

Exam GIFREU

Date: Wednesday, October 28, 2020

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 21 questions numbered 1 through 21 with a total of 100 points.

The points for each question are indicated at the beginning of the question. Questions 9 – 12 pertain to the Case Study.

2. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions provided in this document.

Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel file as directed. Graders will only look at work in the indicated file.
 - a) In the Word document, answers should be entered in the box marked ANSWER. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example, β_1 can be typed as beta_1 and σ^2 can be typed as sigma^2.
 - b) In the Excel document formulas should be entered. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit. Rows can be inserted to the answer input area as required to provide space for your answer.
 - c) Individual exams may provide additional directions that apply throughout the exam or to individual items.
2. The answer should be confined to the question as set.
3. The Word and Excel files that contain your answers must be uploaded before time expires.

CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular investment structure to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

1. (4 points) Both U.S. GAAP and U.S. statutory accounting define risk transfer requirements for reinsurance accounting in the same way.

(a) (1 point) State the two conditions a contract must satisfy in order to receive reinsurance accounting.

ANSWER:

(b) (1 point) Identify two types of reinsurance contracts in which risk transfer is typically self-evident.

ANSWER:

The expected reinsurer deficit (ERD) measure is derived from the probability distribution of net economic outcomes.

(c) (1 point) Explain what the term *economic* means as used in the *probability distribution of net economic outcomes*.

ANSWER:

(d) (1 point) Provide the version of the ERD formula that includes tail value-at-risk (TVaR).

ANSWER:

2. (5 points) Insurance companies in the U.S. need to comply with the prevailing insurance laws in the state they are doing business.

- (a) (1 point) Describe two sources of state insurance laws that regulate insurance company operations for a state.

ANSWER:

A state's Department of Insurance (DOI) is the primary agency in charge of insurance industry regulation. However, state legislatures have significant influence in how state DOIs carry out insurance regulation.

- (b) (1.5 points) Describe three significant ways that state legislator actions influence insurance regulation in each state.

ANSWER:

A regulatory structure that includes a system of checks and balances can help control the negative effects of errors in insurer solvency regulation. The National Association of Insurance Commissioners (NAIC) provides a system of checks and balances to the U.S. state-based regulatory system.

- (c) (1.5 points) Describe how the NAIC provides these checks and balances.

ANSWER:

- (d) (1 point) Describe two activities undertaken by that NAIC that assist state regulators in their oversight of the insurance industry.

ANSWER:

3. (5 points)

- (a) (1 point) Identify the four elements that any contract must include in order to be legally enforceable.

ANSWER:

In addition to the four necessary elements of any legally enforceable contract, insurance contracts include certain special characteristics. One such characteristic is that they are contracts of indemnity.

- (b) (1 point) Identify four other special characteristics of an insurance contract.

ANSWER:

One special characteristic of an insurance contract provides the basis for releasing an insurer from its obligations under the contract because of an insured's concealment or misrepresentation.

- (c) (1 point) Provide the following regarding this special characteristic:

- (i) Identify the special characteristic
- (ii) Describe the special characteristic

ANSWER:

- (d) (2 points) Describe what an insurer must establish in order for the insurer to be released from its obligations for each of the following acts by the insured:

- (i) Concealment
- (ii) Misrepresentation

ANSWER:

4. (5 points)

(a) (2 points) Compare the purpose of the following three NAIC required documents:

- (i) Statement of Actuarial Opinion (SAO)
- (ii) Actuarial Opinion Summary (AOS)
- (iii) Actuarial Report

ANSWER:

Actuarial Standard of Practice (ASOP) No. 36, *Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves*, describes several dates.

(b) (1.5 points) Describe each of the following dates according to ASOP No. 36.

- (i) Accounting Date
- (ii) Review Date
- (iii) Valuation Date

ANSWER:

ASOP No. 36 recommends that opining actuaries review the prior opining actuary's work.

(c) (1.5 points) Describe what ASOP No. 36 specifies that the opining actuary should include in this review.

ANSWER:

5. (4 points)

- (a) (1 point) Describe the doctrine of *res ipsa loquitor* under tort law.

ANSWER:

- (b) (1.5 points) State the three conditions that a plaintiff must establish for application of *res ipsa loquitor*.

ANSWER:

In *States v. Lourdes Hospital*, the New York State Court of Appeals expanded the application of *res ipsa loquitor* by a plaintiff.

- (c) (1.5 points) Explain how the ruling in this case expanded the application of *res ipsa loquitor*.

ANSWER:

6. (5 points) You've been asked to create a report noting aspects of credit-based scoring for insurance.

(a) (0.5 points) Identify two credit characteristics that are commonly included in credit reports.

ANSWER:

(b) (0.5 points) Identify two personal characteristics that are commonly excluded from credit reports due to laws or regulations.

ANSWER:

(c) (2 points) Describe two potential harms to insurance consumers from allowing the insurance industry to use credit-based scoring for personal lines coverages.

ANSWER:

(d) (0.5 points) Identify two key types of non-insurance federal laws in the U.S. and/or Canada that affect an insurer's use of credit-based scoring.

ANSWER:

(e) (1.5 points) Provide an example of how insurers are affected by one of the types of federal laws identified in part (d).

ANSWER:

7. (4 points) JC Insurance (JCI) is a general insurer in the United States. You are given the following ceded reinsurance information for JCI as of December 31, 2019. Amounts in the tables are taken from JCI's Schedule F Part 3 exhibit and are in thousands.

Reinsurer	Reinsurance Recoverable on Paid Losses and Paid Loss Adjustment Expenses					Amounts in Dispute
	Current	Overdue				
		1 to 29 Days	30 to 90 Days	91 to 120 Days	Over 120 Days	
X Re	200	65	70	60	30	20
Y Re	300	45	55	75	20	25
Auto Pool	415	0	0	0	0	0

Reinsurer	Amounts Received Prior 90 Days	Known Case Loss & LAE Reserves	IBNR Loss & LAE Reserves	Unearned Premiums	Funds Held by Company Under Reinsurance Treaties
X Re	35	240	115	130	0
Y Re	55	185	60	0	0
Auto Pool	80	460	135	275	30

- JCI has no other reinsurance.
- None of the reinsurers are affiliated with JCI.
- All of the reinsurers are authorized in JCI's state of domicile and unrated.
- Amounts for Auto Pool reflect cessions to the mandatory automobile residual pool for which JCI acts as a servicing carrier.
- *Amounts in Dispute* are included in the amounts shown for *Reinsurance Recoverable on Paid Losses and Paid Loss Adjustment Expenses*.
- None of the amounts in dispute are overdue.
- JCI's management estimates that none of the loss recoverables are uncollectible.

The responses for all parts of this question are to be provided in the Excel spreadsheet.

- (a) (3 points) Calculate JCI's total Schedule F provision for reinsurance for the 2019 Annual Statement.
- (b) (1 point) Calculate JCI's NAIC RBC reinsurance credit risk charge for 2019.

8. (4 points) In many countries, governments find it necessary to become involved in the provision of insurance products sold to agricultural producers.

- (a) (1.5 points) Describe two types of agricultural insurance programs (or coverages) in developed countries where the government is involved in its provision.

ANSWER:

- (b) (1 point) Provide two reasons that have been used to justify government subsidies of agricultural insurance products.

ANSWER:

- (c) (0.5 points) Identify a type of agricultural insurance product that is typically handled by the private insurance market without government involvement.

ANSWER:

- (d) (1 point) Explain why the agricultural insurance product identified in part (c) does not typically need government involvement.

ANSWER:

**Questions 9 to 12 pertain to the Case Study.
Each Case Study question should be answered independently.**

- 9.** (7 points) Calculate the following amounts for R-Dan, on a total all lines combined basis, using the information provided in the Case Study's *Excerpts from the Annual Statement*.
- (i) (1.5 points) Unearned premium reserve (UPR) as of year-end 2017, gross of ceded reinsurance (i.e., direct plus assumed).
 - (ii) (1 point) Unpaid losses and loss adjustment expenses (L&LAE) as of year-end 2018, gross of ceded reinsurance.
 - (iii) (2 points) Adjusting and Other loss adjustment expense (A&O) payments during calendar year 2018, net of ceded reinsurance.
 - (iv) (1.5 points) A&O incurred during calendar year 2018, net of ceded reinsurance.
 - (v) (1 point) Loss payments during calendar year 2017, net of ceded reinsurance.

The response for this question is to be provided in the Excel spreadsheet.

*Questions 9 to 12 pertain to the Case Study.
Each Case Study question should be answered independently.*

- 10.** (6 points) You are given the following information for R-Dan's NAIC RBC calculation as of December 31, 2018:

Risk Charge category	Calculated Risk Charge (in thousands)
R ₀ charge	60
R ₂ charge	5,280
R ₄ charge (before conditional adjustment)	34,650
R ₅ charge	53,110
R _{CAT} charge	20,100

Bond Categories	Calculated Risk Charge (in thousands)
Federal government issued bonds	0
Class 1 bonds, issued by a U.S. government agency (USGA)	40
Class 1 bonds, not issued by a USGA	500
Class 2 bonds	1,040
Class 3 bonds	730
Class 4 bonds	1,100
Class 5 bonds	1,220
Class 6 bonds	1,830

- The *asset concentration charge* for fixed-income securities is calculated as 650,000.

Calculate the following for R-Dan's 2018 NAIC RBC:

- (i) R₁
- (ii) R₃ after conditional adjustment
- (iii) RBC Ratio

The response for this question is to be provided in the Excel spreadsheet.

*Questions 9 to 12 pertain to the Case Study.
Each Case Study question should be answered independently.*

11. (5 points) Based upon a preliminary review of data, the A.M. Best rating agency has informed R-Dan that it is considering a significant downgrade to R-Dan's financial rating pending a more thorough review of information from R-Dan during the interactive meeting.

- (a) (1 point) Provide two reasons why R-Dan should continue with the interactive meeting for a financial rating despite the potential for a financial rating downgrade.

ANSWER:

R-Dan management proceeds with the interactive meeting and provides the rating agency with all the information included in the Case Study and the complete Actuarial Report for year-end 2018. R-Dan management informs the rating agency that the projected financials (Section 6 of the Case Study) assume a constant 17% underwriting expense ratio, which is consistent with the current level of expenses experienced by R-Dan.

The rating agency notes that the Actuarial Report adequately supports Sue Calvin's point estimate for unpaid losses and loss adjustment expenses.

- (b) (3.5 points) Explain how the information provided by R-Dan management could lead to a financial rating downgrade giving consideration to:
- (i) Projected financials
 - (ii) Documents related to the Actuarial Opinion

ANSWER:

- (c) (0.5 points) Describe how a financial rating downgrade could affect R-Dan's business.

ANSWER:

*Questions 9 to 12 pertain to the Case Study.
Each Case Study question should be answered independently.*

12. (4 points) NAIC instructions for the Actuarial Report state that the appointed actuary must reconcile the data used to estimate reserves with the data reported in Schedule P.

(a) (1 point) Explain whether or not Sue Calvin's Schedule P reconciliation for R-Dan, as documented in her Actuarial Report, satisfies the NAIC instructions.

ANSWER:

Sue Calvin's point estimate for R-Dan's unpaid homeowner's losses included \$8 million for a hurricane which occurred late in 2018.

- This estimate was based on the output of a new hurricane model which R-Dan implemented in 2018.
- The model was run by Jerome Stewart, FSA, FCAS, MAAA who has been leading the Risk Management Department at R-Dan and running catastrophe models for 5 years.
- The data used in the model was audited by R-Dan's Internal Audit Department.
- Sue has no direct hurricane modeling experience and did not review R-Dan's model. However, as a consultant, Sue is generally familiar with the operation of hurricane models and she did review the results for reasonability.

(b) (2 points) Assess whether or not any disclosures are needed in Sue's Statement of Actuarial Opinion for R-Dan with respect to the 2018 hurricane loss. Justify your assessment.

ANSWER:

12. Continued

At R-Dan's request, Sue Calvin performed a premium deficiency reserve (PDR) calculation for R-Dan as of December 31, 2018.

Her estimates by line of business were as follows:

Line of Business	Unearned Premiums as of Dec. 31, 2018 (\$000)	Estimated Equity in Unearned Premium Reserves (\$000)
Private passenger auto liability	62,500	(3,125)
Commercial auto liability	500	25
Automobile physical damage	46,000	1,060
Homeowners multiple peril	98,700	10,365
Special Property	1,100	275

- (c) (1 point) Recommend a PDR for R-Dan to book (if any) based on Sue Calvin's work. Justify your recommendation.

ANSWER:

13. (4 points) In 2002, the European Union (EU) adopted Solvency I as the system of solvency regulation. In 2016, Solvency II replaced Solvency I. Solvency II overcame the main drawback of Solvency I.

(a) (0.5 points) State the main drawback of Solvency I.

ANSWER:

Solvency II establishes two separate capital requirements—a Solvency Capital Requirement (SCR) and a Minimum Capital Requirement (MCR).

(b) (0.5 points) Define the SCR under Solvency II.

ANSWER:

Solvency II provides for regulatory intervention based upon the relation of a company's capital to the SCR and MCR.

(c) (1 point) Indicate the regulatory intervention with respect to the SCR and MCR.

ANSWER:

(d) (0.5 points) Define regulatory forbearance.

ANSWER:

(e) (1.5 points) Explain how the regulatory system in the U.S. acts to reduce regulatory forbearance.

ANSWER:

- 14.** (4 points) Some states in the U.S. have banned the use of gender for rating certain lines of insurance. The European Court of Justice (ECJ) banned the use of gender for all insurance policies in the European Union (EU) effective December 2012. The ECJ decision was justified on the grounds that discrimination based on gender is incompatible with the EU Charter of Fundamental Rights.

Explain whether or not each of the following insurer actions by an automobile insurer in the EU would be permitted:

- (i) Providing a rate discount to insureds employed in specific jobs, that are typically dominated by females in the workforce, in which those employed in those jobs show a significantly lower loss cost than the average.

ANSWER:

- (ii) Testing insureds for signs of hearing loss and surcharging policies where the insured shows signs of hearing loss for frequencies above 1,000 Hertz. Studies have shown that drivers with significant hearing loss have higher loss costs. Some audiological studies have shown that women have better hearing than men at frequencies above 3,000 Hertz.

ANSWER:

- (iii) Surcharging policies where the automobile has an engine with a power rating of over 250 horsepower. This is in addition to the vehicle rating factor. Studies have shown that high horsepower vehicles have a higher loss cost than low horsepower vehicles. Two-thirds of high horsepower vehicles are driven by men.

ANSWER:

- (iv) For a direct writer, direct marketing of policies to females only.

ANSWER:

- (v) For an insurer writing through brokers, increasing broker commissions for policies where the insured is female.

ANSWER:

- 15.** (5 points) U.S. general insurer, WFH General, writes retrospectively rated workers compensation policies. You have the following information for WFH's retrospectively rated policies. Amounts in the second table are in millions of dollars (\$M) as indicated.

	Retro Adjustment Period				
	1	2	3	4	5
Loss Evaluation Age in Months	18	30	42	54	66
Selected Premium Development to Loss Development (PDL) Ratio	1.755	0.625	0.475	0.325	0.000
Percentage of Loss Emerged Since Prior Evaluation	76%	12%	6%	4%	2%

	Policy Year				
	2014	2015	2016	2017	2018
Completed Retro Adjustments as of 12/31/2019	4	3	2	1	0
Reported Losses as of 12/31/2019 (\$M)	180	169	108	102	78
Losses Reported at Prior Retrospective Adjustment (\$M)	179	166	104	90	0
Premium Booked at Prior Retrospective Adjustment (\$M)	230	228	170	162	0
Premium Booked as of 12/31/2019 (\$M)	230	226	170	165	155

	Development age in months				
	12	24	36	48	60
Cumulative Development Factors for Reported Policy Year Losses (i.e., reported loss age-to-ultimate factors)	3.075	1.325	1.133	1.030	1.008

- Premiums for policy years 2018 and prior are fully earned as of year-end 2019.
- Assume that no losses are reported for a policy year after 66 months of development.
- None of the unbilled premiums from the retrospectively rated policies are secured.

The responses for all parts of this question are to be provided in the Excel spreadsheet.

- (a) (4.5 points) Calculate the premium asset on WFH's retrospectively rated policies as of Dec. 31, 2019.
- (b) (0.5 points) Calculate the admitted portion of the premium asset from part (a) under U.S. statutory accounting.

16. (5 points) In the U.S., federal tax-basis loss reserves are determined using:

- Loss reserves derived from Schedule P
- Discount rates promulgated by the U.S. Treasury, and
- Loss payment patterns by line of business derived from Schedule P.

(a) (1 point) Explain why it is appropriate that the tax code uses Schedule P Part 1 information instead of the loss triangles in Schedule P Parts 2 and 3 for the derivation of loss payment patterns.

ANSWER:

In 2017, U.S. tax law reforms were enacted that affected the calculation of tax-basis loss reserves for general insurance companies

(b) (0.5 points) Identify the source of the discount rate used to calculate tax-basis loss reserves:

(i) Before the tax reform of 2017

(ii) After the tax reform of 2017

ANSWER:

(c) (1 point) Explain how the change in part (b) has affected tax liabilities for insurers.

ANSWER:

(d) (1 point) Describe two changes to the procedure for selecting loss payment patterns for tax-basis loss reserves that were introduced in the tax reform of 2017.

ANSWER:

(e) (1.5 points) Explain how anticipated salvage and subrogation (S&S) is handled in the calculation of tax-basis loss reserves.

ANSWER:

17. (4 points) International Standard of Actuarial Practice (ISAP) 1, *General Actuarial Practice*, states that an actuary should retain, for a reasonable period of time, sufficient documentation for purposes such as:

- peer review, regulatory review and audit;
- compliance with law; and
- assumption of any recurring assignment by another actuary.

(a) (1 point) Explain what is meant by *sufficient documentation* in the context of ISAP 1.

ANSWER:

ISAP 1 provides examples of reasonable steps an actuary can take to validate the quality of data.

(b) (1 point) Provide two examples of reasonable validation steps.

ANSWER:

The concept of materiality is important when considering data for an actuarial analysis. The American Academy of Actuaries' discussion paper on materiality references the 1992 case of *SEC v. Price Waterhouse*. The case relates to quantifying materiality in terms of a percentage range.

(c) (0.5 points) Describe a conclusion from this case.

ANSWER:

The International Actuarial Association's paper titled *The Function of the Actuary in Prudential Supervision* describes the following two different capital analyses:

- I. Dynamic Capital Adequacy (DCA)
- II. Strategic Capital Adequacy (SCA)

(d) (1.5 points) Compare these two types of capital analyses.

ANSWER:

18. (6 points) The Preamble to the NAIC Accounting Practices and Procedures Manual defines permitted accounting practices and prescribed accounting practices with respect to U.S. statutory accounting.

(a) (1.5 points) Describe what is meant by each of the following:

- (i) permitted accounting practice
- (ii) prescribed accounting practice

ANSWER:

The principles of U.S. GAAP and U.S. statutory accounting differ in many ways.

(b) (2 points) Identify the difference between U.S. GAAP and U.S. statutory accounting with respect to each of the following:

- (i) Intended audience
- (ii) Emphasis of accounting principles
- (iii) Financial exhibit that is emphasized
- (iv) Regulatory body

ANSWER:

(c) (1 point) Describe an accounting transaction with different treatment under U.S. GAAP vs. U.S. statutory accounting.

ANSWER:

18. Continued

Under U.S. statutory accounting, general insurance companies discount tabular indemnity loss reserves for worker's compensation in accordance with Statement of Statutory Accounting Principles No. 65 (SSAP 65), *Property and Casualty Contracts*.

SSAP No. 65 specifies four items that need to be disclosed for this type of discounting.

(d) (1.5 points) Identify these four disclosure items.

ANSWER:

19. (4 points) The NAIC uses both Financial Analysis Solvency Tools (FAST) scores and IRIS ratios for measuring the financial condition of insurers.

(a) (2.5 points) Describe how FAST scores and IRIS ratios differ with respect to each of the following:

- (i) Interpretation of result from an individual score/ratio
- (ii) Publication of results
- (iii) Weighting of results

ANSWER:

(b) (1.5 points) Identify three FAST scores with no corresponding IRIS ratio.

ANSWER:

20. (5 points)

(a) (1.5 points) Define each of the following statutes regarding the filing of suits under tort law:

(i) Statute of limitations

(ii) Statute of repose

ANSWER:

The *natural conditions rule* is that a landowner is not liable for natural conditions on the land that cause injury either on or off the land.

(b) (0.5 points) Provide one example in which the *natural conditions rule* for landowners might not necessarily apply.

ANSWER:

At one time, courts applied the common-law principle of *contributory negligence* as a defense to negligence actions.

The following two concepts are related to *contributory negligence*:

I. *Last clear chance*

II. *Assumption-of-risk*

(c) (1.5 points) Explain how each of these two concepts relate to the common-law principle of *contributory negligence* as a defense to negligence actions.

ANSWER:

20. Continued

Today, almost all jurisdictions have abandoned the common-law concept of *contributory negligence* in favor of the rule of *comparative negligence*. The specific rules for the application of *comparative negligence* vary by jurisdiction. There are four common variations of the rule that have been used. Two of these variations are the *49 percent rule* and the *50 percent rule*.

- (d) (0.5 points) Identify the two other common variations of the rule.

ANSWER:

Three people, Jermaine, Keira and Levar, were all negligent in an accident. It was determined that they contributed to the accident as follows:

Party	Jermaine	Keira	Levar
Degree of Fault	27.5%	27.5%	45.0%

The jurisdiction where the accident occurs follows the *49 percent rule* of comparative negligence. Assume that the plaintiff is Jermaine and the defendants are Keira and Levar. Keira and Levar did not suffer any significant losses from the accident. Jermaine's loss from the accident amounted to \$100,000 in total. Jermaine was successful in his suit against the defendants.

- (e) (1 point) State the amount that Jermaine will recover from each of the defendants.

ANSWER:

21. (5 points) All over the world, insurance companies are highly regulated and closely supervised.

- (a) (1 point) Describe two reasons why regulators closely monitor and regulate insurance company operations.

ANSWER:

All state Departments of Insurance (DOIs) in the U.S. regulate, to some extent, the prices that insurance companies charge for various insurance products and the type of coverage they offer to the public. State DOIs have legal authority to disapprove and require withdrawal of a premium rate or coverage for a variety of reasons.

- (b) (1 point) Identify four reasons why a state DOI may disapprove a proposed rate or coverage.

ANSWER:

In each state, the DOI has an Insurance Commissioner that is responsible for the operations of the DOI. In some states, the Insurance Commissioner is elected to office. In other states, the Insurance Commissioner is appointed to office.

- (c) (1.5 points) Provide three arguments in favor of an Insurance Commissioner being elected to office.

ANSWER:

- (d) (1.5 points) Provide three arguments in favor of an Insurance Commissioner being appointed to office.

ANSWER:

****END OF EXAMINATION****