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

Exam GIFREU

MORNING SESSION

Date: Thursday, May 5, 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 12 questions numbered 1 through 12.

   b) The afternoon session consists of 9 questions numbered 13 through 21.

   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) (*1.5 points*) Explain how uniform risk charges in a regulatory required capital formula, such as NAIC RBC, may lead to behavior by an insurer that increases its risk of insolvency for each of the following types of risks:

(i) Reserving risk

(ii) Reinsurance credit risk

(b) (*1.5 points*) Explain why the NAIC adopted Own Risk Solvency Assessment (ORSA) reporting as part of the solvency monitoring regime for insurers.

In addition to RBC and ORSA, regulatory solvency monitoring in the U.S. includes on-site risk-focused examinations.

(c) (*1 point*) Explain how duplicative examination efforts by state regulators are minimized for insurers writing in multiple states.

2. (*7 points*) You are selected to be the external Appointed Actuary for New Insurance Commercial Enterprise (NICE). NICE writes commercial property insurance. The company has grown rapidly over its two years of operations and needs a Statement of Actuarial Opinion (SAO) at year-end 2015. For year-end 2014 the domiciliary regulator granted an exemption from the SAO.

(a) (*0.5 points*) Identify two reasons the regulator may have granted NICE an exemption from the SAO requirement in its first year of operation.

As of year-end 2015, you have the following amounts for NICE:

Net case reserves	6.5
Total reserves reported in the Annual Statement for net loss and loss adjustment expenses	6.3
Actuarial range of reasonable estimates for total reserves	7.0 to 9.0
Reported surplus in the Annual Statement	1.5

All amounts are in millions.

(b) (*1 point*) Select the type of SAO indicated by the total reserves reported by NICE management. Justify your selection.

The SAO requires disclosure with respect to risk of material adverse deviation.

(c) (*1 point*) Explain whether or not there would be a risk of material adverse deviation for NICE.

(d) (*1.5 points*) Explain why an actuary might select a range of estimates without selecting a point estimate within the range.

You have been informed that NICE is in negotiations to acquire a competitor. You know that the competitor has provided coverage that can reasonably be expected to produce asbestos liability claims activity.

(e) (*1 point*) Identify the data you should review with respect to asbestos liability exposures for the next year's SAO, assuming that the acquisition is successfully completed.

(f) (*2 points*) Describe four aspects of the company's asbestos liability exposures that you should comment on in next year's SAO, assuming that the acquisition is successfully completed.

3. (*8 points*)

(a) (*2 points*) Describe the two necessary conditions for a reinsurance contract to meet the requirement for transferring insurance risk in U.S. statutory accounting.

Bru Re is a company that reinsures all types of general insurance coverages. You are given the following information to analyze one of Bru Re's annual assumed reinsurance aggregate excess of loss contracts for JB General Insurance:

Gross annual aggregate claim amount (in millions)	Probability
0	80.0%
50	12.5%
350	7.0%
1,000	0.5%

- Coverage: 500 million excess of 40 million on an aggregate basis for losses occurring during the reinsurance contract term, all lines of business combined
- Premium: 50 million
- One-year Treasury rate at contract inception: 5%

JB's aggregate excess of loss reinsurance with Bru Re does not include any contract provisions that shift underwriting risk back to JB. JB uses reinsurance accounting for this reinsurance contract. JB uses Risk Coverage Ratio (RCR) as a measure for testing risk transfer.

(b) (*2.5 points*) Calculate the RCR, in percentage form, for JB's aggregate excess of loss contract with Bru Re.

(c) (*1 point*) Explain why JB would likely not need to test for risk transfer with respect to this aggregate excess of loss contract with Bru Re.

(d) (*0.5 points*) Identify an example of a reinsurance contract provision that could have been included in this aggregate excess reinsurance contract that would shift insurance risk back to JB.

In U.S. statutory accounting, the CEO and CFO of a company must make several attestations with respect to the company's ceded reinsurance contracts in the Annual Statement Reinsurance Attestation Supplement.

(e) (*2 points*) Describe two of the required attestations.

4. (*3 points*) Insurance regulation in the U.S. underwent a number of changes after the Supreme Court's decision in 1944 with respect to the South-Eastern Underwriters Association (SEUA). The SEUA decision made the business of insurance subject to a number of Congressional acts including the Federal Trade Commission (FTC) Act.

(a) (*0.5 points*) Identify two other Congressional acts that the business of insurance was subject to after the SEUA decision that the insurance industry believed would change normal industry practice.

In 1947, the NAIC's Act Relating to Unfair Methods of Competition and Unfair Deceptive Acts and Practices in the Business of Insurance (Unfair Methods) was adopted. It essentially preempts application of the FTC Act to the business of insurance.

(b) (*0.5 points*) Identify two activities by insurers that are prohibited by the NAIC's Act Relating to Unfair Methods.

In 1999, Congress passed the Gramm-Leach-Bliley Act (GLB), also referred to as the Financial Services Modernization Act.

(c) (*1 point*) Explain how GLB affected regulation of the business of insurance.

In 2010, Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act, also referred to as the Dodd-Frank Act. One of the provisions of the Dodd-Frank Act was to establish the Federal Insurance Office (FIO).

(d) (*1 point*) Describe the conditions under which the FIO may preempt state measures of insurance regulation.

5. (*4 points*)

(a) (*1.5 points*) Explain how one would reconcile *Total Losses and Loss Expenses Incurred* as shown in Annual Statement Schedule P Part 1 – Summary to the sum of the following amounts from the Statement of Income:

(i) Line 2 (*Losses incurred*); and

(ii) Line 3 (*Loss adjustment expenses incurred*).

(b) (*1 point*) Explain the effect on a company's Schedule P Part 2 incurred loss development if one of its reinsurers becomes insolvent and its reinsurance recoverables become uncollectible.

(c) (*0.5 points*) Describe the circumstances under which the historical loss development figures in Schedule P Part 2 from a prior year's annual statement will differ from the corresponding figures included in the current year's annual statement even though there are no errors or corrections.

Actuaries often derive triangles by line of business for diagnostic purposes using the development triangles included in Schedule P. An example of this would be *average paid severity development on claims closed* using Schedule P Part 3 paid losses in the numerator and Schedule P Part 5 claims closed with payment in the denominator.

(d) (*1 point*) Describe two potential issues that may limit the usefulness of the Schedule P derived average paid severity development on claims closed triangles, as described above, for a trend analysis even when there is a sufficient volume of claims data to make inferences.

6. (*6 points*) FRE Electronics Corporation manufactures consumer electronics including cellular phones. FRE phones include signal boosting technology that increases reception significantly but also significantly increases the level of radiofrequency emitted by the phone. FRE's target market for its phones is children and young adults.

A class action suit, based upon strict liability, has been filed in a U.S. state against FRE alleging that its phones increase the incidence of brain cancer in children due to dangerously high radiofrequency emissions. Among the plaintiffs are two children that used FRE phones over the past year and have recently been diagnosed with brain cancer. Both children are resident in the state of the suit.

There is general consensus in the scientific community that:

- Most peer-reviewed cohort studies of the general population show no correlation between cell phone use and the incidence of brain cancer.
- Most animal studies on radiofrequency emissions from cell phones are inconclusive.
- Animal studies that found a correlation between brain cancer and radiofrequency emissions involved using a level of radiofrequency emissions that is too high relative to that found in normal cell phone use.
- Increased exposure levels are sometimes used in animal studies in an attempt to project results for long-term exposures in a shorter time frame.
- Children are theoretically at greater risk than adults for developing brain cancer from the use of cell phones.

The plaintiffs' case depends upon the admission of expert testimony by Dr. Key, a medical research doctor. Dr. Key's testimony is to include the following:

- An experiment showed mice exhibited a significant increase in the incidence of brain tumors when subjected to the type of radiofrequencies emitted by cell phones.
- The level of radiofrequency emissions used in the experiment was two times higher than the levels emitted by FRE phones, and the mice were subjected to the radiofrequencies for sixteen hours a day, every day, for a period of two months.
- The same experiment was repeated but only the initial experiment showed a significant increase in the incidence of brain cancer. The follow-up experiment was statistically inconclusive but showed a slight increase in the incidence of brain cancer.
- The experiments followed established protocol for research experiments on animals.
- Results of the experiments were published but not peer reviewed.

6. **Continued**

(a) (*3 points*) Assess the likelihood that the plaintiffs' expert testimony will be admitted by the judge presiding over this case using the U.S. Supreme Court decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.* as a guide.

(b) (*3 points*) Assess the applicability of strict liability as a basis for this tort.

7. (*5 points*) You work for MGI, a general insurer domiciled in the United States, which only writes Homeowners Multiple Peril (HO) and Fire insurance.

MGI's Annual Statement for the year 2015 included the following information:

	Amounts for 2014			**Amounts for 2015**		
	HO	**Fire**	**Total**	**HO**	**Fire**	**Total**
Written Premium	1,600	650	2,250	1,750	750	2,500
Earned Premium	1,550	625	2,175	1,700	725	2,425
Net Investment Income			200			215
Realized Capital Gains			35			20
Unrealized Capital Gains			50			75

	Amounts as of Year End 2014			**Amounts as of Year End 2015**		
	HO	**Fire**	**Total**	**HO**	**Fire**	**Total**
Agents' Balances	70	30	100	90	40	130
Losses	250	85	335	300	80	380
Loss Adjustment Expenses	20	10	30	25	10	35
Policyholders' Surplus			5,500			6,000

Amounts in the tables are in thousands.

- The prepaid expense ratio is 20% for both HO and Fire.
- As of year-end 2014, the unearned premium reserves were 850,000 for HO and 450,000 for Fire.

Calculate MGI's investment gain allocated to HO for the 2015 Insurance Expense Exhibit.

8. (*6 points*) RGO Insurance writes personal automobile insurance in a single state that has a prior-approval law for automobile rate filings. RGO's latest filing with the state introduces a Pay-How-You-Drive usage-based insurance (UBI) system for automobile insurance rates using telematics. The state does not have any laws or regulations for UBI telematics rating. RGO's filing is the first UBI telematics filing in the state.

RGO's filing includes the following:

A	Current insureds must switch to the UBI telematics insurance policy at renewal or they will not be renewed.
B	All current rating factors will be eliminated and replaced by UBI telematics rating as the sole rating factor.
C	Telematics will be provided by the policyholder running an app on a smartphone.
D	The smartphone app is to collect and transmit to RGO the following information in real time: time of day, GPS location, directional g-forces, and speed.
E	RGO estimates that its rate filing will be revenue neutral based upon some very broad assumptions about driver behavior and policyholder retention. Some policyholders may have a rate increase in excess of 50% for unsafe driving habits.
F	Every policyholder will be charged the same base rate at policy inception, which represents a minimum policy premium. The base rate is to initially be set at the lowest rate available in RGO's current rate manual.
G	The policyholder will then be billed a surcharge every two months based upon the frequency and severity of unsafe driving habits. The surcharge will be automatically charged to the policyholder's smartphone account. Rejection of the charge to the account will result in immediate termination of the policy.
H	RGO notes that its surcharge algorithm is complex and proprietary so it cannot reveal the formula. Every combination of unsafe driving habit factors feeds into a point system in which every ten points equals a 1% surcharge. The surcharge bill will only reveal the number of points and the amount of the surcharge for every two-month period.

You have been engaged as a consultant to advise the state regulator on UBI regulation and RGO's rate filing.

Recommend four changes to RGO's UBI rate filing in order to allay potential regulatory concerns. Justify your recommendation.

9. (*5 points*) You are a state regulatory actuary in the U.S. and XYZ Insurance is domiciled in your state. You have noted that XYZ has been making some questionable decisions including:

- Investments in a large amount of non-investment grade bonds;
- Reliance upon a large amount of reinsurance with financially weak reinsurers; and
- Entering negotiations to acquire a competitor that has unfavorable combined ratios and a volume of business comparable to XYZ.

The *Insurer Receivership Model Act* identifies the following as main grounds for regulatory action:

A. Impairment, insolvency, or hazardous financial condition;

B. Improperly disposed property or concealed, altered, or destroyed financial books;

C. Best interest of policyholders, creditors or the public; and

D. Dishonest, improperly experienced, or incapable person in control.

(a) (*2.5 points*) Explain how each of the main grounds for regulatory action identified above justify or do not justify regulatory action regarding XYZ's operations.

(b) (*2.5 points*) Describe one way that a regulator can use each of the following to show that XYZ may require regulatory action:

(i) NAIC Annual Statement

(ii) NAIC Risk-Based Capital (RBC)

(iii) Statement of Actuarial Opinion (SAO)

(iv) NAIC Own Risk and Solvency Assessment Report (ORSA)

(v) Financial rating from a major national rating agency

10. (*4 points*)

(a) (*2 points*) Describe four key differences between private-sector insurance and insurance offered in the U.S. through the National Flood Insurance Program.

Marshlandia, a developing country, is seeing an increase in its national economic exposure to catastrophic floods. No insurers currently offer flood coverage in the country. Past catastrophes have been addressed by the government expending funds and resources for clean-up and recovery. Government expenditures have focused on restoring infrastructure and commercial properties. Residential property owners have been given disaster assistance which is generally insufficient to cover the cost of repairing damage to their dwellings.

The government of Marshlandia is now looking to stimulate the offering of flood insurance in the private insurance market. You have been engaged as a consultant to advise it.

(b) (*2 points*) Propose two actions the government can undertake to stimulate the offering of flood insurance in the private insurance market. Justify your proposals.

11. (*4 points*) Jax General Insurance Company (JGIC) reported a 2015 calendar year loss ratio of 65% and a 2015 accident year loss ratio of 60%.

(a) (*1 point*) Explain whether JGIC's loss ratio information for 2015 is consistent with the practice of "reserve strengthening."

You are given the following information for JGIC:

Accident Year	**Ultimate Loss Ratio**	
	as of Year-End 2014	**as of Year-End 2015**
2013	40%	40%
2014	50%	50%
2015	n/a	60%

Payment Year	**Expected Loss Payment Pattern – Percentage Paid**
1st	50%
2nd	30%
3rd	20%

- Historical losses have followed the expected loss payment pattern exactly.
- Losses are paid, on average, in the middle of the year.
- Calendar year earned premiums have been constant at 100 million per year.
- The annual discount rate is 3%.
- The marginal income tax rate is 35%.
- Discounting of loss reserves for tax purposes uses the expected loss payment pattern as shown in the above table.

JGIC is interested in the effect loss reserve discounting has on its 2015 income tax liability.

(b) (*3 points*) Calculate the difference between JGIC's 2015 income tax liability using discounted loss reserves and its income tax liability using undiscounted loss reserves for accident years 2013 to 2015.

12. (*4 points*)

(a) (*2 points*) Provide one argument for and one argument against the use of medical care cost trends as a proxy for tort cost trends for pricing a liability book of business.

(b) (*1 point*) Explain the purpose of tort reform with respect to the collateral source rule.

(c) (*1 point*) Describe what distinguishes mass torts from other torts.

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

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