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**SOCIETY OF ACTUARIES**  
**Financial and Regulatory Environment – U.S.**

# Exam GIFREU

## MORNING SESSION

**Date:** Thursday, November 2, 2017

**Time:** 8:30 a.m. – 11:45 a.m.

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### INSTRUCTIONS TO CANDIDATES

#### General Instructions

1. This examination has a total of 100 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 40 points).
  - a) The morning session consists of 13 questions numbered 1 through 13.
  - b) The afternoon session consists of 9 questions numbered 14 through 22.

The points for each question are indicated at the beginning of the question. Questions 9 to 13 pertain to the Case Study, which is enclosed inside the front cover of this exam booklet.

2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.
3. 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 on the exam booklet.

#### Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.
2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.
3. The answer should be confined to the question as set.
4. When you are asked to calculate, show all your work including any applicable formulas.
5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets because they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate morning or afternoon session for Exam GIFREU.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.



### **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.**

**\*\*BEGINNING OF EXAMINATION\*\***  
**Morning Session**

**1.** (5 points)

- (a) (1 point) Compare the use of internal company models for regulatory capital purposes in the U.S. with their use in the European Union (EU).
- (b) (2 points) Identify the statistical risk measure used for required capital under each of the following systems:
  - (i) NAIC RBC
  - (ii) Solvency II in the EU
  - (iii) A.M. Best's Capital Adequacy Ratio (BCAR)
  - (iv) Canadian Minimum Capital Test (MCT)
- (c) (1 point) Explain why rating agencies use insurer size and age as variables in computing required capital while the NAIC RBC does not.
- (d) (1 point) Describe how the BCAR formula leads to greater required capital for each of the following:
  - (i) A recently formed general insurance company
  - (ii) A small general insurance company

- 2.** (5 points) Tort law systems fall into one of two major categories in North America and most of Europe.
- (a) (0.5 points) Identify these two major categories of tort law systems.
  - (b) (1 point) Compare the two categories of tort law systems identified in part (a) with respect to:
    - (i) Function of the judge
    - (ii) Use of jury trials
  - (c) (1 point) Describe two reasons why tort law in most Commonwealth countries has not been significantly influenced by U.S. tort law.
  - (d) (1.5 points) Describe three reasons why tort law in the Commonwealth country of Canada has been significantly influenced by U.S. tort law.
  - (e) (1 point) Compare awards for punitive damages under U.S. tort law with those under Canadian tort law.

**3.** (5 points) In the NAIC White Paper, “The U.S. National State-Based System of Insurance Financial Regulation and the Solvency Modernization Initiative” (NAIC SMI), the NAIC adopted a framework that included the concept of a certified reinsurer.

- (a) (2 points) Describe the following as outlined in the NAIC SMI:
- (i) The process for a state to designate a jurisdiction as “qualified” with respect to certified reinsurers.
  - (ii) The criteria for a reinsurer to be designated as a certified reinsurer.
- (b) (0.5 points) Identify the main benefit to a reinsurer of being designated as a certified reinsurer.
- (c) (1 point) Describe Note 23I in the NAIC Annual Statement, Notes to Financial Statements, which applies specifically to insurers making use of certified reinsurers.

Framework General Insurance (FGI), a U.S.-based general insurer, has reinsurance in place from certified reinsurer Ply Re. Details for this reinsurance are as follows:

- The net amount recoverable from Ply Re is 10,000.
  - None of the amounts recoverable are more than 90 days past due.
  - None of the amounts recoverable are in dispute.
  - None of the amounts recoverable are for catastrophes.
- Ply Re has provided collateral in the amount of 3,000.
- Ply Re has the following financial ratings:
  - “A” from A.M. Best, “A-” from S&P, and “A1” from Moody’s.

The state of domicile for FGI has adopted the NAIC model law regarding certified reinsurance. The following table shows required collateral by state rating:

| State rating | Required collateral | A.M. Best’s rating | S&P’s rating | Moody’s rating |
|--------------|---------------------|--------------------|--------------|----------------|
| Secure-1     | 0%                  | A++                | AAA          | Aaa            |
| Secure-2     | 10%                 | A+                 | AA+ to AA-   | AA1 to AA3     |
| Secure-3     | 20%                 | A                  | A+, A        | A1, A2         |
| Secure-4     | 50%                 | A-                 | A-           | A3             |
| Secure-5     | 75%                 | B++, B+            | BBB+ to      | Baa1 to Baa3   |
| Vulnerable-6 | 100%                | B to F             | BB+ to R     | Ba1 to C       |

- (d) (1.5 points) Calculate FGI’s Annual Statement Schedule F provision for reinsurance with respect to reinsurance from Ply Re.

**4.** (4 points)

- (a) (1 point) Describe the accounting treatment of a financial transaction under U.S. statutory accounting if its treatment is not specified by the Statements of Statutory Accounting Principles (SSAPs).

According to SSAP 65, *Property and Casualty Contracts*, property and casualty insurance contracts can be written to cover insured events on the following reporting bases: occurrence, claims-made, and extended reporting.

- (b) (1 point) Describe the losses that are specifically covered by an insurance contract on an extended reporting basis.

SSAP 53, *Property and Casualty Contracts-Premiums*, provides the accounting rules with respect to premium deficiency reserves.

- (c) (1 point) Describe the circumstances under which an insurer should establish a premium deficiency reserve under SSAP 53.

SSAP 3, *Accounting Changes and Corrections of Errors*, provides the statutory accounting treatment in the event of mergers with respect to the restatement of financial information.

- (d) (1 point) Describe this SSAP 3 treatment for the restatement of prior years in the event of a merger for the following Annual Statement (AS) schedules:
- (i) Balance Sheet and Income Statement (column 4 of AS page 2; column 2 of AS pages 3 and 4)
  - (ii) Five Year Historical Summary (columns 2 to 5 of AS page 17)

**5.** (3 points) An important responsibility of many insurance regulators is to review proposed premium rates and determine whether the proposed rates are “reasonable.”

(a) (0.5 points) Describe the inherent difficulty encountered by insurance regulators in evaluating an insurer’s rates for reasonability.

(b) (1 point) Describe two possible actions that an insurance regulator may take if their evaluation determines that a submitted rate schedule is not reasonable.

The existence of an underwriting cycle is considered a contributor to general insurance rate volatility.

(c) (1 point) Describe how the underwriting cycle contributes to rate volatility.

(d) (0.5 points) Describe how insurance regulators attempt to mitigate rate volatility arising from underwriting cycles.



6. (5 points) You are given the following information for a U.S.-based general insurance company that writes retrospectively rated policies.

| Retrospective Rating Parameters             |      |
|---|------|
| Basic premium factor (BPF)                  | 0.20 |
| Expected loss ratio (ELR)                   | 75%  |
| Ultimate standard premium loss ratio (USLR) | 75%  |
| Loss conversion factor (LCF)                | 1.25 |
| Tax multiplier (TM)                         | 1.03 |
| Loss ratio at maximum ( $LR_{\max}$ )       | 1.20 |
| Loss ratio at minimum ( $LR_{\min}$ )       | 0.10 |

| Table M used by the company for retrospective rating |                       |                        |
|--|-----------------------|------------------------|
| Entry Ratio*   | Insurance Charge (IC) | Insurance Savings (IS) |
| 0.12   | 0.920                 | 0.040                  |
| 0.13   | 0.915                 | 0.045                  |
| 0.14   | 0.910                 | 0.050                  |
| 0.15   | 0.905                 | 0.055                  |
| 0.16   | 0.900                 | 0.060                  |
| 1.60   | 0.150                 | 0.750                  |
| 1.70   | 0.120                 | 0.820                  |
| 1.80   | 0.100                 | 0.900                  |
| 1.90   | 0.080                 | 0.980                  |
| 2.00   | 0.000                 | 1.000                  |

\* Entry ratio is rounded to 2 decimal places by the company to use Table M

| Retrospective Adjustment | Expected percentage of loss emerged (EPLR) | Loss elimination ratio from per accident limit (LERPA) | Incremental Loss Capping Ratio (ILCR) |
|--------------------------|--|--|---------------------------------------|
| First                    | 84%  | 2.0%   | 96.0%                                 |
| Second                   | 94%  | 2.5%   | 44.3%                                 |
| Third                    | 100%                                       | 3.5%   | 15.5%                                 |

- (a) (2.5 points) Demonstrate that the ILCR for the second retrospective adjustment is correctly displayed in the table above as 44.3%.
- (b) (2 points) Calculate the implied Cumulative Premium Development to Loss Development (CPDLLD) ratio for the first retrospective rating adjustment using the formula approach.

You are given the following information for a retrospectively rated policy for the policy period subject to its first retrospective adjustment:

|                                    |             |
|------------------------------------|-------------|
| Expected future loss emergence     | 145 million |
| Premium booked prior to adjustment | 155 million |

- (c) (0.5 points) Calculate the premium asset for the policy period subject to the first retrospective adjustment.

7. (4 points) Insurance contracts have certain distinctive features and their own body of law that extends beyond traditional contract law.

- (a) (1 point) Compare the concepts of concealment and misrepresentation in insurance contracts.
- (b) (1 point) Explain how court rulings on disputes between insurers and policyholders are affected by insurance contracts being considered contracts of adhesion.

An insurer issues a motor vehicle insurance contract to an applicant for an off-road recreational motorcycle (i.e., dirt-bike). The contract covers liability and physical damage. You are given the following details for this contract:

- The applicant had disclosed in the application to the insurer that the vehicle would be driven by his 14 year old son.
  - The producer delivered the insurance contract to the insured and verbally stated that the applicant's son is fully covered for operating the dirt-bike.
  - The actual policy wording in the contract included a clause which stated that operators of the vehicle must be at least 16 years of age for coverage to apply.
  - An accident occurred with the dirt-bike during the policy term.
  - The insured's son was in operation of the dirt-bike during the accident and was determined to be at-fault.
  - A claim is made against the policy for damage to the dirt-bike and bodily injury liability to a pedestrian.
  - The insurer denied the entire claim solely on the basis of the clause in the policy regarding operator age.
- (c) (2 points) Explain the legal principle which may obligate the insurer to pay this claim.

**8.** (5 points)

- (a) (1.5 points) Explain why flood risks usually require some form of government involvement to be considered insurable.
- (b) (1.5 points) Describe three differences between the capital structure of the National Flood Insurance Program (NFIP) and that of private insurers.

The NFIP includes private insurers through the Write-Your-Own (WYO) program.

- (c) (1 point) Describe two risks to an insurer by participating as a WYO carrier.
- (d) (1 point) Describe two challenges an insurer must consider when evaluating a potential move into writing private flood coverage.

**Questions 9 to 13 pertain to the Case Study.  
Each question should be answered independently.**

**9.** (5 points)

- (a) (2 points) Calculate R-Dan General Insurance Company's (R-Dan's) investment gain ratio for the 2016 Insurance Expense Exhibit (IEE).

In addition to the information in the Case Study, you are given the following information for the prior year regarding R-Dan's Private Passenger Auto Liability line of business:

|  |         |
|--|---------|
| Net unpaid losses  | 176,200 |
| Net unpaid loss adjustment expenses for Defense and Cost Containment (DCC) | 30,600  |
| Net unpaid loss adjustment expenses for Adjusting and Other (AO)           | 7,100   |
| Net unearned premium reserve   | 56,900  |

- (b) (2 points) Calculate R-Dan's 2016 mean surplus for the Private Passenger Auto Liability line of business using the IEE method of allocation.
- (c) (1 point) Provide two reasons why IEE mean surplus may not be appropriate for calculating profit margins in the ratemaking process.

**Questions 9 to 13 pertain to the Case Study.**  
**Each question should be answered independently.**

**10.** (6 points) The exceptional values for all but one NAIC IRIS Ratio are fixed. The IRIS Ratio 6 exceptional values are reviewed annually and adjusted if necessary based on the investment market. For 2016, the NAIC determined that the exceptional values for IRIS Ratio 6 should remain unchanged from their 2015 values.

(a) (4 points) Determine whether or not each of the following 2016 NAIC IRIS Ratios are exceptional for R-Dan General Insurance Company (R-Dan):

(i) IRIS Ratio 6 (Investment Yield)

(ii) IRIS Ratio 13 (Estimated Current Reserve Deficiency)

(b) (1 point) Provide one strength and one weakness of NAIC IRIS Ratio 13 in examining reserve deficiency.

R-Dan's Actuarial Report included a section entitled "Extended comments on unusual values for IRIS Ratios 11, 12 and/or 13."

(c) (1 point) Propose two additional items that could be included in this section that would increase its usefulness.

**Questions 9 to 13 pertain to the Case Study.**  
**Each question should be answered independently.**

**11.** (6 points) Sue Calvin, the Appointed Actuary for R-Dan General Insurance Company (R-Dan), evaluated the company's risk of material adverse deviation (RMAD) based on two standards: a percentage of reserves, and a percentage of policyholders' surplus.

(a) (1 point) State two alternative materiality standards that may be appropriate for an RMAD.

Sue Calvin selected a materiality standard of \$29 million for R-Dan's RMAD as the minimum of 15% of statutory surplus and 10% of net loss and loss adjustment expense reserves.

(b) (2 points) Select the materiality standard you would have used if you were the Appointed Actuary for R-Dan (whether the same or different from that selected by Sue Calvin). Justify your selection.

In her Statement of Actuarial Opinion, Sue Calvin opined that R-Dan's reserves made a reasonable provision for the liabilities she specified.

(c) (2.5 points) Critique Sue Calvin's opinion that the reserves are reasonable.

On March 25, 2017, R-Dan's CFO, E.J. Bailey, approached Sue Calvin to express concern that the Direct & Assumed Unpaid Losses & LAE recorded in Sue's Opinion did not reconcile with the company's Schedule P – Part 1 Summary. E.J. told Sue that there was a late change to these items in the Annual Statement but he didn't realize that these changes weren't communicated to her for the Opinion. The amounts net of reinsurance ceded reconcile.

(d) (0.5 points) Describe two steps Sue should take next.

*Questions 9 to 13 pertain to the Case Study.  
Each question should be answered independently.*

- 12.** (4 points) R-Dan General Insurance Company (R-Dan) uses its own annual statement data for calculating IRS tax accounting loss reserve discount factors.

For an approximation of the factor, R-Dan uses the following simplifying assumptions:

- Cumulative percentage paid amounts by development period should be rounded to the nearest 0.1%.
- Cumulative percentage paid amounts above 99.6% for a development period should be assigned a value of 100%.
- Once a cumulative percentage paid amount is 100% for a development period, it is 100% for all later development periods.
- The annual discount rate is 4%.

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

**Questions 9 to 13 pertain to the Case Study.  
Each question should be answered independently.**

**13.** (3 points) R-Dan General Insurance Company (R-Dan) has no bad debts. Deferrable acquisition costs under GAAP are assumed to be 20% of premiums.

(a) (1.5 points) Calculate R-Dan's GAAP equity.

R-Dan's 2016 Annual Statement Notes to Financial Statements, which were not included in the Case Study, would include Note 25, *Changes in Incurred Losses and Loss Adjustment Expenses*. The amount to be recorded in Note 25 can be calculated using amounts from the Annual Statement.

(b) (1.5 points) Calculate the amount that would be recorded in R-Dan's 2016 Note 25 on an all lines of business combined basis. Identify the data sources in your calculation.

**\*\*END OF EXAMINATION\*\*  
Morning Session**



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