies are typically used by general insurers:
- (i) High-volume/low-margin for personal lines policies
 - (ii) Low-volume/high-margin for commercial lines policies

Commentary on Question:

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

19. Continued

- (i) High volume/ Low margin strategy – This is a strategy for selling generic products in competitive markets. There is often automation of product and sales processes. Any losses from poor production or poor sales decisions are generally small. Sales margins are low to attract customers. This applies to personal lines in which product purchase is mainly based upon price.
 - (ii) Low volume/ High margin strategy – This is a strategy for attracting customers by differentiating products and personalizing services. It often includes non-standard policies provisions, significant underwriting judgement and services geared to specific customers. To earn higher sales margins, these insurers provide loss engineering expertise, claims-handling abilities and underwriting of unusual exposures. This applies to many commercial lines policies in which the purchase focuses on overall services and a product tailored to the specific risk.
- (c) State the expected range of leverage ratios for the following types of general insurers:
- (i) Personal lines writers
 - (ii) Commercial lines writers
-
- (i) premium to surplus ratio > 2.0
 - (ii) premium to surplus ratio < 1.5

20. Learning Objectives:

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

Learning Outcomes:

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

Sources:

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

- Chapter 12 (Solvency Monitoring)

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

Commentary on Question:

This item tests a candidate's understanding of various aspects of solvency regulation including Solvency II and state guaranty funds.

Solution:

- (a) Describe the following items related to the three Pillars of Solvency II:
 - (i) Three key valuation principles under Pillar I.
 - (ii) The Ladder of Intervention under Pillar I.
 - (iii) Two functions of an insurer that are required to have established policies and procedures under Pillar II.
 - (iv) One element of public disclosure under Pillar III.

Commentary on Question:

For part (i), there are many valuation principles. Only three were required for full credit. For part (iv), there are a number of public disclosures. Only one was required for full credit. The model solution is one example of a full credit solution.

- (i)
 - Investment assets valued at market value;
 - Property assets valued at fair value; and
 - Insurance technical provisions are to be the best-estimate liability equal to the expected value of the future liability cash flows discounted to present value using the appropriate risk-free interest rates with the addition of a risk margin.

20. Continued

- (ii) The Ladder of Intervention is the Solvency Capital Requirement (SCR) and the Minimum Capital Requirement (MCR). If an insurer's capital falls below the SCR, the regulator must take corrective action in an effort to restore the insurer's capital back to the SCR. The MCR sets the minimum level; if an insurer's capital falls below the MCR, the regulator will instigate liquidation of the insurer.
 - (iii) Pillar 2 sets governance and risk management requirements of insurers.
 - (iv) One element of public disclosure is an annual *Solvency and Financial Condition Report*.
- (b) Explain the difference between principles-based and rules-based regulation.

Commentary on Question:

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

Under a rules-based approach, the regulator specifies rules that insurance companies need to follow. No discretion is left for the company regarding valuation of items with specific rules.

Under a principles-based approach, regulation focuses on ensuring that insurance companies have effective risk management systems in place and that they hold the appropriate amount of capital for those risks. Companies have discretion regarding the assumptions used.

- (c) Explain how guaranty funds can reduce market discipline.

Commentary on Question:

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

With coverage from guaranty funds, policyholders have a reduced incentive to purchase from financially stable institutions.

- (d) Describe how guaranty funds can increase the amount of risk assumed by insurers.

The insurer's owners have an incentive to engage in risky activities with guaranty fund protection. This is because the gains of additional risk accrue to the benefit of the owners, while the losses from insolvency are borne by the guaranty fund.

20. Continued

- (e) Explain the purpose of including the *large net worth deductible* in the model act.

The original role of guaranty funds was to pay relatively small claims from those that are financially vulnerable. After the failure of several large commercial lines insurers, funds started paying for sophisticated corporate policyholders' claims. This limitation was added to remove coverage for firms with a very large net worth.

- (f) Identify four policy types that are almost always excluded.

Commentary on Question:

There are a number of policy types that are almost always excluded. Only four were required for full credit. The model solution is an example of a full credit solution.

Title, credit, mortgage and ocean marine.

21. 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:

NAIC Annual Statement

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

- Chapter 7 (Schedule P, Statutory Loss Accounting)

Commentary on Question:

This item tests a candidate's understanding of loss accounting in the NAIC Annual Statement generally and Schedule P specifically.

Solution:

- (a) Explain how to derive the loss ratios from the Schedule Ps as requested in Item I for all individual AYs from 2008 to 2017.

Commentary on Question:

In order to receive full credit, the candidate's response was required to indicate that the initial ultimate loss ratios picks, for the individual Accident Years shown in the latest Annual Statement (AS), need to be obtained from the AS of the prior 9 years. The model solution is an example of a full credit solution. Note that while the model solution shows the column/row numbers, this detail was not required for full credit.

The developed gross ultimate loss ratios by accident year booked in the latest Schedule P Part 1 Summary are available in column (29). For each individual accident year shown in the latest Schedule P Part 1 Summary, the initial gross ultimate loss ratio corresponding to each accident year is shown in the prior 9 Annual Statements in column (29), row (11). Only one loss ratio is picked from each Annual Statement from each of the prior 9 Annual Statements.

- (b) Explain what the rating agency could gain from a review of Item I.

Commentary on Question:

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

21. Continued

For each individual accident year (AY):

- if the initial gross ultimate loss ratio is above the current developed gross ultimate loss ratio, one might conclude that initial reserves for that individual AY were set conservatively.
- if the initial gross ultimate loss ratio is below the current developed gross ultimate loss ratio, one might conclude that initial reserves for that individual AY were set optimistically.

By reviewing this for all accident years, the rating agency may gain an understanding of how optimistically or conservatively the company sets up its initial loss ratio picks if there are distinct patterns. Consistently optimistic initial ultimate loss ratios may lead to ratings concerns on reserve adequacy.

- (c) Describe potential limitations from the rating agency review of Item I.

Commentary on Question:

There are a number of limitations. At least two were required for full credit. The model solution is one example of a full credit solution that describes two limitations.

The main limitation of the analysis is that only 10 years of development is available in Schedule P. For very long tailed lines, this analysis may be insufficient. Also using all lines combined obscures any differences caused by shifts in mix by line of business.

- (d) Explain how to derive net paid L&LAE using Schedule P Part 1 as requested in Item II.

Commentary on Question:

In order to receive full credit, the candidate's response was required to indicate that both the prior year's row and the oldest AY from the previous Annual Statement (AS) need to be excluded from the cumulative paid losses from the prior Schedule P Part-1. Note that the Statement of Income shows incurred losses. The paid losses included within this figure are obtained in the Underwriting and Investment Exhibit. The candidate did not need to note this to get full credit. The model solution is one example of a full credit solution.

Losses here refer to losses and loss adjustment expenses.

AS Statement of Income shows incurred losses. The paid losses included within this figure are obtained in the Underwriting and Investment Exhibit.

21. Continued

Total Net Paid Losses 2017 [as included in the 2017 AS Statement of Income]
= [Total Net Paid Losses from AS 2017 Schedule P Part 1 Summary]
minus
[Total Net Paid Losses from AS 2016 Schedule P Part 1 Summary excluding
both the prior years' row and oldest accident year)]

22. 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:

Mayer Brown, “*Understanding the New Financial Reform Legislation: The Dodd-Frank Wall Street Reform and Consumer Protection Act*,” Section on Title V – Insurance

Commentary on Question:

This item tests a candidate’s knowledge of federal entities created by the Dodd-Frank Act that affect general insurance.

Solution:

The following federal entities were created in the U.S. through the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank):

- (i) Financial Stability Oversight Council (FSOC)
- (ii) Federal Insurance Office (FIO)
- (iii) Bureau of Consumer Financial Protection (BCFP)

Describe two responsibilities of each entity.

Commentary on Question:

Each entity has a number of responsibilities. Only two responsibilities for each entity were required to earn full credit. The model solution is one example of a full credit solution.

- (i) FSOC
 - Responds to emerging threats to the U.S. financial system
 - Facilitates information sharing among regulatory agencies
- (ii) FIO
 - Preempts state laws that interfere with certain international insurance agreements
 - Identifies issues or gaps in the regulation of insurers that could contribute to a systemic crisis in the insurance industry or the U.S. financial system

22. Continued

(iii) BCFP

- Supervision, examination, and enforcement authority over most providers of consumer financial products and services
- Prescribe regulations designed to prevent a covered person or service provider from committing or engaging in an unfair practice in connection with transactions for consumer financial products