INSTRUCTIONS TO CANDIDATES

1. This 100-point examination consists of 38 problem and essay questions.

2. The number of points for each full question or 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.

Write your Candidate ID number and the examination number, 7C, at the top of each answer sheet. Your name, or any other identifying mark, must not appear.

Do not answer more than one question on a single sheet of paper. Write on only the lined side of the paper, and be careful to give the number of the question you are answering on each sheet.

The answer should be concise and confined to the question as posed. When a list of a specific size is requested, do not offer more items in your list than the number requested. For example, if you are requested to list three items, only the first three responses will be graded.

In order to receive full credit or to maximize partial credit on mathematical and computational questions, you must clearly outline your approach in either verbal or mathematical form, showing calculations where necessary. Also, you must clearly specify any additional assumptions you have made to answer the question.

3. 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. Writing will NOT be permitted during this time and you will not be permitted to hold pens or pencils. The supervisor has additional exams for those candidates who have defective exam booklets.

4. Verify that you have received the supplemental information package:


5. Do all problems until you reach the last page of the examination where “END OF EXAMINATION” is marked.

CONTINUE TO NEXT PAGE OF INSTRUCTIONS
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6. All questions should be answered according to Canadian generally accepted accounting practices and principles, unless specifically instructed otherwise. SAP refers to Statutory Accounting Principles, and GAAP refers to Generally Accepted Accounting Principles.

7. 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.

8. Candidates must remain in the examination center until two hours after the start of the examination. 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.

9. At the end of the examination, place all answer sheets in the Examination Envelope. Please insert your answer pages in your envelope in question number order. Insert a numbered page for each question, even if you have not attempted to answer that question. BEFORE YOU TURN IN THE EXAMINATION ENVELOPE TO THE SUPERVISOR, BE SURE TO SIGN IT IN THE SPACE PROVIDED ABOVE THE CUT-OUT WINDOW.

Anything written in the examination booklet will not be graded. Only the answer sheets will be graded.

10. If you have brought a self-addressed, stamped envelope, you may put the examination booklet, supplemental information package, and scrap paper inside and submit it separately to the supervisor. It will be mailed to you. (Do not put the self-addressed stamped envelope inside the Examination Envelope.)

If you do not have a self-addressed, stamped envelope, please place the examination booklet and supplemental information package 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 by contacting the CAS Office.

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

11. 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 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.

12. The exam survey is available on the CAS website in the “Admissions” section. Please submit your survey by May 15, 2006.

END OF INSTRUCTIONS
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1. (3 points)

Tasty Tobacco Company was successfully sued for manufacturing cigarettes that caused serious health problems for the plaintiff. Significant damages were awarded to the plaintiff. Included in the damages was a punitive amount, as Tasty was found to have intentionally included in the cigarettes chemicals that it knew would increase the addictive nature of the product.

a. (1 point)

List four functions or goals of tort law.

b. (2 points)

For each of the goals listed in part a. above, discuss whether or not it might be achieved, based on the results of the case described above.

2. (2 points)

The Dangerous Corporation is a company that operates in Ontario. It specializes in abnormally hazardous activities.

a. (0.5 point)

Describe the basis of responsibility in tort that is most likely to apply to this company’s operations.

b. (0.75 point)

Explain why in Canada there is an emerging theory of responsibility in tort for companies like the Dangerous Corporation.

c. (0.75 point)

In the event of a tort case, provide three defences that might be available to the Dangerous Corporation against a plaintiff’s suit.
3. (2.5 points)
   a. (0.5 point)

   Define the principle of indemnity as used in insurance contract law.

   b. (1.5 points)

   Describe three provisions of insurance contracts that satisfy the principle of indemnity.

   c. (0.5 point)

   Give one example of a provision in some insurance contracts that defies the principle of indemnity.

4. (2 points)

John Smith has purchased the required compulsory automobile insurance coverage from XYZ Insurance Company. After a party in which John consumes a significant amount of alcohol, he drives his car on the highway in Ontario and is involved in a multiple-car collision. John sustains non-life threatening injuries, while some of the passengers of the other vehicles sustain permanent disabling injuries. The injured passengers have decided to sue John to recover damages for the losses they suffered. The police investigators on the scene of the accident concluded that John’s state of intoxication and his careless driving directly caused the accident.

   a. (0.75 point)

   Describe one right and two obligations of XYZ Insurance with respect to the liability claims made against John.

   b. (0.5 point)

   If XYZ Insurance decides to deny the third party claims made against John due to the illegal nature of his conduct, describe the impact on XYZ’s right and obligations described in part a. above.

   c. (0.75 point)

   Briefly describe the case of Dillon vs. Guardian Insurance Co. and state which obligation from part a. above the insurer failed to respect.

CONTINUED ON NEXT PAGE
5. (3.5 points)

One night while walking home after work in her rural town, Jane Doe was hit from behind by a horse that had escaped its barn. Ms. Doe was walking on the sidewalk when the accident happened. As a result of the accident, she was severely injured, resulting in permanent disability. In addition, the expensive suit she was wearing at the time of the accident was ruined. The insurance company of the horse owner is refusing to pay any of Ms. Doe’s damages, on the basis that she was wearing very dark clothing that made her virtually invisible to the horse. Ms. Doe was unable to go back to work for several months after the trial.

a. (0.25 point)

What type of defence is the insurance company using?

b. (1 point)

Describe the two broad categories of damages that are likely to be awarded to Ms. Doe if the court rules in her favour.

c. (1 point)

Assign each of the following specific damages of Ms. Doe to one of the two categories from part b. above.

i) Pain and suffering
ii) Pre-trial loss of income
iii) Loss of future earning capacity
iv) Damaged clothing

d. (0.25 point)

Give one reason why the Canadian court is likely to disagree with the insurance company’s defence.

e. (1 point)

Describe the approaches used by Canadian courts to quantify the damages from part b. above.
6. (3 points)

Widgets Inc. is a manufacturer of industrial products and has been named as a defendant in several asbestos-related lawsuits. The chief financial officer (CFO) is considering the impact this situation might have on Widgets' financial statements. The CFO concludes that FAS 5 contains the relevant accounting guidance regarding whether a liability should be accrued in the financial statements. FAS 5 stipulates that in order to post the liability, the event leading up to the liability must have occurred and the loss from the event must be reasonably estimable.

a. (1 point)

Contrast the difficulties in applying the FAS 5 approach to asbestos-related liabilities versus traditional insurance liabilities, such as automobile liability.

b. (1 point)

The CFO decides to hire a consultant to estimate the asbestos liability and he decides to post that liability in the financial statements. The CFO also decides to include a disclosure regarding the uncertainties that surround the liability estimation process. Give four sources of such uncertainty.

c. (1 point)

Other than the disclosure about the uncertainties surrounding the liability estimation process, give four additional disclosures the CFO might include in the financial statements.

CONTINUED ON NEXT PAGE
7. (5 points)

a. (3 points)

Identify and briefly describe three arguments in favour of the regulation of insurance. Provide one example for each argument.

b. (2 points)

Briefly describe four matters that the Office of the Superintendent of Financial Institutions will consider before issuing a license to a newly-incorporated insurance company. Relate each one of these matters to one of the three reasons for insurance regulation discussed in part a. above. Note that more than one mapping between the Superintendent’s considerations and the arguments in favour of insurance regulation can be valid.

8. (2 points)

With respect to the division of powers between Canadian federal and provincial insurance regulators, identify two areas generally under federal jurisdiction and two areas under provincial jurisdiction.

9. (1 point)

The Canadian government wishes to pass a new federal law that would require all insurance companies, except those incorporated provincially and operating solely within their province of incorporation, to obtain a license from the federal government.

a. (0.5 point)

Based on past court rulings, what would be the likely decision of a Canadian court with regard to this new law?

b. (0.5 point)

What would be the impact of the new law on existing foreign insurance companies?
10. (2.5 points)

a. (1 point)

Briefly describe the following types of rate regulation approaches:

i) Open competition
ii) Prior approval
iii) File and use
iv) Use and file

b. (0.5 point)

Classify the Financial Services Commission of Ontario's Section 410 Filing Guidelines and Section 413 Guidelines, according to the categories in part a. above.

c. (1 point)

Give two reasons why a regulator would change from an open competition approach to a prior approval approach.

11. (1.5 points)

In relation to the Spitzer investigation of the insurer-broker relationship, answer the following:

a. (1 point)

What are the two major accusations against Marsh & McLennan Cos.?

b. (0.5 point)

What is the major impact of this case on the insurance industry?
12. (2 points)

The Speedy Insurance Company of Canada issued a policy protecting the Slow Corporation’s property in Ontario against loss by fire and hail. The policy effective period runs from January 1, 2005 to December 31, 2005. In the event of a covered loss, the policy stipulates that the insured must furnish the proof of loss within sixty days of the event causing the loss.

On March 16, 2005, a fire loss causes significant damages to the Slow Corporation’s property in Ontario. On May 31, 2005, the Slow Corporation had all the documents to submit the proof of loss. On June 15, 2005, the Slow Corporation furnished the proof of loss to the Speedy Insurance Company of Canada and filed its fire claim. On July 1, 2005, the Speedy Insurance Company of Canada denied the claim on the grounds that the Slow Corporation had not furnished the proof of loss within the sixty days stipulated in the policy. As a result, the Slow Corporation filed a suit against Speedy in order to collect the insurance proceeds.

a. (1 point)

Discuss why the court is likely to rule in favour of the Slow Corporation.

b. (0.25 point)

What argument might Speedy make in its defence?

c. (0.5 point)

With regard to the application of the provisions found in the Insurance Act, discuss the Canadian court’s position for insurance policies that cover multiple risks.

d. (0.25 point)

Given the provisions of the Insurance Act as discussed in part c. above, what policy changes should Speedy make to its property policy?
13. (2 points)
   a. (1.25 points)
      What are the Insurance Bureau of Canada’s (IBC’s) five main objectives?
   b. (0.75 point)
      Comment on the objectives of the IBC in relation to anti-trust laws.

14. (2 points)
   KPMG et al., “Motor Vehicle Insurance in British Columbia – At the Crossroads, Volume II: Options and Choices,” discusses the basic design requirements of a motor vehicle insurance system. Briefly describe four of these requirements.

15. (1.5 points)
   a. (1 point)
      Give two arguments in favour of an automobile insurance system that is a hybrid system of tort and no-fault, as opposed to a pure tort system.
   b. (0.5 point)
      Which two Canadian provinces have a pure no-fault program?

16. (2 points)
   Identify and briefly describe four reasons used to justify government participation in insurance and give an example of each.

17. (1.5 points)
   Describe three ways by which the government may provide insurance and list one government insurance program that uses each method.
18. (3 points)

With respect to Canada's public health care system, answer the following:

a. (0.5 point)

Describe how the system is funded.

b. (1 point)

Define the term "intergenerational transfer."

c. (1 point)

What problem does intergenerational transfer pose for the solvency of the system?

d. (0.5 point)

List two mechanisms that could be used to control the costs of the system.

19. (2 points)

a. (0.5 point)

What are Canada's two national federal-provincial business risk management programs under the Agricultural Policy Framework?

b. (1 point)

Give the purpose for each of these programs.

c. (0.5 point)

Who pays for the cost of each of these programs?
20. (2 points)
   a. (1 point)

      Briefly describe two mechanisms used in Canada’s agricultural Production Insurance programs to control adverse selection by insured producers.

   b. (1 point)

      Calculate the Production Insurance indemnity for a canola crop, using the information below. Show all work.

      Expected yield = 2.5 tons/hectare
      Area insured = 250 hectares
      Actual yield = 1.8 tons/hectare
      Selected coverage level = 80%
      Insurable price = $105/ton

21. (2 points)

   Increases in insurance claims costs are often attributed to “social inflation.” Identify and briefly describe four causes of social inflation.

22. (3 points)

   As part of an assessment of the effectiveness of Alberta’s automobile insurance system, the Insurance Bureau of Canada (IBC) prepared a document, “Submission to Alberta Finance on the Automobile Insurance Consultation Paper.” Based on that document, answer the following:

   a. (1.5 points)

      Identify and briefly describe three areas of overcompensation for victims of motor vehicle accidents.

   b. (1.5 points)

      What were the IBC’s recommendations for each of the issues in part a. above?
23. (2 points)

Canadian regulators and public policymakers have recently focused significant attention on corporate governance and the issue of independence. With respect to the Property and Casualty Insurance Compensation Corporation (PACICC), identify two advantages and two disadvantages of an independent PACICC board of directors.

24. (2.5 points)

The following Dynamic Capital Adequacy Testing (DCAT) projections are shown for three companies as at December 31, 2005.

<table>
<thead>
<tr>
<th></th>
<th>Dec 31, 2006</th>
<th></th>
<th>Dec 31, 2007</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Equity</td>
<td>Minimum</td>
<td>Equity</td>
<td>Minimum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Capital</td>
<td></td>
<td>Capital</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Test %</td>
<td></td>
<td>Test %</td>
</tr>
<tr>
<td><strong>Company A</strong></td>
<td>Base Scenario</td>
<td>10,000</td>
<td>8,000</td>
<td>170%</td>
</tr>
<tr>
<td></td>
<td>Adverse Scenario</td>
<td>8,000</td>
<td>7,000</td>
<td>90%</td>
</tr>
<tr>
<td><strong>Company B</strong></td>
<td>Base Scenario</td>
<td>10,000</td>
<td>8,000</td>
<td>170%</td>
</tr>
<tr>
<td></td>
<td>Adverse Scenario</td>
<td>2,000</td>
<td>(500)</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Company C</strong></td>
<td>Base Scenario</td>
<td>10,000</td>
<td>7,000</td>
<td>170%</td>
</tr>
<tr>
<td></td>
<td>Adverse Scenario</td>
<td>5,000</td>
<td>4,000</td>
<td>50%</td>
</tr>
</tbody>
</table>

a. (1.5 points)

For each company, state whether or not the DCAT opinion would be that the company is in “satisfactory financial condition,” based on the information shown. Explain your answer.

b. (1 point)

Assume Company A has an internal capital target ratio of 160%. Based on this internal capital target and the Office of the Superintendent of Financial Institution’s supervisory target ratio, state what additional commentary the company’s DCAT report should contain.
25. (4.5 points)

The Dynamic Capital Adequacy Testing (DCAT) of a Canadian property and casualty insurance company, as at December 31, 2005, indicates the following Capital Available and Capital Required under the Minimum Capital Test (MCT) for the four most adverse scenarios. The MCT results correspond to the lowest values during the forecast period.

<table>
<thead>
<tr>
<th>MCT Capital</th>
<th>Base Scenario</th>
<th>Misestimation of Policy Liabilities (Unpaid Claims)</th>
<th>Frequency/Severity (Single Catastrophe)</th>
<th>Frequency/Severity (Multiple Large Losses)</th>
<th>Increase in Social Inflation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Available</td>
<td>400,000</td>
<td>240,000</td>
<td>300,000</td>
<td>315,000</td>
<td>350,000</td>
</tr>
<tr>
<td>Required</td>
<td>175,000</td>
<td>175,000</td>
<td>175,000</td>
<td>175,000</td>
<td>175,000</td>
</tr>
</tbody>
</table>

a. (0.5 point)

Under which scenario is the Office of the Superintendent of Financial Institutions most likely to intervene? Explain your answer.

b. (1 point)

Briefly explain two major differences between the items that are considered in the Increase in Social Inflation scenario and the Increase in General Inflation scenario. (Note that information on the Increase in General Inflation scenario was not presented in the table above.)

c. (1 point)

Describe two possible ripple effects for the Frequency/Severity (Multiple Large Losses) scenario.

d. (1 point)

Describe two possible management responses for the Increase in Social Inflation scenario.

e. (1 point)

Four months after the DCAT report is issued, it is discovered that because of a previously undetected flaw in the company’s data, the company’s unpaid claims had been understated by 50% in the Appointed Actuary’s Report. What should be done in the context of the DCAT?

CONTINUED ON NEXT PAGE
26. (4 points)

You are provided with the following nominal (i.e. undiscounted) gross loss experience for Company X as at December 31, 2005:

<table>
<thead>
<tr>
<th>Accident Year</th>
<th>Paid Loss</th>
<th>Incurred Loss</th>
<th>Ultimate Loss</th>
<th>Unpaid Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>100</td>
</tr>
<tr>
<td>2003</td>
<td>900</td>
<td>1,200</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>2004</td>
<td>500</td>
<td>?</td>
<td>1,800</td>
<td>?</td>
</tr>
<tr>
<td>2005</td>
<td>?</td>
<td>1,500</td>
<td>?</td>
<td>1,700</td>
</tr>
</tbody>
</table>

Payout Pattern

<table>
<thead>
<tr>
<th></th>
<th>12</th>
<th>24</th>
<th>36</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>30%</td>
<td>35%</td>
<td>25%</td>
<td>10%</td>
</tr>
</tbody>
</table>

In addition, you are given the following information:

- Interest Rate used for discounting: 4%
- Margins
  - Interest Rate Margin: 1%
  - Claims Development Margin: 5%
  - Reinsurance Margin: 2.5%
- Provision for Adverse Deviations (PfAD)
  - Interest Rate PfAD = 30.60
  - Claims Development PfAD = 178.70
  - Reinsurance PfAD = 28.40
- Payments are assumed to be made uniformly throughout the year.

Determine the IBNR for accident year 2003. Show all work.
27. (4.5 points)

You are given the following information for Insurance Company Z as at December 31, 2005:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Unearned Premium</td>
<td>10,000</td>
</tr>
<tr>
<td>Unearned Reinsurance Commissions</td>
<td>1,000</td>
</tr>
<tr>
<td>Ceded Unearned Premium</td>
<td>3,000</td>
</tr>
<tr>
<td>Expected Reinsurance Costs</td>
<td>250</td>
</tr>
<tr>
<td>Gross Expected Loss Ratio</td>
<td>80%</td>
</tr>
<tr>
<td>Ceded Expected Loss Ratio</td>
<td>90%</td>
</tr>
<tr>
<td>Present Value factor (including Margin for Adverse Deviations for Interest) (Gross = Ceded)</td>
<td>0.85</td>
</tr>
<tr>
<td>Margin for Adverse Deviations – Claims</td>
<td>10%</td>
</tr>
<tr>
<td>Margin for Adverse Deviations – Reinsurance</td>
<td>1.5%</td>
</tr>
<tr>
<td>General Expense Ratio</td>
<td>20%</td>
</tr>
<tr>
<td>Proportion of General Expenses for Policy Maintenance</td>
<td>33%</td>
</tr>
<tr>
<td>Internal Loss Adjustment Expense Ratio</td>
<td>4%</td>
</tr>
<tr>
<td>Contingent Commissions</td>
<td>2%</td>
</tr>
<tr>
<td>Net Premiums Written in 2005</td>
<td>16,000</td>
</tr>
</tbody>
</table>

Expense ratios are expressed as a percentage of premium.

a. (2.5 points)

Calculate the net policy liabilities associated with unearned premiums. Show all work.

b. (0.5 point)

Calculate the maximum policy acquisition expenses deferrable. Show all work.

c. (0.5 point)

Calculate the Capital Required for unearned premiums, according to the Minimum Capital Test (MCT). Show all work.

d. (1 point)

Assume that the company defers 75% of its maximum allowable Deferred Policy Acquisition Costs (DPAC) and that 300 of the deferral is due to premium taxes. Calculate the MCT Capital Required for DPAC. Show all work.

CONTINUED ON NEXT PAGE
EXAM 7 – CANADA, SPRING 2006

For questions 28 and 29, please refer to the Supplemental Information provided. That package contains selected pages from the P&C 1 of a hypothetical insurer, ABC Insurance Company.

28. (5 points)

Review the P&C 1 pages for ABC Insurance Company. Provide ten comments on factors that indicate, contribute to, or are a result of, poor financial health. Explain your responses.

29. (7 points)

The actuary for ABC Insurance Company discovers that the Earthquake Reserves Required by OSFI (ERRO) has not been calculated. He compiles the following information (all amounts in $000s).

\[
ERRO = EPR + ERC \\
PML_{500} = 15,000 \\
PML_{250} = 10,000 \\
EPR = 0 \\
\]

ABC has no approved capital market financing available to cover earthquake losses.

a. (0.5 point)

What are the EPR and ERC?

b. (1 point)

Calculate the ERC and therefore the ERRO. Show all work.

c. (1 point)

Based on the value for the ERRO calculated in part b. above, recalculate the Minimum Capital Test. Make sure your answer clearly references changes to appropriate line numbers on page 30.70 of ABC’s P&C 1. Show all work.

d. (4.5 points)

Based on the value for the ERRO calculated in part b. above, determine the appropriate corrections to pages 10.60, 20.10, 20.20, 20.30, and 20.40 of ABC’s P&C 1. Make sure your answer clearly references line numbers. Clearly state if a particular P&C 1 page requires no changes. Show all work.

CONTINUED ON NEXT PAGE
EXAM 7 – CANADA, SPRING 2006

30. (2 points)

The following information is available for a Canadian property and casualty insurer.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>2,000</td>
<td>5,000</td>
<td>4,000</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>2003</td>
<td>1,000</td>
<td>3,800</td>
<td>?</td>
<td>300</td>
<td>900</td>
</tr>
<tr>
<td>2004</td>
<td>?</td>
<td>7,500</td>
<td>5,500</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

Assume that investment income during a calendar year is calculated by the average of the discounted reserves between the two evaluation points multiplied by the same discount rate for each accident year.

Given that the total excess (deficiency) for accident years 2004 and prior is zero, calculate the accident year 2004 paid losses during calendar year 2005. Show all work.
31. (3 points)

The following information is available from the financial statements of Alpha Insurance Company.

<table>
<thead>
<tr>
<th>Alpha Insurance Company</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets</td>
<td>1,700,000</td>
</tr>
<tr>
<td>Total liabilities</td>
<td>1,400,000</td>
</tr>
<tr>
<td>Net unearned premiums</td>
<td>600,000</td>
</tr>
<tr>
<td>Net unpaid claims</td>
<td>700,000</td>
</tr>
<tr>
<td>Capital required on balance sheet assets</td>
<td>59,000</td>
</tr>
<tr>
<td>Investments - adjustments to market</td>
<td>39,000</td>
</tr>
<tr>
<td>Assets with a capital requirement of 100%</td>
<td>31,000</td>
</tr>
</tbody>
</table>

Alpha Insurance cedes to one unregistered reinsurer, XYZ Reinsurance. The financial statement information pertaining to XYZ is as follows.

<table>
<thead>
<tr>
<th>XYZ Reinsurance Company</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premiums ceded to assuming insurer</td>
<td>67,000</td>
</tr>
<tr>
<td>Claims incurred by assuming insurer</td>
<td>32,000</td>
</tr>
<tr>
<td>Unearned premiums ceded to assuming insurer</td>
<td>31,000</td>
</tr>
<tr>
<td>Outstanding losses recoverable from assuming insurer</td>
<td>55,000</td>
</tr>
<tr>
<td>Receivable from assuming insurer</td>
<td>800</td>
</tr>
<tr>
<td>Payable to assuming insurer</td>
<td>1,800</td>
</tr>
<tr>
<td>Non-owned deposits held as security from assuming insurer</td>
<td>97,000</td>
</tr>
<tr>
<td>Letters of credit held as security from assuming insurer</td>
<td>0</td>
</tr>
</tbody>
</table>

Alpha’s capital required factor on the unpaid claims liabilities is 9% and its capital target level is 180%.

a. (1.5 points)

Calculate Alpha’s Minimum Capital Test (MCT) ratio. Show all work.

b. (1 point)

What risk does Alpha face if losses ceded and outstanding to XYZ had been greater by $5 million? What can Alpha request that XYZ do to mitigate this risk? Show all work.

c. (0.5 point)

Why does the MCT test include a capital required factor on the unpaid claims liabilities when the actuary is already including a provision for adverse deviations in the valuation?

CONTINUED ON NEXT PAGE
32. (1 point)

The Minimum Capital Test replaced the previous solvency tests (e.g., Minimum Asset Test) for Canadian insurers as at January 1, 2003. Describe two fundamental differences between the Minimum Capital Test and the previous solvency tests.

33. (4.5 points)

a. (1 point)

Define fair value and explain one difficulty in determining the fair value of reserves.

b. (1.5 points)

PricewaterhouseCoopers (Littmann et al.) completed a study on implementing fair value. Describe the two methods used to select the discount rate for this study and the difference in results between the methods.

c. (1 point)

In the calculation of the fair value of liabilities, a risk margin is added to the discounted reserves. Describe two areas of disagreement on the methodology by which the risk margins should be calculated.

d. (0.5 point)

What additional issue with respect to the calculation of risk margins is only applicable to multi-line insurers?

e. (0.5 point)

Would it be more likely for the risk margin to be higher in a smaller or a larger company? Explain your answer.
34. (2 points)

a. (1.5 points)

The appointed actuary, Bob, of Insurance Company X is fired by company management. Subsequently, the company hires Susie as the appointed actuary. Bob believes he was fired because he had substantially increased the level of IBNR beyond the amount that management wanted to book. With reference to this situation, outline the duties of Bob, Susie, and Insurance Company X under the Insurance Companies Act.

b. (0.5 point)

A few years later, the runoff of Insurance Company X shows that the company had been highly over-reserved while Bob was the appointed actuary. Can Insurance Company X sue Bob for causing the company’s poor financial results during this period? Explain your answer.

35. (2 points)

You are given the following information for Insurance Company Z:

<table>
<thead>
<tr>
<th>Unpaid Claims Category – Actuary’s Estimate</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct – regular business on company systems</td>
<td>25,000</td>
</tr>
<tr>
<td>Assumed Reinsurance</td>
<td>5,000</td>
</tr>
<tr>
<td>Ceded Reinsurance</td>
<td>3,000</td>
</tr>
<tr>
<td>Assumed from Facility Association</td>
<td>4,000</td>
</tr>
<tr>
<td>Ceded to Ontario Risk Sharing Pool</td>
<td>3,000</td>
</tr>
<tr>
<td>Assumed from Ontario Risk Sharing Pool</td>
<td>2,000</td>
</tr>
<tr>
<td>Other amounts to recover</td>
<td>1,000</td>
</tr>
<tr>
<td>Other Net Liabilities</td>
<td>1,500</td>
</tr>
</tbody>
</table>

Assume that all amounts include adjustment expenses, are discounted, and include appropriate provision for adverse deviations.

Calculate the direct, assumed, gross, ceded, and net categories of Unpaid Claims and Adjustment Expenses as they would appear on the Actuary’s Estimate column of the Expression of Opinion in the Appointed Actuary’s Report. Show all work.
36. (2 points)

Describe one example of the responsibilities that an appointed actuary of a property and casualty insurance company has with each of the following professionals/entities:

a. (0.5 point)
   External Auditor of the insurance company.

b. (0.5 point)
   Office of the Superintendent of Financial Institutions.

c. (0.5 point)
   Chief Executive Officer and Chief Financial Officer of the insurance company.

d. (0.5 point)
   Peer Reviewer of the actuarial work product produced by the appointed actuary.

37. (1.5 points)

a. (1 point)
   Identify the four ways in which the appointed actuary of an insurance company can cease to hold office.

b. (0.5 point)
   With whom should the actuary meet in order to report on the financial position of the company? How often should such meetings take place?

38. (1.5 points)

Answer the following question based on the Canadian Institute of Actuaries' Educational Note on Discounting. Briefly describe three considerations, other than the purpose of the valuation, which should be taken into account when selecting discount rates for the purpose of discounting policy liabilities.

END OF EXAMINATION

20
SUPPLEMENTAL INFORMATION:

Selected P&C1 Pages for ABC Insurance Company
### SUMMARY OF SELECTED FINANCIAL DATA FOR FIVE YEARS

**($000)**

<table>
<thead>
<tr>
<th>OPERATIONS</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
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<tr>
<td>Assets</td>
<td>(01)</td>
<td>(02)</td>
<td>(03)</td>
<td>(04)</td>
<td>(05)</td>
</tr>
<tr>
<td>Liabilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Adjusted Equity</td>
<td>109,800</td>
<td>100,483</td>
<td>87,991</td>
<td>94,995</td>
<td>77,727</td>
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<tr>
<td>Gross premiums written</td>
<td>114,216</td>
<td>154,346</td>
<td>90,550</td>
<td>151,230</td>
<td>124,977</td>
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<tr>
<td>Net premiums written</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net premiums earned</td>
<td>93,623</td>
<td>131,975</td>
<td>171,348</td>
<td>171,692</td>
<td>138,118</td>
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<tr>
<td>* Gross claims incurred</td>
<td>76,584</td>
<td>115,214</td>
<td>158,154</td>
<td>125,184</td>
<td>116,459</td>
</tr>
</tbody>
</table>

### PROFITABILITY

* Claims ratio
  - by year of account: 81.80% 87.30% 92.30% 72.91% 84.32%
  - by year of accident: 78.38% 81.06% 88.67% 71.43% 74.64%
* Expense ratio: 32.47% 29.51% 27.64% 29.16% 37.99%
* Underwriting income (loss): (11,864) (19,996) (32,041) (3,557) (30,808)
  - as a % of net premiums earned: -12.67% -15.15% -18.70% 2.07% -22.11%
* Net investment income from insurance operations: 11,945 19,264 18,347 14,272
* Net income (loss) from insurance operations (line 35 + 40): (11,864) (8,050) (12,777) 14,790 (16,536)
* Net investment income - other: 6,042 2,986 4,519 3,084 1,760
* Net investment income (total) as a % of net premiums earned [(line 40 + 44)/100]: 6.45% 11.31% 13.88% 12.48% 11.61%
* Investment yield: 1.86% 2.96% 4.11% 3.65% 3.10%
* Net income (loss): (6,324) (4,317) (7,492) 12,004 (12,268)
* Return on equity: -5.60% -7.95% -13.4% 14.21% -14.51%

### FINANCIAL

* Dividends to shareholders: 5,000 5,000 5,000 5,000 5,000
* Share Capital and Contributed Surplus paid in during the year: 0 0 0 0 0
* Share Capital and Contributed Surplus redeemed during the year: 0 0 0 0 0

### OTHER RATIOS

* Adjusted Equity as a % of liabilities: 24.31% 20.75% 16.94% 19.13% 15.56%
* Gross risk ratio (line 05/line 04): 1.04 1.54 2.17 1.59 1.60
* Net risk ratio (line 06/line 04): 1.04 1.54 2.17 1.59 1.60
* Agents and brokers balances and amounts due from subsidiaries and affiliates as a % of Adjusted Equity: 3.34% 2.93% 2.46% 2.12% 2.82%
* Claims development as a % of Adjusted Equity: -2.92% -8.20% -7.07% 6.24% -17.20%

### MINIMUM CAPITAL TEST

* Excess of Capital Available over Capital Required: 50,308 38,274 34,394 19,423
* Capital Available as a % of Capital Required: 184.35% 168.78% 153.42% 130.60%

P&C-1 (2003) 10.60
## ABC Insurance Company

### Insurer

### 2005 Year

#### ASSETS

($000)

<table>
<thead>
<tr>
<th>Page</th>
<th>Current Year (01)</th>
<th>Prior Year (03)</th>
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ABC Insurance Company
Insurer

LIABILITIES AND EQUITY
($000)

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<th>Current Year (01)</th>
<th>Prior Year (03)</th>
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<td>Borrowed Money and Accrued Interest</td>
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<td>Income Taxes due and accrued</td>
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<td>Policyholder Dividends and Rating Adjustments</td>
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<td>Other Liabilities</td>
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<td>Shares issued and paid</td>
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<td>Contributed Surplus</td>
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<td>Retained Earnings</td>
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<td>(7,915)</td>
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<td>20.40</td>
<td>Reserves</td>
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<td>Total Equity</td>
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<td>TOTAL LIABILITIES AND EQUITY</td>
<td>89</td>
<td>577,388</td>
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P&C-1
(2005)
<table>
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<th>Page</th>
<th>Current Year (01)</th>
<th>Prior Year (03)</th>
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</thead>
<tbody>
<tr>
<td><strong>UNDERWRITING OPERATIONS</strong></td>
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<td><strong>Premiums Written</strong></td>
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<td><strong>Net Premiums Written</strong></td>
<td>124,597</td>
<td>151,230</td>
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<tr>
<td><strong>Decrease (increase) in Unearned Premiums</strong></td>
<td>13,521</td>
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<td><strong>Net Premiums Earned</strong></td>
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<td>171,692</td>
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<tr>
<td>Service Charges</td>
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<td>0</td>
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<tr>
<td>Other</td>
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<td><strong>Total Underwriting Revenue</strong></td>
<td>138,118</td>
<td>171,692</td>
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<tr>
<td><strong>Net Claims and Adjustment Expenses</strong></td>
<td>116,439</td>
<td>123,184</td>
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<tr>
<td><strong>Acquisition Expenses</strong></td>
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<td>Commissions</td>
<td>27,284</td>
<td>19,451</td>
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<td>Other</td>
<td>7,156</td>
<td>8,369</td>
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<td><strong>Total Claims and Expenses</strong></td>
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<td>175,249</td>
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<td><strong>Premium Deficiency Adjustments</strong></td>
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<td><strong>Underwriting Income (Loss)</strong></td>
<td>(30,808)</td>
<td>(3,557)</td>
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<td><strong>INVESTMENT OPERATIONS</strong></td>
<td></td>
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<tr>
<td><strong>Income</strong></td>
<td>19,678</td>
<td>21,834</td>
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<td><strong>Recognized Gains (Losses)</strong></td>
<td>(2,867)</td>
<td>451</td>
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<td><strong>Expenses</strong></td>
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<td>854</td>
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<td><strong>Net Investment Income</strong></td>
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<tr>
<td><strong>OTHER REVENUE AND EXPENSES</strong></td>
<td></td>
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<tr>
<td><strong>Income (Loss) from Ancillary Operations</strong></td>
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<tr>
<td>(net of Expenses of $'000)</td>
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<tr>
<td><strong>Share of Net Income (Loss) of Subsidiaries and Affiliates</strong></td>
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<td>0</td>
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<tr>
<td><strong>Gains (Losses) from fluctuations in Foreign Exchange Rates</strong></td>
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<td>0</td>
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<tr>
<td><strong>Other</strong></td>
<td>0</td>
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<tr>
<td><strong>Net Income (Loss) before Income Taxes and Extraordinary Item</strong></td>
<td>(14,776)</td>
<td>17,874</td>
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<td><strong>INCOME TAXES</strong></td>
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<tr>
<td><strong>Current</strong></td>
<td>648</td>
<td>6,138</td>
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<tr>
<td><strong>Future</strong></td>
<td>(3,156)</td>
<td>(268)</td>
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<td><strong>Total Income Taxes</strong></td>
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<td>5,870</td>
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<td><strong>Extraordinary Items (net of Income Taxes of $'000)&quot;</strong></td>
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<td>0</td>
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<tr>
<td><strong>NET INCOME (LOSS) FOR THE YEAR</strong></td>
<td>(12,268)</td>
<td>12,004</td>
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# Statement of Retained Earnings

<table>
<thead>
<tr>
<th>Description</th>
<th>Current Year (01)</th>
<th>Prior Year (02)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance at beginning of year</td>
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<tr>
<td>Prior period adjustments:</td>
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<td>0</td>
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<tr>
<td>Adjusted balance at beginning of year</td>
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<td>0</td>
</tr>
<tr>
<td>Net income (loss) for the year</td>
<td>(12,268)</td>
<td>12,004</td>
</tr>
<tr>
<td>Dividends declared to shareholders</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Decrease (increase) in Reserves</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Net increase (decrease) in Retained Earnings during the year</td>
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<td>7,004</td>
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<tr>
<td>Balance at end of year</td>
<td>(7,915)</td>
<td>9,353</td>
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## Reserves

<table>
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<th>Description</th>
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<tbody>
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<td>Earthquake Reserves</td>
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<tr>
<td>Reserve Complement</td>
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<td>Premium Reserve</td>
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<td>Mortgage Reserve</td>
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<td>Total Reserves</td>
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P&C-1 (2005)
# Minimum Capital Test

(S000)

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<td><strong>Capital Available</strong></td>
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<tr>
<td>Subordinated Indebtedness and Redeemable Preferred Shares</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Investments - Adjustment to Market</td>
<td>5,167</td>
<td>3,784</td>
</tr>
<tr>
<td>Less: Assets with a Capital Requirement of 100%</td>
<td>0</td>
<td>0</td>
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<tr>
<td><strong>Total Capital Available</strong></td>
<td>82,894</td>
<td>98,779</td>
</tr>
<tr>
<td><strong>Capital Required</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance Sheet Assets</td>
<td>20,366</td>
<td>22,116</td>
</tr>
<tr>
<td>Unearned Premiums/Unpaid Claims</td>
<td>43,106</td>
<td>42,269</td>
</tr>
<tr>
<td>Catastrophes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reinsurance Ceded to Unregistered Insurers</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Off-Balance Sheet Exposures</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Minimum Capital Required</strong></td>
<td>63,471</td>
<td>64,385</td>
</tr>
<tr>
<td><strong>Excess Capital Available over Capital Required</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(line 09 minus line 29)</td>
<td>19,423</td>
<td>34,394</td>
</tr>
<tr>
<td>Line 09 as a % of line 29</td>
<td>130.60%</td>
<td>153.42%</td>
</tr>
</tbody>
</table>
QUESTION #1

A. 1. Compensation
2. Deterrence
3. Psychological needs.
4. Ombudsman

B. 1. The victim receives damage so have been compensated for its loss.
2. The Tasty Tobacco Company has to pay punitive damages, so will try to avoid chemicals in cigarettes in the future to not have to pay another time.
3. Punitive damages have been paid by the defendant, so the defendant have been punished for the act committed. The victim will be appeased.
4. The trial apply some pressure on persons with political/social/economic powers to legislate more the product in the cigarettes.
QUESTION #2

A. Most likely to fall under strict liability – which is a legal principle which may require one party to compensate another for injury or damages even if loss neither intentionally nor negligently caused.

B. Belief that a higher standard or duty of care is appropriate for companies engaging in abnormally dangerous activities.

C. Defenses for strict liability include:
   - consent of the plaintiff – plaintiff consents to being subject to hazardous activity.
   - default of the plaintiff – similar to contributory negligence.
   - Legislative authority – if authorized by legislation to engage in hazardous activity.
QUESTION #3

A. Principle that a plaintiff cannot recover more than the loss is already sustained.
   ➢ principle to prevent the overcompensation

B. • When an insured receives an amount for his fixed property, he cannot keep the property because of the residual value she could have (salvage). Thus, insurer takes the ownership of the property.
   • When an insurer indemnify an insured, it becomes subrogate in the right of the insured to recover his cost from the at-fault third-party (subrogation).
   • If multiple source of recovery, the total amount must not exceed the loss suffered. (For example, the insurer will pay only the excess to reach the amount of loss if he is a secondary payer.)

C. Guaranteed replacement cost where the insured could recover more than the amount of his house.
QUESTION #4

A. One right: to ask for the co-operation of John to defend the claim.

Two obligations:
(i) The company is obligated to defend John,
(ii) The company should act in utmost good faith: In this case it means the company should take John’s interest into account when it settles the claim.

B. XYZ will lose its right mentioned above. However, if later on, it was ruled that XYZ’z denial of coverage is groundless, XYZ may end up paying all the damage.

C. The insurer didn’t act in good faith. Dillon hit a 5 year old boy and caused serious damages. He’s 100% at fault. Dillon’s insurer, Guardian, had a chance to settle the claim within the policy limit, but decided not to do so. The final judgment was above Dillon’s policy limit. Dillon sued Guardian for the amount above his limit and won.
QUESTION #5 – SAMPLE 1

A. Contributory negligence.

B. Pecuniary Damage – damage that can be measured in fairly precise mathematical terms.

Non-pecuniary damage – damages related to pain and suffering.

C. i) is non-pecuniary damage
   ii) is pecuniary damage
   iii) is pecuniary damage
   iv) is pecuniary damage

D. Insurance company cannot use contributory negligence as a complete defense and refuses to pay any damages to the plaintiff.

E. For non-pecuniary damage, could evaluate based on;
   
   i) functional approach – the approach that measures the sum to provide purchases to the individual that makes life easier and to provide the amenities of life.
   
   ii) conceptual approach – based on the objective value of assets lost through injury.
   
   iii) personal approach – by measuring how much happiness lost through the injury.

   For pecuniary damage, the factors in measuring the potential expense are based on cost of care, duration of expense, contingency, discount rate and overlapping factors.
QUESTION #5 – SAMPLE 2

A. Contributory negligence.

B. Special damage, ex pretrial pecuniary loss: the cost to replace the expensive suit. Definition: award that can be mathematically evaluated at the trial.

General Damage – damage that can’t be evaluated with fairly mathematical precision. ex post trial pecuniary expense or non-pecuniary loss.

C. i) general damage
   ii) special damage
   iii) general damage
   iv) special damage

D. It is not expected from worker to wear light color, the possible event of being hit! Ms. Doe haven’t been negligent at all in wearing a dark suit.

E. Special damage: use what have effectively been paid (receipt for clothing, income lost from accident to trial)

   General Damage - take into account several factors. For pecuniary loss, they can use income level, adjusted for contingencies. For non-pecuniary loss: functional approach. Use factor like lost in amenities in life.
A.  
- It is difficult to define “occurrence” in asbestos liability as exposure period are long and might have occurred years ago. 
- Reasonable estimates are not easy to produce. As the exposure is over a long period of time, and they are multiple claimant, and amount are increasing from year to year. It is hard to produce adequate estimates. 
- In automobile liability; accident occurs on a day, and not over a period of time. 
- The number of plaintiff is known quickly after the occurrence, not years later. 

B.  
1. The number of plaintiff is unknown. 
2. The inflation in tort suit is unknown 
3. Government can pass legislation with unknown effect 
4. Grouping of claimant/plaintiff complexity the process. It is unknown if some other defendant will bankrupt. 

C.  
1. Whether consultant had been hired to estimate liability 
2. Products and affiliated companies having exposure to asbestos 
3. Method of calculating liabilities 
4. Restructuring plan in case of bankruptcy
QUESTION #7

A. Economic impact – concentration of financial power of insurers

Undesirable business practice – need to control pressure tactics of agents and delays in claim settlement.

Insurer insolvency – need to make sure insurer can meet obligations to policyholders and need to protect interest of policyholders.

B. 1. Experience of managers (business practice)

2. Nature and soundness of business plan (solvency)

3. Capital available (solvency)

4. Integration in the Canadian market (economic impact)
**QUESTION # 8**

<table>
<thead>
<tr>
<th>Federal</th>
<th>Provincial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorporation</td>
<td>Market conduct</td>
</tr>
<tr>
<td>Winding up</td>
<td>Insurance contract</td>
</tr>
</tbody>
</table>
QUESTION # 9

a) Based on the insurance reference case, it is not within the power of Federal government to impose that condition. It would be rejected.

b) Foreign insurance companies already need to be federally incorporated. No impact.
QUESTION # 10

A.  
   i. Open competition: no filing and approval required for the rates and rules.  
   ii. Prior approval: rates and rules need to be approved before use.  
   iii. File and use: rates and rules need to be filed within certain period of time before use.  
   iv. Use and file: rates and rules need to be filed within certain period of time after use. (usually 30 days)

B. 410 Guidelines are for prior approval.  
   413 Guidelines are for file and use.

C. Significant rate increases resulting in affordability problem.  
   Intensive market competition and strict UW conduct resulting in availability problem.
QUESTION # 11

A. 1. Fixed prices and rigged bids.

   2. Did not properly disclose to their customers the contingent commissions paid to brokers.

B. Some brokers no longer accept contingent commissions.

   Insurers are being more careful about paying contingent commissions to brokers.
QUESTION # 12

A. Because the nature of the loss is fire and falls under the Ontario Fire Statutory Act which asks for proof as soon as feasibly possible.

B. Speedy may use that the insured did not act in good faith since it had all documents ready on time, but did not submit them on time.

C. Multiple risks policies will apply the provisions appropriate to each loss depending on the nature of the loss and not the category of the policy.

D. Policy change: should follow fire Act by saying that proof of loss is required when practical.
A.

- Discuss of general insurance
- Collect and analyse data
- Engage in research
- Study legislation
- Provide information to public

B. The insurance industry is the only industry that allows to collect and analyze data on industry. These analysis are then available to all insurers. The other industry would not allow to give that information to protect their company from competition.
QUESTION # 14

- Adequate benefits
  - large part of premiums paid as claims
  - insureds adequately protected in case of loss

- Promotion on Wellness
  - promotes rehabilitation
  - focus on health and not financial gain from insurance

- Personal Responsibility
  - wrongdoer retain part of responsibility (affected some way by its tort)
  - responsibilgation [sic] of insureds

- Consumer oriented services
  - fast and efficient services
  - listening to insureds for potential improvements
QUESTION # 15

A) Save costs from reducing cases that go to court.
   Quicker settlement since avoid long litigation process and can focus on rehabilitation.

B) Quebec
   Manitoba
Efficiency - Some costs can be eliminated and government can have more efficient procedure i.e. social security.

Convenience - It’s better that government provide insurance that try to co-ordinate all sector of industry i.e. flood insurance.

Residual Market - When private insurance does not want to provide coverage, government provide to fill gap i.e. auto insurance for young.

Collateral Social Purpose: Make social benefits to society like building code i.e. in case of flood insurance.
QUESTION # 17

- Government as the only insurer: Employment insurance
- Government act as partnership – Flood insurance
- Government in competition with private insurer: Auto residual market
a) Pay as you go system with the following sources:

- Premium paid by resident
- Payroll tax
- General revenue
- Sales tax on group plan and self insurance programs

b) The cost of the care for older generation is put on the next generation who is the current labour force.

c) Since the demographic structure will change in the near future so that the proportion of the working labour to the retired group is decreasing, will give much more burden on the future labour force which will lead to the insolvency of the system.

d) 1) Introduce some deductible or co insurance

2) Shift some coverage/cost to private sector
A) - Canadian Agricultural Income Stabilization (CAIS)
    - Production Insurance

B) - CAIS provides protection from increasing input costs and decreasing market values.
    - Production Income provides protection from decreased production due to uncontrollable forces such as weather, insects, etc.

C) Provincial and Federal Government share in the costs of these programs. Producers pay insurance premiums which contribute to cost of the programs.
QUESTION # 20

A)  
- Must insure production before any opportunity for loss  
- Must insure entire production of a commodity, not just certain fields/ acres

B)  
\[
\text{Actual} = \frac{1.8}{2.5} = 72\% \\
\text{Expected}
\]

Coverage 80% - 72% = 8%

\[
$105 \times 2.5 \text{ tons} \times 230 \text{ acres} \times 8\% = $5250.
\]

Ton acre
QUESTION # 21

- Increased focus on pain and suffering
- Increased use of lawyers and lawyer solicitation
- Willingness of judges and juries to give out new and larger awards
- Growing sense of entitlement of claimants
QUESTION # 22

A)

1) Victims are allowed double recovery in some cases where they receive coverage from both social programs and insurance.

2) Compensation for lost income should be based on net income, not on gross income.

3) Prejudgment interest on general damages overcompensates victims

B)

1) Private insurance should be second payer.

2) Compensation for lost income should be based on net income.

3) Prejudgment interest should be eliminated.
QUESTION # 23

Advantages:  
- greater relationship with regulator, who requested this change.
- Members, not working for an insurance company will probably have more time for the PACICC.

Disadvantages:
- Members will quickly be out-dated relating to insurance issues.  
  (if directors do not work in P & C industry, they will be less concerned / Informed about emerging issues)
- Greater cost involved → Industry will have to pay salary to those working full-time on the board.  Up to now, director (from industry) work for free on PACICC.
QUESTION # 24

a) A - Satisfactory since meet minimum regulatory capital (100%) requirement in base scenario and meet all obligations in projection period (equity >0) under both base and adverse scenario.

B - Unsatisfactory since equity < 0 in 2\(^{nd}\) year of projection under adverse scenario.

C - Unsatisfactory since MCT ratio < 100% under based scenario in 2\(^{nd}\) year of projection.

b) Co. A’s MCT ratio drops below OSFI’s target of 150%. There is possibility that OSFI will intervene and hence Co. A may not be allowed to carry out its business plan as intended.
QUESTION # 25

a) Misestimation of policy liabilities
   \[ \text{MCT} = \frac{240}{175} = 137.1\% \text{ which is below } 150\% \]

b) increase in social inflation will increase costs in liability lines
   increase in general inflation will increase costs in all lines
   
   increase in social inflation will not adjust yield curve
   increase in general inflation will increase yield curve

   ?

c) increase in reinsurance rate next renewal
   increase in policy liabilities related to adjustable reinsurance contract


d) increase rates
   change the mix of business


e) DCAT should be reissued
   The change should reflect in base and all adverse scenarios
### QUESTION # 26

<table>
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<tr>
<th></th>
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<th></th>
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<tbody>
<tr>
<td>2002</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>x</td>
<td>x</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>1800-500=1300</td>
<td>1300 x 25%=928.57</td>
<td>1300 x 10%=371.43</td>
<td>0</td>
</tr>
<tr>
<td>2005</td>
<td>1700</td>
<td>1700 x 35%=850</td>
<td>850 x 25%=607.14</td>
<td>242.86</td>
</tr>
</tbody>
</table>

PV of Unpaid = \((100 + X + 928.57 + 850) \times 1.04^{-0.5} + (371.43 + 607.14) \times 1.04^{-1.5} + 242.86 \times 1.04^{-2.5}\)

= \(X \times 1.04^{-0.5} + 2984.93\)

Claim Dev PFAD = Claim Dev Margin x PV of unpaid

178.70 = \((X \times 1.04^{-0.5} + 2984.93) \times 5\%

X = 600.74

IBNR AY2003 = Unpaid – Paid

= 600 – 900 = 300
a) Net policy liabilities on UPR
   → SUM OF
      + expected incurred losses on UPR
      + expected internal LAE
      + maintenance costs
      + contingent commissions
      + expected XOL reinsurance costs

   Expected incurred losses on UPR

   Gross expected losses = (UPR) X (ELR)
   = 10000 X 80%
   = 8000
   → @ present value = 0.85 X 8000 = 6800
   PFAD = 10% x 6800 = 680

   Gross expected losses = 6800 + 680 = 7480

   Ceded expected losses = (UPR) x (ELR)
   = 3000 X 0.90
   = 2700
   → @ present value = 0.85 x 2700 = 2295
   PFAD = 10% x 2295 = 229.50

   Ceded expected losses = 2295 x 229.50 = 2524.50

   Net expected losses @ present value = 6800 – 2295 = 4505

   Claims PFAD = 4505 x 10% = 451
   Reins PFAD = 2295 x 1.5% = 34

   Net expected losses @ present value incl PFAD = 4505 + 451 + 34 = 4990

   Internal adj. expenses = (4%) x (Gross UPR)
   (Gross basis) = 0.04 x 10000
   = 400

   Maintenance Costs = UPR x {General expenses} {% of Maintenance} {Ratio} {in general costs}
   = (10000) (0.20) (0.33)
   = 660
Contingent commission = (2%) (Gross UPR)  
= 0.02 X 10000  
= 200

→ Net policy liability = 4990 = Exp. Losses  
Associated with UPR + 400 = ULAE  
+ 660 = Maintenance  
+ 200 = Contingent  
+ 250 = Reins. Costs

answer = 6500

b) Max DPAE = Net UPR - Net policy liabilities associated with UPR + Unearned commission  
= 7000 - 6500 + 1000.00  
= 1500

c) Capital required for UPR is equal to

8% x maximum between  
   i) Net UPR  
   ii) 50% of NWP in last 12 months

Net UPR = 10000 – 3000 = 7000  
NWP x 50% = 16000 x 50% = 8000

   Capital required = 8000 x 8%  
   = 640

d) Since max deferrable = 1500  
→ 75% x 1500 = 1125

   Tax portion = 300  
   Commission portion = 825

Capital required for tax portion = 0  
Capital required for commission portion = max {35% x (825-1000) , 0} = 0
QUESTION # 28

1. Negative UW income for last 5 years indicates poor performance.

2. 2005 MCT ratio less than min supervisory target of 150%
   Indicates solvency concern

3. Negative claims development for last 5 years indicates adverse development,
   inadequate reserving practices in prior years.

4. Overall net income for 4 of last 5 years has been negative.

5. Company continues to issue SH dividends every year despite negative income – more
   concern for shareholders than for policyholders.

6. Equity has been declining, from 110 in 2001 to 78 in 2005 → less equity to cushion
   losses, protect policyholders.

7. Company NWP = GWP so does not avail itself to reinsurance and is therefore keeping
   100% of risks (not advisable).

8. Expense ratio increased significantly from 2004 – 2005 → not managing company
   well.

9. Investment yield ~3 % is poor, perhaps funds are not well invested.

10. Company shows recognized losses on investments → asset – liability mismatch,
    negative income forcing insurer to sell assets at a loss.
QUESTION # 29  [Note that no candidate response received full marks for this question. The response below represents the best candidate answer with appropriate modifications to represent a full mark answer.]

a) EPR = Earthquake premium reserve
   (voluntary accumulation of premium up to PML 500 for future earthquake losses)

   ERC = Earthquake reserve complement

b) ERC = PML250 + (N/25) (PML 500 – PML250) – retention – recoverable – EPR –
   cap market fin
   = 10000 + (2005 – 1997) (15000 – 10000) – 10% x 77727 – 0 (no reinsurance) – 0
   (no info about cap. market fin. so assume 0)
   = 3827
   ERRO = 0 + 3827 = 3827

  
  
  
  
  
  
  c) 30.70 line 01, Equity = 77727 (no chg since 20.20 lines 44 and 45 both changes,
       30.70 line 03, Sub. Indebtness = 0 (no change)
       30.70 line 05, Adj. market = 5167 (no change)
       30.70 line 09, Capital available = 82894 (no change)
       30.70 line 20, Balance sheet assets = 20366 (no change)
       30.70 line 22, UP and unpaid = 43106 (no change)
       30.70 line 24, Catastrophes = 3827 (changes from 0)
       30.70 line 26, Rein. Unreg = 0 (no change)
       30.70 line 28, Off-bal = 0 (no change)
       30.70 line 29, Capital required = 67298 (changes from 63471)

       30.70 line 89, Excess available over required = 15596 (changes from 19423)

       30.70 line 90, MCT ratio = \( \frac{82894}{67298} = 123\% \)

  
  
  d) 20.10 no change

   20.20 Line 44 \( \rightarrow \) - 7915 - 3827 = -11742 ) all for current year
   Line 45 \( \rightarrow \) 3827
   Line 49 no change
   20.30 no change
   20.40 line 12 \( \rightarrow \) -3827
Line 15 → -21095
Line 89 → -11742
Line 90 → 3827
Line 99 → 3827

10.60 Line 04 → 77727 – 3827 = 73900
Line 60 → 73900 = 14.79%
        499661
Line 62 → 1.69
Line 64 → 1.69
Line 66 → 2190 = 2.96%
        73900
Line 68 → (74.64% - 84.32%) x 138118 / 73900 = -18.09%
Line 70 → 82894 – 67298 = 15596
Line 71 → 123.17%
Assume inv income = yield \times (\text{liab 0 + liab 1}) \text{ yield} = \nu

2004 paid during 2005 = x

1) Estimate yield: let $z$ = discounted res 05 for 2003

\[
900 = 3800 - 1000 + 300 \\
z = 3800 - 1000 + 300 - 900 = 2200 \\
300 = \nu \frac{(3800 + 2200)}{2}
\]

$\nu = 0.1$

2) Calculate inv income for 2002, 2004

2002 : \nu \left(\frac{5000 + 4000}{2}\right) = 450 \\
2004 : \nu \left(\frac{7500 + 5500}{2}\right) = 650

3) Set total excess/def to 0 and solve for $x$

Result 12/31/04 = 5000 + 3800 + 7500 = 16300 \\
Result 12/31/05 = 4000 + 2200 + 5500 = 11700 \\
Paid = x + 2000 + 1000 = x + 3000 \\
Income = 300 + 450 + 650 = 1400 \\
16300 - 11700 - x - 3000 + 1400 = 0 \\
x = 16300 - 11700 - 3000 + 1400 \\
x = 3000

Acc. Yr 2004 paid during 2005 = 3000
QUESTION # 31

(a) Equity = 1700 – 1400 = 300
    Adj to market = 39
    Less 100% items = 31

    308 available

    BS assets 59
    UCAE 700 (0.09)
    UPR 600 (0.08)
    Reins.  (31 + 55) 1.1 + 0.8 – 1.8 – 97 = -3.4 so 0

    170 required

    MCT = 308 = 1.81 so okay
    170

(b) (31 + 55 + 5) x 1.1 + 0.8 – 1.8 – 97 = 2.1

    Capital req’d becomes 170 + 2.1 = 172.1
    MCT becomes 179% below internal target

    Alpha can request 1. an increase in the non-owned deposit provided
                     2. a letter of credit from XYZ

(c) Pfad’s in the valuation are for expected variations. The capital required factor in the MCT is for abnormal, unexpected adverse deviations.
QUESTION # 32

(1) MCT explicitly addresses off-balance sheet exposure.

(2) MCT considers risk by line of business.
    Different capital requirement factor was assigned to different lines.
QUESTION # 33

(a) Fair value is the amount which would result in an arms length transaction between two willing parties.

One difficulty is that there is no market for “reserve transaction” that is liquid enough to determine fair value

(b) 1 - Yield curve approach
- apply series of risk-free government securities that match cash flow from liabilities
- compute average rate on those securities

2 - Duration approach
- Calculate average duration of liability cash flows
- Rate is risk-free rate (government securities) on security matching average duration of liability cash flows

→ The two methods produce very similar results

(c) 1) Should we use market imperfections and how?  In risk margins
2) What is the definition of systematic risk?  (include or exclude elements not diversiable like inflation)
+ how incorporate ?

(d) Correlation of risks between lines of business. Need risk margins to be additive.

(e) Risk margin as a percent of liabilities should be lower in a large company because the law of large numbers predicts that the percent variation of losses will be less when there is a higher volume of business.
QUESTION #34

a) - Bob must prepare a report on why he believes he was fired and send it to the directors and the superintendent.

- Susie must request a copy of the report, above, before accepting the appointment – If not received within 15 days, she can proceed.

- Company X must notify the superintendent of the release and subsequent hire of the actuaries.

b) He cannot be sued as long as he was acting in good faith.
QUESTION # 35

Direct = 25000 + 4000 + 2000 – 3000 = 28000
Assumed = 5000 (Assumed reins.)
Gross = 28000 + 5000 = 33000

Ceded = 3000

Net = Gross – Ceded – other recoverables + other net liab.
     = 33000 – 3000 – 1000 + 1500

Net = 30500
QUESTION # 36

a) Cooperate with the External Auditor according to the CIA/CICA JPS, represent the policy liabilities and other liabilities determined by the AA are complete and appropriately valued.

b) Prepare and file the AAR with the insurer’s financial statements.

c) Bring to the attention of the CEO/CFO any matters with adverse effect on the company’s well being which require rectifications.

d) Cooperate with the reviewer and make sure access to the necessary information are provided.
QUESTION # 37

a) Die
   Resign as appointed actuary
   Have appointment revoked
   Cease to be an actuary

b) Actuary should meet with the Directors of the company to report this. They should meet at least once a year.
QUESTION # 38

1) Cash flow consideration. When expected cash flow is not sufficient to cover liabilities, should consider expected capital gain (loss) on sale of the assets.

2) Investment expense consideration, usually reduce rate of return on investment by several points.

3) Default risk on the assets - risk the counterparty may not be able to pay for the amount as expected.