

---

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

# Exam GIFREU

## MORNING SESSION

**Date:** Thursday, November 3, 2016

**Time:** 8:30 a.m. – 11:45 a.m.

---

### 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 14 questions numbered 1 through 14.
  - b) The afternoon session consists of 8 questions numbered 15 through 22.The points for each question are indicated at the beginning of the question.
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.



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

**1.** (4 points)

- (a) (1 point) Define the risk measure Tail Value-at-Risk (TVaR).
- (b) (1 point) Describe the main advantage of using the risk measure Risk Coverage Ratio (RCR) over TVaR for risk transfer testing of reinsurance contracts.

You are given an analysis that shows a reinsurance contract has a RCR of 1.45. You review the calculation and note that the calculation used a probability of net economic loss that was understated by 10% and an average severity of net economic loss that was understated by 15%. The expected economic gain across all possibilities used in the calculation was correct.

- (c) (1 point) Calculate the corrected RCR for this reinsurance contract.

Another risk measure for risk transfer testing of reinsurance contracts uses a multiple of Right-Tailed Deviation (RTD) and is referred to as  $\alpha$ RTD.

- (d) (1 point) Explain what may be implied by a reinsurance contract with an  $\alpha$ RTD of 6,000,000.

**2.** (5 points) Many jurisdictions require individuals driving an automobile to have a minimum amount of third-party liability insurance. Despite this legal requirement, some drivers find it difficult to obtain this insurance from private insurers.

(a) (1 point) Explain why it may be difficult or impossible for some individuals to get the required automobile insurance from private insurers.

In order to minimize the number of drivers without insurance, many jurisdictions have set up residual automobile insurance market programs. One type of residual market program is a joint underwriting association (JUA).

(b) (2 points) Describe the typical operational structure of a JUA.

In 2003, the Facility Association of Canada (FAC) published the position paper “Considerations for Residual Market Regulation” which included a number of recommendations for the efficient regulation and operation of residual markets.

(c) (2 points) Describe four recommendations from the FAC’s paper.

- 3.** (6 points) You are a consulting actuary for Small Mutual Insurance Company (SMIC). SMIC writes mostly homeowners policies in the northeast region of the United States.

SMIC submitted the results of its planning model to a rating agency. The planning model output is a set of Annual Statement pro forma schedules projected to the end of 2016. SMIC is concerned that a poor rating may harm its ability to write business.

You accompanied SMIC senior management in an interactive meeting with the rating agency on June 30, 2016. During the meeting, the lead rating analyst raised the following concerns with respect to the planning model output:

- The Summary for Schedule P Part 1 loss and LAE reserves did not cross check with the liabilities in the balance sheet for unpaid losses and LAE.
- The projected growth rate for written premiums is high at 15%.
- The net retention level for hurricane catastrophe occurrence coverage has increased over that of 2015.

During a break in the meeting, you conferred with SMIC's senior management and determined the following:

- The accountants created a Summary for Schedule P Part 1 by summing the individual line Schedule P Part 1 exhibits.
- The written premium growth estimate was the result of a 10% exposure base increase on homeowners' policies from a new inflation guard program and an increase of 6% on the homeowners' premium rate level.
- The company converted its replacement cost homeowners' policy to one that limits replacement cost to 125% of the policy limit. A study conducted by the company indicated that this change would result in a lowering of the aggregate exposure.

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

4. (4 points) You are given the following financial information for a general insurance company as of year-end 2014:

Accounting item	Amount
Admitted agents' balances	2,400
Non-admitted agents' balances	5,800
Unearned premium reserve (UEPR)	25,000

The following table includes information from all of the policies for the insurer from 2015:

Agent	Policy	Policy effective date	Premium payment frequency	Annual premium for policy effective in 2015	Agent's balance as of year-end 2015
Ace	A	Sept. 1	Annually	600	300
Ace	B	Nov. 1	Annually	1,200	0
Jack	C	Oct. 1	Annually	4,000	0
Jack	D	Nov. 1	Annually	12,600	9,500
Queen	E	Oct. 1	Annually	13,600	2,600
Queen	F	June 1	Quarterly	12,000	900
King	G	Dec. 1	Quarterly	2,400	0
King	H	Sept. 1	Monthly	3,000	200
King	I	Apr. 1	Annually	2,000	900

- When a policyholder has premium due, the amount due (i.e., the agent's balance) is for the current premium payment period.
  - The prepaid expense ratio for the insurer is 35%.
- (a) (1 point) Calculate the non-admitted agents' balances as of year-end 2015 under U.S. statutory accounting.
- (b) (3 points) Calculate the investable assets portion of the UEPR for calendar year 2015 based upon the investment income allocation procedure used in the Insurance Expense Exhibit from U.S. statutory accounting.

**5.** (6 points)

- (a) (1 point) Provide two ways that an appointed actuary's independence is preserved when the actuary issues a U.S. Statement of Actuarial Opinion.
- (b) (1.5 points) Describe three standards an actuary could consider in determining whether a particular item is material for opinion purposes.

Actuarial Standard of Practice (ASOP) No. 36, *Statements of Actuarial Opinion Regarding Property/Casualty Loss and Loss Adjustment Expense Reserves* and International Standard of Actuarial Practice 1, *General Actuarial Practice* both provide guidance for issuing a Statement of Actuarial Opinion.

- (c) (1 point) Compare the guidance from these two documents regarding handling a material data deficiency.

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

- (i) Accounting Date
  - (ii) Review Date
  - (iii) Valuation Date
- (d) (1.5 points) Define each of these three dates in the context of an actuarial opinion report.

ICE Insurance is a multi-line general insurer preparing its NAIC Annual Statement as of December 31, 2015. The work to produce the financial statements takes approximately one month to complete after year-end. The Annual Statement is published on January 30, 2016. A major ice storm occurs on January 2, 2016 causing a material level of automobile and homeowners' claims. Weather forecasts on December 30, 2015 predicted the major ice storm.

- (e) (1 point) Explain how an estimate for the ice storm losses should be reflected in the NAIC Annual Statement for ICE Insurance as of December 31, 2015.

**6.** (6 points)

- (a) (1.5 points) Define the Three Pillars of the European Union's Solvency II initiative.
- (b) (1.5 points) Assess how regulators in the U.S. address or are planning to address the issues raised by each of the Three Pillars of Solvency II.
- (c) (0.5 points) Describe one advantage and one disadvantage of internal capital models from the perspective of regulators.
- (d) (0.5 points) Describe one advantage and one disadvantage of internal capital models from the perspective of insurance companies.
- (e) (1 point) Provide two approaches for including a catastrophe component in a capital model.
- (f) (1 point) Describe types of operational risk that insurance companies face.



7. (3 points) A state department of insurance (DOI) is reviewing its system for regulating the solvency of general insurance companies domiciled in its state. You have been engaged as a consultant to assist in its review.

The DOI is:

- NAIC accredited and wishes to remain NAIC accredited;
- Concerned about the risk of insolvency from small and newly formed insurers;
- Concerned about the risk of insolvency from excessive reliance on reinsurance; and
- Not overly concerned with investments held by general insurers.

The DOI has submitted to you the following changes it is considering for its system of solvency regulation:

<b>Change</b>	<b>Description of change</b>
A	Re-compute NAIC IRIS ratios for companies writing in the state by increasing the net reserve and net premium amounts by 50% of the ceded amounts. Use the re-computed NAIC IRIS ratios to identify companies requiring further investigation.
B	Automatically double the NAIC RBC capital requirements for general insurers in the first ten years of operations and for general insurers with under 25 million in premium volume in the state.
C	Restrict reinsurance accounting to reinsurance contracts provided by reinsurers with an A.M. Best Rating of A- or higher.
D	Eliminate all diversity and liquidity investment requirements for general insurers licensed in the state.

Assess the changes being considered by the DOI.

**8.** (4 points)

Numerous tort reforms have been enacted by the states including:

- (A) Joint and several liability reform
- (B) Prejudgment interest reform
- (C) Collateral source rule reform

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

- (i) The rule of law prior to reform
- (ii) The purpose of the rule of law
- (iii) A shortcoming of the rule of law
- (iv) A reform that has been enacted that addresses the shortcoming

**9.** (3 points)

- (a) (1 point) Describe the location requirements for an insurer to be licensed as a domestic insurer in a state.
- (b) (1 point) Describe the difference between foreign insurers and alien insurers as defined by insurer licensing regulation in the United States.
- (c) (1 point) Identify two state licensing requirements that apply specifically to alien insurers.

**10.** (5 points) Casualty insurers may purchase an annuity to fund structured settlement payments to claimants.

(a) (1.5 points) Explain how annuity-funded structured settlement payments to claimants affect Schedule P loss development patterns.

MRH Casualty Insurance Company has 75 million in statutory surplus as of Dec. 31, 2015. MRH has arranged for structured settlements on a number of its liability insurance claims by purchasing annuities. The following table outlines key information with respect to MRH's structured settlements:

	<b>Statutory Value of Annuity at Purchase Date</b>	<b>Statutory Value of Annuity at Dec. 31, 2015</b>	<b>Annuity Payer</b>	<b>Annuity Payer Financial Rating</b>	<b>Annuity Payee</b>
(1)	1.1 million	0.9 million	ZM Life Insurance Co.	A+	MRH
(2)	0.5 million	0.4 million	ZM Life Insurance Co.	A+	Claimant
(3)	0.6 million	0.6 million	RX Life Insurance Co.	A	MRH
(4)	0.45 million	0.35 million	RX Life Insurance Co.	A	Claimant
(5)	0.7 million	0.55 million	QT Life Insurance Co.	B	Claimant
(6)	0.3 million	0.3 million	QT Life Insurance Co.	B	Claimant
(7)	0.75 million	0.65 million	YY Life Insurance Co.	B+	Claimant
(8)	0.2 million	0.2 million	YY Life Insurance Co.	B+	MRH
(9)	1.0 million	0.8 million	DP Life Insurance Co.	A-	Claimant

- MRH obtains a release of liability from the claimant whenever the annuity payer is financially rated A- or higher and the annuity payee is the claimant.
- ZM Life Insurance Co. is an affiliate of MRH.
- ZM Life Insurance Co. and YY Life Insurance Co. are licensed in MRH's state of domicile.
- RX Life Insurance Co., QT Life Insurance Co., and DP Life Insurance Co. are not licensed in MRH's state of domicile.

(b) (3.5 points) Construct MRH's required disclosures for Note 27 in the Notes to Financial Statements of its Annual Statement as of Dec. 31, 2015.

- 11.** (3 points) You are the pricing actuary for a U.S.-based insurance company that is considering offering products liability insurance in the country of Newlandia.

You have been provided the following data to assist you in pricing these policies:

A	An estimate of total direct tort costs in Newlandia for each of the last three years
B	Historical and projected GDP for Newlandia
C	Historical and projected consumer inflation data for Newlandia
D	Price of similar products liability policies sold in the U.S. by the insurer
E	An estimate of total tort liability costs as a percentage of GDP for the U.S. over the past five years

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

- 12.** (5 points) Northville Insurance Holding Company (NIHC) has a number of subsidiaries including Polar General Insurance (PGI) and Claims Handling of Northville (CHN). NIHC and all of its subsidiaries are domiciled in the United States. CHN acts as third party administrator for the primary general insurance subsidiaries of NIHC. CHN is not an insurance company.

PGI has an agreement with CHN in which CHN handles all of PGI's automobile bodily injury claims incurred during accident year 2015. CHN's handling of these claims includes payment of all loss adjustment expenses (LAE) for them. This agreement remains in effect as long as PGI remains solvent. On January 1, 2015, PGI paid CHN a onetime prepaid LAE fee in the amount of 10,000,000 for the services provided in this agreement.

- (a) (2 points) Explain how the prepaid loss adjustment expense fee of 10,000,000 would be accounted for by:
- (i) CHN in its 2015 financial statements; and
  - (ii) PGI in its 2015 statutory annual statement.

An automobile bodily injury accident insured by PGI occurred on August 1, 2015. CHN handled the claim for PGI and paid all LAE as they were incurred. As of December 31, 2015:

- CHN has paid 75,000 in LAE for this claim; and
  - The estimate of unpaid LAE for this claim is 250,000.
- (b) (3 points) Explain how the paid LAE and estimated unpaid LAE for this claim would be accounted for by:
- (i) CHN in its 2015 financial statements; and
  - (ii) PGI in its 2015 statutory annual statement.

**13.** (3 points) A state has a guaranty plan in case of insurer insolvency with the following features:

- Modeled using the NAIC’s Post-Assessment Property and Liability Insurance Guaranty Association Model Act.
- Covers personal lines of business only.
- Includes a deductible above the original policy deductible.
- Coverage for unearned premiums is set at 50%.
- Funded by assessments collected from insurers licensed in the state using a uniform assessment rate applied to direct premiums written in the state.

The state is NAIC accredited and it wishes to remain NAIC accredited. The state has hired you as a consultant to review the changes it is considering with respect to the guaranty plan. It is considering the following changes:

<b>Change</b>	<b>Description of change to the guaranty plan</b>
A	Extend coverage to all lines of business.
B	Modify coverage to include 100% reimbursement of unearned premiums and eliminate the plan deductible for claims above the original policy deductible.
C	Include buildup of a pre-insolvency assessment fund in addition to post-insolvency assessments. The pre-insolvency assessment fund should have a target fund level large enough to cover 25% of the cost of insolvency for the state’s average general insurer. The fund is to be built up over five years.
D	Double both pre- and post-insolvency assessment rates for small insurers and insurers in operation for less than ten years. This is intended to account for their increased risk of insolvency.

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

- 14.** (3 points) You are the appointed actuary for EZ Insurance. Your analysis shows that the direct plus assumed reserves are a reasonable estimate, but the net reserves are deficient because of a poor likelihood of collectibility.
- (a) (0.5 points) State the type of opinion you would issue for EZ Insurance.
  - (b) (1 point) Draft part C of the Opinion section, relating to reserve adequacy, for inclusion in the Statement of Actuarial Opinion for EZ Insurance.
  - (c) (1.5 points) Describe three ways to analyze the collectibility of reinsurance recoverables.

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



**USE THIS PAGE FOR YOUR SCRATCH WORK**

**USE THIS PAGE FOR YOUR SCRATCH WORK**