

Exam 6C



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Exam 6-Canada

Regulation and Financial Reporting (Nation Specific)

May 5, 2016

4 HOURS

INSTRUCTIONS TO CANDIDATES

1. This 73 point examination consists of 29 problem and essay questions.
2. For the 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/tape.
 - Write your Candidate ID number and the examination number, 6C, at the top of each answer sheet. For your Candidate ID number, four boxes are provided corresponding to one box for each digit in your Candidate ID number. If your Candidate ID number is fewer than 4 digits, begin in the first box and do not include leading zeroes. 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.

CONTINUE TO NEXT PAGE OF INSTRUCTIONS

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.

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. Interoffice mail is not acceptable.

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 23, 2016.

END OF INSTRUCTIONS

EXAM 6 – CANADA, SPRING 2016

1. (2.5 points)

a. (1 point)

Identify four areas of concern with the financial soundness or solvency of insurance companies which federal legislation addresses.

b. (1 point)

Other than duty to disclose and contents of the insurance policy, identify four areas of the insurance contract that provincial legislation regulates.

c. (0.5 point)

Describe the requirements for foreign insurance companies to hold adequate assets in Canada under the Insurance Companies Act.

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EXAM 6 – CANADA, SPRING 2016

2. (2 points)

a. (1 point)

Briefly describe four qualifications that OSFI Guideline E-15 expects an Appointed Actuary to possess.

b. (1 point)

Briefly describe four responsibilities of an external reviewer outlined in OSFI Guideline E-15.

CONTINUED ON NEXT PAGE

EXAM 6 – CANADA, SPRING 2016

3. (2.0 points)

A Canadian auto insurance regulator in a highly competitive jurisdiction is considering a proposal by a consortium of insurance companies and dental practitioners to use a driver's *number of dental visits in the past 12 months* as an automobile insurance rating variable. The consortium has conducted a multivariate statistical analysis of empirical claims data to justify their proposal. This analysis found the following statistically significant result: each additional visit to the dentist in the past 12 months lowers the expected automobile insurance claims of the driver by 20%, all else equal.

The regulator has recently heard the testimony of Jeff Kucera at the NAIC Public Hearing of Credit-Based Insurance Scores about the use of credit-based insurance scores in rating. The regulator works closely with the NAIC and would like to ensure that *number of dental visits in the past 12 months* is evaluated relative to the arguments presented in this testimony.

a. (0.5 point)

Provide support in favour of using the *number of dental visits in the past 12 months* as a fair and valid automobile insurance rating criterion.

b. (1.0 point)

The regulator elects to approve this rating variable. Five years later, a new study recognizes that a gradual increase in dental fees has led to a 10% overall reduction in annual dental visits across the driving population. Fully defend the regulator's decision to maintain *number of dental visits in the past 12 months* as an approved rating variable in light of this new study.

c. (0.5 point)

The privacy commissioner rules that *number of dental visits in the past 12 months* constitutes personal information under the privacy laws of the jurisdiction and requires informed customer consent to be used in rating and underwriting. Identify two elements that should be included in the consent request to the customer.

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EXAM 6 – CANADA, SPRING 2016

4. (2.0 points)

a. (0.25 point)

Briefly describe the main responsibility of a Relationship Manager designated by OSFI for a federally regulated financial institution.

b. (0.75 point)

Briefly describe three key principles followed by OSFI in its risk assessment of federally regulated financial institutions.

c. (1.0 point)

Identify the two levels of control at which OSFI assesses the quality of risk management of a federally regulated financial institution and briefly describe the primary responsibilities of each level of control.

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EXAM 6 – CANADA, SPRING 2016

5. (2 points)

In 2011 and 2012 the Ontario Court of Appeal ruled on two significant cases regarding the criteria to meet the definition of catastrophic impairment. Fully describe the impact of one of these two cases on the definition of catastrophic impairment, including the original court decision and the subsequent appeal decision.

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EXAM 6 – CANADA, SPRING 2016

6. (2 points)

A province is considering introducing a cap on non-pecuniary damages only on minor injury claims. However, it is concerned with the legality of introducing the cap. Evaluate the likelihood of a successful legal challenge. Provide reference to any case precedents.

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EXAM 6 – CANADA, SPRING 2016

7. (1.75 points)

a. (0.50 point)

Identify a group of defendants that are frequently negatively impacted by the legal doctrine of joint and several liability. Briefly describe how this legal doctrine may impact the group in lawsuits.

b. (0.50 point)

Identify and briefly describe a possible reform to the joint and several doctrine to alleviate the potential negative impact to groups identified in part a. above.

c. (0.50 point)

Describe a concern that the trial lawyers may use to argue against a tort reform to the joint and several liability doctrine.

d. (0.25 point)

Identify a potential remedy to address the concern mentioned in part c. above.

EXAM 6 – CANADA, SPRING 2016

8. (4 points)

An agricultural producer insures the production of a particular crop under a plan with the following details:

Area	100 acres
Coverage Level	70%
Probable Yield	584 kg/acre
Price	\$0.41/kg

a. (1.0 point)

Identify and briefly describe two types of yield-based production insurance programs in Canada.

b. (1.0 point)

Identify and briefly describe two types of non-yield-based production insurance programs in Canada.

c. (0.5 point)

Using the plan described above, calculate the indemnity paid to the producer with an actual production of 25,000 kg.

d. (1.5 points)

Identify and briefly describe three other agriculture risk management programs in Canada under Growing Forward 2.

EXAM 6 – CANADA, SPRING 2016

9. (2.25 points)

a. (0.75 point)

Briefly describe the origin, role and goal of the Facility Association.

b. (0.5 point)

Identify two risk-sharing mechanisms used by the Facility Association.

c. (1.0 point)

Compare and contrast the two mechanisms described above with respect to:

- i. Risk insured
- ii. Underwriting and pricing of risk insured

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EXAM 6 – CANADA, SPRING 2016

10. (2.0 points)

a. (1.25 point)

Identify five reasons why government participation in insurance is considered necessary.

b. (0.75 point)

Identify three ways in which the government can be involved as an insurance provider.

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EXAM 6 – CANADA, SPRING 2016

11. (2.75 points)

A government insurance panel is considering various alternatives to improve availability of flood insurance for homeowners. A flood catastrophe model indicates the following expected loss costs for the different risk zones:

Risk Zone	Expected Flood Loss Cost (dollars)	Number of Homes (thousands)
A	50	855
B	300	100
C	3,500	45
Total	230	1,000

Market research revealed that homeowners would be willing to pay up to \$1,000 per year for flood protection. Any price in excess of that would be regarded as unaffordable.

a. (1.0 point)

Two approaches to offer flood insurance are the optional system and the bundled system. Compare and contrast these two approaches in terms of the following:

- i. moral hazard
- ii. allocation of cost

b. (1.5 points)

Propose and justify pricing for zones A, B and C which would maximize the number of households covered and discourage development in high-risk zones. Assume no expenses, no profit margin and no competition.

c. (0.25 point)

Identify a policy condition in part b. above which would help discourage development in high-risk zones and encourage loss control.

12. (1 point)

Identify two financial and two non-financial considerations associated with the future cash flows of a reinsurance commutation.

EXAM 6 – CANADA, SPRING 2016

13. (7.75 points)

The following information is available for a property and casualty insurance company that only writes auto insurance as at December 31, 2015. All amounts are in thousands of dollars (\$000s).

The cumulative accident year payment pattern is as follows:

Age (months)	% cumulative paid
12	25.0%
24	50.0%
36	75.0%
48	100.0%

The following additional information is also available:

- Assume all claim payments are made in the middle of the year.
- The company started writing business on January 1, 2015.
- The exposures, 12 months policies, are uniformly written throughout the year.
- There is no reinsurance.
- Annual Gross Written Premium in 2015 = \$10,000
- Net undiscounted unpaid claims at the end of 2015 = \$5,250
- Margin for Adverse Deviation (MfAD) Claims development: 10.0%
- MfAD Investment return rates: 0.5%
- The budgeted loss ratio for 2016 is equal to 65.0%.
- Maintenance expenses are equal to 3.0% of gross written premiums.
- Assume that maintenance expenses are paid during the time the unearned premium is earned.
- Interest rate shock factor = 1.25%.

<< QUESTION 13 CONTINUED ON NEXT PAGE >>

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EXAM 6 – CANADA, SPRING 2016

The composition of the company's bond portfolio is as follows:

Description	Bond #1	Bond #2
Maturity Date	31/12/2016	31/12/2017
Annual Coupon Rate	2.60%	3.50%
# of coupons per year	2	2
Par value	\$10,000	\$10,000
Coupons value (\$)	\$130	\$175
Annual effective yield	2.31%	3.23%
Modified Duration	0.972	1.888
Market Value	\$10,030	\$10,060

Note that there are no other invested assets other than Bond #1 and Bond #2 and that the combined market yield of the investment portfolio is used to discount losses.

Calculate the margin required for interest rate risk for the current year.

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EXAM 6 – CANADA, SPRING 2016

14. (2 points)

The following information is provided for a property and casualty insurance company as of December 31, 2015. All amounts are in thousands of dollars (\$000s).

Incremental Paid					Undiscounted Ultimate				
AccYr	12	24	36	48	AccYr	12	24	36	48
2012	2,000	1,000	500	0	2012	4,000	3,500	3,750	3,500
2013	1,500	750	250		2013	2,500	2,750	2,750	
2014	3,500	2,000			2014	5,500	7,000		
2015	2,500				2015	4,500			

Actuarial Present Value Ultimate				
AccYr	12	24	36	48
2012	4,500	3,600	3,800	3,500
2013	2,750	2,900	2,800	
2014	6,000	7,400		
2015	5,000			

The annual yield rate is 4.5%.

a. (0.5 point)

Calculate the undiscounted excess / (deficiency) ratio for accident year 2012 as of December 31, 2015.

b. (1 point)

Calculate the cumulative investment income on unpaid claims for accident year 2013 as of December 31, 2015.

c. (0.5 point)

Calculate the cumulative discounted excess / (deficiency) ratio for accident year 2013 as of December 31, 2015.

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EXAM 6 – CANADA, SPRING 2016

15. (2.5 points)

The following information is available for a Canadian property and casualty insurance company as at December 31, 2015. The company began operations on January 1, 2015. All amounts are in thousands of dollars (\$000s).

Accident Year	Net Paid Loss	Net Incurred Loss	Net Ultimate Loss
2015	2,000	3,500	10,000

	Discount Rate	Claims Development MfAD	Reinsurance Rate MfAD
Net	5.00%	6.00%	4.00%

Cumulative accident year payment pattern (net layer only):

- Percentage paid by 12 months = 20%
- Percentage paid by 24 months = 30%
- Percentage paid by 36 months = 50%
- Percentage paid by 48 months = 75%
- Percentage paid by 60 months = 100%

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

The gross discounted present value of claims liabilities (excluding PfADs) as at December 31, 2015 is 18,121.

Total net unpaid claims and adjustment expenses on an actuarial discounted basis as at December 31, 2015 are 8,180.

a. (2 points)

Calculate the net Investment PfAD at December 31, 2015.

b. (0.5 point)

Identify two considerations in calculating the portfolio yield.

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EXAM 6 – CANADA, SPRING 2016

16. (1 point)

a. (0.5 point)

Identify two key principles that provide a framework for risk transfer and risk transfer assessment.

b. (0.5 point)

Provide two examples of limitations of risk transfer.

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EXAM 6 – CANADA, SPRING 2016

17. (2 points)

The Earthquake Exposure Sound Practices Guideline sets out OSFI's expectations for policies and procedures applicable to insurers that have material earthquake exposure.

a. (0.5 point)

Briefly describe two methods to test the completeness, accuracy and consistency of the exposure data.

b. (0.75 point)

Briefly describe three best practices that insurers are expected to have in order to ensure that their earthquake models are appropriately used.

c. (0.75 point)

Identify three non-modelled exposure and risk factors that should be considered as part of an insurer's earthquake PML.

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EXAM 6 – CANADA, SPRING 2016

18. (2.75 points)

The following is an extract from page 80.10 of a Canadian property and casualty insurance company's P&C-1 as of December 31, 2015. All amounts are in thousands of dollars (\$000s).

	Deferred Commissions at beginning of year	Unearned Commissions at beginning of year	Commissions in respect of premiums written				Deferred Commissions end of year	Unearned Commissions end of year	Net Commissions attributable to the Period
			Direct	Reinsurance Assumed	Reinsurance Ceded	Net			
Automobile - total	14,000	?	10,000	1,000	4,000	?	16,000	?	?
Property - total	16,000	?	13,000	?	5,000	10,000	19,000	?	?
Total	30,000	?	23,000	?	9,000	?	35,000	?	?

Other financial information from page 80.10:

- Gross Contingent Commissions = 5,000
- Ceded Contingent Commissions = 2,000
- Gross Other Non-Deferrable Commissions = 3,000
- Ceded Other Non-Deferrable Commissions = 1,000
- Ceded Commission Income (Auto & Property Combined) = 11,000

a. (2.25 points)

Calculate Total Net Commissions as it appears on page 80.10.

b. (0.5 point)

Define non-deferrable commissions.

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EXAM 6 – CANADA, SPRING 2016

19. (2.5 points)

The following information is available from a property and casualty insurance company's December 31, 2015 P&C-1. All amounts are in thousands of dollars (\$000s).

	Income Statement Value 12 months (previous year)	Income Statement Value 12 months (current year)
Direct premiums written in the past 12 months	389,000	406,000
Reinsurance assumed in the past 12 months - Not Intra Pool	0	0
Reinsurance assumed in the past 12 months - Intra Pool	215,000	225,000
Reinsurance ceded in the past 12 months - Not Intra Pool		19,000
Reinsurance ceded in the past 12 months - Intra Pool		214,000

	Current Period
Insurance risk margin	64,000
Market risk margin	40,000
Credit risk margin	3,500

The following risk factors are used in the calculation of operational risk:

	Risk Factor
Direct premiums written in the past 12 months	2.50%
Reinsurance assumed in the past 12 months - Not Intra Pool	1.75%
Reinsurance assumed in the past 12 months - Intra Pool	0.75%
Reinsurance ceded in the past 12 months - Not Intra Pool	2.50%
Reinsurance ceded in the past 12 months - Intra Pool	0.75%
Premium growth above 20% threshold	2.50%
Capital/margin required component (balance sheet value)	8.50%
Cap	30.00%

The correlation factor between the asset risk and the insurance risk is 50%.

Calculate the total capital (margin) required at the target level as at December 31, 2015.

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EXAM 6 – CANADA, SPRING 2016

20. (3.75 points)

a. (2 points)

Fully discuss the potential effect of a transfer of insurance business with an unregistered reinsurer to a registered reinsurer on the components of the MCT formulae.

b. (1.25 points)

Fully describe how the capital required for off-balance sheet exposures is calculated in the MCT formulae.

c. (0.5 point)

Explain the purpose of the diversification credit in the MCT calculation.

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EXAM 6 – CANADA, SPRING 2016

21. (2.75 points)

You are given the following information with respect to the DCAT projections of a Canadian property and casualty insurance company. All amounts are in thousands of dollars (\$000s).

Scenario 1	Latest Year	Projection Year 1	Projection Year 2	Projection Year 3	Projection Year 4
Net Earned Premiums	10,000	10,400	10,800	11,200	11,600
Net Incurred Claims	6,500	6,240	6,480	6,720	6,960
Operating Expenses	2,500	2,600	2,700	2,800	2,900
Investment Income Net of Expenses	2,500	1,000	1,100	1,200	1,300
Income Taxes	875	640	680	720	760

Scenario 2	Latest Year	Projection Year 1	Projection Year 2	Projection Year 3	Projection Year 4
Net Earned Premiums	10,000	10,400	11,400	13,100	15,050
Net Incurred Claims	6,500	6,240	7,980	9,170	10,535
Operating Expenses	2,500	2,600	3,135	3,603	4,139
Investment Income Net of Expenses	2,500	1,000	1,150	1,300	1,450
Income Taxes	875	640	359	407	457

a. (0.25 point)

Briefly describe which of the above scenarios is more likely to be a base scenario.

b. (0.5 point)

Describe an event which can lead to the results shown in the adverse scenario.

<< QUESTION 21 CONTINUED ON NEXT PAGE >>

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EXAM 6 – CANADA, SPRING 2016

c. (1.5 points)

Identify and briefly describe three impacts on the MCT in the adverse scenario identified in part b. above.

d. (0.5 point)

Identify two possible corrective management actions for the adverse scenario identified in part b. above.

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EXAM 6 – CANADA, SPRING 2016

22. (2.75 points)

a. (0.75 point)

Briefly describe three reasons why insurers maintain credit ratings with rating agencies.

b. (0.5 point)

Briefly describe two measures taken by rating agencies to ensure consistent ratings across insurance companies.

c. (1.5 points)

Describe how the following approaches are used by rating agencies to determine economic capital:

- i. Expected policyholder deficit
- ii. Stochastic cash flow capital models
- iii. Principles-based systems

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EXAM 6 – CANADA, SPRING 2016

23. (2.25 points)

You are provided with the following select information from an insurance company's December 31, 2015 P&C-1. All amounts are in thousands of dollars (\$000s).

Assets	Current Year	Prior Year
Total Investments	400,000	380,000
Recoverable from Reinsurers		
Unearned Premiums	50,000	40,000
Unpaid Claims and Adjustment Expenses	150,000	135,000
Total Assets	700,000	670,000

Liabilities	Current Year	Prior Year
Payables		
Agents and Brokers	2,500	1,500
Policyholders	1,000	1,000
Other Insurers	10,000	9,000
Unearned Premiums	100,000	80,000
Unpaid Claims and Adjustment Expenses	400,000	350,000
Unearned Commissions	4,000	3,000
Total Liabilities	600,000	550,000

Statement of Income	Current Year	Prior Year
Premiums Written		
Direct	250,000	170,000
Reinsurance Assumed	150,000	130,000
Reinsurance Ceded	100,000	80,000
Underwriting Income (Loss)	(120,000)	(100,000)
Net Investment Income	105,000	80,000
Total Income Taxes	(5,000)	(5,000)
Net Income (Loss) for the Year	(20,000)	(25,000)

The company has no income from subsidiaries or any investment income gains.

<< QUESTION 23 CONTINUED ON NEXT PAGE >>

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EXAM 6 – CANADA, SPRING 2016

a. (1.0 point)

Calculate the following key financial indicators as of December 31, 2015:

- i. Return on Equity
- ii. Return on Revenue
- iii. Net Loss Reserves to Equity
- iv. Return on Assets

b. (1.25 points)

Based on the indicators calculated in part a. above, comment on the company's financial health.

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EXAM 6 – CANADA, SPRING 2016

24. (2.25 points)

a. (0.75 point)

Briefly describe three similarities between DCAT and ORSA.

b. (1.5 points)

Describe three differences between DCAT and ORSA.

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EXAM 6 – CANADA, SPRING 2016

25. (4 points)

a. (1 point)

Briefly describe four aims of the Solvency II regime.

b. (1.5 points)

Identify and briefly describe the three pillars in the Solvency II framework.

c. (1.5 points)

Contrast the MCT and the Solvency II Internal Model with regard to the following elements:

- i. Methodology
- ii. Correlation among risk categories
- iii. Operational risk

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EXAM 6 – CANADA, SPRING 2016

26. (2.25 points)

A Canadian property and casualty insurance company holds the following three bonds. Assume the company is an income tax exempt corporation and that it has no other investments. All amounts are in thousands of dollars (\$000s).

Bond	Classification	Amortized value at 12/31/2014	Market value at 12/31/2014	Coupon received in 2015	Amortized value at 12/31/2015	Market value at 12/31/2015
AAA	Held to maturity	2,000	2,100	50	2,000	2,200
BBB	Available for sale	1,000	900	100	900	950
CCC	Held for trading	1,500	1,600	75	1,400	1,300

a. (0.75 point)

Determine the value of each bond to be shown in its financial statements at 12/31/2015.

b. (1 point)

Calculate the impact of holding these investments on net income and other comprehensive income in 2015.

c. (0.5 point)

Describe the implications of selling \$1,500 of the AAA bond.

EXAM 6 – CANADA, SPRING 2016

27. (1 point)

For OSFI's earthquake preparedness test, Probable Maximum Losses (PMLs) have historically been based on the greater of the British Columbia or Quebec PMLs.

a. (0.5 point)

Briefly describe two disadvantages of this approach.

b. (0.5 point)

Compare how PMLs should be reported to OSFI for foreign and Canadian insurers when there is earthquake exposure outside of Canada.

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EXAM 6 – CANADA, SPRING 2016

28. (1.5 points)

The following information is available:

- An insurance company's fiscal year-end is December 31, 2015;
- A major event impacting the company's insurance contract liabilities occurs on January 15, 2016;
- The actuary becomes aware of the event on January 20, 2016, prior to completing the year-end valuation.

a. (0.25 point)

Define "subsequent event" according to the Canadian Institute of Actuaries.

b. (1.25 points)

Using the subsequent event decision tree, assess whether or not this event should be classified as a subsequent event.

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EXAM 6 – CANADA, SPRING 2016

29. (3.75 points)

a. (0.75 point)

Identify three desirable characteristics of a risk margin.

b. (3 points)

For each category, identify two considerations and explain how they would affect the selected margin in each of the following category:

- i. Claims development
- ii. Recovery from reinsurance ceded
- iii. Investment return rates.

END OF EXAMINATION

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.
- Candidates should justify all selections when prompted to do so. For example, if the candidate selects an all year average and the question prompts a justification of all selections, a brief explanation should be provided for the reasoning behind this selection. Candidates should not that a restatement of a numerical selection in words is not a justification.
- 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.
- Candidates should note that the sample answers provided in the examiner's report are not an exhaustive representation of all responses given credit during grading, but rather the most common correct responses.
- In cases where a given number of items were requested (e.g., "three reasons" or "two scenarios"), the examiner's report often provides more sample answers than the requested number. The additional responses are provided for educational value, and would not have resulted in any additional credit for candidates who provided more than the requested number of responses. Candidates are reminded that, per the instructions to the exam, when a specific number of items is requested, only the items adding up to that number will be graded (i.e., if two items are requested and three are provided, only the first two are graded).

EXAM STATISTICS:

- Number of Candidates: 95
- Available Points: 73
- Passing Score: 49
- Number of Passing Candidates: 37
- Raw Pass Ratio: 38.95%
- Effective Pass Ratio: 41.11%

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 1	
TOTAL POINT VALUE: 2.5	LEARNING OBJECTIVE: A1
SAMPLE ANSWERS	
Part a: 1 point	
Sample answers <ul style="list-style-type: none">• periodic filing of financial information• restrictions on types of investments insurers can make• conditions for entry into insurance business• other areas to protect policyholder interests	
Part b: 1 point	
Sample answers <ul style="list-style-type: none">• premium payment• reinstatement• insurable interest• policy terms Other accepted answers <ul style="list-style-type: none">• Contract taking effect• Incontestability• Designation of beneficiaries• Insured dealing with the contract• Wording of the contract• Claims settlement• Coverages• Agents licensing• Approval of rates• Statutory conditions• Policy conditions• Rating variables• Consumer protection• Marketing practices	
Part c: 0.5 point	
Sample answers <ul style="list-style-type: none">• Must have asset vested in Canada and controlled by Chief Agent or Minister of Finance• Must have sufficient vested assets to cover liabilities both in Canada plus sufficient margin as determined by BAAT Another answer <ul style="list-style-type: none">• Foreign companies need to vest in a Canadian trust at least \$5 Million	

SAMPLE ANSWERS AND EXAMINER'S REPORT

EXAMINER'S REPORT
Part a
<p>Candidates are expected to know the concern by the government. Candidates had average knowledge of this topic and mixed a few concepts together. Common mistakes include</p> <ul style="list-style-type: none">• Listing types of risk• Creation of rating bureaus• Failing to mention that filing has to be periodic and about financial information• Listing reasons for an insurer to exit a market• Listing items irrelevant to the question
Part b
<p>Candidates are expected to know about insurance contracts. They did great on b. Credits were extended to a large list of possible answer. Most candidates that didn't get full credit just did not write enough items down.</p>
Part c
<p>Candidates are expected to know the requirements on the foreign branches. They had average knowledge of this particular notion. We were looking for something about vested asset and prescribed amount or anything close to that to get full credits.</p> <p>Some candidates mentioned requirement unrelated to holding adequate assets and no credit was given.</p>

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 2	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE: A1
SAMPLE ANSWERS	
Part a: 1 point	
<p>Sample answers</p> <ul style="list-style-type: none"> • Be an FCIA • Have worked at least 3 of the last 6 years in Canada with at least one performing valuation work • Not have been subject to any adverse finding by the CIA Disciplinary Tribunal • Be knowledgeable/have experience with Standards of Practice and any other relevant legislation/regulation <p>Other accepted answer</p> <ul style="list-style-type: none"> • Is up to date with respect to the CIA's Continuing Professional Development requirement 	
Part b: 1 point	
<p>Sample answer</p> <ul style="list-style-type: none"> • Confirm the work has been done within the Accepted Actuarial Practice • Review the methods and assumptions of the AA and discuss whether they are appropriate • Discuss the appropriateness and effect of changes to methods and assumptions • Review the adequacy of processes, systems and work of others relied on by the AA to the extend it has not been reviewed by auditor <p>Other answers:</p> <ul style="list-style-type: none"> • Report to Superintendant if adverse findings • Must review DCAT work and other stress tests • Fully document findings and report to OSFI 	
EXAMINER'S REPORT	
<p>In general, candidates did great on this question. Candidates were expected to know the requirements of an Appointed Actuary and a Peer Reviewer stated by OSFI.</p>	
Part a	
<ul style="list-style-type: none"> • Candidates are expected to know the requirements as an Appointed Actuary. • Some candidates failed to provide enough items to get full credit • In particular, incomplete requirement were given zero credit 	
Part b	
<ul style="list-style-type: none"> • Candidates are expected to know the requirements as a Peer Reviewer. • Candidate were able to articulate valid answers to get partial credits • Some candidates repeated themselves and items weren't different enough to be accounted as two different elements. 	

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 3	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE: A2
SAMPLE ANSWERS	
Part a: 0.5 point	
<p>Sample answers:</p> <p style="padding-left: 40px;">Multivariate statistical analysis shows that it is statistically significant. There is a statistical relationship between insurance claims and # of dental visits. The analysis indicate should use as a rating variable.</p> <p>Another sample answer:</p> <p style="padding-left: 40px;">The rating variable is statistically significant and highly predictive of differentiating expected claim cost.</p>	
Part b: 1 point	
<p>Sample answer:</p> <p style="padding-left: 40px;">Overall shift in # of visiting dentist could increase overall premium but expect total insurance cost should be unchanged</p> <p style="padding-left: 40px;">-# of visiting is just one of multiple rating factors. Insurers other factors, capping could mitigate the impact of such change in visiting dentist.</p> <p style="padding-left: 40px;">-Assume total premium is adequate. Insurer can adjust overall premium by off balance factor. If change in # of visits is consistent between people than off-balance adjustment can make sure the individual premium unaffected</p> <p>Other sample answer:</p> <p style="padding-left: 40px;">The number of visits is reduced across the driving population. Therefore when calculating the rate differential when using new data, the relative proportion will not change. Total aggregate premium will not change because of the reduction. Actuary will regularly review data available and make sure rating calculation is updated accordingly. Off-balance factors will be use to adjust the overall premium level if necessary.</p>	
Part c: 0.5 point	
<p>Sample answer to get full credits:</p> <ul style="list-style-type: none"> • What personal information will be collected • The circumstances under which personal information may be disclosed to other parties <p>Many other answers received full credits</p>	
EXAMINER'S REPORT	
<p>This question challenged the candidate to use existing knowledge and to apply it to a hypothetical situation. Most candidates were able to come up with valid answers.</p>	
Part a	
<ul style="list-style-type: none"> • Candidates are expected to use the knowledge they had to build an answer. Most candidates were able to articulate good answers. • Common reason for not getting full credits was not providing enough information. 	
Part b	
<p>As stated above, this is an application question. Candidates are expected to defend the approved rating variable based on the information provided in the question.</p>	

SAMPLE ANSWERS AND EXAMINER'S REPORT

Candidates were able to recognize the impact of the distributional shift on overall premium level. Most candidates forgot to discuss the impact on individual rating factors for the number of dentist visit variable.

Part c

Candidates are expected to know the elements in the consent request. Most candidates did great on this part. As long as relevant answers were provided, full credits were awarded. Candidates who did not receive full credits were either not providing enough items or repeating the same item twice.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 4	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE: A2
SAMPLE ANSWERS	
Part a: 0.25 point	
<p>Sample answer:</p> <p style="padding-left: 40px;">Main point of contact between OFSI and FRFI who is <u>responsible for overall risk assessment</u></p> <p>Other sample answer:</p> <p style="padding-left: 40px;">It is the main point of contact between OSFI and the FRFI. It must always have an up to date evaluation of the risk in the company.</p>	
Part b: 0.75 point	
<p>Sample answer:</p> <ul style="list-style-type: none"> • Identification of risk: must be able to identify all material risks • Should be forward looking: must be able to estimate the future condition of the company • Assess the whole institution and not certain part of the company <p>Other answers:</p> <ul style="list-style-type: none"> • Differentiate between inherent risk and risk mitigation • Dynamic adjustments • Sound predictive judgement • Understanding drivers of risks: should understand what the key causes of risks are. 	
Part c: 1 point	
<p>Sample answers:</p> <ul style="list-style-type: none"> • Operational management: manage activities on a daily basis, ensure qualified staff understand risk and how to manage them, ensure efficient and sufficient and staff to manage risk • Oversight functions: Include compliance financial actuarial internal audit risk management senior management and board. They operate independently from operational and oversee the entire insurer to identify, monitor and manage risk. <p>Other answers:</p> <ul style="list-style-type: none"> • Operation management – basically the management of day to day operation to insure risk are managed • Oversight functions – should look at the risk at an enterprise wide level and assess risk that are at that level • 	
EXAMINER'S REPORT	
Candidate had an average knowledge of the topic discussed in this question.	
Part a	
<p>Candidates are expected to understand the role of the relationship manager.</p> <p>Most candidates pointed out that the relationship manager was the point of contact between</p>	

SAMPLE ANSWERS AND EXAMINER'S REPORT

OSFI and the FRFI but failed to mention the main responsibility, which is to maintain an up to date risk assessment profile.

Part b

Candidates are expected to know the principles in the risk assessment. They were able on average to come up with partial credit answer. Some candidates were not able to link the question back to the source material making it difficult for them to answer the question. This topic should be familiar to candidate.

Part c

Candidates are expected to understand the controls that OSFI used to assess the quality of risk management. They had trouble linking the question back to the source material. Some candidates thought the two levels were Board of directors and Management, partial credits were given for that as both of these are part of the oversight functions. This topic should be familiar to candidate.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 5	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE: A3
SAMPLE ANSWERS	
<p>Sample answers:</p> <p>Aviva vs Pastore</p> <p>The Pastore has a serious accident, her right leg was broken after a serious procedure. After use one leg for so long her other leg is not working properly. She claimed for the coverage under the catastrophic coverage.</p> <p>There are two types of catastrophic definition</p> <ul style="list-style-type: none">• Class 4 impaired catastrophic• Class 5 extreme catastrophic <p>To qualify class 4 there are 4 criteria (function for daily activity, social function, concentration, decompensation from work)</p> <p>Original court: if a cat loss and DAC assessment approved to be CAT</p> <p>Appeal: Aviva was argue the catastrophic should be met for all 4 criteria, not only one</p> <p>The court to determined 1 is it under the standard review 2 is it only one function can contribute the CAT definition</p> <p>The decision of the appeal, the case should defined as CAT loss and the indemnity should pay to Pastore.</p> <p>Sample answer to almost get full credits:</p> <p>Kusnierz vs Economical</p> <p>Here it was looking at a catastrophic impairment where it was required 55% to be declared a catastrophic impairment.</p> <p>The trial judge rules that the insured wasn't catastrophically impairment as the separate physical and mental impairment considered separately do not need the 55% threshold. The SABs did not outline that if it should be considered together and physical or mental should have been considered together, the document would have explicitly said so.</p> <p>This was overturned on appeal which said that because it didn't specify we can read it from the natural ready that they can be considered together and the insured did qualify for a classification of a catastrophic impairment.</p> <p>The impact is that mental and physical impairment should be classified together in determining whether something is categorized as a catastrophic impairment. This might means slightly more people being categorize as such, but because of the rarity of the cases to begin with, this is not a significant increase, and will not have dramatic increases</p>	

SAMPLE ANSWERS AND EXAMINER'S REPORT

in insurance rates etc... It can also be seen as more fair and in line with modern values.

EXAMINER'S REPORT

Candidate did poorly on this question. These are recent cases and candidate should be more knowledgeable about them. Most people were able to obtain partial credits but it's mainly the lack of information that restricted awarding credits. The question hinted at what we were looking for (fully describe impact, original court decision, subsequent appeal decision) but candidate only provided partial information.

Some candidates confused the cases with the trilogy which is related to the cap on pecuniary damages.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 6	
TOTAL POINT VALUE: 2.00	LEARNING OBJECTIVE: A3
SAMPLE ANSWERS	
2 points	
<ul style="list-style-type: none">• Sample answer #1<ul style="list-style-type: none">○ Case: Morrow v. Zhang○ In this case, the injured contested the 4,000\$ cap on non-pecuniary damages from minor injury. His arguments were based on Canadian Charter of Rights article 7 and 15.○ Article 7<ul style="list-style-type: none">▪ Injured stated to his right to freedom was not respected since he was “forced” to follow certain medical practices in order to be compensated. Court held that this was not limiting his freedom in any way since he can choose not to do it. Also, no limitation of right to justice since there’s no right to justice.○ Article 15<ul style="list-style-type: none">▪ Injured states that the law is discriminatory for minor injured victims. Indeed, they can’t be “fully” compensated for non-pecuniary damage will major injured can. Also, this stigmatizes the minor injured. First, the inured won on this point, but at Appel, they reversed the decision. Indeed, he reasonable person would think this is discriminatory and when the law is looked at in its total, there is no stigmatization of minor injured victim.○ In this case, the cap was declared to be legal. Therefore, another province should feel confident that the cap will be allowed.• Sample answer #2<ul style="list-style-type: none">○ Such a cap was introduced in AB legislation + was a subject of Morrow vs Zhang.○ Constitutional challenge of MIR protocol in case<ul style="list-style-type: none">▪ Cap discriminates against MI victims → less worthy of pecuniary damages▪ Cap promotes stereotype as malingerers▪ Cap was ruled to differentiate between MI victims + comparator group of other victims on an enumerable ground (type of injury)▪ Initial ruling was that the cap was unconstitutional (MIR regulation was evaluated separately from added benefits injured qualified for) → makes MI victims bear unfair share of cost cutting that came from need to reduce prems.○ On Appeal: decision overturned<ul style="list-style-type: none">▪ Must evaluate cap in conjunction w treatment protocol▪ While there is differation on enumerable ground, no discrimination – treats MI victims’ injuries as real + requiring care▪ Cap not unconstitutional○ Case introduces cap but in return for added benefits○ Trilogy – diff from this case → cap applies to ALL injuries○ Success of the cap in this case will hinge on return to insured. Is there an added benefit in return or simply limitation of benefits rights.• Sample answer #3	

SAMPLE ANSWERS AND EXAMINER'S REPORT

- The court will likely find the cap legal due to the previous case, *Morrow v. Zhang*, regarding Minor Injury Reform (MIR).
- The case plaintiffs suggested that the cap was discriminatory against the minorly injured because it forces an expectation of them taking more money than needed AND force them to certain types of treatments, which violates the Charter.
- The court found that the MIR did not force minorly injured to seek specific types of treatment, as they are free to not abide by the strictness and seek the treatment they wish (with a reduction in awards). The court also found that there is not a perceived connotation of minorly injured taking more than they need because the reform needed to be looked at as whole → this will show that the purpose was not to reduce the payment to minorly injured but instead to reduce premiums for everyone (not just minorly injured)
- So if the cap's purpose was to reduce premiums for everyone, rather than impose restrictions on only the minorly injured, then the courts will make it legal.

EXAMINER'S REPORT

Very few candidates received full credit for this question. The candidate was expected to recognize that the case *Morrow v. Zhang* has set precedent in Canada with regards to a cap on non-pecuniary damages for minor injuries.

The majority of candidates were able to reference the relevant case *Morrow v. Zhang*. Some candidates used the Trilogy cases as an argument to support the cap. However, the Trilogy has set a precedent for setting a cap to **overall** non-pecuniary damages rather than specifically on minor injuries. Partial credit was awarded for using Trilogy cases as case precedent.

Full credit was awarded to candidates who were able to cite the Court of Appeal's decision and list the reasons in support of the Court's decision.

Partial credit was awarded to candidates describing the facts of the case precedents.

Some candidates mentioned why a cap wasn't appropriate without referring to the reasons in support of the Court's decision, however the question specifically asked to evaluate the likelihood of a successful legal challenge. Proper support from the relevant cases would have made for stronger candidate responses.

A few candidates incorrectly argued that the cap would be successfully challenged based on *Morrow v. Zhang*. While the cap was struck down by the trial judge, that decision was later overruled by the Court of Appeal.

Common errors:

- Referring to the Trilogy cases as support for a cap on non-pecuniary damages for minor injuries
- Not providing enough reasons to support the Court of Appeal's decision

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 7	
TOTAL POINT VALUE: 1.75	LEARNING OBJECTIVE: A4
SAMPLE ANSWERS	
Part a: 0.50 point	
<ul style="list-style-type: none"> • Sample answer #1 <ul style="list-style-type: none"> ○ Peripheral defendants in asbestos claims. Since the major defendants are often bankrupt, lawyers may go after peripheral defendants to pay more than their fair share of liability, when it's unlikely they knew about the dangers of asbestos. ie. If a peripheral defendant is 5% liable, and a bankrupt major defendant is 95% liable, the peripheral defendant might end up paying 100% • Sample answer #2 <ul style="list-style-type: none"> ○ Defendant with deep pockets (rich defendants) because J&S liab say that the totality of the claim losses can be taken from only one tortfeasor even if he was only partially at fault. ○ Rich people were often choose in trial because of their ability to pay all the claim if there are insolvent defendants • Sample answer #3 <ul style="list-style-type: none"> ○ Deep pocket defendants ○ In joint & several liability, any defendant that have responsibility in a lawsuit can pay 100% of claims, even if only 1% responsible. Because of that, lawers target deep pocket responsible to lower the risk of winning against an non solvent responsible. 	
Part b: 0.50 point	
<ul style="list-style-type: none"> • Sample answer #1 <ul style="list-style-type: none"> ○ Could limit joint and several liability to when defendant is less than 25% at fault. In the example above, the defendant is responsible for 5% which is <25% so joint and several wouldn't be applied to them under this reform • Sample answer #2 <ul style="list-style-type: none"> ○ Bar application of joint and several on non-pecuniary damages. This would help mitigate "big pocket" syndrome. • Sample answer #3 <ul style="list-style-type: none"> ○ Change to a several liability system, where the losses/benefits are proportional to the degree of liability of the defendant so a rich defendant won't pay more only because he is rich • Sample answer #4 <ul style="list-style-type: none"> ○ Change joint & several liability to proportionality ○ Defendant only responsible to pay its share of fault ○ ie. if the defendant is 15% at fault, it will never pay claims >15% of total amount 	
Part c: 0.50 point	
<ul style="list-style-type: none"> • Sample answer #1 <ul style="list-style-type: none"> ○ Trial lawyers seek full payment for the claimant. If claims are proportionate to fault and defendants go bankrupt, then the claimant may not be rightfully compensated. • Sample answer #2 <ul style="list-style-type: none"> ○ Trial lawyer may argue that the victims will be denied full compensation if the rule of joint and several liability is removed and some of the defendants cannot afford the damages they are responsible for 	

SAMPLE ANSWERS AND EXAMINER'S REPORT

- Sample answer #3
 - A trial lawyer would argue that their client is entitled to the full damages awarded, and that the financial states of the defendants should not prejudice the amount the plaintiff deserves
- Sample answer #4
 - Plaintiffs deserve to be fully compensated for their losses & it results in a more efficient legal system (often companies settle before court)
- Sample answer #5
 - Increases legal costs b/c there would be fewer pre-trial settlements
 - Instead would cost much more time/money to determine degree of fault for each def.

Part d: 0.25 point

- Sample answer #1
 - A potential remedy would be to set up a government fund or an insurance fund that can compensate plaintiffs who are harmed by defendants with inadequate insurance or money to pay damages
- Sample answer #2
 - Creation of a trust, where plaintiffs can receive damages they are unable to get from defendants
- Sample answer #3
 - Introduce a fund like PACICC to cover in case of insolvency.
- Sample answer #4
 - Establish a fund to pay in case some defendants unable to pay.

EXAMINER'S REPORT

Candidates generally performed well on this question. Candidates were expected to know the principle behind joint and several liability, how it affects certain defendants, potential tort reforms and concerns regarding the tort reforms. In addition, candidates were asked to identify a remedy to lawyers' concerns in regards to tort reform.

The majority of candidates received full credit for parts a) and b), while c) and d) were more challenging.

Some candidates confused a tort reform as a potential remedy to lawyers' concerns in part d).

Part a

Most candidates received full credit for this question with almost all receiving partial credit. Candidates were expected to identify a class of defendants such as peripheral defendants or defendants with "big pockets" and recognize how joint and several liability negatively impacts these types of defendants in lawsuits – namely they may be responsible for 100% of the damages even if they are only remotely at fault.

Common errors:

- Failing to identify/describe a group of defendants
- Failing to recognize the "deep pocket" syndrome or 100% damages even if 1% at fault

Part b

Almost all candidates received full credit for this question.

Full credit was given for adequately describing a tort reform but not identifying it.

SAMPLE ANSWERS AND EXAMINER'S REPORT

Common errors:

- Create a trust
- Inadequate description of a tort reform

Part c

About half of candidates received full credit for this question while the vast majority received partial credit. Candidates recognized that a main concern trial lawyers had was that plaintiffs may not be fully compensated and received partial credit.

For full credit, candidates were expected to mention that **without the rule** of joint and several liability, plaintiffs may not be fully compensated.

Other acceptable answers included reference to increases in efficiency of the court systems as well as increases in legal costs.

Common errors:

- Failing to make connection that J&S liability is what allows plaintiffs to receive full compensation

Part d

Approximately half of the candidates received credit for this question. Candidates mentioning a fund, or trust received full credit.

Candidates sometimes responded with tort reforms which would have been acceptable answers to part b), such as i) barring joint & several liability on non-economic damages, ii) threshold system, iii) proportional system. However, these responses would have been acceptable answers to part b) because they are tort reforms. Part d) asked for a remedy to address lawyers' concerns on potential tort reform to the J&S doctrine.

Common errors included:

- Listing a tort reform (introduce several liability on non-pecuniary damages)

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 8	
TOTAL POINT VALUE: 4	LEARNING OBJECTIVE: B2
SAMPLE ANSWERS	
Part a: 1 point	
<ul style="list-style-type: none"> • Sample Answer #1 Individual: Insured production is insured on his own production of the year according to contract. Collective: Farmers are reimbursed based on production of all insured of an area compared to a historical average. Own production is not relevant. 	
<ul style="list-style-type: none"> • Sample Answer #2 AgriInsurance – Pays if disaster hits and results in lower yields. Ex. Pests, hail and wind, flood. AgriStability – Pays if market changes result in lower income for farmers. Ex. Increase input prices, decrease in crop prices. 	
Part b: 1 point	
<ul style="list-style-type: none"> • Sample Answer #1 Weather Derivative: Based on a weather event. Excess moisture, drought etc. Mortality Insurance: Based on probability of death from an insured peril (disease etc.) hog mortality for example. 	
<ul style="list-style-type: none"> • Sample Answer #2 Acre Based – Have a field protected against adverse event based on size. For example fire. Destruction of 50% of field due to fire not based on production. Perennial Coverage – Based on the number of trees subject to a deductible. 	
Part c: 0.5 point	
<ul style="list-style-type: none"> • Sample Answer #1 $(584 \times 100 \times 0.7 - 25000) \times 0.41 = \\$6,510.80$ 	
Part d: 1.5 points	
<ul style="list-style-type: none"> • Sample Answer #1 AgriInvest – Program to encourage producers to save money. Government will make the same deposit as they do in the account for the first 1% (max 15,000). AgriStability – Protects producers against decrease in their production income. This can be due to an increase in expenses, a decrease in prices or a decrease in production. Western Livestock Price Insurance – Protects against fluctuations in market value of livestock. 	
<ul style="list-style-type: none"> • Sample Answer #2 APP – Provides low interest short term loans to producers. AgriRecovery – Disaster recovery program which is assessed on a case by case basis AgriInvest – Allow to invest 100% of net sales a year to a max of 400% of average net sales. Government match the first 1% up to 15,000. 	
EXAMINER'S REPORT	
Part a	
<ul style="list-style-type: none"> • Candidates did well on this part. • Candidates were expected to demonstrate their knowledge of the learning objectives by 	

SAMPLE ANSWERS AND EXAMINER'S REPORT

<p>identifying and describing two types of agricultural programs.</p> <ul style="list-style-type: none">• A common error was failing to correctly identify the name of the program.• Another common error was to only identify a single program when the candidate was expected to identify two programs.
<p>Part b</p> <ul style="list-style-type: none">• Candidates did well on this part.• Candidates were expected to demonstrate their knowledge of the learning objectives by identifying and describing two types of agricultural programs.• A common error was to identify a program not related to production insurance or to incorrectly identify the name of the program.
<p>Part c</p> <ul style="list-style-type: none">• Candidates did very well on this part.• Candidates were expected to demonstrate their knowledge of the benefits provided under the plan• The most common error was not applying the coverage level correctly.
<p>Part d</p> <ul style="list-style-type: none">• Candidates did well on this part.• Candidates were expected to demonstrate their knowledge of the learning objectives by identifying and describing three additional agriculture risk management programs.• A common error was to incorrectly identify the name of the program. For example "AgriFinance" is an incorrect response. However, if the candidate was still able to describe the program correctly partial credit was given.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 9	
TOTAL POINT VALUE: 2.25	LEARNING OBJECTIVE: B1, B2
SAMPLE ANSWERS	
Part a: 0.75 point	
<ul style="list-style-type: none"> • Sample Answer #1 Facility Association – Created by insurance industry as non-profit entity to provide insurance in involuntary market, create reinsurance mechanism in voluntary market. <ul style="list-style-type: none"> - Creates rating for FA risk and administers things such as participation rules, transfer limits - Since auto insurance mandatory, FA created to provide insurance to those unable in private sector to ensure all are able to get insurance - Creates sharing mechanism for higher risk insureds • Sample Answer #2 Developed to ensure availability of compulsory auto insurance across Canada. It's role is to provide a residual market for auto insurance and try to have as small a market share as possible. It's goal is to ensure availability of auto insurance. 	
Part b: 0.5 point	
Residual Market Risk Sharing Pools	
Part c: 1.0 point	
<ul style="list-style-type: none"> • Sample Answer #1 FARM Risks Insured – those unable to obtain insurance in voluntary market for PPV <ul style="list-style-type: none"> - Limited to commercial vehicles and private passenger auto Underwriting and pricing – based on FA rates <ul style="list-style-type: none"> - Must have been refused coverage by insurer authorized to do so RSP Risks Insured – high risk policies insured by private insurer and ceded to RSP <ul style="list-style-type: none"> - Only private passenger vehicles not qualified for FARM Underwriting and pricing – Must have minimum statutory limits and be underwritten and priced appropriately (in accordance with approved rates) <ul style="list-style-type: none"> - Underwritten and priced by insurer using own rates and underwriting policies. • Sample Answer #2 The risks insured by FARM are residual risks that won't be accepted by traditional insurers. In RSP, risks have been accepted by insurers. RSP is a pool of the worse risk of the insurance companies, but all of the risks have still been accepted by those companies (as opposed to FARM) With FARM, the insured knows he is using facility association since he (or his broker) has to contact FA. The price of his insurance contract is determined by FA. For RSP, the insured doesn't know he is ceded to the pool. The insurer will apply the same U/W guidelines as usual and the same pricing algorithm. 	
EXAMINER'S REPORT	
Part a	
<ul style="list-style-type: none"> • Candidates did well on this part. 	

SAMPLE ANSWERS AND EXAMINER'S REPORT

- Candidates were expected to demonstrate knowledge that Facility Association plays an important role in ensuring the availability of auto insurance coverage to all insureds who need it.
- The most common error was failing to describe the origin of the program.

Part b

- Candidates did extremely well on this part almost all candidates received full credit.
- Candidates were expected to demonstrate knowledge that the Facility Association uses multiple risk-sharing mechanisms
- A common error was to identify Facility Association as the risk-sharing mechanism without further clarification.

Part c

- Candidates did very well on this part most candidates received full credit.
- Candidates were expected to demonstrate understanding of the differences between the multiple risk-sharing mechanisms used by the Facility Association.
- A common error was failing to answer the question in full. Some candidates did not discuss the underwriting and pricing of the two mechanisms.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 10	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE: B2
SAMPLE ANSWERS	
Part a: 1.25 points	
<ul style="list-style-type: none">• Sample Answer #1 Filling a need unmet by private insurance Convenience Efficiency Providing compulsory coverage Social Purpose	
Part b: 0.75 point	
<ul style="list-style-type: none">• Sample Answer #1 Direct competition with private insurer In partnership with private insurer As a sole insurer • Sample Answer #2 As a direct competitor in the open market As the only provider in a monopoly As a reinsurer to private insurers	
EXAMINER'S REPORT	
Part a	
<ul style="list-style-type: none">• Candidates did extremely well on this part almost all candidates received full credit.• Candidates were expected to demonstrate knowledge of why government participation in insurance is sometimes considered necessary.• A common error was to identify less than the five reasons asked for in the question.	
Part b	
<ul style="list-style-type: none">• Candidates did extremely well on this part almost all candidates received full credit.• Candidates were expected to demonstrate knowledge of the different ways that the government can be involved as an insurance provider.• A common error was to identify less than the three ways asked for in the question.	

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 11	
TOTAL POINT VALUE: 2.75	LEARNING OBJECTIVE: B2, B3
SAMPLE ANSWERS	
Part a: 1 point	
<ul style="list-style-type: none">• Sample Answer #1<ul style="list-style-type: none">○ i. Moral Hazard<ul style="list-style-type: none">➤ Optional would have a higher moral hazard as the insured has more control over purchasing this coverage or not, or adding it later on to an existing policy, whereas with bundled it's just attached to your standard personal property insurance○ ii. Allocation of Cost<ul style="list-style-type: none">➤ With a bundled system, everyone pays for the losses of few whereas with an optional system you'll have adverse selection from people only adding the coverage if they consider themselves to be a high flood-risk, so the costs would be more concentrated on the high risks and may lead to coverage becoming unaffordable• Sample Answer #2<ul style="list-style-type: none">○ i. Moral Hazard<ul style="list-style-type: none">➤ Optional system is more susceptible to moral hazard. The people at highest risk of flood damage are the most likely to purchase and most likely not to properly prepare their homes for flood damage.➤ In a bundled system everyone has flood coverage, less susceptible to moral hazard since they are not self-selecting coverage○ ii. Allocation of Cost<ul style="list-style-type: none">➤ In an optional system it is more difficult to allocate cost across book of insureds since only those at risk for flood will buy. Bundled system can spread the cost because everyone has flood, still appropriate allocation however, as highest amount of cost still to flood prone areas• Sample Answer #3<ul style="list-style-type: none">○ i. Moral Hazard<ul style="list-style-type: none">➤ Both optional and bundled systems may cause an insured to be less likely to do their own risk mitigation and more likely to exaggerate claims (as they are both insured), but optional may be more at risk for moral hazard because people knowingly opt-in to it, whereas it is just part of a bundled system○ ii. Allocation of Cost<ul style="list-style-type: none">➤ Optional systems will allows the insured to pay for their expected loss costs, but bundled will have lower risks subsidizing the loss costs of higher risks	

SAMPLE ANSWERS AND EXAMINER'S REPORT

Part b: 1.5 points

- Sample Answer #1

Risk Zone	Expected Losses
A	$50 \times 855 = 42,750$
B	$300 \times 100 = 30,000$
C	$3500 \times 45 = 157,500$
Total	230,250

Pricing

Change C = 1,000, so get $1,000 \times 45 = 45,000$ in premium from C, means shortfall of $157,500 - 45,000 = 112,500$ in overall premium.

B is 6 times the loss cost of A

$$A \times 855 + 6A \times 100 = 230,250 - 45,000 = 185,250$$

$$1455A = 185,250$$

$$A = 127.32$$

$$B = 6A = 763.92$$

Charge A 127, B 764, C 1000, so that coverage is maximized, but level of risk is still reflected to discourage building in C.

- Sample Answer #2

Implement a bundled system where everyone purchases flood that is bundled with their homeowners insurance. Since \$1,000 is the maximum an insured will pay, charge full \$1,000 for Zone C, the riskiest zone with the fewest homes. Need to allocate the additional cost to the other zones. Increase Zone A & B to \$125 above their expected costs. This is a moderate increase when compared to overall homeowners premium.

$$A = \$175, B = \$425, C = \$1,000$$

A =	175×855	149,625
B =	425×100	42,500
C =	$1,000 \times 45$	45,000
		237,125

$$237,125 / 1,000 = 237 \sim 230$$

This would be adequate to cover expected losses yet still share cost fairly proportionately across risk zones. The high cost for Zone C discourages away from this high risk zone.

- Sample Answer #3

To maximize the # of households covered, risk Zone C will not be excluded, even though it is very high risk. Since \$1k/year is the most that will be paid and zone C costs are \$3.5k/year, we will cap Zone C prices at \$1k/year. This relatively high price will discourage development in Zone C. Allocate the remaining loss costs of Zone C to Zone B and A.

SAMPLE ANSWERS AND EXAMINER'S REPORT

Total = $230 \times 1,000 = 230,000$, $C = 1,000 \times 45 = 45,000$. So $A + B = 185,000$

C's excess loss cost = $2,500 \times 45 = 112,500$.

A + B # of homes = $855 + 100 = 955$, so C's excess loss cost per home = 117.80, add to A and B

A = 167.80

B = 417.80

C = 1,000

Part c: 0.25 point

- Sample Answer #1

Require houses in Zone C to have a flood protection system in place

- Sample Answer #2

Risk-based deductible

- Sample Answer #3

Set a large deductible for Zone C to encourage loss control

EXAMINER'S REPORT

Part a

- Candidates generally did well on this part.
- Candidates were expected to demonstrate knowledge of bundled and optional systems of offering flood insurance coverage.
- The most common error was confusing moral hazard with adverse selection in part i.
- Almost all candidates were able to identify that a bundled system commonly shifts costs from high risk insureds to low risk insureds (a form of subsidization or cost-sharing) and that an optional system fairly allocates costs to risk (high risk insureds pay for the majority of the costs).
- Some candidates used the assumption that the bundled system utilized full risk based pricing for the underlying coverages essentially making the flood component of the premium equivalent to the optional flood coverage. Under this assumption, alternative arguments for moral hazard and allocation of cost were given full credit

Part b

- Most candidates either scored poorly or very well on this part
- Candidates were expected to demonstrate knowledge of methods to discourage development in high risk areas (what motivates customers to reduce risk) while maximizing the uptake of insurance coverage.
- Common errors were:

SAMPLE ANSWERS AND EXAMINER'S REPORT

- Providing no pricing structure at all
- Recommending a pricing structure that excluded Zone C and therefore did not maximize the number of households covered
- Setting the price of Zone C above 1,000
- Recommended pricing structure did not balance to an expected flood loss cost of approximately 230 and would therefore generate a profit or loss
- Failing to justify the proposed pricing model in terms of how it maximizes number of households covered and discourage development in high risk zones

Part c

- Most Candidates received full credit for this part
- Candidates were expected to identify a condition of insurance coverage that would motivate customers to reduce their risk.
- The most common error was stating that coverage would be excluded from Zone C, whereas the part asked for a policy condition and not a risk selection/underwriting rule

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 12	
TOTAL POINT VALUE: 1	LEARNING OBJECTIVE: C1
SAMPLE ANSWERS	
Acceptable solutions: Financial: <ul style="list-style-type: none">- Amount and timing- Discount rate- Cost of inflation- Potential for volatility in cash flows- Income tax- Cost of holding capital- Payment pattern Non-financial: <ul style="list-style-type: none">- Morbidity or mortality of the claimant(s)- Current and future entitlements of the claimant(s)- Unfavourable court decisions	
EXAMINER'S REPORT	
<ul style="list-style-type: none">• Candidates were expected to know key considerations given to a reinsurance commutation.• Most candidates seemed to be able to identify at least one of the financial considerations.• Some candidates put down more than two financial considerations.• A few candidates put down incentives/benefits of a commutation instead of considerations.	

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 13

TOTAL POINT VALUE: 7.75

LEARNING OBJECTIVE: C1 and C2

SAMPLE ANSWERS

Part a: 7.75 points

1) Calculation of the duration of the bond portfolio

(1)	(2)	(3)	(4)
Asset	Market value	Modified duration	Yield
Bond #1	10,030	0.972	2.31%
Bond #2	10,060	1.888	3.23%
Total	20,090	1.431	2.92%

Portfolio duration = $(10,030 \times 0.972 + 10,060 \times 1.888) / (20,090) = 1.431$ (weighed by market value)

Portfolio yield = $(10,030 \times 0.972 \times 2.31\% + 10,060 \times 1.888 \times 3.23\%) / (20,090 \times 1.431) = 2.92\%$ (weighed by market value and modified duration)

2) Present Value of unpaid losses

Adjusted payout pattern

(1)	(2)	(3)	(4)
Timing	Cumulative Payout	Incremental Payout	Unpaid Payout
0.5	25.0%	25.0%	33.3%
1.5	50.0%	25.0%	33.3%
2.5	75.0%	25.0%	33.3%
3.5	100.0%	25.0%	
4.5	100.0%		

Timing 0.5: $25\% / 75\% = 33.3\%$

Timing 1.5: $25\% / 75\% = 33.3\%$

Timing 2.5: $25\% / 75\% = 33.3\%$

SAMPLE ANSWERS AND EXAMINER'S REPORT

Present Value Unpaid Losses

(1)	(2)	(3)	(4)	(5)	(6)
Timing	Payout	PV Factor @ 2.92%	PV @ 2.92%	PV Factor @ 2.42%	PV @ 2.42%
0.5	1,750	0.986	1,725.50	0.988	1,729.00
1.5	1,750	0.958	1,676.50	0.965	1,688.75
2.5	1,750	0.931	1,629.25	0.942	1,648.50
Total	5,250		5,031.25		5,066.25

Macaulay Duration **1.481**

Modified Duration **1.439**

(2) = Unpaid Payout * \$5,250

(3) = $(1 + 2.92\%)^{-t}$

(4) = (2) * (3)

(5) = $(1 + 2.92\% - 0.50\%)^{-t}$

(6) = (2) * (5)

Macaulay Duration = $\frac{\sum(t \cdot (4))}{(4)_{total}}$

Modified duration = Macaulay duration / $(1 + 2.92\%)$

Net Unpaid Undiscounted = \$5,250.00

Net Unpaid Discounted = \$5,031.25

PfAD claims development = \$503.13 = 5031.25 * 10%

PfAD Interest Rate = \$35.00 = \$5066.25 - \$5031.25

Net Unpaid Disc. w/ PfAD = \$5569.38

SAMPLE ANSWERS AND EXAMINER'S REPORT

3) Premium liabilities

Premium Liabilities Duration

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Timing	Cumulative Payment Pattern (Interpolated)	In Year Payment	PV Factor @ 2.92%	PV @ 2.92%	PV Factor @ 2.42%	PV @ 2.42%	Age at EOY
0.2929	30.18%	30.18%	0.992	0.299	0.993	0.300	0.7071
1.2929	55.18%	25.00%	0.963	0.241	0.970	0.243	1.7071
2.2929	80.18%	25.00%	0.936	0.234	0.947	0.237	2.7071
3.2929	100.00%	19.82%	0.91	0.18	0.924	0.183	3.7071
Total				0.954		0.963	

Macaulay Duration **1.602**

Modified Duration **1.557**

(1) To adjust average payment date for UPR exposure, assume x to be the time to end of the year from the average payment of the UPR. The average payment is the time that would split the UPR triangle in half. The area of the triangle is 72 (12 * 12 / 2). To solve for x, $x^2/2 = 36$. Thus $x = 8.485$ months, which is 0.7071 years. So from the beginning of the year the average payment is at 1-x or 0.2929 years. Also, 1/3 should be accepted since it represents the average accident date for premium liabilities.

(2) Claims will occur on average 0.2929 years after the December 31 valuation date. At the end of the first calendar year, claims in connection with unearned premium will be 1.0000 - 0.2929 = 0.7071 years old on average. The cumulative payment pattern for these claims is therefore interpolated between a cohort of claims that are 0.5 years old (assumed payment pattern at 12 months) and 1.5 years old (assumed payment pattern at 24 months). The cumulative payment pattern is linearly interpolated as follows:

$$[(0.7171 - 0.5)/(1.5 - 0.5)] \times (50\% - 25\%) + 25\%$$

The linear interpolation is similar in subsequent years.

$$(4) = (1 + 2.92\%)^t - (1)$$

$$(5) = (3) * (4)$$

$$(6) = (1 + 2.92\% - 0.50\%)^t - (1)$$

$$(7) = (3) * (6)$$

$$\text{Macaulay Duration} = \text{sumproduct}((5);(1)) / (5)_{\text{total}}$$

$$\text{Modified duration} = \text{Macaulay duration} / (1 + 2.92\%)$$

SAMPLE ANSWERS AND EXAMINER'S REPORT

Maintenance expenses:

Undiscounted = $10,000 * 3.0\% = 300$ (using unearned premium to calculate maintenance expense is also accepted $(5,000 * 3.0\%)$)

Discounted = $300 * (1.0292)^{-0.2929} = 297.60$

Macaulay Duration = $297.60 * 0.2929 / 297.60 = 0.2929$

Modified Duration = $0.2929 / (1.0292) = 0.285$

Premium Liabilities:

Unearned Premium = 5,000.00

Loss ALAE = $5,000 * 65\% = 3,250.00$

PV Loss ALAE = $3,250 * 0.954 = 3,100.50$

PfAD claims development = $3,100.50 * 10\% = 310.05$

PfAD Interest Rate = $3,250 * (0.963 - 0.954) = 29.25$

PV with PfAD = 3,439.80

Policy Liabilities in connection with Unearned Premium = $3,439.80 + 300 = 3,739.80$

Total Duration Premium Liabilities = $(3439.80 * 1.557 + 297.6 * 0.285) / (297.6 + 3439.80) = 1.456$

4) Interest rate risk margin

	(1)	(2)	(3)	(4)
	Fair Value	Modified Duration	Positive Shock +1.25%	Negative Shock (1.25%)
Interest Sensitive Assets				
Bond portfolio	20,090	1.431	359.36	(359.36)
Total			359.36	(359.36)
Interest Sensitive Liabilities				
Net unpaid claims and adjustment expenses	5,569	1.439	100.17	(100.17)
Net premium liabilities	3,740	1.456	68.06	(68.06)
Total			168.23	(168.23)

(3) = (1)*(2)*1.25%

(4) = (1)*(2)*(-1.25%)

SAMPLE ANSWERS AND EXAMINER'S REPORT

Capital required for Δy shock increase = $\text{MAX}(0; 359.36 - 168.23) = 191.13$

Capital required for Δy shock decrease = $\text{MAX}(0; -359.36 - -168.23) = 0$

Total interest rate risk margin = $\text{MAX}(191.13 ; 0) = 191.13$

EXAMINER'S REPORT

- This question combined MCT and premium liability.
- The candidates were expected to know how to evaluate policy liabilities in accordance with accepted practice in Canada and to calculate interest rate risk margin component of the MCT.
- It is understood that this is a long and tough question, even for the well-prepared candidates as the question is not broken down to subparts to guide through the calculation process.
- Most candidates managed to obtain partial credit. Most difficult parts were to calculate the premium liabilities and the durations.
- Few candidates used another method to calculate interest rate risk margin. They calculated the value of liabilities with a positive shock and the negative shock. They used those values and compared them the APV of liabilities. They did the same thing for the asset and compare them with market value of the bonds. This solution was accepted but no candidates got full credit.
- Some candidates used effective duration. The answer has been accepted.
- Some candidate used unearned premium to calculate maintenance expense instead of written premium as asked in the question. Both answers were accepted.
- Most of the candidates are having problem in the calculation of duration, particularly the maintenance expense duration.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 14	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE: C1
SAMPLE ANSWERS	
Part a: 0.5 point	
<p>Excess (Deficiency) ratio 2012 = Change in Ultimate / Prior Outstanding = (4000-3500)/2000 = 25%</p> <p>Excess (Deficiency) ratio 2012 = Change in Ultimate / Prior Outstanding = (3750-3500)/250 = 100%</p>	
Part b: 1 point	
<p>2013 investment income = $((2,750-1,500)+(2,900-2,250))/2 * 4.5\% = 43$ 2014 investment income = $((2,900-2,250)+(2,800-2,500))/2 * 4.5\% = 21$ Total = 64</p>	
Part c: 0.5 point	
<p>(Change in Ultimate + Investment Income) / Prior Outstanding = $(2750-2800+64)/1250 = 1.13\%$</p>	
EXAMINER'S REPORT	
<p>Candidates were expected to know all parts as the learning objective is categorized as 1. Candidates generally scored well, most mistakes came from Part b.</p>	
Part a	
<p>Candidates were expected to be able to calculate the ratio using change in undiscounted ultimates divided by undiscounted reserves. Common mistake was not calculating reserves using ultimate and cumulative paid.</p>	
Part b	
<p>Candidates were expected to be able to calculate investment income. Common mistakes were using undiscounted instead of discounted ultimates and not calculating reserves properly.</p>	
Part c	
<p>Candidates were expected to be able to calculate the ratio using change in discounted ultimates plus investment income, divided by discounted reserves. Common mistakes were not calculating reserves using ultimate and cumulative paid.</p>	

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 15	
TOTAL POINT VALUE: 2.25	LEARNING OBJECTIVE: C1
SAMPLE ANSWERS	
Part a: 2 points	
Sample Answer:	
Net Undiscounted Unpaid Loss = $10,000 - 2,000 = 8,000$	
Future net paid losses:	
2015: $8,000 * 0.1 / 0.8 = 1,000$	
2016: $8,000 * 0.2 / 0.8 = 2,000$	
2017: $8,000 * 0.25 / 0.8 = 2,500$	
2018: $8,000 * 0.25 / 0.8 = 2,500$	
Net disc at disc rate = $1,000 / (1.05)^{0.5} + 2,000 / (1.05)^{1.5} + 2,500 / (1.05)^{2.5} + 2,500 / (1.05)^{3.5} = 7,155.23$	
Net Claims PfAD = $7,155.23 * 6\% = 429.31$	
Net Reinsurance PfAD = $(18,121 - 7,155.23) * 4\% = 438.63$	
Net Total PfADs = $8,180 - 7,155.23 = 1,024.77$	
Net Investment PfAD = $1,024.77 - 438.63 - 429.31 = 156.83$	
Part b: 0.5 point	
<u>Possible considerations:</u>	
<ul style="list-style-type: none">• T-bills are sold at a discount and mature at par, quoted “coupon rates” generally are nominal simple discount rates. May need to convert to annual effective.• Bond portfolio yields are commonly nominal yield, compounded semi-annually. May need to convert to annual effective.• Bonds can have call features that result in early redemption, which may impact valuation.• Early principal repayment features may accelerate bond payments.• Accrued investment income should be combined with the book value of bonds.• Returns on equities are volatile and history may not be representative of future – caution required.• Actuary may use and take responsibility for the estimate of IRR from an investment professional if actions are justified.	
<u>Additional Accepted Answers:</u>	
<ul style="list-style-type: none">• The method of valuing assets and reporting investment income• The allocation of those assets and that income among lines of business• The return on the assets at the balance sheet date• The yield on assets acquired after the balance sheet date• The capital gains and losses on assets sold after the balance sheet date	

SAMPLE ANSWERS AND EXAMINER'S REPORT

- Rate of return on assets backing up liabilities
- Investment expenses, and losses from default (C1 risk)
- Reinvestment Risks
- Liquidation of Assets/Credit Risk
- Market condition
- Payment pattern
- New money rate/risk-free interest rate
- Duration of the assets

EXAMINER'S REPORT

- The candidate was expected to know the calculation for discounted claims liabilities and know the considerations for determining the portfolio yield/discount rate
- Candidates generally scored well, with a majority of candidates getting most, if not all of the marks
- The question was pretty straightforward. The only tricky part is that it required candidates to work backwards to get the investment pfad.

Part a

- The candidate was expected to know the formula to calculate the discounted claims liabilities
- In order to get full credit the candidate had to solve for the net investment pfad
- Candidates generally did well on this part
- Common errors made by candidates were:
 - Incorrectly calculating the reinsurance pfad (subtracting the net unpaid claims and expense from the gross)
 - Incorrectly calculating the future net paid losses; mix the concepts of Net Incurred Loss and Net Paid Loss.
 - Incorrectly calculating the net discounted future paid losses, some candidates include the net paid loss in calculating the present value.

Part b

- The candidate was expected to know the considerations for determining a portfolio yield/discount rate
- In order to get full credit the candidate had to give two considerations
- Candidates generally did well on this part
- Candidates gave answers from other parts of the paper, and not specifically from the portfolio yield section of the paper
- Common errors made by candidates were:
 - Whether the current value of assets is sufficient to cover liabilities has no bearing on the portfolio yield.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 16	
TOTAL POINT VALUE: 1	LEARNING OBJECTIVE: C1
SAMPLE ANSWERS	
Part a: 0.50 point	
<ul style="list-style-type: none"> • Sample answer #1 <ul style="list-style-type: none"> ○ Assessment of risk transfer should be done at contract inception & anytime there is a change in contract provisions ○ There are various approaches to assessing risk transfer • Sample answer #2 <ul style="list-style-type: none"> ○ No single method can be used to assess the existence of every risk transfer ○ The entire agreement, consisting of the reinsurance contract and any other verbal or written agreement must be considered in the assessment of risk transfer • Sample answer #3 <ul style="list-style-type: none"> ○ Professional judgement is required in the assessment of the existence of risk transfer ○ Existence of risk transfer is assessed at inception and every time changes in the reinsurance agreement significantly alter the expected future cash flows 	
Part b: 0.50 point	
<ul style="list-style-type: none"> • Sample answer #1 <ul style="list-style-type: none"> ○ Limitation on timing of claim payments ○ Profit sharing/adj. commission/experience based premium • Sample answer #2 <ul style="list-style-type: none"> ○ Changes in premium – eg. Swing-rated ○ Preset timing of payments • Sample answer #3 <ul style="list-style-type: none"> ○ Profit sharing ○ High front-end reinsurance commission • Sample answer #4 <ul style="list-style-type: none"> ○ Payment schedule → this essentially removes the timing risk component of insurance risk ○ Profit commissions → the performance of the ceded business should not be a factor, we want to measure pure insurance risk • Sample answer #5 <ul style="list-style-type: none"> ○ Profit commissions: when assessing risk transfer, there should not be a profit expected as first it may indicate that there is not enough risk transfer and this will make price increase ○ Forced renewals: when assessing risk transfer, there should not be any agreement as the cedant has to renew the risk transfer with the reinsurer until for example reinsurer remakes his loss • Sample answer #6 <ul style="list-style-type: none"> ○ If there are any limitations with regards to timing of payments could be a sign of insufficient risk transfer <ul style="list-style-type: none"> ▪ Payments from reinsurer must be made in a timely manner ○ Commutation clauses <ul style="list-style-type: none"> ▪ If there is the option of commutation, that can significantly limit risk 	

SAMPLE ANSWERS AND EXAMINER'S REPORT

transfer as risk can be just passed back after commutation

EXAMINER'S REPORT

Candidates were expected to understand the principles behind a framework for assessing risk transfer, rather than defining what risk transfer is, as well as features of contracts that may potentially limit risk transfer in a given contract.

Candidates generally performed well on part b) but had more trouble with part a). The question asked for **key principles behind a framework** for risk transfer. Many candidates described or defined of risk transfer rather than mentioning how one could go about assessing it.

Part a

The candidates were expected to know the principles behind risk transfer assessment rather than defining risk transfer.

The candidate must have mentioned 2 **principles** underlying a framework for risk transfer and risk transfer assessment.

Some candidates described an approach to assessing risk transfer (10-10 rule/reinsurer suffering significant loss) rather than principles behind the framework that would allow one to assess risk transfer (ie. multiple approaches to assessing RT).

Common errors:

- Defining risk transfer
- Uncertain timing of loss
- Uncertain amount of loss
- Significant probability a reinsurer may suffer a loss
- Reinsurer assumes significant amount of loss

Part b

Candidates are expected to understand the limitation of the risk transfer. Majority of candidates received full credit for this part. There were many acceptable answers. Candidates received credit for reasonable explanations to reinsurance contract features that may limit risk transfer.

Common errors:

- Confusing forced reinstatement with forced renewals (the former is a common feature in reinsurance contracts)

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 17	
TOTAL POINT VALUE: 2	LEARNING OBJECTIVE: C1
SAMPLE ANSWERS	
Part a: 0.5 point	
<ul style="list-style-type: none">• Sample answer #1<ul style="list-style-type: none">○ Summarize data and review key statistics○ Look at year-to-year changes in exposures (and compare with historical data)• Sample answer #2<ul style="list-style-type: none">○ Portfolio-specific data sensitivity analysis can be done regularly to ensure the quality of data○ Aggregating data by key occupancy, geocode, etc. and compare them with known attributes to test reasonableness of the data• Sample answer #3<ul style="list-style-type: none">○ Compare the data on key metrics to last years data to ensure reasonability○ Look at the historical data for any evidence on consistent mistakes/issues	
Part b: 0.75 point	
<ul style="list-style-type: none">• Sample answer #1<ul style="list-style-type: none">○ Knowledge of assumptions, limitations & methods to interpret the results○ Understand inherent uncertainty in the model output and effects on capital reqs & reinsurance reqs.○ If two models give different PML, must reconcile and explain any subsequent model adjustment• Sample answer #2<ul style="list-style-type: none">○ Understand alternative models and know why selected model is the most appropriate one○ Sound knowledge of assumptions and methodologies○ Ensure qualified staff to run the model• Sample answer #3<ul style="list-style-type: none">○ To encounter the inherent risk of the model, can use several different models to evaluate the result○ Only qualified staff are allowed to run the model, he/she need to know the assumptions and methodologies of using the model○ To regularly review and update the model to ensure the model is still valid	
Part c: 0.75 point	
<ul style="list-style-type: none">• Sample answer #1<ul style="list-style-type: none">○ Increase seismicity after event○ Claims handling expenses○ Exposure growth between data is extracted and model is run• Sample answer #2<ul style="list-style-type: none">○ Claim handling expenses○ Marine and auto insurance○ Adequacy of insurance-to-value• Sample answer #3	

SAMPLE ANSWERS AND EXAMINER'S REPORT

- Exposure growth
- Debris removal
- Contingent interruption of business operations

EXAMINER'S REPORT

Few candidates received full credit for this question. Part a) was the most challenging part mostly because the candidates didn't answer the question asked although their answers were relevant to the OSFI Earthquake guideline. Candidates generally did well on parts b) and c).

All three parts of this question were really about knowing the correct lists of methods/practices from the OSFI Earthquake guideline.

Part a

Candidates are expected to describe methods to test the accuracy of data. Some candidates received full credit for this part.

Many candidates provided quality control process that should be implemented to ensure data completeness, accuracy, and consistency. However, the question was asking for methods to test the exposure data. So, many candidates received no credit, or at least partial credit, on part a) for this reason.

Common error:

- Describing a quality control process. For example:
 - Have internal controls in place that ensure data systems record data properly
 - Data audits
 - Invest in technology to ensure accurate data is entered in the system

Part b

Candidates are expected to know the best practice to ensure the model are appropriately used. They generally did well on part b).

Most candidates were able to give at least one best practice to ensure earthquake models are appropriately used and many provided three.

Common error:

- Describing a practice an insurer should have in validating an earthquake model (i.e. test output of models against actual event or historical data)

Part c

Candidates are expected to identify non-modelled factors. Most candidates received full credit for this part. It was largely a "hit or miss" question where candidates provided 3 good answers or no good answers.

Common error:

- Identifying exposures that are usually modeled (i.e. social inflation, demand surge, post-event inflation, exposure to multiple region)

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 18	
TOTAL POINT VALUE: 2.75	LEARNING OBJECTIVE: C1
SAMPLE ANSWERS	
Part a: 2.25 points	
<p>Total Ceded Commission Income = Total Unearned Commissions at beginning of year + Total Reinsurance Ceded Commission Written – Total Unearned Commissions at end of year</p> <p>Property Reinsurance Assumed Commissions = Property Net Commissions – Property Gross Commissions + Property Ceded Commissions = 10,000 – 13,000 + 5,000 = 2,000</p> <p>Total Reinsurance Assumed Commissions = Auto + Property = 1,000 + 2,000 = 3,000</p> <p>Total Commission Expense = Total Deferred Commissions at beginning of year + Total Direct Commissions + Total Reinsurance Assumed Commissions – Deferred Commissions end of year = 30,000 + 23,000 + 3,000 – 35,000 = 21,000</p> <p>Total Gross Commissions = Commission Expense + Gross Contingent Commissions + Gross Other Non-Deferrable Commissions = 21,000 + 5,000 + 3,000 = 29,000</p> <p>Total Ceded Commissions = Commission Income + Ceded Contingent Commissions + Ceded Other Non-Deferrable Commissions = 11,000 + 2,000 + 1,000 = 14,000</p> <p>Total Net Commissions = Total Gross Commissions – Total Ceded Commissions = 29,000 – 14,000 = 15,000</p> <p>Alternative solutions:</p> <p>Net commission in respect of Auto premium written = 10,000 + 1,000 – 4,000 = 7,000</p> <p>Total net commission in respect of premium written = 7,000 + 10,000 = 17,000</p> <p>Adjustment for deferred commissions = 30,000 - 35,000 = -5,000</p> <p>Net contingent commission = 5,000 – 2,000 = 3,000</p> <p>Net other non-deferrable commission = 3,000 – 1,000 = 2,000</p> <p>Ceded commission income = Adjustment for unearned commissions + commission in respect of Reinsurance ceded => Adjustment for unearned commissions = 11,000 – 9,000 = 2,000</p> <p>Total net commission = Total net commission in respect of premium written + Adjustment for deferred commissions + Net contingent commission + Net other non-deferrable commission - Adjustment for unearned commissions = 17,000 + (-5,000) + 3,000 + 2,000 – 2,000 = 15,000</p>	
Part b: 0.5 point	
<p>Non-deferrable commissions are those that cannot be readily identified as exclusively relating to and varying with the acquisition of premiums and therefore are not recoverable.</p>	
EXAMINER'S REPORT	
<p>Candidates were expected to know the calculation for total net commissions from 80.10 in the P&C 1</p> <p>They were also expected to know what deferrable commissions were</p>	

SAMPLE ANSWERS AND EXAMINER'S REPORT

No candidate received full marks for this question

A few candidates received full marks for part a), and the majority of candidates received partial marks for part b)

Part a

- Candidates were expected to know the formula to calculate the Total Net Commissions
- Candidates in general used the alternative approach.
- Candidates in general did well in solving Net Commissions in respect of premium written.
- Most candidates calculated the adjustments for deferred commission correctly.
- The majority of the candidate solved net contingent commissions and net non-deferred commission correctly.
- Common mistakes include 1) instead of subtracting commission income, some candidates add commission income back, 2) A lot of candidates don't understand that ceded commission income includes commissions in respect of premium written, resulting in double counting the commission for reinsurance assumed.

Part b

- Candidates were expected to know the definition of deferrable commissions
- Many candidates missed "that cannot be readily identified as exclusively relating to and varying with the acquisition of premiums"
- Some used "not deferrable" to define the term.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 19					
TOTAL POINT VALUE: 2.5			LEARNING OBJECTIVE: C2		
SAMPLE ANSWERS					
Part a: 2.5 points					
		Income Statement Value 12 m (previous year) (01)	Income Statement Value 12 m (current year) (02)	Risk Factor (03)	Capital (Margin) Required (02)x(03) (09)
Direct premiums written in the past 12m	01	\$389,000	\$406,000	2.50%	\$10,150
Reinsurance assumed in the past 12 m - Not Intra Pool	02	\$0	\$0	1.75%	\$0
Reinsurance assumed in the past 12 m - Intra Pool (MCT only)	03	\$215,000	\$225,000	0.75%	\$1,688
Subtotal: Gross premiums	09	\$604,000	\$631,000		
Reinsurance ceded in the past 12 m - Not Intra Pool	10		\$19,000	2.50%	\$475
Reinsurance ceded in the past 12 m - Intra Pool (MCT only)	11		\$214,000	0.75%	\$1,605
Greater of 0.75% on ceded and 0.75% assumed - Intra Pool (MCT only)	12				\$1,688
Premium growth above 20% threshold	13		-	2.50%	-
Subtotal: premium operational risk requirement component	19				\$12,313
Capital/margin required component ¹ (balance sheet value)	30		107,500	8.50%	\$9,138
Total operational risk uncapped	39				\$21,451

SAMPLE ANSWERS AND EXAMINER'S REPORT

Cap	50			30%	\$32,250
Total operational risk margin	89				\$21,451

Operational risk margin = $\text{MIN} \{30\% \text{CR}_0, (8.50\% \text{CR}_0 + 2.50\% \text{P}_w + 1.75\% \text{P}_a + 2.50\% \text{P}_c + 2.50\% \text{P}_\Delta) + \text{MAX}(0.75\% \text{P}_{\text{aig}}, 0.75\% \text{P}_{\text{cig}})\}$

where:

CR_0 is total capital required for the reporting period, before the operational risk margin and diversification credit

P_w is direct premiums written in the past 12 months

P_a is assumed premiums written in the past 12 months arising from third party reinsurance

P_{aig} is assumed premiums written in the past 12 months arising from intra-group pooling arrangements

P_c is ceded premiums written in the past 12 months arising from third party reinsurance

P_{cig} is ceded premiums written in the past 12 months arising from intra-group pooling arrangements

P_Δ is growth in gross premiums written in the past 12 months above a 20% threshold

Diversification credit:

A (Asset risk margin = Credit Risk + Market Risk) = \$40,000 + \$350 = \$43,500

I (Insurance Risk margin) = \$64,000

R (Correlation factor) = 50%

Diversification Credit = $A + I - (A^2 + I^2 + 2 \times R \times A \times I)^{0.5} = \$13,840$

Total Capital (Margin) Required at Target = \$43,500 + \$64,000 + \$21,451 - \$13,840 = \$115,111

EXAMINER'S REPORT

- The candidates were expected to know that the capital required for operational risk is function of direct written premium, assumed written premium, ceded written premium and the sum of capital required for insurance, market, credit risks. The candidates were expected to know how to calculate the diversification credit. Then, the candidates were expected to know how to calculate the total capital required at Target level.
- The candidates generally scored very well in this question. Most candidates received at least partial credit.
- The common error was to divide the capital required by 1.5 at the end, which is not requested at Target level. Also, some candidates forgot to calculate the greater of ceded premium and assumed premium of the intra pool in the calculation of premium operational risk requirement.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 20	
TOTAL POINT VALUE: 3.75	LEARNING OBJECTIVE: C1,C2
SAMPLE ANSWERS	
Part a: 2.0 points	
<ul style="list-style-type: none"> • Sample answer #1 <ul style="list-style-type: none"> ○ Available capital: <ul style="list-style-type: none"> ➤ The deduction for recoverable from unregistered reinsurers will be removed => increase in available capital ○ Required capital: <ul style="list-style-type: none"> ➤ The margin for recoverables from unregistered reinsurers will be removed=> decrease in required capital ➤ There will be an extra charge in the asset risk margin category for reinsurance recoverables from reg. reinsurer => increase in required capital (less than above decrease) ➤ If collateral was held, there will be less credit risk since no collateral will be needed => decrease in required capital ➤ Under the operational risk category there will be less risk associated with ceded written premiums => reduction in required capital ➤ => Overall reduction in required capital ○ =>MCT ratio should increase • Sample answer #2 <ul style="list-style-type: none"> ○ First on available capital there is an effect if the collateral (non-owned deposit+LOC+payable) is smaller than the recoverable from reinsurer ($\max\{A+B+C-D-E-F, 0\}$) ○ In the capital required there is a 15% required on A+B (O/S loss+recoverable) less excess of $\max\{D+E+F-A-B-C, 0\}$ which could be 0 or higher ○ And there is a credit risk on collateral (LOC and non-owned deposit) which is reduced by excess collateral ○ Thus the potential effect is more capital available and less capital required for insurance risk and credit risk, <ul style="list-style-type: none"> ➤ Also, operational risk as a consequence and diversification credit smaller • Sample answer #3 <ul style="list-style-type: none"> ○ The amount of unregistered reinsurance not covered by acceptable collateral is deducted from capital available. Changing to registered reinsurer would not require this deduction thus capital available will be higher ○ Insurance risk margin includes a provision for unregistered reinsurance. This provision will not be required, thus insurance risk margin will decrease ○ Credit risk margin includes a provision for counterparty credit risk on collateral held for unregistered reinsurance. This will no longer be required. Thus credit risk margin will decrease ○ Operational risk will likely decrease due to a decrease in both insurance risk and credit risk ○ Overall, capital required decreases and capital available increases, thus MCT increases. 	
Part b: 1.25 points	

SAMPLE ANSWERS AND EXAMINER'S REPORT

- Sample answer #1
 - First calculate equivalent amount (ex: gross replacement cost of structure settlement)
 - Subtract guarantees and collateral
 - Multiply by credit conversion factor to reflect maturity and nature
 - Multiply by capital factor to reflect credit worthiness of counter party
 - ... add the total to required capital
- Sample answer #2
 - First a credit equivalent amount is calculated for each Off-B/S asset category. For letter of credit and non-owned deposits, this is equal to the face amount. For structured settlements, this is equal to the replacement cost. For derivatives, it is equivalent to the positive replacement cost + an add-on factor.
 - The credit equivalent amount is then reduced by collateral since a separate calculation is performed for collateral
 - The credit equivalent amount is then multiplied by two factors: the credit conversion factor and the counterparty credit risk factor. The counterparty credit risk factor depends on the counterparty rating. The credit conversion factor depends on the duration of the exposure.
- Sample answer #3
 - Req'd capital = (credit equivalent @ reporting date – any collateral held) * credit conversion factor * counterparty credit risk
 - Credit equivalent amt = replacement cost in cases of structure settlements
 - Credit conversion factor encaptures nature & maturity of instrument
 - Counterparty credit risk accounts for probability of default of counterparty

Part c: 0.5 point

- Sample answer #1
 - To reflect that it is unlikely to suffer a loss from different groups of risk factor simultaneously at a high confidence level since they are not perfectly correlated.
- Sample answer #2
 - Diversification credit is a component that recognizes that there is very low probability that all risk categories will suffer a maximum loss simultaneously. Therefore, capital required is reduced.
- Sample answer #3
 - Reflect that not all risks are fully correlated and some will not happen at same time. Thus, reduce capital required.

EXAMINER'S REPORT

Most candidates did not receive full credit on this question.

Most candidates received partial credit in a) for discussing some effect of transferring insurance business from an unregistered reinsurer to a registered reinsurer. Part b) was the most challenging part, as very few provided an adequate answer showing that this part was probably not covered in their studies. As for part c), candidates generally scored very well.

Part a

SAMPLE ANSWERS AND EXAMINER'S REPORT

Candidates were expected to give the potential effect on both the capital available and the capital required and providing details on which components of the capital required (insurance risk, credit risk, operational risk, diversification risk, etc.) were impacted and how (i.e. increase or decrease).

Most candidates provided some effect of transferring insurance business to a registered reinsurer and were awarded partial credit.

Common error:

- Describing the opposite situation (i.e. transferring business from a registered to an unregistered reinsurer)

Part b

Candidates were expected to know the different amount/factors in the calculation and provide a description of these when it was not self-explanatory.

Candidates did not perform very well on this part. Most candidates didn't know the calculation involved for the capital required for off-balance sheet exposures.

Common error:

- No mention of the reduction to the credit equivalent amount by any collaterals held
- No description of the credit conversion factor (i.e. credit conversion factor reflects the nature and maturity of the instrument)

Part c

Candidates are expected to know what diversification credit is. Most candidates received full credit on this part.

The diversification credit was well known by most candidates. Some candidates received only partial credit where the explanation only has one point. E.g. only mentioning that there are correlation across risk category, but did not mention the credit is for reducing the total capital.

Common error:

- Explaining that the diversification credit is to account for diversity of the insurer across product, line of business, or territory.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 21	
TOTAL POINT VALUE: 2.75	LEARNING OBJECTIVE: C2
SAMPLE ANSWERS	
Part a: 0.25 point	
Scenario 1 is more likely to be the base scenario because financial results flow logically from one year to the next. There is continuity from the actual results of the most recent year.	
Part b: 0.5 point	
Increase in premium volume. We see that the premium volume is significantly higher than under the base scenario. Rapid growth leads to increase in loss ratio and expenses due to ripple effects.	
Part c: 1.5 point	
Any three of the following:	
<ul style="list-style-type: none"> • Lower capital available: since net income is lower and therefore equity will also be lower under the adverse scenario • Premium liabilities: higher premium volume translates into higher unearned premiums and higher premium liabilities • Claim liabilities: higher earned premiums and higher loss ratios are likely to be associated with higher unpaid claims • Operational risk margin: higher written premiums translate into a higher margin. Also an increase in insurance risk will lead to an increase in the operational risk margin. • Reinsurance recoverable: if the company purchases reinsurance, higher ceded unearned premiums and unpaid claims may attract higher capital required; • Invested assets: higher premiums received and unpaid claims may translate into higher invested assets, which will attract more capital charges. 	
Part d: 0.5 point	
Any two of the following:	
<ul style="list-style-type: none"> • Implement rate changes • Underwriting actions – restrictions on new business, withdrawal from unprofitable markets • Reviewing distribution channels • Reducing certain types of expenses (for example, advertising costs) • Using reinsurance to mitigate capital strain • Capital injection 	
EXAMINER'S REPORT (BY PART, AS APPLICABLE)	
Candidates generally scored very well on this question and many candidates received full credit. Most point deductions were in part (c).	
Part a	
<ul style="list-style-type: none"> • Candidates were expected to identify the base scenario with rationale. • Candidates performed very well on this part • Common errors made by candidates: <ul style="list-style-type: none"> ○ Identified scenario #2 as base scenario ○ Rationale for scenario #1 as base scenario being higher income/surplus 	
Part b	
<ul style="list-style-type: none"> • The candidates were expected to know: 	

SAMPLE ANSWERS AND EXAMINER'S REPORT

- the characteristics of the adverse scenario on the income statement
- Candidates needed to be able to identify the cause of the adverse scenario and justify using observations from the question.
- Candidates performed very well on this part
- Common errors made by candidates:
 - No justification provided
 - Incorrect scenario identified (large loss, catastrophic event)

Part c

- The candidates were expected to know:
 - The components of MCT affected
 - The direction in which the MCT component will move given the projection results
- Candidates performed well on this part
- If the incorrect event was identified in part b, full marks were given in part c if the correct impact on MCT for that event were identified
- Common errors made by candidates:
 - Conclude credit risk, catastrophe risk, or other components of MCT would be affected with no assumption stated regarding unregistered reinsurer, etc.
 - Assume operational risk would increase as a result of higher operating expenses
 - No justification provided as to why the component would change

Part d

- The candidates were expected to identify the management actions
- Candidates performed very well on this part
- If the incorrect event was identified in part b, full marks were given in part d if the correct management actions for that event were identified
- Common errors made by candidates:
 - Identified management actions from other adverse scenarios

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 22	
TOTAL POINT VALUE: 2.75	LEARNING OBJECTIVE: C2
SAMPLE ANSWERS	
Part a: 0.75 point	
<ol style="list-style-type: none">1. Agents are wary of unrated insurers, since they might be financially distressed. It is less expensive to pay for a rating than to demonstrate financial strength individually to various stakeholders.2. Reliance by consumers and third parties: independent agents use ratings to select insurers, insurers use ratings to select reinsurers, and investors use ratings to select companies to invest in.3. Rating agencies are efficient at assessing financial strength.	
Part b: 0.5 point	
<p>Any two of the following</p> <ul style="list-style-type: none">• Relate ratings to economic capital measures• Issue ratings by committees independent from the ratings analyst• Review ratings periodically• Collect consistent information from companies and follow consistent guidelines in assessing the information <p>Some candidates answered "Rating agencies do not change ratings too quickly because they look over longer time periods to ensure ratings are due to true downgrades and not driven by short term volatility". Although this approach is intended to promote accuracy, we considered it also as a measure to ensure consistency across insurance companies because this approach is applied to all companies.</p>	
Part c: 1.5 point	
<p>Two elements expected for each subpart:</p> <ul style="list-style-type: none">• Expected policyholder deficit:<ul style="list-style-type: none">○ AM Best evaluates risks such as reserving risk, capital losses on stocks, bond defaults, interest rate risk and new business losses on a stochastic basis.○ The EPD represents the average loss for the worst 1% of outcomes (i.e. TVAR at 99%).○ The EPD for each risk depends on the volatility and size of the risk.○ EPD is the pure premium for the unlimited aggregate excess of loss reinsurance contract, where the attachment point is chosen such that EPD equals to 1% of the market value of the reserves. The attachment point represents the capital charge for the risk.• Stochastic cash flow capital models:<ul style="list-style-type: none">○ The models are based on the distributions of each risk and simulate repeatedly from them○ Cash flows are projected until all current liabilities are settled○ Required capital is set by a value at risk or tail value at risk measure for the aggregate loss distribution• Principles-based systems:	

SAMPLE ANSWERS AND EXAMINER'S REPORT

- S&P focuses on evaluating insurers' ERM systems and internal capital models.
- It bases capital requirements on a weighted average of its own formula and the client's economic capital model.
- S&P reasons that well-managed insurers evaluate their capital needs more accurately than a rating agency can.

EXAMINER'S REPORT

Candidates generally scored well on part (a) and (b) of this question. For part (c), candidates were expected to demonstrate an understanding of the approaches and the differences between them, but candidates often identified the rating agency instead.

Part a

- Candidates were expected to briefly describe three reasons why insurers maintain credit ratings with rating agencies.
- Candidates performed very well on this part
- Common errors made by candidates:
 - Assume regulators use credit rating to assess insurers
 - Repeating the same argument in different words, partial credit was given in this case

Part b

- Candidates were expected to briefly identify measures or processes used by rating agencies to promote consistency among ratings.
- Most candidates received partial or full marks on this part
- Common error included:
 - Not describing two measures
 - Incomplete description

Part c

- Candidates were expected to describe each method by providing at least two elements of description for each method.
- Common errors made by candidates:
 - Description not detailed enough
 - Named the rating agency instead of providing description around the approach
 - Unable to provide the correct description

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 23	
TOTAL POINT VALUE: 2.25	LEARNING OBJECTIVE: C2
SAMPLE ANSWERS	
Part a: 1 point	
<p>(i) Return on equity = Net Income / Equity = -20,000 / (700,000 – 600,000) = -20%</p> <p>Or</p> <p>Return on equity = Net Income / Average Equity = -20,000 x 2 / (700,000 – 600,000 + 670,000 – 550,000) = -18.18%</p> <p>(ii) Return on revenue = (Underwriting Income + Investment Income) / Gross Premiums = (-120,000 + 105,000) / (250,000 + 150,000) = -3.75%</p> <p>(iii) Net loss reserves to equity = Net loss reserves / Equity = (400,000 – 150,000) / (700,000 – 600,000) = 250%</p> <p>(iv) Return on assets = Net Income / Average Assets = -20,000 x 2 / (700,000 + 670,000) = -2.92%</p>	
Part b: 1.25 points	
Return on equity:	Ratio is below threshold of 5.4% (unfavorable)
Return on revenue:	Ratio is below threshold of 6.2% (unfavorable)
Net reserves to equity:	Ratio is above threshold of 200% (unfavorable)
Return on assets:	Ratio is below threshold of 2.6% (unfavorable)
<p>All ratios indicate unfavorable results for the company. The company had significant underwriting loss and net losses in the last two years. Overall the financial health is poor.</p>	
EXAMINER'S REPORT	
Candidates generally scored well on this question, in particular on part (b), and many candidates	

SAMPLE ANSWERS AND EXAMINER'S REPORT

received full credit. Most point deductions in part (a) came from calculation errors.

Part a

- The candidates were expected to know:
 - How to analyze financial statements
 - How to calculate various financial health ratios
- Candidates needed to calculate all components of the ratio correctly.
- Common errors made by candidates:
 - Calculation errors
 - Using net premiums instead of gross premiums in part (iii)
 - Using gross reserves instead of net reserves in part (iii)
 - Not using an average in part (iv)

Part b

- The candidates were expected to know:
 - Recommended thresholds for financial health ratios
 - Comment on the calculated ratios
- To obtain full credit, candidates needed to state 4 thresholds and comment on whether these thresholds were met.
- Common errors made by candidates:
 - Mixing up some of the thresholds
 - Not stating the threshold
 - Not stating an overall conclusion

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 24	
TOTAL POINT VALUE: 2.25	LEARNING OBJECTIVE: C2
SAMPLE ANSWERS	
Part a: 0.75 point	
<p>Possible answers include the following:</p> <ul style="list-style-type: none">• Both involve the identification of material risks• Both are subject to periodic objective review• Both must be filed with the regulator• Both include scenario/stress testing• Both serve as tools to enhance the understanding of the interrelationship between risk profile and capital needs• There must be a report for both• Both are forward looking and based on the insurer's business/strategic plan over the business planning horizon• Both must be prepared at least annually, and more frequently if circumstances warrant it• Both can be used to identify corrective management actions• Both can be used to develop and implement risk mitigation strategies• Both recognize enterprise-wide risks• Both involve a risk-based assessment	
Part b: 1.5 points	
<p>Possible answers include the following:</p> <ul style="list-style-type: none">• The DCAT must be prepared by the appointed actuary and include a statement of actuarial opinion, whereas ORSA is management responsibility (often with significant input from the actuary)• The ORSA must be implemented/performed in accordance with regulatory guidelines, whereas the DCAT must be performed in accordance with CIA standards of practice• The scope of ORSA is larger than that of DCAT's; it includes Board oversight and senior management responsibility, the ERM process, monitoring, internal controls, etc. DCAT focuses on the quantitative aspect of ORSA.• ORSA contains a large qualitative component whereas DCAT is mostly quantitative• DCAT alternate assumptions must be determined in the 95th to 99th percentile range, whereas for ORA the magnitude of scenarios/assumptions is tailored to risk appetite• DCAT is more prescriptive process; in the ORSA the process to determine the internal target is more flexible (e.g. a stochastic model can be used, time horizon is more flexible, confidence level is not prescribed)• In DCAT the opinion states whether the financial condition is satisfactory if it meets a minimum set of criteria; in contrast the ORSA is process to ensure appropriate enterprise risk management	

SAMPLE ANSWERS AND EXAMINER'S REPORT

EXAMINER'S REPORT

The candidates were expected to demonstrate understanding of the similarities and differences between DCAT and ORSA. Most candidates demonstrated a strong understanding of the similarities but few candidates were able to articulate three differences. Few candidates received full marks for this question.

This question was challenging because it required comparing and contrasting two different concepts.

Part a

- Candidates were expected to describe three similarities between DCAT and ORSA.
- Most candidates received full credit for this part.
- Some candidates listed two responses that were essentially the same but reworded differently – in such instances, only partial credit was awarded. For example, answering that both are used to assess the adequacy of capital and that for both the company would look at how the material risks would impact capital would count towards the identification of one similarity.

Part b

- Candidates were expected to describe three differences between DCAT and ORSA.
- Few candidates received full credit on this part and generally candidates struggled to describe differences between DCAT and ORSA.
- Most point deductions came from:
 - Describing fewer than 3 differences
 - Descriptions that were too brief or incomplete An example of an incomplete description is: "DCAT and ORSA use different time frames for projections". This response received partial credit only; to receive full credit, the graders would have expected more detail on the difference in time horizons or comments on which of DCAT or ORSA has more flexibility with regards to the time horizon used in the analysis.
-

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 25	
TOTAL POINT VALUE: 4	LEARNING OBJECTIVE: C2
SAMPLE ANSWERS	
Part a: 1 point	
<p>Sample answer:</p> <p>Any 4 from below:</p> <ul style="list-style-type: none">• Alignment of economic and regulatory capital including giving appropriate recognition to diversification benefits within companies and between subsidiaries.• Freedom for companies to choose their own risk profile and match it with an appropriate level of capital• An early warning system for deterioration in solvency by active capital management• By better aligning risk and capital management, encouraging an improvement in the identification of risks and their mitigation• Make reporting consistent across different insurance companies• Create consistent regulation/standards across the European Union• Allow insurance members of EU to operate in all EU countries with one license• Standardize valuation techniques and improve governance and reporting• Improve customer confidence that insurers are financially stable• Provide a level playing field for all insurers to compete• Promote transparency and better disclosure• Better promote policyholders interest and promote solvency	
Part b: 1.5 point	
<p>Sample Answer #1:</p> <p>Pillar 1 covers all the quantitative requirements. This pillar aims to ensure firms are adequately capitalized with risk-based capital. All valuations in this pillar are to be done in a prudent and market-consistent manner. Companies may use either the Standard Formula approach or an internal model approach. The use of internal models will be subject to stringent standards and prior supervisory approval to enable a firm to calculate its regulatory capital requirements using its own internal model.</p> <p>Pillar 2 imposes higher standards of risk management and governance within a firm's organization. This pillar also gives supervisors greater powers to challenge their firms on risk management issues. It includes the Own Risk and Solvency Assessment (ORSA), which requires a firm to undertake its own forward-looking self-assessment of its risks, corresponding capital requirements, and adequacy of capital resources.</p> <p>Pillar 3 aims for greater levels of transparency for supervisors and the public. There is a</p>	

SAMPLE ANSWERS AND EXAMINER'S REPORT

private annual report to supervisors, and a public solvency and financial condition report that increases the level of disclosure required by firms. Any current returns will be completely replaced by reports containing core information that firms will have to make to the regulator on a quarterly and annual basis. This ensures that a firm's overall financial position is better represented and includes more up-to-date information.

Sample Answer #2:

Pillar 1: Quantitative requirements. Ensure firms are adequately capitalized with risk based capital, internal or Standard Formula approach.

Pillar 2: Qualitative requirements: Imposes higher standards of risk management and governance within a firm's organization. Includes ORSA

Pillar 3: Disclosure requirements: Aims for greater levels of transparency for supervisors and the public. Increases level of disclosure through internal reports and reports to regulators

Part c: 2.5 points

Sample Answer #1:

	MCT	Solvency II Internal Model
Methodology	Static factor model	Dynamic cash-flow model
Correlation among risk categories	A diversification credit is used to take into account that risk are not perfectly correlated with each other. An explicit credit for diversification is permitted between the sum of credit and market risk requirements, and the insurance risk requirements	Consider correlation within and across risk categories
Operational risk	Based on a formula. Different capital factors are applied to written premiums	Explicitly modeled

SAMPLE ANSWERS AND EXAMINER'S REPORT

Sample Answer #2:

	MCT	Solvency II Internal Model
Methodology	Rules based	Principles based
Correlation among risk categories	A diversification credit is used .	Consider correlation within and across risk categories
Operational risk	Based on a formula based on premiums	Explicitly modeled

EXAMINER'S REPORT

- The candidate was expected to know about various solvency frameworks particularly about MCT and Solvency II.
- Generally candidates did not score well on the question as a whole. Very few candidates scored most of the marks.
- The question was challenging as candidates may not have been as familiar with the details of the newer Solvency II compared to the details on the MCT. Candidates were expected to synthesize details from the Solvency II paper as well as the Guidelines on the MCT.

Part a

- Candidates were expected to know the purpose or aims of Solvency II
- Candidates had to list four aims
- Candidates responded with answers from various parts of the paper
- Common errors made were:
 - Including answers that were too general or broad and that did not show a good understanding of the topic

Part b

- Candidates were expected to know the 3 pillars of Solvency II
- Candidates needed to identify and briefly describe all three pillars
- Common errors made were:
 - Being too general with the description of the pillars
 - Being able to identify the pillars, but leaving the descriptions blank

SAMPLE ANSWERS AND EXAMINER'S REPORT

Part c

- Candidates were expected to know details about MCT and Solvency II
- Candidates needed to contrast MCT and Solvency II in three areas
- Common errors made were:
 - Not contrasting the two methods, but rather saying they were the same
 - Stating that Solvency II did not explicitly model operational risk
 - Leaving certain sections entirely blank

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 26		
TOTAL POINT VALUE: 2.25	LEARNING OBJECTIVE: D1	
SAMPLE ANSWERS		
Part a: 0.75 point		
Bond	Classification	Value
AAA bond	Held for maturity	2,000
BBB bond	Available for sale	950
CCC bond	Held for trading	1,300
Part b: 1 point		
<p>Net income: \sum Coupons + Changes in amortized value for Held to maturity and Available for sale + Change in fair value for held for trading assets</p> <p>Net Income = $(50 + 100 + 75) + (2,000 - 2,000 + 900 - 1,000) + (1,300 - 1,600) = -175$</p> <p>Other comprehensive income = Difference between fair value and amortized cost at 12/31/2015 - Difference between fair value and amortized cost at 12/31/2014</p> <p>Other comprehensive income = $(950 - 900) - (900 - 1000) = 150$</p>		
Part c: 0.5 point		
<p>The sale of "more than an insignificant amount" of a Held to maturity asset requires the reclassification of the entire category as available for sale.</p> <p>or</p> <p>The consequence for tainting the Held to maturity portfolio is considered a major impediment to using this category because it potentially reduces flexibility in managing the portfolio for rebalancing or strategic benefit, and it creates significant reporting challenges as asset sale/redeployment becomes attractive</p>		
EXAMINER'S REPORT		
<p>Candidates were expected to be able to identify the classification of each bond and how they should be dealt with in the financial statements.</p> <p>Candidates generally scored well, see part b for details.</p>		
Part a		
This appears on exam every year.		
Part b		
<p>Most candidates were able to identify BBB as contribution to OCI and calculate coupon as part of income. Candidates lost credit over not calculating the change in amortized value for HTM and AFC and the change in fair value for HFT correctly. Candidates also lost credit over not calculating the change in difference between fair value and mortised cost for OCI.</p>		
Part c		

SAMPLE ANSWERS AND EXAMINER'S REPORT

Most candidates were able to answer part c correctly. Candidates lost credit over reclassifying the HTM to a wrong class after the sale.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 27	
TOTAL POINT VALUE: 1	LEARNING OBJECTIVE: C1
SAMPLE ANSWERS	
Part a: 0.5 point	
Disadvantages: <ul style="list-style-type: none">• This approach understates the PML for insurers with significant exposures in both earthquake zones.• This approach ignores earthquake exposure elsewhere, which can have a material impact.	
Part b: 0.5 point	
<ul style="list-style-type: none">• Branches of foreign insurers should report their PMLs based on Canada wide exposure.• Canadian insurers should report their PMLs based on worldwide exposure.	
EXAMINER'S REPORT	
Candidates were expected to know how to calculate earthquake reserves. Candidates generally scored well, see subparts for detail.	
Part a	
Candidates are expected to understand the calculations of the PML. Any response that are logical are credited with points. There are no common mistake. Candidates who do not receive the credit are mostly leaving this question blank.	
Part b	
Candidates are expected to know the difference in reporting between a Canadian insurer and a foreign branch. Candidates lost credit over giving only one answer and not specifying whether it was for Canadian or Foreign insurer.	

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 28	
TOTAL POINT VALUE: 1.5	LEARNING OBJECTIVE: C1, D1
SAMPLE ANSWERS	
Part a: 0.25 point	
A subsequent event is an event of which an actuary first became aware after the calculation date but before the corresponding report date.	
Part b: 1.25 points	
a. When did the actuary first become aware of the event? The actuary became aware of the event after the calculation date of December 31st.	
b. Does the event reveal a data defect or calculation error? No.	
c. When did the event occur? January 15th.	
d. Does the event make the entity different? The earthquake does not retroactively make the entity different, but it makes the entity different after the balance sheet date.	
e. What is the purpose of the work? If the purpose is to report on the entity as it was, then the actuary would not take the event into account in the selection of methods and assumptions. In addition, the effect of the earthquake will be disclosed in the notes of the financial statements.	
EXAMINER'S REPORT	
Candidates were expected to know the definition of subsequent events and at least the dates for deciding whether an event is considered a subsequent event. Candidates generally scored well, see subpart for detail. The question was not challenging and is straight forward.	
Part a	
Candidates generally scored well in this question. Partial definitions were given full credit.	
Part b	
Candidates generally scored well in this question. Candidates lost credit over not indicating whether the event revealed a data defect or calculation error. Candidate also lost credit by not specifying the applicable answer/decision for this particular situation.	

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 29	
TOTAL POINT VALUE: 3.75	LEARNING OBJECTIVE: C1
SAMPLE ANSWERS	
Part a: 0.75 point	
Accepted answers:	
<ul style="list-style-type: none"> • The less is known about the current estimate and its trends; the higher should be the risk margin • Risks with low frequency and high severity should have higher risk margins than risks with higher frequency and low severity • For similar risks, contracts that persist over a longer timeframe should have higher risk margins than those of shorter duration • Risks with a wide probability distribution should have higher risk margins than those with narrower distribution • To the extent that emerging experience reduces uncertainty, risk margins should decrease, and vice versa • Capture all possible uncertainties accurately • Be practical / simple to apply / easy to calculate / easy to understand / easy to explain / reasonable • Be consistent • Be measurable • Reflect economic conditions • Reflect insurer's internal conditions • Properly reflects risk intended to capture / accurately reflect the risk • Responsive to the current condition • Reflect volatility statistically / consider error in estimation / consider statistical fluctuation • Reflect risk differences • Consider increase / deterioration trend • Capture all risks • Be quantifiable • Be justifiable • Be stable • Not subject to manipulation 	
Part b: 3 points	
<p><u>Claims development</u></p> <p><u>Considerations related to operations – claims management</u></p> <p>Systems affecting claims handling procedures</p> <p style="padding-left: 20px;">low margin situation: stable and consistent</p> <p style="padding-left: 20px;">high margin situation: significant changes in coding procedures, kind of loss codes, etc</p> <p>Claims management leadership and personnel</p> <p style="padding-left: 20px;">low margin situation: stable and strong</p> <p style="padding-left: 20px;">high margin situation: lack of consistent leadership, high turnover of personnel</p> <p>Adequacy of staffing</p> <p style="padding-left: 20px;">low margin situation: stable and adequate, consistent use of internal and external adjusters</p>	

SAMPLE ANSWERS AND EXAMINER'S REPORT

high margin situation: inadequate staffing, shift from internal to external adjusters (or vice-versa)

Guidelines for claims handling

low margin situation: specific and consistent guidelines

high margin situation: absence of guidelines, significant changes

Procedures for/philosophy regarding: opening claims, minor claims, major claims, defending claims, closing claims, claims expenses

low margin situation: specific and consistent guidelines

high margin situation: absence of guidelines, significant changes

Procedures for establishing case outstanding

low margin situation: specific and consistent guidelines

high margin situation: absence of guidelines, significant changes

Relative adequacy of case outstanding

low margin situation: specific and consistent

high margin situation: significant changes

Considerations related to operations – underwriting

Systems affecting underwriting

low margin situation: specific and consistent

high margin situation: significant changes

Underwriting leadership and personnel

low margin situation: stable and strong

high margin situation: lack of consistent leadership, high turnover of personnel

Adequacy of staffing

low margin situation: stable and adequate

high margin situation: inadequate staffing

Guidelines of underwriting

low margin situation: specific and consistent guidelines

high margin situation: absence of guidelines, significant changes

Considerations related to operations – other

Technology and processing systems

low margin situation: specific and consistent

high margin situation: significant changes

Internal controls

low margin situation: specific and consistent controls

high margin situation: absence of controls, significant changes

Accounting systems

low margin situation: specific and consistent

high margin situation: significant changes

Considerations related to the data on which the estimate is based

Volume of losses and premiums in each period

low margin situation: stable, high volume

high margin situation: volume changes significantly from period to period

Homogeneity in data grouping

low margin situation: significant homogeneity

SAMPLE ANSWERS AND EXAMINER'S REPORT

high margin situation: limited homogeneity

New exposure

low margin situation: credible historical experience available

high margin situation: absence of credible historical experience

For reinsurers: relationship with ceding companies, types of treaties, attachment points, limits

low margin situation: stable

high margin situation: high turnover or significant changes

History of credible loss development experience

low margin situation: available

high margin situation: unavailable or limited

Mix of business

low margin situation: stable

high margin situation: significant changes

Stability of historical loss development experience

low margin situation: high

high margin situation: low

Potential influence of large losses

low margin situation: limited effect on loss experience

high margin situation: significant effect on loss experience

Considerations related to the line of business

Environment: legislative, judicial, government

low margin situation: stable, no changes expected, or no recent changes

high margin situation: recent changes or changes likely

Length of tail

low margin situation: short

high margin situation: long

Latent claims

low margin situation: low potential for latent claims

high margin situation: high potential for latent claims

Liability exposure

low margin situation: limited or none

high margin situation: high

Excess of loss exposure

low margin situation: limited or none

high margin situation: high

Coverage and/or policy form

low margin situation: stable

high margin situation: significant changes

Compensation system

low margin situation: stable

high margin situation: significant changes

Retention of insurer

low margin situation: stable

high margin situation: change over experience period

SAMPLE ANSWERS AND EXAMINER'S REPORT

Recovery from reinsurance ceded

Proportion of related party reinsurance

low margin situation: low

high margin situation: high

Ceded loss ratio

low margin situation: low

high margin situation: high

Ceded commission rate

low margin situation: low

high margin situation: high

Unregistered reinsurance

low margin situation: none

high margin situation: significant

Reinsurers with weak financial condition

low margin situation: none

high margin situation: significant

Reinsurers under receivership or liquidation

low margin situation: none

high margin situation: significant

Signed reinsurance contract/cover notes

low margin situation: yes

high margin situation: no

Claim coverage disputes with reinsurers

low margin situation: none

high margin situation: significant

Reinsurance with balance sheet exposure

low margin situation: limited or none

high margin situation: significant

Margin for investment return rates

Matching of assets and liabilities

low margin situation: cash flows are well-matched

high margin situation: significant mismatch of cash flows

Quality of assets

low margin situation: high

high margin situation: low

Reliance on capital gains

low margin situation: minimal

high margin situation: high

Capital losses

low margin situation: minimal

high margin situation: high

Length of claim settlement period

low margin situation: short

high margin situation: long

Claim payment pattern

SAMPLE ANSWERS AND EXAMINER'S REPORT

low margin situation: stable
high margin situation: significant variability
Projected cash flow
low margin situation: positive
high margin situation: negative
Determination of interest rate
low margin situation: based on insurer's asset portfolio
high margin situation: not based on insurer's asset portfolio
Asset default risk
low margin situation: low
high margin situation: high
Asset valuation issues
low margin situation: none
high margin situation: significant
Concentration by type of investments
low margin situation: not a concern
high margin situation: significant concern
Concentration with types of investment
low margin situation: not a concern
high margin situation: significant concern
Current economic conditions
low margin situation: strong economy
high margin situation: recession
Investment expenses
low margin situation: low
high margin situation: high

EXAMINER'S REPORT

Any reasonable answers were accepted.
Candidates generally scored well, see subpart for detail.

Part a

Candidates are expected to know the desirable characteristics of a risk margin. They generally scored well in this question. Any reasonable answers were accepted.

Part b

Candidates are expected to know the drivers of a risk margin. They generally scored well in this question.
Candidates lost credit over not indicating whether the risk margin should go up or down in the considerations identified.
Candidates also lost credit over not being able to identify two correct considerations for the category.