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# Exam 6-Canada

## Regulation and Financial Reporting (Nation Specific)

April 25, 2014

4 HOURS

### INSTRUCTIONS TO CANDIDATES

1. This 73 point examination consists of 34 problem and essay questions.
2. For problem and essay questions, the number of points for each full question and part of a question is indicated at the beginning of the question or part. Answer these questions on the lined sheets provided in your Examination Envelope. Use dark pencil or ink. Do not use multiple colors or correction fluid.
  - Write your Candidate ID number and the examination number, 6C, at the top of each answer sheet. Your name, or any other identifying mark, must not appear.
  - Do not answer more than one question on a single sheet of paper. Write only on the front lined side of the paper – **DO NOT WRITE ON THE BACK OF THE PAPER.** Be careful to give the number of the question you are answering on each sheet. If your response cannot be confined to one page, please use additional sheets of paper as necessary. Clearly mark the question number on each page of the response in addition to using a label such as “Page 1 of 2” on the first sheet of paper and then “Page 2 of 2” on the second sheet of paper.
  - The answer should be concise and confined to the question as posed. When a specified number of items are requested, do not offer more items than requested. For example, if you are requested to provide three items, only the first three responses will be graded.
  - In order to receive full credit or to maximize partial credit on mathematical and computational questions, you must clearly outline your approach in either verbal or mathematical form, showing calculations where necessary. Also, you must clearly specify any additional assumptions you have made to answer the question.
3. Do all problems until you reach the last page of the examination where "END OF EXAMINATION" is marked.

All questions should be answered according to the Canadian statutory accounting practices and principles, unless specifically instructed otherwise. SAP refers to Statutory Accounting Principles, and GAAP refers to Generally Accepted Accounting Principles.

**CONTINUE TO NEXT PAGE OF INSTRUCTIONS**

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4. Prior to the start of the exam you will have a **fifteen-minute reading period** in which you can silently read the questions and check the exam booklet for missing or defective pages. A chart indicating the point value for each question is attached to the back of the examination. Writing will NOT be permitted during this time and you will not be permitted to hold pens or pencils. You will also not be allowed to use calculators. The supervisor has additional exams for those candidates who have defective exam booklets.
5. Your Examination Envelope is pre-labeled with your Candidate ID number, name, exam number and test center. Do not remove this label. Keep a record of your Candidate ID number for future inquiries regarding this exam.
6. Candidates must remain in the examination center until two hours after the start of the examination. The examination starts after the reading period is complete. You may leave the examination room to use the restroom with permission from the supervisor. To avoid excessive noise during the end of the examination, candidates may not leave the exam room during the last fifteen minutes of the examination.
7. At the end of the examination, place all answer sheets in the Examination Envelope. Please insert your answer sheets in your envelope in question number order. Insert a numbered page for each question, even if you have not attempted to answer that question. Nothing written in the examination booklet will be graded. Only the answer sheets will be graded. Also place any included reference materials in the Examination Envelope. BEFORE YOU TURN THE EXAMINATION ENVELOPE IN TO THE SUPERVISOR, BE SURE TO SIGN IT IN THE SPACE PROVIDED ABOVE THE CUT-OUT WINDOW.
8. If you have brought a self-addressed, stamped envelope, you may put the examination booklet and scrap paper inside and submit it separately to the supervisor. It will be mailed to you. Do not put the self-addressed stamped envelope inside the Examination Envelope.

If you do not have a self-addressed, stamped envelope, please place the examination booklet in the Examination Envelope and seal the envelope. You may not take it with you. Do not put scrap paper in the Examination Envelope. The supervisor will collect your scrap paper.

Candidates may obtain a copy of the examination from the CAS Web Site.

All extra answer sheets, scrap paper, etc. must be returned to the supervisor for disposal.

9. Candidates must not give or receive assistance of any kind during the examination. Any cheating, any attempt to cheat, assisting others to cheat, or participating therein, or other improper conduct will result in the Casualty Actuarial Society and the Canadian Institute of Actuaries disqualifying the candidate's paper, and such other disciplinary action as may be deemed appropriate within the guidelines of the CAS Policy on Examination Discipline.
10. The exam survey is available on the CAS Web Site in the "Admissions/Exams" section. Please submit your survey by May 14, 2014.

**END OF INSTRUCTIONS**

**EXAM 6 – CANADA, SPRING 2014**

1. (3 points)

a. (1 point)

Briefly describe four ways that Canadian insurance regulation promotes solvency.

b. (1 point)

Describe two reasons the insurance industry was singled out for public oversight of solvency.

c. (1 point)

Compare and contrast the oversight responsibilities of the Canadian federal and provincial insurance regulators.

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**EXAM 6 – CANADA, SPRING 2014**

2. (3 points)

Answer the following with respect to the case of *Whiten v. Pilot Insurance Co.*:

a. (1.5 points)

Describe the facts of the case and the Supreme Court's final decision.

b. (1.5 points)

Identify and briefly describe three considerations the Supreme Court used to determine the quantum of punitive damages.

**CONTINUED ON NEXT PAGE**

**EXAM 6 – CANADA, SPRING 2014**

3. (2.25 points)

Regarding the landmark case of Resurfice Corp. v. Hanke:

a. (0.5 point)

Describe the facts of the case.

b. (0.75 point)

Describe the outcome of the initial trial and the reasons for the decision.

c. (0.5 point)

Describe the decision of the Supreme Court and its reasoning regarding causation.

d. (0.5 point)

Briefly describe the two requirements for the application of the “material contribution” test in determining causation.

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**EXAM 6 – CANADA, SPRING 2014**

4. (2 points)

Answer the following questions about asbestos litigation:

a. (0.5 point)

Explain why the peripheral defendants (those accused of having asbestos either in their products or on their premises) could bear the majority of the costs of awards relating to asbestos use.

b. (0.5 point)

It has been typical for plaintiffs' attorneys to join several plaintiffs in a group to file their claims against many defendants. Explain how this practice results in a more complicated and expensive process for resolving asbestos claims.

c. (1 point)

Identify and briefly describe two potential reforms to mitigate the costs of the asbestos litigation system.

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**EXAM 6 – CANADA, SPRING 2014**

5. (1.5 points)

An at-fault driver causes an automobile accident resulting in serious injury to both himself and the other driver. Both drivers require attendant care benefits and are unable to return to work.

a. (0.5 point)

Briefly describe how a pure liability insurance system would compensate each driver.

b. (0.25 point)

Briefly describe how a pure injury insurance system would compensate each driver.

c. (0.75 point)

Suggest an alternative system for compensation and describe how it would address some inequities of the systems described in part a. and part b. above.

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**EXAM 6 – CANADA, SPRING 2014**

6. (1 point)

A small Ontario mutual insurance company is conducting a review of the homeowners' mix of business in the last 12 months and has some concerns regarding the number of new business applications with prior water damage claims.

The company plans to address the problem with a rate change, but as an interim solution tells its top five brokers not to place any business with prior water damage claims with the company.

Explain how the brokers should respond according to the RIBO Code of Conduct.

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**EXAM 6 – CANADA, SPRING 2014**

7. (2.25 points)

a. (0.5 point)

Provide an argument for using credit-based insurance scores according to the “Actuarial Standard of Practice No. 12: Risk Classification”.

b. (0.5 point)

Provide a counter-argument to the answer in part a. above.

c. (0.5 point)

Briefly describe two guidelines the Insurance Bureau of Canada provides in its code of conduct for insurers’ use of credit information.

d. (0.75 point)

Explain how changes made in 2010 by the Financial Services Commission of Ontario addressed credit-based risk rating in auto insurance.

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**EXAM 6 – CANADA, SPRING 2014**

8. (1 point)

The Property and Casualty Insurance Compensation Corporation (PACICC) was established to protect policyholders and claimants in the event of an insurer insolvency.

Given the following information:

- Total amount advanced by PACICC in Ontario: \$3,000,000
- Total amount recovered by PACICC from insolvent insurer and third parties in Ontario: \$1,000,000
- Total PACICC assessment in Alberta: \$300,000,000
- A and B are the only insurers with direct written premium in Ontario.
- C and D are the only insurers with direct written premium in Alberta.

<b>Insurer</b>	<b>Jurisdiction</b>	<b>Direct Written Premium (\$)</b>
A	Ontario	\$325,000,000
B	Ontario	\$175,000,000
C	Alberta	\$500,000,000
D	Alberta	\$50,000,000

Determine the amount of the PACICC assessment for which insurers A and C are responsible.

**EXAM 6 – CANADA, SPRING 2014**

9. (1.25 points)

In a given jurisdiction, auto insurance pricing is regulated. The government recently mandated a rate freeze on a particular class of risks, which made them rate inadequate. There is no “take-all-comers” rule in this particular jurisdiction.

a. (0.25 point)

Describe how the rate freeze will impact the availability of insurance for this class of risks.

b. (1 point)

Propose and fully describe a solution for this jurisdiction to address the issues in part a. above without imposing a “take-all-comers” rule.

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**EXAM 6 – CANADA, SPRING 2014**

10. (1 point)

Describe the advantages and disadvantages of foreign participation in the Canadian insurance industry.

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EXAM 6 – CANADA, SPRING 2014

11. (2.25 points)

a. (0.75 point)

Briefly describe three reasons policy-makers passed the Terrorism Risk Insurance Act (TRIA).

b. (1 point)

For each terrorism event below, calculate the reimbursement for which an insurer would be eligible under TRIA. All losses occurred after 2007.

i. Terrorism Event #1

Aggregate industry losses	\$75 million
Insurer's share of losses	\$50 million
Insurer's deductible	\$5 million

ii. Terrorism Event #2

Aggregate industry losses	\$200 million
Insurer's share of losses	\$75 million
Insurer's deductible	\$10 million

c. (0.5 point)

Identify two reasons why terrorism could be considered uninsurable by the private market.

**EXAM 6 – CANADA, SPRING 2014**

12. (2 points)

a. (0.5 point)

Greater efficiency is an argument in favour of government insurance programs. Explain how the cost savings claimed for such programs may be overstated.

b. (1.5 points)

Identify and briefly describe three reasons, other than efficiency, for government participation in insurance.

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**EXAM 6 – CANADA, SPRING 2014**

13. (3.5 points)

Canada's Agricultural Policy Framework (APF) includes two business risk management programs:

- the Production Insurance Program
- the Canadian Agricultural Income Stabilization (CAIS) Program

a. (1.5 points)

Describe each program and explain how they complement each other.

b. (0.5 point)

Identify two types of Production Insurance plans.

c. (1.5 points)

Livestock insurance is not currently offered by the APF. A private insurance company wants to offer this coverage and asks that a plan similar to the Production Insurance plan for crops be designed. Describe how the plan could be set up including underwriting, pricing and the claims handling procedure.

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**EXAM 6 – CANADA, SPRING 2014**

14. (2 points)

a. (0.50 point)

Describe the historical reason for the inception of workers' compensation programs in Canada.

b. (0.25 point)

Briefly explain how workers' compensation programs are funded in Canada.

c. (1.25 points)

Fully explain the concept of individual liability in workers' compensation, including a description of its operation, its funding, and the entities for which it is used.

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**EXAM 6 – CANADA, SPRING 2014**

15. (2.5 points)

Given the information for a Canadian P&C insurer:

Summary of Assets which Support Policy Liabilities							
Description	Interest Rate	Maturity Date	Par Value	Market Value	Market Yield	Effective Market Yield	Modified Duration
BOND A	3.10%	18/6/40	\$2,055,000	\$2,638,691	1.82%	1.83%	20.13
BOND B	4.56%	26/3/40	\$1,080,000	\$1,321,528	3.33%	3.36%	16.91
BOND C	4.99%	30/10/37	\$200,000	\$247,497	3.57%	3.61%	15.57
Total			\$3,335,000	\$4,207,716			

Accident Year	Gross Paid Loss (\$000s)	Gross Case Reserve (\$000s)	Gross Incurred Loss (\$000s)	Gross Ultimate Loss (\$000s)
2010	\$1,788	\$0	\$1,788	\$1,788
2011	\$1,025	\$1,025	\$2,050	\$2,050
2012	\$357	\$2,023	\$2,380	\$2,380
Total	\$3,170	\$3,048	\$6,218	\$6,218

Cumulative Accident Year Payment Pattern	
Maturity	Percentage Paid
12	15%
24	50%
36	100%

Other information:

- Margin for adverse deviation for investment rate return: 25 basis points
- Margin for adverse deviation for claims development: 500 basis points
- All bonds are categorized as Available for Sale.

Assume that all payments are made in the middle of the year.

Using a discount rate calculated from the bond information given above, calculate the unpaid claims liability as at December 31, 2012.

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**EXAM 6 – CANADA, SPRING 2014**

16. (3 points)

A property and casualty insurance company is exposed to earthquake risk through its operations in British Columbia; however, it has struggled with finding an accurate and consistent way of quantifying this risk. Several measures, including Probable Maximum Loss (PML), have been used, but the results have varied significantly from one year to the next. This concerns senior management, as they are unsure that the company's financial resources would be sufficient in the event of a severe earthquake.

a. (1.5 points)

Identify three key principles in managing earthquake risk, and briefly describe how a failure in each may be leading to the problems experienced by this insurance company.

b. (1 point)

Briefly describe four practices the company could use to improve the earthquake risk estimation process and achieve strong catastrophic risk management.

c. (0.5 point)

Identify two types of financial resources that an insurer can use to support earthquake exposures.

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**EXAM 6 – CANADA, SPRING 2014**

17. (3.25 points)

The following is a partially completed Unpaid Claims and Loss Ratio Analysis Exhibit for an insurance company. All amounts are in thousands of dollars (\$000s).

Accident Year	Paid Loss Cumulative	Total Undiscounted Unpaid Claims and Adjustment Expense	Present Value of Unpaid Claims and Adjustment Expenses – Total	PFAD Claims	PFAD Reinsurance	PFAD Interest Rate
(01)	(03)	(06)	(07)	(08)	(10)	(11)
2011	1,800	600	591	44	0	2
2012	1,200	1,500	1,460	110	0	10

Accident Year	Discounted Reserves including PFAD	Earned Premium	Investment Income from UPR	Cumulative Investment Income from Unpaid Claim Reserve	Loss Ratio Undiscounted	Loss Ratio Discounted
(01)	(12)	(13)	(14)	(15)	(16)	(17)
2011	637	4,500	12	13	??	??
2012	1,580	5,000	14	??	??	??

Additional information is also available:

- Investment Yield for 2012 = 4%
- Future income tax rate = 35%
- Net claims liabilities amount carried in the balance sheet = 2,500
- There are no reserves related to accident years prior to 2011

a. (1.75 points)

Calculate the Undiscounted and Discounted Loss Ratio (columns 16 and 17) for accident years 2011 and 2012.

b. (1.5 points)

Calculate the estimated effect of discounting the asset for future income taxes.

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**EXAM 6 – CANADA, SPRING 2014**

18. (1.75 points)

The following information is available from the December 31, 2012, Appointed Actuary's Report of an insurance company.

Incremental Paid Losses and ALAE			
Accident Year	12 month (\$000s)	24 month (\$000s)	36 month (\$000s)
2010	\$40,000	\$20,000	\$10,000
2011	\$45,000	\$15,000	
2012	\$35,000		

Discounted Outstanding Losses and ALAE			
Accident Year	12 month (\$000s)	24 month (\$000s)	36 month (\$000s)
2010	\$48,000	\$30,000	\$18,000
2011	\$47,000	\$28,000	
2012	\$50,000		

Annual Yield			
	CY 2010	CY 2011	CY 2012
Annual Yield	2.75%	3.0%	2.5%

Calculate the discounted excess or deficiency ratio for accident year 2010 as at December 31, 2012.

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EXAM 6 – CANADA, SPRING 2014

19. (2.25 points)

Given the information below for a property and casualty insurance company:

Line of Business	Net Unearned Premium Reserve (\$000s)	Selected Undiscounted Loss Ratio	Discount Factor
Total Auto (excl Facility)	\$8,000	70%	0.90
Personal Property	\$4,000	65%	1.05
Facility	\$300	120%	1.00

Selected Maintenance Expense Ratio	2.5%
Selected Internal Adjustment Expense Ratio	10%
Selected Contingent Commission Ratio	1%
Discount from Average Accident Date to the Evaluation Date	0.98

Calculate the maximum deferred policy acquisition costs that the company can record on its financial statements.

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**EXAM 6 – CANADA, SPRING 2014**

20. (2.5 points)

Identify and briefly explain the impact on the Minimum Capital Test (MCT) if each of the following actions is performed by a company.

a. (0.5 point)

Reinvests the cash from matured government bonds into common shares.

b. (0.5 point)

Increases exposure to liability lines of business.

c. (0.5 point)

Increases the deferred commission amount.

d. (0.5 point)

Increases the reinsurance quota share percentage with an unaffiliated registered reinsurer.

e. (0.5 point)

Increases the reinsurance quota share percentage with an unregistered reinsurer. A letter of credit is held in the same amount of the increase of ceded unpaid losses and unpaid premium reserve (UPR).

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**EXAM 6 – CANADA, SPRING 2014**

21. (2.5 points)

The Property and Casualty Minimum Capital Test Advisory Committee (P&C MAC) has outlined a vision for new principles-based solvency financial requirements. Insurers that choose to develop models will calculate their regulatory asset requirement on two bases: at a target level (i.e., regulatory target asset requirement or TAR) and at a minimum level (i.e., regulatory minimum asset requirement or MAR).

a. (0.5 point)

Briefly describe the purpose of MAR and TAR.

b. (1 point)

Briefly describe the risk measures that underlie:

- i. MAR
- ii. TAR
- iii. The BCAR model
- iv. Solvency II

c. (1 point)

The P&C MAC describes the core concepts that the future P&C insurer's solvency framework should cover. Briefly describe four of these concepts.

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**EXAM 6 – CANADA, SPRING 2014**

22. (1.5 points)

In A.M. Best's Capital Adequacy Ratio (BCAR) model, the required capital can be divided into seven components. Two of the components are the loss and loss-adjustment expense reserves factor and the net premiums written factor.

The Office of the Superintendent of Financial Institutions (OSFI) uses a risk-based formula to calculate the required capital.

a. (1 point)

The BCAR model includes several adjustments in the calculation of loss and loss-adjustment expense reserves (B5) factor. Identify four adjustments that are not included in OSFI's formula.

b. (0.5 point)

Identify two differences between BCAR's net premiums written factor and that of OSFI's formula.

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**EXAM 6 – CANADA, SPRING 2014**

23. (2 points)

In the United States, insurance companies are required to present their financial statements under two bases: Statutory Accounting Practices (SAP) and Generally Accepted Accounting Principles (GAAP).

Compare these two bases in terms of:

a. (0.5 point)

Objective

b. (0.5 point)

Intended users

c. (0.5 point)

Asset recognition

d. (0.5 point)

Deferred income taxes

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**EXAM 6 – CANADA, SPRING 2014**

24. (2 points)

OSFI's "Guideline A-4: Internal Target Capital Ratio for Insurance Companies" sets out OSFI's expectations with respect to the setting of an internal target capital ratio and capital management policies for federally regulated insurance companies.

a. (1 point)

Describe an approach an insurer could use to determine its internal target capital ratio.

b. (0.5 point)

Explain whether or not it is appropriate to consider a future injection of capital when setting the internal target capital ratio.

c. (0.5 point)

Describe the actions OSFI requires of an insurer that anticipates falling below its internal target capital ratio.

**EXAM 6 – CANADA, SPRING 2014**

25. (1.5 points)

The Dynamic Capital Adequacy Testing (DCAT) report for a federally regulated Canadian property and casualty insurer was produced based on data as of December 31, 2012 and a business plan as of June 30, 2013. On September 1, 2013, before the DCAT report was filed with OSFI, management decided to accelerate growth in the Ontario automobile market.

a. (0.5 point)

Describe any actions required by the actuary before filing the DCAT report with OSFI.

b. (0.5 point)

The fast growth in the Ontario automobile market may create pressure on the company's profitability for the next few years and the company directors plan to inject capital in 2014. Explain whether or not it is acceptable practice to include a capital injection in the DCAT base scenario.

c. (0.5 point)

A premium volume increase adverse scenario was created with assumptions that would require a capital injection. Explain whether or not it is acceptable practice to include a capital injection in this adverse scenario.

**EXAM 6 – CANADA, SPRING 2014**

26. (6.75 points)

The following information is available from the December 31, 2012 P&C-1 of a federally regulated insurer. All amounts are in thousands of dollars (\$000s).

**Liabilities & Equity (Page 20.20)**

Shares issued and paid	\$100,000
Contributed Surplus	\$40,000
Retained Earnings	\$5,000
Reserves	\$0
Accumulated Other Comprehensive Income (Loss)	\$12,000

**Minimum Capital Test (Page 30.70)**

<b>Capital Available</b>	
Subordinated Indebtedness and Redeemable Preferred Shares	\$0
Accumulated Other Comprehensive Income (Loss) on:	
Available for Sale Equity Securities	\$11,400
Available for Sale Debt Securities	\$600
Foreign Currency (Net of Hedging Activities)	\$0
Assets with a Capital Requirement of 100% (EXCLUDES the amount calculated for unregistered reinsurers on page 70.38)	\$11,000
<b>Capital Required</b>	
Balance Sheet Assets	\$23,500
Unearned Premiums / Unpaid Claims / Premium Deficiencies	?
Reinsurance Ceded to Unregistered Reinsurers	?
Interest Rate Risk	\$20
Structured Settlements, Letters of Credit, Derivatives and other exposures	\$80

**Line specific information**

Line of business	Net Written Premium (\$000s)	Net Unearned Premium (\$000s)	Net Unpaid Claims (\$000s)	Provision for Adverse Deviation (\$000s)	Margin on unearned premium (\$000s)	Margin on unpaid claims (\$000s)
Property - Personal	\$74,000	\$40,000	\$32,000	\$1,600	8%	5%
Automobile - Liability & Personal Accident	\$237,500	\$125,000	\$700,000	\$105,000	8%	10%
Automobile – Other	\$90,900	\$45,000	\$12,000	\$600	8%	5%

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**EXAM 6 – CANADA, SPRING 2014**

(26 cont.)

**Reinsurance Ceded to Unregistered Reinsurers (Page 70.38)**

Name of Assuming Reinsurer	Unearned Premium Ceded to Assuming insurer (\$000s)	Outstanding Losses Recoverable from assuming insurer (\$000s)	Receivable from assuming insurer (\$000s)	Payable to assuming insurer (\$000s)	Non-owned deposits held as security from assuming insurer (\$000s)	Letters of credit held as security from assuming insurer (\$000s)
ABC Re	\$1,000	\$1,500	\$400	\$0	\$3,000	\$500
DEF Re	\$2,500	\$2,500	\$0	\$4,000	\$1,500	\$0
XYZ Re	\$0	\$150	\$50	\$0	\$0	\$0

**Other information**

- Based on the Appointed Actuary’s analysis, there is no premium deficiency.
- The company has determined that the Minimum Gross Capital Level test is not relevant.
- The company’s internal Minimum Capital Test (MCT) target is 195%.

Calculate the MCT Ratio and briefly describe any actions the company should take based on this result.

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**EXAM 6 – CANADA, SPRING 2014**

27. (2.75 points)

OSFI expects insurers to develop a formal stress testing process as part of financial risk management.

a. (0.5 point)

Define the term “stress testing” as used by OSFI.

b. (1.5 points)

Describe three general considerations of stress testing programs for insurance companies.

c. (0.75 point)

Define the term “reverse stress test” and describe how this approach can be used in the DCAT analysis.

EXAM 6 – CANADA, SPRING 2014

28. (2.25 points)

The DCAT of a federally regulated Canadian property and casualty insurer indicates the following lowest projected levels of surplus in the forecast period under the base scenario and the three most adverse scenarios.

Scenario	Surplus (\$)	MCT
Base	800,000	200%
Premium risk (significantly higher than the base scenario)	625,000	?
Policy liabilities risk (unpaid claims)	600,000	?
Frequency and severity risk (single large claim)	425,000	?

a. (0.5 point)

Explain whether the insurer's financial condition is satisfactory.

b. (0.75 point)

Evaluate the likelihood of the OSFI to intervene in each adverse scenario. Assume Capital Required is the same for all scenarios.

c. (0.5 point)

Identify two possible management actions to the premium risk scenario.

d. (0.5 point)

Identify two possible ripple effects for the frequency and severity risk (single large claim) scenario.

**EXAM 6 – CANADA, SPRING 2014**

29. (1.5 points)

Various mechanisms are available to a reinsurer to transfer insurance obligations to another entity. Two of these options are commutation and novation.

a. (0.75 point)

Define “commutation” and describe the impact on the balance sheets of the two entities involved in this type of transaction.

b. (0.75 point)

Define “novation” and describe the impact on the balance sheets of the two entities involved in this type of transaction.

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**EXAM 6 – CANADA, SPRING 2014**

30. (1 point)

An analysis of the net present value of underwriting loss for a reinsurance contract indicates the following:

- There is a 5% chance that the contract will generate an underwriting loss for the reinsurer.
- In all of the underwriting loss scenarios, the average underwriting loss to reinsurance premium ratio is 25%.

Based on this information, provide one argument which indicates the presence of risk transfer and one argument which indicates the absence of risk transfer.

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EXAM 6 – CANADA, SPRING 2014

31. (2 points)

Situation	Information available about the Actuary
A	FCIA A worked as a pricing actuary of ABC's subsidiary, but resigned two years ago.
B	FCIA B purchased five shares of ABC a week ago.
C	FCIA C invested in a mutual fund which owns shares of ABC.
D	FCIA D works in a consulting firm. His colleague was involved in the external audit of ABC this year.
E	FCIA E works in a consulting firm. His colleague is the Appointed Actuary of ABC.

a. (0.75 point)

Briefly describe OSFI's three objectives for requiring peer review of the work of the Appointed Actuary.

b. (1.25 points)

ABC Insurance Company (ABC) is a federally licensed insurer. For each of the above situations, state whether the respective Fellow of the Canadian Institute of Actuaries (FCIA) is eligible to serve as external reviewer of ABC's Appointed Actuary Report. Support your answer and cite any special conditions that apply.

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**EXAM 6 – CANADA, SPRING 2014**

32. (1.5 points)

Given the information provided below:

Distribution by Line of Business and Geography					
Year-ended December 31, 2011					
Line of Business	Gross Written Premium (\$000s)				
	Ontario	Nova Scotia	Alberta	British Columbia	Total
Automobile	\$120,000	\$23,000	\$50,000	\$0	\$193,000
Personal Property	\$32,000	\$12,000	\$21,000	\$70,000	\$135,000
Commercial Property	\$18,000	\$0	\$25,000	\$85,000	\$128,000
<b>Total</b>	<b>\$170,000</b>	<b>\$35,000</b>	<b>\$96,000</b>	<b>\$155,000</b>	<b>\$456,000</b>
Year-ended December 31, 2012					
Line of Business	Gross Written Premium (\$000s)				
	Ontario	Nova Scotia	Alberta	British Columbia	Total
Automobile	\$150,000	\$24,000	\$52,000	\$0	\$226,000
Personal Property	\$33,000	\$12,000	\$22,000	\$72,000	\$139,000
Commercial Property	\$19,000	\$0	\$26,000	\$88,000	\$133,000
<b>Total</b>	<b>\$202,000</b>	<b>\$36,000</b>	<b>\$100,000</b>	<b>\$160,000</b>	<b>\$498,000</b>

a. (0.75 point)

Identify three considerations in determining the concentration risk of an insurance company.

b. (0.75 point)

Based on the information provided above, briefly state three key points that should be included in the disclosure of concentration risk in the insurer's financial statements. Assume that the company's rate levels in 2012 were the same as in 2011.

**EXAM 6 – CANADA, SPRING 2014**

33. (1.5 points)

a. (0.5 point)

Define “portfolio yield rate” according to the Canadian Institute of Actuaries’ “Educational Note: Discounting”.

b. (0.75 point)

Briefly describe three considerations when calculating a portfolio yield rate.

c. (0.25 point)

Briefly describe a situation in which the portfolio yield rate may be used as the discount rate for estimation of present value of ceded policy liabilities.

**CONTINUED ON NEXT PAGE**

**EXAM 6 – CANADA, SPRING 2014**

34. (1 point)

According to the Canadian Institute of Actuaries publication “Report: Materiality”:

a. (0.25 point)

Identify the main factor underlying the selection of a materiality level in an actuary’s work.

b. (0.25 point)

Briefly describe when an omission, understatement or overstatement is considered material.

c. (0.5 point)

Describe the difference between the materiality level for Dynamic Capital Adequacy Testing work and the materiality level for valuation work.

**END OF EXAMINATION**

**Exam 6 C**  
**Regulation and Financial Reporting (Nation Specific)**

QUESTION	POINT VALUE OF QUESTIONS	(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	3.00	1.00	1.00	1.00				
2	3.00	1.50	1.50					
3	2.25	0.50	0.75	0.50	0.50			
4	2.00	0.50	0.50	1.00				
5	1.50	0.50	0.25	0.75				
6	1.00	1.00						
7	2.25	0.50	0.50	0.50	0.75			
8	1.00	1.00						
9	1.25	0.25	1.00					
10	1.00	1.00						
11	2.25	0.75	1.00	0.50				
12	2.00	0.50	1.50					
13	3.50	1.50	0.50	1.50				
14	2.00	0.50	0.25	1.25				
15	2.50	2.50						
16	3.00	1.50	1.00	0.50				
17	3.25	1.75	1.50					
18	1.75	1.75						
19	2.25	2.25						
20	2.50	0.50	0.50	0.50	0.50	0.50		
21	2.50	0.50	1.00	1.00				
22	1.50	1.00	0.50					
23	2.00	0.50	0.50	0.50	0.50			
24	2.00	1.00	0.50	0.50				
25	1.50	0.50	0.50	0.50				
26	6.75	6.75						
27	2.75	0.50	1.50	0.75				
28	2.25	0.50	0.75	0.50	0.50			
29	1.50	0.75	0.75					
30	1.00	1.00						
31	2.00	0.75	1.25					
32	1.50	0.75	0.75					
33	1.50	0.50	0.75	0.25				
34	1.00	0.25	0.25	0.50				
<b>TOTAL</b>	<b>73.00</b>							

## SAMPLE ANSWERS AND EXAMINER'S REPORT

### GENERAL COMMENTS:

- Candidates should note that the instructions to the exam explicitly say to show all work; graders expect to see enough support on the candidate's answer sheet to follow the calculations performed. While the graders made every attempt to follow calculations that were not well-documented, lack of documentation may result in the deduction of points where the calculations cannot be followed or are not sufficiently supported.
- Incorrect responses in one part of a question did not preclude candidates from receiving credit for correct work on subsequent parts of the question that depended upon that response.
- Candidates should try to be cognizant of the way an exam question is worded. They must look for key words such as "briefly" or "fully" within the problem. We refer candidates to the Future Fellows article from December 2009 entitled "The Importance of Adverbs" for additional information on this topic.
- Some candidates provided lengthy responses to a "briefly describe" question, which does not provide extra credit and only takes up additional time during the exam.
- Generally, candidates were fairly well prepared for this exam. However, candidates should be cautious of relying solely on study manuals, as some candidates lost credit for failing to provide basic insights that were contained in the syllabus readings.
- The sample answer is from a candidate that received full credit for the question. If there are multiple answers that receive full credit, more sample answers are included.

### EXAM STATISTICS:

- Number of Candidates: 116
- Available Points: 73
- Passing Score: 51
- Number of Passing Candidates: 52
- Raw Pass Ratio: 44.83%
- Effective Pass Ratio: 46.02%

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 1</b>	
<b>TOTAL POINT VALUE: 3</b>	<b>LEARNING OBJECTIVE: A1</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 1 point(s)</b>	
<ul style="list-style-type: none"> <li>- Restrict the licensing and creation of foreign and domestic insurers</li> <li>- Mandate periodic filings of financial information of insurers</li> <li>- Create a government office for compliance</li> <li>- Restrict type of investments insurers can make</li> </ul>	
<b>Part b: 1 point(s)</b>	
<ul style="list-style-type: none"> <li>- There were a large number of bankruptcies of insurers and this lead to concerns that policyholders wouldn't have their obligation paid for</li> <li>- Short term price competition wasn't in public's long-term interest, because they wanted to make sure obligations would be paid for</li> </ul>	
<b>Part c: 1 point(s)</b>	
<p><u>Federal</u> -mainly responsible for solvency issues of insurers. Do this by making sure insurers meet conditions for engaging in insurance business, protect policyholder interest</p> <p><u>Provincial</u> -responsible for market conduct, approving premium rates, reviewing sales practices and claims settlement practices and licensing of agents/brokers</p>	
<b>EXAMINER'S REPORT</b>	
Candidates generally performed very well on this question.	
<b>Part a</b>	
candidates generally scored very well listing a wide-range of ways that the federal government uses to promote solvency	
<b>Part b</b>	
candidates did good job at identifying the reasons but lost points for not able to fully explaining the implications.	
<b>Part c</b>	
candidates generally scored very well.	



## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 2</b>	
<b>TOTAL POINT VALUE: 3</b>	<b>LEARNING OBJECTIVE: A3</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 1.5 point(s)</b>	
<p>Insured's house was destroyed in a fire. After some time, the insurer cuts off the rent without notice alleging arson ("that insured deliberately set the house on fire"). The allegation was wholly discredited at trial as no evidence of arson. Jury first awarded punitive damage of \$1M which was reduced to \$100k by the court of appeal. Supreme Court reversed the court of appeal's decision to reduce the award as though very high the award was within the rational limit as the act was highly reprehensible as an effort to force an unfair settlement.</p>	
<b>Part b: 1.5 point(s)</b>	
<ul style="list-style-type: none"><li>- Degree of vulnerability of the plaintiff. Punitive damage would be higher if defendant abuse of a position of power</li><li>- Degree of harm or potential harm directed at plaintiff. The more harm is done the higher the quantum</li><li>- Other advantage wrongfully gained – so that the defendant don't see the award simply as a fee</li></ul>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
<p>Candidates generally were able to list the facts of the case leading to the trial. However, some candidates were unable to fully provide details of the case from the initial trial, to the appeal and finally to the Supreme Court's verdict.</p>	
<b>Part b</b>	
<p>Candidates generally were able to list the considerations but some did not earn full credit by not being able to expand on the considerations.</p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 3</b>	
<b>TOTAL POINT VALUE: 2.25</b>	<b>LEARNING OBJECTIVE: A3</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point(s)</b>	
Hanke badly burned sued manufacturer of ice-surfacing machine for negligence in making the gasoline and water tanks so similar leading to his mistake	
<b>Part b: 0.75 point(s)</b>	
The trial judge found that Hanke did not prove negligence of manufacturer as Hanke's error not manufacturer design error's. Notably due to Hanke's own admission and application of but for rule test. The appeal judge found that trial judge errs in its foreseeability and causality analyses	
<b>Part c: 0.5 point(s)</b>	
Supreme Court conclude that manufacturer is not liable for Hanke's injury and assessment of comparative blameworthiness is not necessary since Hanke's error not a design error and the but for rule test is the basic test and contribution rule test not justified and necessary in this case	
<b>Part d: 0.5 point(s)</b>	
<ul style="list-style-type: none"> <li>- Plaintiff cannot prove negligence of defendant using the but for rule test because of factors outside of plaintiff's control</li> <li>- The defendant may have exposed claimant to unreasonable risk with his conduct/negligence and the plaintiff suffered a loss</li> </ul>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
Most candidates were able to fully describe the facts of the case.	
<b>Part b</b>	
Most candidates were able to provide the verdict of the initial trial but many were unable to provide the drivers of the decision (i.e., foreseeability and unable to establish that the injury was due to the negligence of the manufacturer)	
<b>Part c</b>	
Most candidates were able to provide the verdict of the Supreme Court but many were unable to provide the reasoning of the decision (i.e., Court of Appeal erred in failing to recognize that the basic test for causation remains the "but for" test and that it erred in applying the material contribution test when it was unnecessary)	
<b>Part d</b>	
Many candidates were confused about the role of the "but for" test for the application of the "material contribution" test in determining causation.	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 4</b>	
<b>TOTAL POINT VALUE: 2</b>	<b>LEARNING OBJECTIVE: A4</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point(s)</b>	
<i>Primary defendants may be insolvent/bankrupt and peripheral defendant is joint-and-severally liable</i>	
<b>Part b: 0.5 point(s)</b>	
<b>Sample 1:</b> <i>Plaintiffs may have varying degrees of injury severity, and by lumping them together, the less severely injured plaintiffs may benefit from more severely injured plaintiffs, leading to greater overall settlement and it is more difficult for the defendant to come up with a defence</i>	
<b>Sample 2:</b> <i>-class action suits may include plaintiffs that don't have health issues due to asbestos and only passed some initial screening</i> <i>-adding to cost because lawyers may receive contingent fees and try to maximize damages received from defendants</i> <i>-may add some defendants only 1% liable "deep pocket" syndrome</i>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

**Part c:** 1.0 point(s)

**Sample 1:**

- 1) Put restrictions on Forum Shopping
  - Make it less easy for plaintiff counsel to initiate lawsuits in “pro-plaintiff” jurisdictions
- 2) Restrict class actions, which generate millions in lawyers’ fees, while victims only receive small amounts, and make defense difficult for defendants

**Sample2:**

- *collateral rule that permits the injured person to be compensated by multiple sources. There was no rule about asking about information regarding all other compensation at trial*
  - *amend this rule to get the information and then decrease costs paid*
- *Net income as basis instead of gross basis. Government gives a tax break to injured, and the injured person incurs less expenses, so compensation should be based on net income*

**Sample 3:**

- *Barring the application of joint and several liability for non-economic loss. This would reduce the transaction cost, and accelerate the settlement*
- *Eliminate the pre-judgment interest*
  - *Because pre-judgment interest tends to over compensate the plaintiff and force defendant to pay for delay not caused by them*

**Sample 4:**

- *Introduce a medical exam requirement before a claimant can claim asbestos damages*
- *No fault trust*
  - *To allocate funds to those meeting exposure and medical criteria requirements*

**Sample 5:**

- *Information sharing between trusts and solvent defendants*
  - *If the evidence is allowed to develop and submitted before trial from trusts then that can allow for set-offs and avoid over compensation*
- *Set-offs*
  - *The payment that solvent defendants make should take into account the payments made by trust. So there is no over compensation*

**Sample 6:**

- *Inactive dockets*
  - *To allow currently non-malignant plaintiff the right to sue – without the application of statute of limitations. This will reduce the # of non-malignant claimants and they only sue if they develop related sickness*
- *Venue limitations*
  - *Most cases were filed in a few states due to favorable litigation environment for these cases. Now some states require a link between the injured/case and the venue chosen*

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>EXAMINER'S REPORT</b>
<b>Part a</b>
<p>Most candidates mentioned that primary defendants may be insolvent or bankrupt and that the application of joint and several liability has the potential to move the majority of the costs to the peripheral defendants.</p> <p>Some candidates only stated that the primary defendants may be insolvent or bankrupt without making the connection to joint and several liability. On its own, the insolvency of primary defendants does not necessarily transfer the costs to the peripheral defendants. This was not given full credit.</p>
<b>Part b</b>
<p>Candidates scored very well on this part. Almost all candidates mentioned the additional discovery costs associated with grouped plaintiffs with dissimilar injuries and associated increased legal fees.</p>
<b>Part c</b>
<p>The syllabus discussed a large variety of potential reforms that were all accepted for full credit. A small number of candidates did not describe the type of reform and only identified it by name.</p>

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 5</b>	
<b>TOTAL POINT VALUE: 1.5</b>	<b>LEARNING OBJECTIVE: B1</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a:</b> 0.5 point	
<p>In a liability system, the not at-fault driver (or his insurer) would sue the at-fault driver, and would probably be compensated by him (or his insurer). It might be settled before or after a trial. The at-fault driver could be entitled to no compensation, so would probably seek compensation from another source (health insurance for example).</p>	
<b>Part b:</b> 0.25 point	
<p><b>Sample 1:</b></p> <p>In an injury system, compensation is not related to the degree of fault. Both drivers would be compensated for their loss of income and attendant care costs.</p> <p><b>Sample 2:</b></p> <p>Both drivers will receive no-fault accident benefits from their own insurer</p>	
<b>Part c:</b> 0.75 point	
<p><b>Sample 1:</b></p> <p>Combined liability and injury insurance. This system is probably the best, because it keeps the liability system for major injuries and the injury system for minor injuries. It uses a descriptive or monetary threshold to select which system to use. It is more fair than the liability system because the at-fault driver would be compensated if it's a minor injury, but it also keeps the "retribution" aspect of the liability system for major injuries.</p> <p><b>Sample 2:</b></p> <p>I would suggest a combined system, possibly using a threshold method. This would ensure that the combined system would provide some benefits up to a certain threshold to compensate the basic losses regardless of the fault. This would ensure that there is some penalty on the at-fault driver for misconduct because it provides flexibility for the other driver to sue for serious injuries, for awards such as non-pecuniary damage (pain and suffering)</p> <p><b>Sample 3:</b></p> <p>Combined injury and liability system: for minor injuries use injury system, for more severe use liability.</p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

- Avoids problems of reduced payments for catastrophically injured drivers
- Minor injury for all claimants regardless of fault. People only slightly at-fault will still be compensated.
- Less money is used for lawyers, etc. and more available to pay injured.

### **EXAMINER'S REPORT**

Candidates performed fairly well on this question. The philosophy and description of the different insurance systems is expected to be known

#### **Part a**

Candidates did well on this subpart and most of candidates understood how system worked.

#### **Part b**

Candidates did well on this subpart and most of candidates understood how system worked.

#### **Part c**

Most of the points lost on this question was due to candidates not clearly identifying how the described system addressed inequities of the system in a and b.

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 6</b>	
<b>TOTAL POINT VALUE: 1</b>	<b>LEARNING OBJECTIVE: A2</b>
<b>SAMPLE ANSWERS</b>	
<ul style="list-style-type: none"><li>- Brokers should respond by communicating with their customers who request a quote regarding this situation</li><li>- Should disclose that they could not attempt to place the business with this insurer</li><li>- Especially in the case where the unavailability will negatively impact the customers, brokers must disclose this lack of options to customer</li></ul>	
<b>EXAMINER'S REPORT</b>	
Most candidates were able to list that the broker needs to disclose in writing regarding the limitations imposed by the insurance company. However, many did not thoroughly discuss the repercussions to the insured.	



## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 07</b>	
<b>TOTAL POINT VALUE: 2.25</b>	<b>LEARNING OBJECTIVE: A2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point(s)</b>	
<p><b>Sample 1:</b> <i>Clear evidence that claims experience of insureds can be predicted using credit rating.</i></p> <ul style="list-style-type: none"><li><i>Proof exists that using credit-score in rating can better rate specific insured's risk, otherwise overall premium is not less, just redistributed.</i></li></ul>	
<p><b>Sample 2:</b> <i>Credit shows significant differences in expected loss costs, which helps make rate not excessive, and not unfairly discriminatory</i></p>	
<p><b>Sample 3:</b> <i>A rate should be in line with expected costs of providing coverage. It is statistically proven that there is a link between good credit score and good claim experience. This factor is a good factor to use in risk classification</i></p>	
<b>Part b: 0.5 point(s)</b>	
<p><b>Sample 1:</b> <b>Counter-Argument to Sample 1 above</b> <i>Evidence of claims experience is only for claims free, severity of claims is similar for all credit scores.</i></p> <ul style="list-style-type: none"><li><i>Evidence that it just may be that higher credit-scored insureds pay out some claims out of pocket</i></li><li><i>Need more proof</i></li></ul>	
<p><b>Sample 2:</b> <b>Counter-Argument to Sample 2 above</b> <i>Credit reports contain many errors, using these erroneous reports would not produce a fair rate</i></p>	
<p><b>Sample 3:</b> <b>Counter-Argument to Sample 3 above</b> <i>People with good credit scores do not have less accidents, they just are more likely to pay themselves for small claims. They may still be at risk of having claims, especially higher severity claims</i></p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<p><b>Part c: 0.5 point(s)</b></p> <p><b>Sample 1:</b></p> <ul style="list-style-type: none"><li>• <i>Credit scores must be up to date</i></li><li>• <i>Consider special life circumstances (so divorce, immigration, etc.)</i></li></ul> <p><b>Sample2:</b></p> <ul style="list-style-type: none"><li>• <i>If insured thinks they are punished for credit information, can write to insurer and insurer should consider</i></li><li>• <i>Confidentiality</i><ul style="list-style-type: none"><li>○ <i>Keep info private, only necessary parties see it</i></li></ul></li></ul> <p><b>Sample 3:</b></p> <ul style="list-style-type: none"><li>• <i>Get informed consent from customer before using credit score in underwriting or rating a policy</i></li><li>• <i>Do not use credit score as a sole factor in decision to refuse coverage or not renew a policy</i></li></ul>
<p><b>Part d: 0.75 point(s)</b></p> <p><b>Sample 1:</b></p> <ul style="list-style-type: none"><li>• <i>Officially defined credit information</i></li><li>• <i>Made it illegal for insurers to refuse to quote, bind or renew only on terms of credit info</i></li><li>• <i>Insureds must give permission for insurers to use their credit info, and insurers can't refuse to quote, bind or renew due to credit info alone.</i></li></ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"><li>• <i>Defined credit</i></li><li>• <i>Cannot terminate policy, refuse quote due to credit along</i></li><li>• <i>Cannot require consent of credit before quoting</i></li></ul>
<b>EXAMINER'S REPORT</b>
<p><b>Part a</b></p> <p>Candidates did well on this section. Most candidates identified the correlation between credit scores and loss experience.</p>
<p><b>Part b</b></p> <p>Candidates did not read the question carefully. Many candidates provided a response to part b which was not a counter-argument to the answer provided in part a. For example many candidates stated in part b that using credit score was discriminatory but did not use this as an argument in part a.</p>
<p><b>Part c</b></p> <p>Many guidelines were mentioned in the syllabus and most candidates earned full credit for this part.</p>
<p><b>Part d</b></p> <p>Generally candidates did well on part d. The most common error was to provide a Financial Services Commission of Ontario regulation that was not a <b>change</b> made during 2010.</p>

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 8</b>	
<b>TOTAL POINT VALUE: 1</b>	<b>LEARNING OBJECTIVE: B2</b>
<b>SAMPLE ANSWERS</b>	
<p>A: total assessment = <math>3M - 1M = 2M</math></p> <p>So A assessment = <math>2M \times \left( \frac{325M}{325M + 175M} \right)</math></p> <p>which is less than <math>1.5\% \times 325M = 4.875M</math></p> <p>C: = <math>\left( \frac{500M}{500M + 50M} \right) \times 300M = 272M</math></p> <p>Since <math>272M &gt;</math> the max limit <math>1.5\% \times 500M = 7.5M</math></p> <p>So <math>C = 7.5M</math></p>	
<b>EXAMINER'S REPORT</b>	
<p>Most candidates received full credit on this question.</p> <p>In order to determine the assessment for each company the candidate needed to understand and apply the assessment cap.</p> <p>The most common mistake made was forgetting that a cap applies to the assessment. A portion of the candidates did not remember the specific percentage of the cap.</p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 09</b>	
<b>TOTAL POINT VALUE: 1.25</b>	<b>LEARNING OBJECTIVE: B1-B3</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.25 point(s)</b>	
<p><b>Sample 1:</b> <i>Availability for this class will be reduced due to the fact that insurer that think of the risks have inadequate premium (too risky) will refuse them.</i></p> <p><b>Sample 2:</b> <i>Insurers will start rejecting applications to insureds that would have inadequate premiums, resulting in an availability crisis.</i></p>	
<b>Part b: 1 point(s)</b>	
<p><b>Sample 1:</b> <i>They should introduce a risk sharing pool that allow to cede risk that insurer find that they are underpricing for. Result of the pool would be distributed between all insurers in that jurisdiction in function of their voluntary business in auto. This will increase the availability of that class of risk.</i></p> <p><b>Sample 2:</b> <i>Create a broker pool that works to place high-risk insureds, similar to how high risk properties are placed in Newfoundland. If an insured is denied a policy, the brokers would work together to find an insurer that would accept that driver since not all insurers would have equally inadequate rates across all segments of the population, so it is likely that at least one insurer will accept the risk</i></p> <p><b>Sample 3:</b> <i>There should be a risk sharing pool were insurers could transfer risks they consider inadequate. Cost of the program will be pooled among participating insurers based on participation ratio. There should be no limitation to risk transfer or else we will face another availability problem. If there is a limitation we should also have a residual market in place.</i></p> <p><b>Sample 4:</b> <i>The government could set up a facility association, as an insurer of last resort. They could select a servicing company to handle claims. Any net loss would be charged out to the industry based on share of the voluntary market.</i></p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

EXAMINER'S REPORT
<b>Part a</b>
Candidates did extremely well on part a. Most candidates were awarded full credit. Any mention of reducing availability was given full credit.
<b>Part b</b>
The majority of candidates did well on part b. The most common error was for the candidate to propose removing the "Rate Freeze" or switching to competitive rating. The question clearly states that there is a rate freeze in effect. The candidates were asked to propose a solution to address the availability concerns within this market without changing the scenario described by the question.

## SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 10	
TOTAL POINT VALUE: 1	LEARNING OBJECTIVE: B3
<b>SAMPLE ANSWERS</b>	
<u>Advantages</u>	
<b>Sample 1</b>	
<ul style="list-style-type: none"><li>- Increases competition which leads to more affordability</li><li>- Increases innovation as new ideas are brought in to better serve customers</li></ul>	
<b>Sample 2</b>	
<ul style="list-style-type: none"><li>- More competition resulting in more availability of insurance</li><li>- More competition allows premiums to be competitive, making them more affordable to customers</li></ul>	
<b>Sample 3</b>	
<ul style="list-style-type: none"><li>- Increase availability, more options and choice for customers</li><li>- Canadian insurers will be treated favorably in the jurisdiction where foreign insurer principally operates (Minister of Finances requirement when licensing foreign insurer)</li></ul>	
<b>Sample 4</b>	
<ul style="list-style-type: none"><li>- Multinational companies have more international opportunity to diversify their portfolio. Well diversified company is less likely to be insolvent</li><li>- Creates tax revenue for Canada</li></ul>	
<u>Disadvantages</u>	
<b>Sample 1</b>	
<ul style="list-style-type: none"><li>- Runs counter to goal of federal government to promote Canadian ownership</li><li>- Harder to verify financial resources of parent</li></ul>	
<b>Sample 2</b>	
<ul style="list-style-type: none"><li>- Foreign parent failure is the main cause of Canadian insolvency</li><li>- Domestic funds and profit are being transferred to foreign countries</li></ul>	
<b>Sample 3</b>	
<ul style="list-style-type: none"><li>- Retained profits are returned to parent company and are not kept in Canada</li><li>- Take market share from domestic insurers</li></ul>	
<b>EXAMINER'S REPORT</b>	
<p>Due to open ended nature of the question, most candidates were able to get at least partial points. In the advantages, some candidates simply stated increased competition without specifying the advantage this brings such as lower rates and increased availability; in such cases the answer wasn't accepted.</p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 11</b>	
<b>TOTAL POINT VALUE: 2.25</b>	<b>LEARNING OBJECTIVE: B1-B2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.75 point</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"><li>- Private insurer didn't want to insure against terrorism acts following 2001/09/11</li><li>- This would make some insured unable to meet their regulatory requirements (e.g. necessary for mortgages)</li><li>- This raised fear of economic disruption (delayed in construction projects)</li></ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"><li>- To fill the need for commercial building insurance unmet by private insurers</li><li>- To ensure stable social environment as many of the construction projects could not be built is no such insurance existed</li><li>- For efficiency, as Department of Treasury can make use of existing private insurer infrastructure for claims handling</li></ul> <p><b>Sample 3:</b></p> <ul style="list-style-type: none"><li>- Construction and development projects would be delayed if no coverage</li><li>- Business owners would not be able to satisfy their legal obligations with their lenders (requiring adequate insurance of assets)</li><li>- If terrorism program was under government control, it would be inefficient as providing timely access to benefits (so it uses private insurers in TRIA)</li></ul> <p><b>Sample 4:</b></p> <ul style="list-style-type: none"><li>- To fill an insurance need unmet by private insurers as they generally exclude terrorism risk from their coverage</li><li>- To achieve a social purpose as it would have slowed the while economy by delaying construction projects by restricting loans, etc.</li><li>- Convenience: government may set up as insurance program quickly and is able to work with Treasury Department to find ways to recoup losses in a case of an event</li></ul>	
<b>Part b: 1 point</b>	
<p>i) Aggregate industry loss below 100M\$ threshold so no reimbursement (event won't be considered eligible)</p> <p>ii) Event &gt; 100M\$ so coinsurance is 15%. Reimbursement = <math>(75M - 10M) * (1 - 15\%) = 55.25M</math></p>	
<b>Part c: 0.5 point</b>	
<b>Sample 1:</b>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

- Too large potential losses and no basis to evaluate the premium to charge for such risk
- CAT bonds market insufficient to manage terrorism risk

### Sample 2:

- High potential for catastrophic loss may cause lack of funding for program without government support
- TRIA rates are highly subsidized, premiums would be too high in a private market

### EXAMINER'S REPORT

Candidate did ok on this question. Calculations seem to be the hardest part of this question.

#### Part a

Candidates were expected to know the reasons of inception of TRIA. Most of the candidates came up with at least 2 reasons.

#### Part b

Calculations seemed to prove a little hard for candidates. Candidates were expected to know how to apply the deductible and coinsurance for the reimbursement.

#### Part c

Candidates were expected to know at least one reason why terrorism couldn't be insurable



## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 12</b>	
<b>TOTAL POINT VALUE: 2</b>	<b>LEARNING OBJECTIVE: B3</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point</b>	
The claim handling and administration will likely be done by other departments and such costs may be excluded from calculating the “cost savings” involved in the program. For example advertising of the insurance provided by the government may be overlooked if it is bundled into the costs of another department.	
<b>Part b: 1.5 point</b>	
<b>Sample 1:</b> <ul style="list-style-type: none"><li>- Mandatory insurance: to make sure everyone has coverage that is mandatory, like auto insurance</li><li>- Social benefit: provide benefit to the society as a whole, like healthcare</li><li>- Filing needs not met by private insurance: when private companies won't insure certain risks, like terrorism</li></ul>	
<b>Sample 2:</b> <ul style="list-style-type: none"><li>- Filling needs unmet by private insurance. For example: private insurers don't have financial capacity to provide terrorism insurance</li><li>- Compulsory purchase of insurance: in order to fulfil social purpose, residual market is setup to ensure every driver has insurance</li><li>- Convenience: government can easily pass legislation to raise fund in order so setup a new program</li></ul>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
Many candidates received no credit on this part.	
<b>Part b</b>	
The answer is one of key learning objectives of the exam so a large majority of students was well prepared and obtained most of points.	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 13</b>	
<b>TOTAL POINT VALUE: 3.5</b>	<b>LEARNING OBJECTIVE: B1-B2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 1.5 point</b>	
<p><b>Sample 1:</b></p> <p>Production insurance :</p> <ul style="list-style-type: none"><li>- Manage production risk that arise in the agricultural industry</li><li>- Provide income loss protection on a commodity basis due to uncontrollable risk loss, e.g. weather, snow, wind, drought</li><li>- Doesn't cover market price volatility or fuel price increase</li><li>- Participation is voluntary</li></ul> <p>CAIS :</p> <ul style="list-style-type: none"><li>- Mitigate unforeseen income disruption and promote long-term income stability</li><li>- Provide income loss protection above the entire farm entity basis</li><li>- Cover perils not covered by PI, e.g. market price volatility, fuel price increase, etc.</li></ul> <p>The payments from PI are counted as the income for the reference margin on CAIS. If producer participate in PI, they're eligible for higher reference margin and potentially higher payments under CAIS.</p> <p><b>Sample 2:</b></p> <p>Production insurance :</p> <ul style="list-style-type: none"><li>- Provides income protection on a commodity basis for uncontrollable production losses due to weather, pests, disease.</li><li>- Encourages risk management and mitigation of losses</li></ul> <p>CAIS :</p> <ul style="list-style-type: none"><li>- Provides protection against income disruption due to rises in input costs (eg: fuel) or changes in market price.</li><li>- Promotes long-term income stability</li></ul> <p>They complement each other as different types of loss protection are provided by each program (no overlap)</p> <p>Both programs are run by the provincial and federal governments which allows coordination of roles and efficiencies in administering the programs</p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

### Part b: 0.5 point(s)

- Individual yield program
- Collective protection

### Part c: 1.5 point(s)

#### Sample 1:

- Underwriting :
  - o To avoid moral hazard, all livestock must be insured
  - o Insurance must be bought before any possible loss
- Pricing :
  - o Should include deductible and coinsurance to avoid moral hazard
  - o Pricing must be risk-based to make sure the program is sustainable
  - o Pricing should consider historical losses of the insured
- Claims :
  - o Claims must be paid quickly for the insured to avoid economic disruption

#### Sample 2:

- Underwriting :
  - o Farmer to choose a livestock to be insured. Once a livestock type is selected, all of the livestock of the same type in that farm is to be insured
  - o Insurance must be purchased before any damages are possible
  - o Operate on a co-insurance basis with deductible to ensure financial accountability and loss prevention
- Pricing :
  - o Can be based on long term historical results
- Claims :
  - o Claims can be made based on individual production basis or area production basis
  - o Product would cover all losses to livestock caused by natural hazards like fire, flood or disease.

## SAMPLE ANSWERS AND EXAMINER'S REPORT

EXAMINER'S REPORT
<b>Part a</b>
<p>In relation to Production Insurance, a lot of candidates stated only that it covers production losses. Because the objective of the question is to provide a description of production insurance, simply stating that production losses are covered was deemed insufficient particularly because the program is already named Production Insurance. We were looking for a description of what types perils are covered, how it works, etc.</p> <p>Most candidates had a good understanding of what CAIS is and how it complemented with Production Insurance.</p>
<b>Part b</b>
<p>Most candidates got full points for this question. It only was asking to state so no explanation was necessary.</p>
<b>Part c</b>
<p>Hardest part of the question due to its open ended nature.</p> <p>Some candidates have described a government-based insurance plan even though the question states that it is a private insurer.</p> <p>Given that there are a significant number of points available, we expected candidates to describe the hypothetical program in detail. Some candidates have given a correct answer however they hadn't elaborated enough to obtain full points.</p>

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 14</b>	
<b>TOTAL POINT VALUE: 2</b>	<b>LEARNING OBJECTIVE: B1, B2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point(s)</b>	
<i>Historical reason was to reduce the burden on courts and congestion in courts and provide immediate assistance to injured worker</i>	
<b>Part b: 0.25 point(s)</b>	
<i>Funded by employer contributions (assessments)</i>	
<b>Part c: 1.25 point(s)</b>	
<ul style="list-style-type: none"><li>• Used for public agencies, large corporations in transportation industry</li><li>• Funded by employers</li><li>• Employers are assessed amount based on actual claims and expenses for their company</li><li>• “pay-as-you-go” model</li><li>• Self-insured since employer pays own costs</li><li>• Benefits still administered through workers compensation boards</li></ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>EXAMINER'S REPORT</b>
<b>Part a</b>
<p>Most candidates only receive partial credit for this part. Candidates commonly described how workers' compensation operates (similar to what is being asked for in part c) as the reason for its inception. Very few candidates were able to recall that the legal system was no longer able to efficiently handle the amount of cases.</p> <p>A few candidates mentioned that increased accidents and industrialization were part of the reason for inception.</p>
<b>Part b</b>
<p>A lot of candidates received full credit for this part.</p>
<b>Part c</b>
<p>Most candidates scored well on this part. Many components of the individual liability mechanism were given credit since the question left it somewhat open and did not specify how many items/components were needed for full credit.</p>

**SAMPLE ANSWERS AND EXAMINER'S REPORT**

<b>QUESTION 15</b>			
<b>TOTAL POINT VALUE: 2.5</b>		<b>LEARNING OBJECTIVE: C1</b>	
<b>SAMPLE ANSWERS</b>			
<p><math>MfAD_{int} = 0.25\%</math>  <math>MfAD_{claims} = 5\%</math>                      (\$'000)</p> <p><i>Bonds AFS: Valued at market value. Use effective market yield weighed by Market value and duration.</i></p> <p><math>Discount\ Rate = [(2,638,691 * 20.13 * 0.0183) + (1,321,528 * 16.91 * 0.0336) + (247,497 * 15.57 * 0.0361)] / [(2,638,691 * 20.13) + (1,321,528 * 16.91) + (247,497 * 15.57)] = 0.0235</math></p>			
<i>Unpaid Claims</i>	<i>AY 2010</i>	<i>AY 2011</i>	<i>AY 2012</i>
12	0%	50%/50%	35%/85%
24	0%	0%	50%/85%
36	0%	0%	0%
<p><math>AY\ 2010\ APV = 0</math>  <math>AY\ 2011\ PV = 1,025 \times (1.0235)^{-0.5} = 1,013.18</math>  <math>PV_{with\ PfAD\ int} = 1,025 \times (1.025 - 0.0025)^{-0.5} = 1,014.42</math>  <math>PV_{PfAD\ claims} = 1,013.18 \times 5\% = 50.66</math>  <math>AY\ 2012\ PV = 833 \times (1.0235)^{-0.5} + 1,190 \times (1.0235)^{-0.5} = 1,972.68</math>  <math>PV_{with\ PfAD\ int} = 833 \times (1.025 - 0.0025)^{-0.5} + 1,190 \times (1.025 - 0.0025)^{-0.5} = 1,977.92</math>  <math>PV_{PfAD\ claims} = 1,972.68 \times 5\% = 98.63</math>  <math>APV = (1,014.42 + 50.66) + (1,977.92 + 98.63) = 3,141.63</math></p>			
<b>EXAMINER'S REPORT</b>			
<p>In general, candidates performed well on this question where the majority of mistakes were made in calculating the correct discount rate.</p>			

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 16</b>	
<b>TOTAL POINT VALUE: 3</b>	<b>LEARNING OBJECTIVE: D1, C3</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 1.5 point(s)</b>	
<p><i>PML Estimates: the PML estimate of this company probably does not reflect total ultimate expected cost to insurer and consider data quality, non-modeled exposures or less, exposure to multiple regions and model uncertainty, then the PML estimates won't be accurate and reliable as in this case.</i></p> <p><i>EQ models: the company is probably not using the models with a sound knowledge of its underlying assumptions and methodologies and with caution to reflect uncertainty in such estimate, which cause the PML estimate to vary significantly from one year to the next.</i></p> <p><i>EQ data quality: the company is probably not capturing appropriate data and regularly test data for consistency, accuracy and completeness which cause PML estimate to vary.</i></p>	
<b>Part b: 1 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"><li>• <i>Investment in technology to improve data quality</i></li><li>• <i>Auditing of data by an independent party responsible for collection and coding of data</i></li><li>• <i>Implement contingency plans to ensure claim's handling and adequacy of staff</i></li><li>• <i>Testing the output of models with actual data</i></li></ul> <p><b>Additional Accepted Answers:</b></p> <ul style="list-style-type: none"><li>• <i>Sound and comprehensive earthquake exposure risk management policy</i></li><li>• <i>Earthquake exposure data needs to be appropriately captured and regularly tested for consistency, accuracy and completeness</i></li><li>• <i>Earthquake models should be used with a sound knowledge of underlying assumptions and methodologies</i></li><li>• <i>PML estimates should properly reflect the total expected ultimate cost to the insurer, including considerations for data quality, non-modelled exposures, model uncertainty, and exposures to multiple regions</i></li><li>• <i>Ensuring that financial resources are at an adequate level and appropriate contingency plans are in place in the event of a major earthquake</i></li></ul>	
<b>Part c: 0.5 point(s)</b>	
<p><b>Sample 1:</b> <i>Capital and surplus of insurer; earthquake reserve</i></p> <p><b>Additional Accepted Answers:</b></p> <ul style="list-style-type: none"><li>• <i>Capital &amp; Surplus (i.e. retention or retained earnings)</i></li></ul>	



## SAMPLE ANSWERS AND EXAMINER'S REPORT

- *Earthquake Reserves*
- *Reinsurance Coverage (catastrophe reinsurance treaty or other per risk, quota share, excess of loss that covers catastrophe losses)*
- *Capital Market Financing (innovative financing transactions)*

### EXAMINER'S REPORT

- This question asked based on OSFI Earthquake, which is key material for the exam
- Candidates generally score well on this question, especially on part c, where majority of candidates got full mark

#### Part a

- Candidates are expected to know Osfi Earthquake key principles well
- Candidates are expected to identify 3 out of 5 principles, and describe how a failure in each principle may lead to the problems in order to get full marks
- Quite a few candidates were able to identify key principles but failed to describe the failure

#### Part b

- Candidates are expected to know general practices to manage to earthquake risk, as several papers mentioned common practices
- Candidates can draw answers from Osfi Earthquake or AM Best Catastrophe, and there are many possible answers to this part
- Candidates generally scored well on this part

#### Part c

- This part can be answered with common knowledge
- A lot of candidates got full mark on this part

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 17</b>	
<b>TOTAL POINT VALUE: 3.25</b>	<b>LEARNING OBJECTIVE: C1</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 1.75 point(s)</b>	
<p> <math>2011 \text{ undiscounted LR} = (1800+600)/4500 = 53.33\%</math>  <math>2012 \text{ undiscounted LR} = (1200 + 1500) / 5000 = 54\%</math>  <math>2011 \text{ discounted LR} = (1800 + 637 - 13) / (4500 + 12) = 53.72\%</math>  <math>\text{Investment Income from Unpaid @ 12 month} = 1580 / 2 * 4\% = 31.6</math>  <math>2012 \text{ discounted LR} = (1200 + 1580 - 31.6) / (5000 + 14) = 54.8\%</math> </p>	
<b>Part b: 1.5 point(s)</b>	
<p> <b>Sample 1:</b>  <math>PV \text{ factor} = (591 + 2 + 1460 + 10) / (600 + 1500) = 0.9824</math>  <math>\text{Estimated effect} = \{2500 - 0.95 * \min(2500; 637 + 1500)\} * 35\% * (1 - 0.9824) = 2.426</math> </p> <p> <b>Sample 2:</b>  <math>APV \text{ reserve} = 637 + 1580 = 2217</math>  <math>\text{Min}(2500, 2217) = 2217</math>  <math>PV \text{ factor} = (591 + 2 + 1460 + 10) / (600 + 1500) = 0.982</math>  <math>\text{Effect of discounting} = (2500 - 0.95 * 2217) * 35\% * (1 - 0.982) = 2.48</math> </p>	
<b>EXAMINER'S REPORT</b>	
<p>Candidates are expected to calculate the accident year loss ratio on undiscounted and discounted basis. They are also expected to calculate the estimated effect of discounting the asset for future income taxes.</p>	
<b>Part a</b>	
<ul style="list-style-type: none"> <li>• the candidate is expected to know the P&amp;C 1 page 60.30</li> <li>• the candidate would obtain full credit if they showed the formula and calculated answer correctly</li> <li>• it is well answered, but some candidates missed the investment income, sometimes they forgot to add in investment income from UPR</li> <li>•</li> </ul>	
<b>Part b</b>	
<ul style="list-style-type: none"> <li>• the candidate was expected to know C1</li> <li>• the candidate will obtain full credit if they show the formula and calculate answer correctly</li> <li>• it is well answered, but some candidates miss the present value factor, or forgot to apply the minimum to the reported reserves and the APV</li> </ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 18</b>	
<b>TOTAL POINT VALUE: 1.75</b>	<b>LEARNING OBJECTIVE: C1</b>
<b>SAMPLE ANSWERS</b>	
<p><b>Sample 1:</b>  <i>XS/deficiency ratio for AY 2010</i>  <math>= \{48,000 - 20,000 - 10,000 - 18,000 + 0.03 * [(48,000 + 30,000) / 2] + 0.025 * [(30,000 + 18,000) / 2]\} / 48,000</math>  <math>= 1,770 / 48,000</math>  <math>= 3.7\% \text{ of excess}</math></p> <p><b>Sample 2:</b>  <i>2011 investment income</i> <math>= (48,000 + 30,000) / 2 * 0.03 = 1,170</math>  <i>2012 investment income</i> <math>= (30,000 + 18,000) / 2 * 0.025 = 600</math>  <i>So excess amount</i> <math>= 48,000 - (20,000 + 10,000) - 18,000 + (1,170 + 600) = 1,770</math>  <i>So ratio</i> <math>= 1,770 / 48,000 = 0.0368 = 3.69\%</math></p> <p><b>Sample 3:</b>  <i>Investment income</i> <math>= (48,000 + 30,000) / 2 * 0.03 + (30,000 + 18,000) / 2 * 0.025 = 1,770</math>  <i>So excess / deficiency</i> <math>= 48,000 - 18,000 - 20,000 - 10,000 + 1,770 = 1,770</math>  <i>Excess ratio</i> <math>= 1,770 / 48,000 = 3.69\%</math></p>	
<b>EXAMINER'S REPORT</b>	
<ul style="list-style-type: none"> <li>• the candidate is expected to know excess and deficiency ratio</li> <li>• the candidate would have obtained full credit if they show the formula and calculate answer correctly</li> <li>• it is well answered, but some candidates lost points for not pointing out that is an excess ratio as it is positive</li> </ul>	

**SAMPLE ANSWERS AND EXAMINER'S REPORT**

<b>QUESTION 19</b>	
<b>TOTAL POINT VALUE: 2.25</b>	<b>LEARNING OBJECTIVE: C1</b>
<b>SAMPLE ANSWERS</b>	
<p><b>Sample 1:</b>  <i>Equity in unearned premium</i>  <math>= \text{UPR} - \text{losses on UPR (disc)} - \text{maintenance exp} - \text{internal adj exp} - \text{contingent comm}</math>  <math>= (8,000 + 4,000 + 300) - (8,000 * 0.7 * 0.9 + 4,000 * 0.65 * 1.05 + 300 * 1.2 * 1) - (8,000 + 4,000) * 0.025 * 0.98 - (8,000 * 0.7 * 0.9 + 4,000 * 0.65 * 1.05) * 0.1 - (8,000 + 4,000) * 0.01</math>  <math>= 2,979</math></p> <p><i>Since EQUIP is positive, no premium deficiency exists</i>  <i>So the maximum DPAC that can be recorded is <math>2979 + 0 = 2979</math></i></p>	
<p><b>Sample 2:</b>  <i>Unearned Premium</i> <math>= 8,000 + 4,000 + 300 = 12,300</math>  <i>Unpaid claims discounted</i> <math>= 8,000 * 0.7 * 0.9 + 4,000 * 0.65 * 1.05 + 300 * 1.2 * 1 = 8,130</math>  <i>Maintenance discounted</i> <math>= (8,000 + 4,000) * 0.025 * 0.98 = 294</math>  <i>Internal Adjustment Expense</i> <math>= (8,000 * 0.7 * 0.9 + 4,000 * 0.65 * 1.05) * 0.1 = 777</math>  <i>Contingent Commission</i> <math>= (8,000 + 4,000) * 0.01 = 120</math>  <i>EQUIP</i> <math>= 2,979</math>  <i>Maximum DPAC</i> <math>= \text{EQUIP} = 2,979</math></p>	
<b>EXAMINER'S REPORT</b>	
<ul style="list-style-type: none"> <li>• the candidate is expected to know C1</li> <li>• the candidate will obtain full credit if they show the formula and calculate answer correctly</li> <li>• it is well answered, but some candidates lost points for not knowing when to apply the discount</li> </ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 20</b>	
<b>TOTAL POINT VALUE: 2.5 points</b>	<b>LEARNING OBJECTIVE: C2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point(s)</b>	
<ul style="list-style-type: none"> <li>Common shares are riskier, so the balance sheet factor applied to it will be greater, meaning higher capital required. It should lower the MCT ratio.</li> </ul>	
<b>Part b: 0.5 point(s)</b>	
<ul style="list-style-type: none"> <li>Liability lines have long payout period, which means that unpaid claims liabilities will increase. The capital required factor for unpaid claims is usually higher for liability lines, so the capital required will increase, which should lower the MCT ratio.</li> </ul>	
<b>Part c: 0.5 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>If the deferred commission, which is an asset, is increased, it should mean an increase in equity. It will then increase the capital available, which will produce a higher MCT ratio.</li> </ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"> <li>Decrease MCT as capital required for assets will increase.</li> </ul>	
<b>Part d: 0.5 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>Unaffiliated registered reinsurer balances have low factors applied. So, the decrease of liability (unpaid claims and unearned premium) should lower the capital required, producing a higher MCT ratio.</li> </ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"> <li>MCT decreases since capital required increases from the credit factor for unaffiliated registered reinsurance.</li> </ul>	
<b>Part e: 0.5 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>Not all the letter of credit amount produces a credit for the margin of unregistered reinsurer. Not easy to predict impact: unpaid claims and unearned premiums will be lower, but there will be capital required for the fact that the reinsurer is unregistered. Most likely, the MCT will be lower.</li> </ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"> <li>Will increase capital required for reinsurance ceded to unregistered reinsurers. Decrease MCT.</li> </ul>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
<ul style="list-style-type: none"> <li>For this question, candidates were expected to know that common shares have a higher capital required for balance sheet assets than government bonds.</li> <li>Candidates scored really well on this question.</li> <li></li> </ul>	
<b>Part b</b>	
<ul style="list-style-type: none"> <li>For this question, candidates were expected to know that liability lines of business have a higher capital required for unpaid claims factor.</li> <li>Candidates scored really well on this question.</li> <li></li> </ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>Part c</b>
<ul style="list-style-type: none"><li>• For this question, candidates needed to know the impacts caused by an increase in deferred commissions.</li><li>• Candidates had difficulty with this question.</li><li>• This question was challenging because a change in deferred commissions will have multiple impacts (expenses, underwriting income, net income, surplus, capital available, capital required).</li></ul>
<b>Part d</b>
<ul style="list-style-type: none"><li>• For this question, candidates were expected to know the impacts caused by an increase in quota share reinsurance with an unaffiliated reinsurer.</li><li>• This question was challenging in the way that there was not a lot of assumptions given in the question and that the impacts are dependent on those assumptions. This resulted in candidates needing to give a more general answer on this question.</li></ul>
<b>Part e</b>
<ul style="list-style-type: none"><li>• For this question, candidates were expected to know the impacts caused by an increase in quota share reinsurance with an unregistered reinsurer. They also needed to understand the calculation of capital required for unregistered reinsurers.</li><li>• This question was challenging in the way that there was not a lot of assumptions given in the question and that the impacts are dependent on those assumptions. This resulted in candidates needing to give a more general answer on this question.</li></ul>

**SAMPLE ANSWERS AND EXAMINER'S REPORT**

<b>QUESTION 21</b>	
<b>TOTAL POINT VALUE: 2.5</b>	<b>LEARNING OBJECTIVE: C3</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point</b>	
<p><b>Sample 1:</b>  <i>The MAR is the minimum level of capital to encounter all the responsibilities of the company, based on risks determined by the standard model. This is the level below which the company is taken under the control of OSFI.</i>  <i>TAR is the level of capital required for an ongoing business and take into account risk considered in the internal model and those inherent of the company activities. Company will want to operate at a higher level than MAR to have an appropriate return for stakeholders.</i></p> <p><b>Sample 2:</b>  <i>MAR – identify the level at which regulator take control or other appropriate actions</i>  <i>TAR – identify the ongoing level of asset that regulator expect company to maintain as a minimum</i></p> <p><b>Sample 3:</b>  <i>MAR – provides the point at which OSFI's intervention will trigger</i>  <ul style="list-style-type: none"> <li>- <i>Minimum asset level required to operate</i></li> <li>- <i>Must use standard formula to determine this</i></li> </ul> <i>TAR – provides the additional assets to support unexpected liabilities that may arise</i>  <ul style="list-style-type: none"> <li>- <i>Target that insurers are expected to operate above this level</i></li> <li>- <i>Can use internal model or standard formula for this</i></li> </ul> </p>	
<b>Part b: 1 point</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>• <i>MAR – TBD</i></li> <li>• <i>TAR – 99.5% VaR or 99% TVaR for 1 year horizon + terminal provision</i></li> <li>• <i>BCAR – 1% EPD</i></li> <li>• <i>Solvency II – 99.5% VaR for 1 year time horizon</i></li> </ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"> <li>i) <i>To be determined</i></li> <li>ii) <i>VaR or TVaR</i></li> <li>iii) <i>Expected policyholder of 0.01</i></li> <li>iv) <i>VaR</i></li> </ul> <p><b>Sample 3:</b></p> <ul style="list-style-type: none"> <li>i) <i>MAR: need to be determined</i></li> <li>ii) <i>TAR: use a 99.5% VaR or 99% TVaR over 1 year horizon + terminal provision</i></li> <li>iii) <i>BCAR – use a 1% EPD ratio (expected policyholder deficit)</i></li> <li>iv) <i>Solvency II – use a 99.5% VaR</i></li> </ul> <p><b>Sample 4:</b></p> <ul style="list-style-type: none"> <li>i) <i>MAR – TBD</i></li> <li>v) <i>TAR – 99.5% VaR or 99% TVaR for 1 year horizon + terminal provision</i></li> <li>ii) <i>1% EPD</i></li> <li>iii) <i>Solvency II – 99.5% VaR for 1 year time horizon</i></li> </ul>	
<b>Part c: 1 point</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>i) <i>The insurer has the choice between an internal model or a standard model approach</i></li> </ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

- ii) *All the risks of the company should be considered: liquidity, credit,...*
- iii) *All risks should be modeled individually and then consider diversification benefits*
- iv) *The mitigation strategy in place for the company should be considered.*

### **Sample 2:**

- i) *Reflect risk mitigation*
- ii) *Provide option for a company to use a standardized approach or an internal model but with regulatory approval to calculate capital requirements*
- iii) *Consider all risks (insurance, credit, market, liquidity, operational risks)*
- iv) *Model each risk separately so that capital required = sum of capital required for each risk*

### **Sample 3:**

- i) *Provide the insurer the option to use standard model or internal model for TAR*
- ii) *Consider all risks*
- iii) *Consider the dependencies between risks and within risks and recognize when appropriate and measurable*
- iv) *Provides sufficient asset level at the end of the time horizon for*
  - *runoff of remaining assets*
  - *transfer obligations*

## **EXAMINER'S REPORT**

### **Overall**

This question tested the future principles-based solvency framework. Candidates are expected to know the purpose of asset requirements, the measurement of capital, and the considerations in building the framework. Some candidates confused it with the current solvency measurement of MCT.

### **Part a**

Candidates are expected to distinguish the purpose of MAR and TAR. Candidates earned full credit if they pointed out MAR is the point that will trigger regulator taking control and TAR is the going concern level.

This part was generally well answered.

Some candidates answered MAR is the minimum amount of assets the company needs to hold and TAR as the target amount of assets the company needs to hold. This was simply rephrasing the question but did not discuss the purposes of these requirements.

Other common mistakes: Some candidates confused these measures with the OSFI MCT requirement. Some candidates did not recognize that both MAR and TAR should cover all risks, implicitly or explicitly.

### **Part b**

Candidates are required to distinguish the different risk measure of VaR, TVaR, and EPD. Answers did not need to mention the percentiles to obtain full credit.

Common mistakes are: Most candidates did not understand the meaning of risk measure. They just listed the formula of BCAR calculation, which was not accepted. Some candidates did not recognize the risk measure for MAR is not determined yet.

### **Part c**

The question asked for the core concepts of the future P&C insurer's solvency framework.

Candidates are expected to know the considerations in building the new principles-based solvency



## SAMPLE ANSWERS AND EXAMINER'S REPORT

framework.

This part was the most challenging for candidates.

Some candidates listed the current multi-level approaches to insurer supervision, which was the approaches regulator assess insurers. This was not what the question asked for.

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 22</b>	
<b>TOTAL POINT VALUE: 1.5</b>	<b>LEARNING OBJECTIVE: C1</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 1 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>• <i>reserve deficiency of a company</i></li> <li>• <i>size of a company</i></li> <li>• <i>the volatility of a company's case-incurred loss development factors</i></li> <li>• <i>growth in a company's exposure</i></li> </ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"> <li>• <i>reserve deficiency</i></li> <li>• <i>diversification benefits</i></li> <li>• <i>size of company</i></li> <li>• <i>growth</i></li> </ul>	
<b>Part b: 0.5 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>• <i>BCAR use different risk factors by line of business while OSFI applies same factor</i></li> <li>• <i>OSFI's formula applies a risk on the max(NUPR, 50% of NWP)</i></li> </ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"> <li>• <i>BCAR: different risk factors by line; OSFI: same factor for all lines</i></li> <li>• <i>BCAR: include diversification benefits; OSFI: no diversification benefits</i></li> </ul>	
<b>EXAMINER'S REPORT</b>	
<p>This question compares the different components between the BCAR and the MCT. Although there is no direct comparison shown in any of the study material, the candidates are expected to understand both the tests and be able to compare them.</p>	
<b>Part a</b>	
Most of the candidates can only list two different components.	
<b>Part b</b>	
Most of the candidates be able to identify at least one difference.	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 23</b>	
<b>TOTAL POINT VALUE: 2</b>	<b>LEARNING OBJECTIVE: C3</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a:</b> 0.5 point(s)	
<i>GAAP stresses measurement of emerging earnings of a business from period to period, (i.e., matching revenue to expense), while SAP stresses measurement of ability to pay claims in the future.</i>	
<b>Part b:</b> 0.5 point(s)	
<i>GAAP is designed to meet the varying needs of the different users of financial statements. SAP is designed to address the concerns of regulators, who are the primary users of statutory financial statement.</i>	
<b>Part c:</b> 0.5 point(s)	
<i>GAAP has recognized certain assets such as deferred policy acquisition costs, while SAP treats it as expense when incurred.</i>	
<b>Part d:</b> 0.5 point(s)	
<i>It has been recognized by GAAP but not SAP.</i>	
<b>EXAMINER'S REPORT</b>	
Most candidates did fairly well on this question and were able to identify some of the key differences between SAP and GAAP. Many candidates were unclear in their response to part (c).	
<b>Part a</b>	
Most of the candidates are able to compare in terms of objectives.	
<b>Part b</b>	
Most of the candidates are able to compare in terms of intended users.	
<b>Part c</b>	
Candidates had a difficult time comparing the difference in asset recognition between SAP and GAAP. Most candidates were able to identify that the DPAE is recognized in GAAP but not in SAP.	
<b>Part d</b>	
Most candidates received full credit for this part.	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 24</b>	
<b>TOTAL POINT VALUE: 2</b>	<b>LEARNING OBJECTIVE: C2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 1 point(s)</b>	
<p><b>Sample 1:</b>  <i>Internal target could be set such that the impact of a relatively likely scenario is not projected to cause the insurer to fall below the supervisory target (MCT = 150%) at any time during the future time horizon and the impact of a higher loss scenario not projected to cause the insurer to fall below an insurer defined threshold (e.g. 50% at any time during the time horizon.</i></p> <p><b>Sample 2:</b>  <i>The insurer could use an internal capital model to determine its internal ratio. It should consider its own risk appetite and profile. Also consider its risk mitigation approach. The model should be forward looking and consider stress tests and scenarios tests.  Stress testing can be used to evaluate the capital needs for each risk factor. Model TVAR such that the 99<sup>th</sup> level is targeted.</i></p>	
<b>Part b: 0.5 point(s)</b>	
<p><b>Sample 1:</b>  <i>It is not appropriate to consider a future injection of capital when setting the internal target capital ratio, unless this injection is planned and certain. It is ok to consider the future injection when setting the level the company operates above the internal target capital level.</i></p> <p><b>Sample 2:</b>  <i>Can only inject capital if the scenario is in the insurer's control, otherwise not permitted to inject capital. The actuary must ascertain that the company can and will inject capital.</i></p>	
<b>Part c: 0.5 point(s)</b>	
<i>Notify OSFI immediately and provide OSFI with plan to restore the MCT to at least the internal target within a reasonably short time period.</i>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
<p>Difficult given the more general guidelines provided in the readings. Candidates struggled to get full mark on this open-ended question. Candidates were expected to know an approach that would be used to quantify the Internal Target Ratio for full credit. Due to the release of Revised A4 from OSFI, many answers were given partial credit including description of more qualitative approaches.  Candidates were too brief in general.</p>	
<b>Part b</b>	
<p>This is a tricky question as OSFI paper states that it's not acceptable for Internal Target but only for operating level above Internal Target. As in practice, the DCAT Base scenario is not different for Internal target and can include capital injections; candidates answers such as "acceptable if in business plan and under management control" were accepted to be consistent with common practice.</p>	
<b>Part c</b>	
Almost all candidates earned full credit.	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 25</b>	
<b>TOTAL POINT VALUE: 1.5</b>	<b>LEARNING OBJECTIVE: C2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point(s)</b>	
<p><b>Sample 1:</b> Because the DCAT base scenario is based on the company's business plan, the actuary should determine if this is a material change to the base scenario. If so, make changes to report.</p> <p><b>Sample 2:</b> It is considered a subsequent event because it occurs before report date but after calculation date. It should adjust report because the purpose of DCAT is to project future.</p> <p><b>Sample 3:</b> Examine materiality of the change in strategy on the financial condition of the company, reflect in DCAT report if material impact on base/adverse scenario, disclose.</p>	
<b>Part b: 0.5 point(s)</b>	
<p><b>Sample 1:</b> Can include capital injection in base scenario if it is part of the business plan and the actuary believes it is reasonable.</p> <p><b>Sample 2:</b> It is acceptable if the control injection is within the business plan and management have a big control in this injection.</p> <p><b>Sample 3:</b> It is acceptable to include capital injections in DCAT base scenario if actuary believes that id the intent of the company and the company has the ability to do so.</p>	
<b>Part c: 0.5 point(s)</b>	
<p><b>Sample 1:</b> Since it is a scenario, it would only be appropriate if management have control over volume growth.</p> <p><b>Sample 2:</b> It depends if the scenario is within management's control. If it is (due to the growth for example) then it is acceptable.</p> <p><b>Sample 3:</b> The adverse scenario is based on an event that is not in control of management and thus capital injection is not appropriate.</p>	
<b>EXAMINER'S REPORT</b>	
<ul style="list-style-type: none"> <li>• Many candidates received partial credit on each part by missing key elements in their answers.</li> </ul>	
<b>Part a</b>	
<ul style="list-style-type: none"> <li>• We expect that candidates understand that a change to the business plan with material impacts requires the work to be redone.</li> <li>• Most of candidates received partial credit on that part.</li> <li>• The most common missing element was forgetting to mention materiality.</li> </ul>	
<b>Part b</b>	
<ul style="list-style-type: none"> <li>• We expect that candidates should know that is acceptable to include capital injection in the base scenario. This provides partial credit.</li> <li>• To receive full credit, candidates should mention that the injection should be part of the</li> </ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

business plan.

- Candidates scored well in this part. Candidates lost credit by omitting that the capital injection should be part of the business plan.

### **Part c**

- Some candidates answered the question ignoring of the premium volume increase scenario mentioned in part b the question. Full credit was given if the response was correct.
- Most of candidates received partial credit on this part.

**SAMPLE ANSWERS AND EXAMINER'S REPORT**

<b>QUESTION 26</b>	
<b>TOTAL POINT VALUE: 6.75</b>	<b>LEARNING OBJECTIVE: C-2a) (Calculate and Use MCT)</b>
<b>SAMPLE ANSWERS</b>	
<p><i>MCT = Capital Available/Capital Required</i></p> <p><i>Capital Available = Equity – AOCI + AOCI(Equity, Debt, Foreign Currency) – Assets with 100% capital requirement = (100,000+40,000+5,000+0+12,000)-12,000+0+11,400+600-11,000-200=145,800</i>  <i>*200 is unregistered reinsurance</i></p> <p><i>Unregistered reinsurers:</i></p> <ul style="list-style-type: none"> <li>• <i>ABC Re = -600 &lt; 0</i></li> <li>• <i>DEF Re = -500 &lt; 0</i></li> <li>• <i>XYZ Re = 200</i></li> </ul> <p><i>Capital Required = BS Assets + Interest Rate Risk + Structured Settlements + Unearned Premium/Unpaid Claims + Reins. to unregistered</i></p> <p><i>Margin for unearned premium = 8%*max(net UEP, 50% NWP)</i></p> <ul style="list-style-type: none"> <li>• <i>Personal Property = 8%*(40,000, 50%*74,000) = 8%*(40,000)=3,200</i></li> <li>• <i>Auto-Liab = 8%*(125,000)=10,000</i></li> <li>• <i>Auto-Other = 8%*(45,450)=3,636</i></li> <li>• <i>Total = 16,836</i></li> </ul> <p><i>Margin for unpaid claims = % * (Net unpaid – PfAD)</i></p> <ul style="list-style-type: none"> <li>• <i>Property = 5% (32,000-1,600) = 1,520</i></li> <li>• <i>Auto-Liab = 10% (700,000-105,000) = 59,500</i></li> <li>• <i>Auto-Other = 5% (12,000-600)=570</i></li> <li>• <i>Total = 61,590</i></li> </ul> <p><i>Margin for reinsurance ceded:</i></p> <p><u><i>ABC Re</i></u>  <i>Margin = 10%(1,000+1,500) = 250</i>  <i>Credit = 1/1.5 *(500+3,000+0-(1,000+1,500+400)) = 400</i>  <i>Margin required = 250 – 400 = -150 &lt; 0; 0</i></p> <p><u><i>DEF Re</i></u>  <i>Margin = 10%(2,500+2,500) = 500</i>  <i>Credit = 1/1.5 *(500) = 333.33</i>  <i>Margin required = 166.67</i></p> <p><u><i>XYZ Re:</i></u>  <i>Margin = 15</i>  <i>Credit = 1/1.5 *(-200) = 0</i></p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

*Margin required = 15*

*Total Margin for unreg. Reinsurance = 0 + 166.67 + 15 = 181.67*

*Capital required = 23,500 + 16,836 + 61,590 + 181.67 + 20 + 80 = 102,207.67*

*MCT = 145,800/102,207.67 = 142.65% < 150%*

- *Less than the internal target ratio and the supervisory target ratio.*
- *Must inform OSFI immediately.*
- *Provide a plan outlining corrective actions and specific timeframes for the company to return to its internal target ratio.*

### EXAMINER'S REPORT

- The candidates were expected to know how to calculate MCT based on the information available from PC&1, and also comment on any actions the company should take based on its MCT score.
- Candidates generally scored well for this question. Most candidates know the formula for MCT, and can perform the calculation correctly, with a few exceptions:
  - For capital required on unpaid claims, a lot of candidates missed the fact this should be calculated based on net unpaid **excluding PfAD**
  - For capital available, some candidates double counted AOCI and some candidates did not calculate the deduction for unregistered reinsurers correctly
  - A number of candidates did not apply the formula for calculating the capital required for reinsurance ceded to unregistered reinsurers correctly
  - Some candidates missed the fact that the company should provide OSFI a plan (including actions and timeframe) to return to its internal MCT target.



**SAMPLE ANSWERS AND EXAMINER'S REPORT**

<b>QUESTION 27</b>	
<b>TOTAL POINT VALUE: 2.75</b>	<b>LEARNING OBJECTIVE: C2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point(s)</b>	
<p><b>Sample 1:</b> A risk management tool used to determine the potential impact on a company financial condition, of a selected change of risk factors, corresponding to an exceptional but plausible event.</p> <p><b>Sample 2:</b> Risk management process which measures the impact of the company's financial of a change of one or multi interdependent factors, it is assumed to be an extreme but plausible scenario.</p> <p><b>Sample 3:</b> Stress testing is a risk management tool where a company measures the effect on financial condition of remote, but plausible events.</p>	
<b>Part b: 1.5 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>○ Stress testing program should cover a range of perspective and technique. Should consider views from across the company and cover a range of perspectives and techniques.</li> <li>○ Need for documentation. Should by governed by documented policies and procedures, assumptions and fundamental elements of each stress test should be documented.</li> <li>○ Need for flexible infrastructure. Should be able to accommodate different and possibly changing stress test at an appropriate granular level, should allow aggregation of comparable risk across the company.</li> </ul> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"> <li>○ Insurer should consider all risks that at enterprise level to be incorporated into stress testing, to help insurer in understanding it potential risks.</li> <li>○ Insurer should have a robust infrastructure in place to accommodate change in risk factors and tis effect on insurer's financial condition.</li> <li>○ Management and board should regularly review and update its stress testing process as part of overall risk management.</li> </ul> <p><b>Sample 3:</b></p> <ul style="list-style-type: none"> <li>○ Includes a range of various perspectives and techniques. Include views from across the company ad include ranges of different perspectives and techniques.</li> <li>○ Need for documentation. The stress testing program should be governed by written policies and operation to run the program, should be appropriately documented.</li> <li>○ Need for flexible infrastructure. Flexible enough to accommodate different and possibly changing scenarios at an appropriate level of granularity.</li> </ul>	
<b>Part c: 0.75 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>○ Identify an outcome that affecting financial condition</li> <li>○ Determine a scenario or combination which could produce the outcome</li> <li>○ Could be useful to define plausible scenarios</li> </ul> <p><b>Sample 2:</b></p>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

Start with a specific result and then work backward to analyze what's need to set that result and assess of that scenario is plausible. Could be useful to define adverse scenario that should be assess in the DCAT process.

### Sample 3:

Start from the result. Given a certain result, how far would the risk factor needs to change, it will tell whether the scenario is adverse and plausible.

### EXAMINER'S REPORT

- We expect that candidates know what stress testing is and the general idea behind the concept.
- Candidates did poorly on this question. Candidates had difficulty to differentiate between different parts of the paper. Some candidates listed purposes of stress testing instead of considerations of stress testing programs in part b.

#### Part a

- We expect that candidate should know what stress testing is.
- To receive full credit, candidates should know:
  - Stress testing evaluates the financial condition of an insurer
  - Under a set of exceptional but plausible adverse scenarios.
- The most common error made by candidates is they forget the second element of the definition (under a set of exceptional but plausible adverse scenarios).
- Candidates did well on this part.

#### Part b

- Candidates did poorly on this part.
- Some candidates gave the purposes of stress testing instead of general considerations of stress testing programs.

#### Part c

- We expect that candidates should know at least that process starts with a specified outcome and works backward to identify scenarios that cause the outcome.
- To receive full credit, candidates should give:
  - That the process starts with a specified outcome.
  - Then, work backwards to identify what scenarios could bring that outcome
  - Then, determine if the scenario is plausible.
- Candidates did well on this part.
- The most common error made by candidates is they forgot the third element of the definition (determine if the scenario is plausible).

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 28</b>	
<b>TOTAL POINT VALUE: 2.25</b>	<b>LEARNING OBJECTIVE: C2</b>
<b>SAMPLE ANSWERS</b> {include responses to each part of this question below; delete remaining, unused parts}	
<b>Part a:</b> 0.5 point(s)	
<p><b>Sample 1:</b> The insurer financial condition is satisfactory as base scenario have MCT &gt; 100 % (the minimum capital) and all other adverse scenario have a surplus rather than a negative equity.</p> <p><b>Sample 2:</b> Yes, it is a good financial condition since he is able to meet all future financial obligation under adverse scenario (surplus &gt;0) and MCT &gt; 150 % (supervisory ratio) under base scenario</p> <p><b>Sample 3:</b></p> <ul style="list-style-type: none"> <li>○ Surplus &gt;0 in all scenarios</li> <li>○ MCT = 200 % on base &gt; 100 %</li> </ul>	
<b>Part b:</b> 0.75 point(s)	
<p>Scenario i) Premium risk:</p> <ul style="list-style-type: none"> <li>● MCT: \$ 625,000/ 400,000 = 156.25%</li> <li>● OSIF will not intervene as MCT &gt;= 150%</li> </ul> <p>Scenario ii) Liability risk</p> <ul style="list-style-type: none"> <li>● MCT: \$ 600,000/ 400,000 = 150%</li> <li>● OSIF may or may not intervene as MCT = 150%</li> </ul> <p>Scenario iii) Frequency and severity risk</p> <ul style="list-style-type: none"> <li>● MCT: \$425,000 / 400,000 = 106.25%</li> <li>● OSIF will intervene as MCT &lt; 150%</li> </ul>	
<b>Part c:</b> 0.5 point(s)	
<p>Actual candidate answer for full marks (any two):</p> <ul style="list-style-type: none"> <li>● Implementing rate changes, where possible;</li> <li>● Underwriting actions (e.g., restrictions on new business, withdrawal) in unprofitable markets;</li> <li>● Reviewing the distribution channels;</li> <li>● Reducing certain types of expenses (for example, advertising costs); and</li> <li>● Using reinsurance to mitigate capital strain.</li> <li>● Purchase reinsurance to cede more premiums.</li> </ul>	
<b>Part d:</b> 0.5 point(s)	
<p>Actual candidate answer for full marks (any two):</p> <ul style="list-style-type: none"> <li>● Insolvency of one or more reinsurers accounting for a significant portion of the insurer's reinsurance coverage.</li> <li>● Increases in the policy liabilities related to current reinsurance contracts which are swing-rated, have variable commission, or require reinstatements.</li> <li>● Loss of reinsurance coverage for remainder of term.</li> <li>● Increases in reinsurance rates or non-availability of reinsurance at the next renewal.</li> <li>● Post-event inflation (i.e., a significant temporary increase in the cost of labour and materials) following a catastrophe resulting in increases to the ultimate cost of unpaid</li> </ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<p>claims as well as future claims.</p> <ul style="list-style-type: none"><li>• Post-event inflation in regions not directly affected by the catastrophic event;</li><li>• Forced sale or liquidation of assets.</li><li>• Increased Property and Casualty Insurance Compensation Corporation (PACICC) assessments resulting from failure of other insurers.</li><li>• Rating agency downgrade.</li></ul>
<b>EXAMINER'S REPORT</b>
<ul style="list-style-type: none"><li>• Candidates scored well on this question.</li></ul>
<b>Part a</b>
<ul style="list-style-type: none"><li>• To receive full credit, candidates should give the criteria for the base scenario and the criteria for the adverse scenarios for satisfactory condition.</li><li>• We accepted two thresholds for the base scenario (100 % and 150 %).</li><li>• Candidates did very well on this part.</li></ul>
<b>Part b</b>
<ul style="list-style-type: none"><li>• To receive full credit, candidates must compute the MCT for each of the adverse scenarios and evaluate the likelihood that OSFI will intervene in each of them.</li><li>• The most common error is to use the wrong threshold (100 % instead of 150 %).</li><li>• Some candidates incorrectly based their decisions on the level of surplus.</li><li>• Some candidates did not know what OSFI will do if the MCT equal exactly 150 %. In that case, we accept the two options.</li><li>• Candidates did well on this part.</li></ul>
<b>Part c</b>
<ul style="list-style-type: none"><li>• To receive full credit, candidates should identify two management actions to the premium risk scenario (significantly higher than the base scenario).</li><li>• Some candidates did not understand the difference between a ripple effect and a management action.</li><li>• Candidates did very well on this part.</li></ul>
<b>Part d</b>
<ul style="list-style-type: none"><li>• To receive full credit, candidates should identify two ripple effects for the frequency and severity risk (single large claim) scenario.</li><li>• Some candidates did not understand the difference between a ripple effect and a management action.</li><li>• Candidates did very well on this part.</li></ul>

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 29</b>	
<b>TOTAL POINT VALUE: 1.5</b>	<b>LEARNING OBJECTIVE: C4</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.75 point(s)</b>	
<b>Sample 1:</b> Commutation: All future cash flows are current valued with the intent to accelerate settlement of obligation.  Seller: Assets: Cash decrease for payment to buyer Liab: Reduce unpaid claims by amount of obligation  Buyer: Reverse process Assets: Increase cash Liab: Unpaid increase for obligation	
<b>Sample 2:</b> Commutation: Process by which the future unpaid claims and adjustment expenses are current valued taking into financial and non-financial factors to accelerate payment and close the case.  Balance Sheet (1) Assets: <u>Decrease</u> by the consideration payment made by the seller to buyer <u>Increase</u> for the buyer of the commutation (2) Unpaid claims: decrease for seller and increase for buyer	
<b>Part b: 0.75 point(s)</b>	
<b>Sample 1:</b> Novation: Both parties agree to a new contract and void past obligations.  In this case both entities will clear their liability and asset entries associated with the prior agreement and set up new ones. Differences would be booked in income statement.	
<b>Sample 2:</b> Novation: Replace old contract with a new valid contract between the same or different parties. Balance sheet impact depends on terms of the contract.	
<b>EXAMINER'S REPORT</b>	
Candidates were expected to know the definition of commutation and novation and describe the impact on the balance sheet of each.  Candidates did well on the first part of this question and did not do well on the second part. About a third of the candidates received no marks on part b. Many of the candidates that received some marks on part b received the marks for the definition of novation but could not describe the impact on the balance sheet of a novation.	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

### **Part a**

Candidates did well on part a. Most candidates knew the definition of commutation. Some candidates did not provide a detailed enough description of commutation and lost marks and commonly omitted "to accelerate payments and close the case" from the definition.

Most candidates were able to identify the impact on the balance sheet of a commutation, but some candidates identified the impact on loss development triangles, which was not part of the question.

### **Part b**

Candidates did not do well on part b. Most candidates knew the definition of novation. Some candidates did not provide a detailed enough description of novation and lost marks, often by omitting "between the same or different parties" from the definition.

Most candidates were not able to identify the impact on the balance sheet of a novation. Many candidates answered incorrectly or simply did not answer this part of the question.

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 30</b>	
<b>TOTAL POINT VALUE: 1</b>	<b>LEARNING OBJECTIVE: C4</b>
<b>SAMPLE ANSWERS</b>	
<p><b>Sample 1:</b> Presence: <math>ERD = 5\% \times 25\% = 1.25\% &gt; 1\%</math> Absence: According to the 10-10 rule, 5% probability &lt; 10% for the risk transfer to happen probability must be &gt; 10%.</p> <p><b>Sample 2:</b> <math>ERD \text{ test} = 0.05 \times 0.25 = 1.25\% &gt; 1\%</math>, so present risk transfer 10-10 rule failed, since 5% chance of loss &lt; 10% so absence risk transfer</p>	
<b>EXAMINER'S REPORT</b>	
<p>Candidates were expected to use the 10-10 rule to prove absence of risk transfer and to use the <math>ERD &gt; 1\%</math> rule to provide existence of risk transfer. Some candidates mentioned an ERD of 2% was required to provide the existence of risk transfer. We accepted this answer.</p> <p>Candidates generally did well the question. A common error was to try to use the 10-10 rule to prove both existence and absence of risk transfer.</p>	

**SAMPLE ANSWERS AND EXAMINER'S REPORT**

<b>QUESTION 31</b>	
<b>TOTAL POINT VALUE: 2</b>	<b>LEARNING OBJECTIVE: D1</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.75 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>• <i>Assist OSFI in determining whether AA's work meets the standard (method, valuation, assumptions)</i></li> <li>• <i>Provide opportunities for external education for AA and peer review (new learning opportunities of other view point)</i></li> <li>• <i>Increase public confidence of the Actuarial profession and insurance industry</i></li> </ul> <p><b>Sample 2:</b></p> <ol style="list-style-type: none"> <li>1. <i>Narrow the range of practices of AA</i></li> <li>2. <i>Opportunities for external education for AA and peer reviewer</i></li> <li>3. <i>Increase public confidence</i></li> </ol>	
<b>Part b: 1.25 point(s)</b>	
<p><i>FCIA A – no, because 3 years of separation required</i></p> <p><i>FCIA B – no, as he/she have a direct ownership in company</i></p> <p><i>FCIA C – yes, indirect interests through mutual fund allowed</i></p> <p><i>FCIA D – yes, provided the FCIA did not take any role during the external audit process (but OSFI doesn't prefer external review in the same company as external auditor)</i></p> <p><i>FCIA E – no, as he/she is in the same company as the AA</i></p>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
<ul style="list-style-type: none"> <li>• Most candidates could describe OSFI's objectives for peer review</li> <li>•</li> </ul>	
<b>Part b</b>	
<ul style="list-style-type: none"> <li>•</li> <li>• Some candidates didn't distinguish direct vs. indirect financial interest, some were confused between external auditor and AA</li> </ul>	



## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 32</b>	
<b>TOTAL POINT VALUE: 1.5</b>	<b>LEARNING OBJECTIVE: C2</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.75 point(s)</b>	
<p><b>Sample 1:</b></p> <ol style="list-style-type: none"> <li>1. <i>Diversification</i></li> <li>2. <i>Underwriting Limit</i></li> <li>3. <i>Reinsurance</i></li> </ol> <p><b>Sample 2:</b></p> <ul style="list-style-type: none"> <li>• <i>Concentration by Line of Business</i></li> <li>• <i>Concentration by geography</i></li> </ul>	
<b>Part b: 0.75 point(s)</b>	
<p><i>Most of the automobile business (150/226=66%) is written in Ontario Property (Personal and Commercial) in BC represents 160/498=32% of total premium 150/120-1=25% automobile business in Ontario has grown at 25% in the last year</i></p>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
<ul style="list-style-type: none"> <li>• Candidate was expected to know concentration risk from CIA Disclosure</li> <li>•</li> </ul>	
<b>Part b</b>	
<ul style="list-style-type: none"> <li>• Candidate was expected to interpret given GWP by LOB and Region and identify any concentration risks.</li> <li>• Most candidates were able to identify rapid growth in Ontario Auto, but fewer were able to identify BC Property concentration risk</li> </ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 33</b>	
<b>TOTAL POINT VALUE: 1.5</b>	<b>LEARNING OBJECTIVE: C1</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.5 point(s)</b>	
<i>The internal rate of return, that when applied to the cash flows of the company, produce the book value of the assets.</i>	
<b>Part b: 0.75 point(s)</b>	
<p><b>Sample 1:</b></p> <ul style="list-style-type: none"> <li>• <i>Method for valuing assets</i></li> <li>• <i>Return on asset at balance sheet date</i></li> <li>• <i>Yield on assets acquired after balance sheet date</i></li> </ul> <p><b><u>Additional Accepted Answers</u></b></p> <ul style="list-style-type: none"> <li>• <i>the method of valuing assets and reporting investment income,</i></li> <li>• <i>the allocation of those assets and that income among lines of business,</i></li> <li>• <i>the return on the assets at the balance sheet date,</i></li> <li>• <i>the yield on assets acquired after the balance sheet date,</i></li> <li>• <i>the capital gains and losses on assets sold after the balance sheet date, and</i></li> <li>• <i>investment expenses, and losses from default (C1 risk)</i></li> <li>• <i>Reinvestment Risks</i></li> <li>• <i>Liquidation of Assets/Credit Risk</i></li> <li>• <i>Market condition</i></li> <li>• <i>Payment pattern</i></li> <li>• <i>New money rate/risk-free interest rate</i></li> </ul>	
<b>Part c: 0.25 point(s)</b>	
<i>When company's investments are sufficient to support gross policy liabilities.</i>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
<ul style="list-style-type: none"> <li>• Candidates are expected to understand the definition of portfolio yield rate.</li> <li>• Some candidates were not able to describe the full definition</li> </ul>	
<b>Part b</b>	
<ul style="list-style-type: none"> <li>• Candidates are expected to know considerations in selecting a discount rate</li> <li>• There are many possible answers to this part, and candidates can draw answers from various parts of CIA Discounting paper.</li> <li>• Candidates generally scored well on this part</li> </ul>	
<b>Part c</b>	
<ul style="list-style-type: none"> <li>• This part can be answered with common knowledge</li> <li>• Almost all candidates got full mark on this part</li> </ul>	

## SAMPLE ANSWERS AND EXAMINER'S REPORT

<b>QUESTION 34</b>	
<b>TOTAL POINT VALUE: 1</b>	<b>LEARNING OBJECTIVE: D1</b>
<b>SAMPLE ANSWERS</b>	
<b>Part a: 0.25 point(s)</b>	
<i>Is the user perspective of the work</i>	
<b>Part b: 0.25 point(s)</b>	
<i>Is considered material if the actuary thinks it will materially impact the decision making of the user or the reasonable expectation of the user.</i>	
<b>Part c: 0.5 point(s)</b>	
<p><i>The level for DCAT is less rigorous that the one for the valuation work. Materiality for valuation is to see the material impact on net income, earning Materiality level for DCAT is for the surplus used in the scenario testing, but no need to be as rigourous.</i></p> <p><b><u>Additional Accepted Answer</u></b> <i>For DCAT, the materiality level is related to adverse scenarios; for valuation, the materiality level is related to financial statement, policy liability or profit level.</i></p>	
<b>EXAMINER'S REPORT</b>	
<b>Part a</b>	
<ul style="list-style-type: none"> <li>• Candidates are expected to know the main factor for materiality level selection</li> <li>• Candidates generally did well on this part</li> </ul>	
<b>Part b</b>	
<ul style="list-style-type: none"> <li>• Candidates are expected to know when a materiality change will need to be reported.</li> <li>• Candidates generally scored well on this part</li> </ul>	
<b>Part c</b>	
<ul style="list-style-type: none"> <li>• Candidates are expected to know the differences between DCAT and valuation in terms of materiality level.</li> <li>• Most candidates failed to describe what determines the materiality levels for DCAT and valuation work, and they simply stated that DCAT materiality level is less rigorous than valuation.</li> </ul>	