INSTRUCTIONS TO CANDIDATES

1. This 100 point examination consists of 56 questions divided into two sections. Section I contains 22 multiple choice questions worth one point each. Section II contains 34 problem and essay questions worth a total of 78 points.

2. To answer the multiple choice questions, use the short-answer card provided and a number 2 or HB pencil only. Mark your short-answer card during the examination period. No additional time will be allowed for this after the exam has ended. Please make your marks dark and fill in the spaces completely. Fill in that it is Spring 2005, and the exam number 5.

Darken the spaces corresponding to your Candidate ID number. Five rows are available. If your Candidate ID number is fewer than 5 digits, include leading zeros. (For example, if your Candidate ID number is 987, consider that your Candidate ID number is 00987, enter a zero on the first row, a zero on the second row, 9 on the third row, 8 on the fourth row, and 7 on the fifth [last] row.) Please write in your Candidate ID number next to the place where you darken the spaces for your Candidate ID number. Your name, or any other identifying mark, must not appear on the short-answer card.

For each of the multiple choice questions, select the one best answer and fill in the corresponding letter. One quarter of the point value of the question will be subtracted for each incorrect answer. No points will be added or subtracted for responses left blank.

3. For the problem and essay questions, 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, 5, 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.

CONTINUE TO NEXT PAGE OF INSTRUCTIONS

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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.

4. Do all problems until you reach the last page of the examination where "END OF EXAMINATION" is marked.

5. Throughout this examination ISO refers to the Insurance Services Office, and NCCI refers to the National Council of Compensation Insurers.

6. 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.

7. At the beginning of the examination, check through the exam booklet for any missing or defective pages. The supervisor has additional exams for those candidates who have defective exam booklets.

8. Verify that you have received the reference materials:

9. 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.

10. At the end of the examination, place the short-answer card and 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 THE EXAMINATION ENVELOPE IN 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 short-answer card and the answer sheets will be graded.

CONTINUE TO NEXT PAGE OF INSTRUCTIONS
11. If you have brought a self-addressed, stamped envelope, you may put the examination booklet and scrap paper inside and submit it separately to the supervisor. It will be mailed to you. (Do not put the self-addressed stamped envelope inside the Examination Envelope.)

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

Candidates may obtain a copy of the examination by contacting the CAS Office.

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

12. 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.

13. The exam survey is available on the CAS website in the “Admissions” section. Please submit your survey to the CAS Office by May 31, 2005.

END OF INSTRUCTIONS
SECTION I, QUESTIONS 1 – 22, MULTIPLE CHOICE QUESTIONS (1 POINT EACH)

1. Under an ISO commercial general liability policy, which of the following are excluded?
   
   1. The cost of the recall of a defective product
   2. Damage to a product manufactured by the policyholder
   3. Liability for damage to railroad property assumed under a sidetrack agreement

   A. 1 only
   B. 3 only
   C. 1 and 2 only
   D. 2 and 3 only
   E. 1, 2, and 3

2. Identify the type of liability imposed in each of the following four examples.

   I. Employer is liable for employee’s wrongful act
   II. Manufacturer is liable for sale of defective product
   III. Tenant agrees in lease to pay for damage to building that occurs during term of the lease
   IV. Workers Compensation


   A. I - 2  II - 2  III - 1  IV - 2
   B. I - 2  II - 3  III - 2  IV - 3
   C. I - 3  II - 1  III - 1  IV - 2
   D. I - 3  II - 2  III - 1  IV - 2
   E. I - 3  II - 2  III - 1  IV - 3
3. Which of the following is **false** regarding coverage provided by the ISO Personal Auto Policy?

   A. For uninsured motorist coverage, arbitration is binding if the amount of damages is below the financial responsibility limits.
   B. Coverage is not provided for loss of earnings because of attendance at hearings at the insurer’s request.
   C. An adjustment for depreciation and physical condition is made in determining actual cash value in the event of a total loss.
   D. Defense costs are provided by the policy and are in addition to policy limits.
   E. Coverage for a non-owned car is excess over any other applicable coverage.

4. A company leases and occupies space in a multi-tenant building. Through the negligence of one of its employees, a fire occurs at the company's premises. The fire causes the following damage:

   - Company premises = $100,000
   - Other parts of the building = $300,000
   - Bodily injury to the company's employees = $75,000
   - Bodily injury to other tenants' employees = $50,000

The company has a Commercial General Liability (CGL) policy with a fire damage limit of $25,000, a per occurrence limit of $250,000, and an aggregate limit of $500,000.

What is the total amount of loss the insurer will pay as a result of the company's claims?

   A. $25,000
   B. $250,000
   C. $275,000
   D. $500,000
   E. $525,000
5. Which of the following are covered under an ISO commercial general liability policy?

1. A customer slips on a wet floor at the named insured’s premises and sues to recover medical expenses.
2. A customer injures himself while testing a weed trimmer in the named insured’s store. The weed trimmer was determined to be made in a faulty manner by the named insured.
3. A computer the named insured was fixing for a customer at the named insured’s premises is stolen.

A. 2 only  
B. 3 only  
C. 1 and 2 only  
D. 1 and 3 only  
E. 1, 2, and 3

6. A driver’s insurance premium, before discounts and without expense fees, is as follows:

- Bodily Injury and Property Damage Liability = $210
- Comprehensive (Other than Collision) = $100
- Collision = $320
- Medical Payments = $20

The driver’s vehicle has a qualifying alarm, dual-side passive restraints and anti-lock brakes. If the premium is calculated using the ISO Personal Automobile Manual, how much does the driver save by having these safety features?

A. Less than $21.60  
B. At least $21.60, but less than $24.60  
C. At least $24.60, but less than $27.60  
D. At least $27.60, but less than $30.60  
E. At least $30.60
7. According to Webb, et al, *Insurance Operations and Regulation*, which of the following statements about an insurer's capacity to write insurance is false?

A. State regulators consider a premium to surplus ratio too high when it exceeds 3 to 1.
B. An insurer's capacity to write business refers to the relationship between premiums written and the size of policyholders surplus.
C. Adverse selection can reduce the insurer's ability to write business in succeeding years.
D. The purchase of reinsurance can enable an insurer to meet an aggressive premium growth target.
E. An insurer issuing stock will increase the premium to surplus ratio.

8. Which of the following types of insurers are cooperative insurers?

1. Lloyd's of London
2. Mutual Insurers
3. Reciprocal Exchanges

A. 1 only
B. 2 only
C. 3 only
D. 1 and 2 only
E. 2 and 3 only

9. According to Webb, et al, *Insurance Operations and Regulation*, which of the following activities are most commonly performed by line underwriters?

1. Classifying risks
2. Providing service to producers and policyholders
3. Determining the optimal product mix

A. 2 only
B. 3 only
C. 1 and 2 only
D. 1 and 3 only
E. 1, 2, and 3
10. According to Boor, "The Impact of the Insurance Economic Cycle on Insurance Pricing," which of the following is the most likely effect on collected rates and bureau rates as the result of a hard market?

A. Collected rates and bureau rates will increase.
B. Collected rates and bureau rates will be unaffected.
C. Collected rates will increase but bureau rates will decrease.
D. Collected rates will increase but bureau rates will be unaffected.
E. Collected rates will decrease but bureau rates will be unaffected.

11. Which of the following factors serve to make the business cycle of the insurance industry shorter than the business cycle of other markets?

1. The insurance market is relatively easy to enter and exit.
2. Underwriters may be unaware of the profitability of their rates until years after their policies have been written.
3. Insurers manage reserves so as to stabilize their net income from year to year.

A. 1 only
B. 3 only
C. 1 and 2 only
D. 2 and 3 only
E. 1, 2, and 3
12. According to Jones, "An Introduction to Premium Trend," the average premium level should be adjusted for which of the following when determining a premium trend?

1. Rating plan changes that affect the average premium level without affecting the level of coverage.
2. Rating plan changes that affect the average premium level but also include a corresponding change in the level of coverage.
3. The use of rating plans has changed the average premium level over time, if the changes are not expected to continue.

A. 1 only  
B. 2 only  
C. 1 and 3 only  
D. 2 and 3 only  
E. 1, 2, and 3

13. When evaluating the trending procedure to be used in estimating future costs, the actuary should consider which of the following?

1. The trending procedure used in the previous analysis.
2. The choice of an appropriate database and methodology, with particular emphasis given to the credibility of the data relied upon.
3. The effect of known biases or distortions on the experience relied upon, such as types of risks, coverage changes, and distributional changes in deductibles.

A. 1 only  
B. 3 only  
C. 1 and 2 only  
D. 2 and 3 only  
E. 1, 2, and 3

CONTINUED ON NEXT PAGE
14. A twelve-month policy providing coverage on two automobiles was written on May 1, 2004. A second twelve-month policy providing coverage on one automobile was written on November 1, 2004. Which of the following represents the exposures as of December 31, 2004?

<table>
<thead>
<tr>
<th></th>
<th>Calendar Year 2004 Written Exposures</th>
<th>Calendar Year 2004 Earned Exposures</th>
<th>Inforce Exposures</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>3.0</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>B.</td>
<td>3.0</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>C.</td>
<td>3.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>D.</td>
<td>6.0</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>E.</td>
<td>6.0</td>
<td>3.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>

15. A claim occurred in May 2001 and was reported in September 2003. Which of the following would cover this claim?

1. A one-year occurrence policy effective January 1, 2003
2. A second-year claims-made policy effective January 1, 2003
3. Tail coverage effective January 1, 2003 for a physician retiring after 10 years of practice covered by claims-made coverage

A. 2 only
B. 3 only
C. 1 and 3 only
D. 2 and 3 only
E. None of 1, 2, or 3
16. You have been asked to prepare rate filings for States A and B for a policy year beginning January 1, 2006. In State A, policyholders have renewal dates evenly distributed throughout the year. In State B, all policies renew on January 1. For each of these two states, to what date would you trend the losses? Assume policies are in effect for one year.

A. State A: January 1, 2007; State B: January 1, 2007
B. State A: July 1, 2006; State B: January 1, 2007
C. State A: January 1, 2006; State B: January 1, 2007
D. State A: January 1, 2007; State B: July 1, 2006
E. State A: July 1, 2006; State B: July 1, 2006

17. Based on Sherwood, “Individual Risk Rating,” which of the functions in the table below define appropriate credibility rules? Assume that full credibility for a claim set is assigned when five or more claims have been observed.

<table>
<thead>
<tr>
<th>Number of claims</th>
<th>( f_1 )</th>
<th>( f_2 )</th>
<th>( f_3 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.20</td>
<td>0.42</td>
<td>0.04</td>
</tr>
<tr>
<td>2</td>
<td>0.40</td>
<td>0.60</td>
<td>0.16</td>
</tr>
<tr>
<td>3</td>
<td>0.60</td>
<td>0.76</td>
<td>0.36</td>
</tr>
<tr>
<td>4</td>
<td>0.80</td>
<td>0.89</td>
<td>0.64</td>
</tr>
<tr>
<td>5</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

A. \( f_1 \) only
B. \( f_2 \) only
C. \( f_1 \) and \( f_2 \) only
D. \( f_1 \) and \( f_3 \) only
E. \( f_1 \), \( f_2 \), and \( f_3 \)
18. Using the following data, calculate the complement of credibility for class 3 based on the rate change for the larger group applied to the present rate.

<table>
<thead>
<tr>
<th>Class</th>
<th>Exposures</th>
<th>Losses</th>
<th>Present Pure Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200</td>
<td>$100,000</td>
<td>$550.00</td>
</tr>
<tr>
<td>2</td>
<td>300</td>
<td>$135,000</td>
<td>$500.00</td>
</tr>
<tr>
<td>3</td>
<td>500</td>
<td>$215,000</td>
<td>$455.00</td>
</tr>
<tr>
<td>Total</td>
<td>1,000</td>
<td>$450,000</td>
<td>$487.50</td>
</tr>
</tbody>
</table>

A. Less than 400  
B. At least 400, but less than 425  
C. At least 425, but less than 450  
D. At least 450, but less than 475  
E. At least 475

19. Given the following information, calculate the loss elimination ratio at a $500 deductible.

<table>
<thead>
<tr>
<th>Loss Amount</th>
<th>Claim Count</th>
<th>Total Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below $500</td>
<td>150</td>
<td>$15,000</td>
</tr>
<tr>
<td>$500</td>
<td>6</td>
<td>$3,000</td>
</tr>
<tr>
<td>Over $500</td>
<td>16</td>
<td>$22,000</td>
</tr>
</tbody>
</table>

A. Less than 0.4  
B. At least 0.4, but less than 0.5  
C. At least 0.5, but less than 0.6  
D. At least 0.6, but less than 0.7  
E. At least 0.7
EXAM 5, SPRING 2005, SECTION I

20. A property is valued at $400,000. The coinsurance requirement for the policy is 80% of the property value. The building suffers a covered loss of $50,000. What is the coinsurance penalty if the insured carries a policy with a $300,000 face value?

A. $3,125
B. $10,000
C. $12,500
D. $37,500
E. $46,875

21. There are currently five major data collection programs at NCCI. Match each of the programs listed below with the primary purpose of the data collection program.

<table>
<thead>
<tr>
<th>NCCI Data Collection Programs</th>
<th>Primary Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Annual Financial Call Data</td>
<td>1. Confirm proof of workers compensation coverage</td>
</tr>
<tr>
<td>II. Workers Compensation Statistical Plan (WCSP) Data</td>
<td>2. Calculate overall loss cost and rate level changes</td>
</tr>
<tr>
<td>III. Detailed Claim Information (DCI) Data</td>
<td>3. Pool financial reporting procedures</td>
</tr>
<tr>
<td>IV. Policy Issue Capture System (PICS) Data</td>
<td>4. Special analyses and research</td>
</tr>
<tr>
<td>V. Residual Market Data</td>
<td>5. Calculate loss cost relativities and experience rating modifications</td>
</tr>
</tbody>
</table>

A. I - 1 II - 5 III - 4 IV - 3 V - 2
B. I - 2 II - 4 III - 5 IV - 1 V - 3
C. I - 2 II - 5 III - 4 IV - 1 V - 3
D. I - 4 II - 5 III - 2 IV - 3 V - 1
E. I - 5 II - 2 III - 3 IV - 1 V - 4

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10
22. Which of the following elements is not included in the basic premium in NCCI's retrospective rating plan?

A. Agents' Commissions and Other Acquisition Expenses
B. Insurance Charge
C. Taxes
D. General Expenses
E. Profit and Contingencies
23. (2 points)

Briefly describe each of the following types of suits that are covered by an employers liability policy.

a. (0.5 point)
   Third-party over

b. (0.5 point)
   Care and loss of services

c. (0.5 point)
   Consequential bodily injury

d. (0.5 point)
   Dual capacity

24. (1 point)

Both auto insurance policies and homeowners insurance policies provide medical payments coverage. What is the major difference between them with regard to the parties covered?

25. (1.5 points)

a. (1 point)

What are two purposes of exclusions in insurance policies?

b. (0.5 point)

For each of the two reasons above, identify one peril that is excluded from coverage under a homeowners policy.
26. (1.5 points)

A manufacturing company employs a specialized risk management department to oversee its loss mitigation efforts. The executives of the risk management department, along with corporate counsel, work with an insurance company to develop a workers compensation policy.

a. (0.5 point)

In order for a contract to be legally enforceable, it must include the elements of offer, acceptance, and consideration. Explain the element of consideration as it relates to this particular situation.

b. (1 point)

In the event that the manufacturing company and the insurer disagree over coverage provided in the policy, the contract of adhesion doctrine may be considered by the courts in interpreting the insurance contract. Explain the contract of adhesion doctrine and list two factors that may be considered.

27. (2 points)

Assume a policyholder has an ISO HO-3 policy. A tornado destroys 75% of the roof. Given the following information, how much will the insurer pay for the losses? Show all work.

- The Coverage A limit on the policy is $160,000.
- Standard Coverage C limits apply.
- The policy contains a $1,000 deductible.
- All covered losses are settled on a replacement cost basis.
- New local building codes require that roof tie down straps be installed in new construction and in any major remodeling.
- In cases of remodeling, if over 50% of a roof is replaced, the entire roof must be secured with roof tie downs.

<table>
<thead>
<tr>
<th>Description</th>
<th>Replacement Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damage to dwelling due to the tornado</td>
<td>$125,000</td>
</tr>
<tr>
<td>Damage to contents due to the tornado</td>
<td>$85,000</td>
</tr>
<tr>
<td>Cost to install roof tie downs on the replaced portion of the roof</td>
<td>$2,000</td>
</tr>
<tr>
<td>Cost to remove the remainder of the roof, which was not damaged, and rebuild it with roof tie downs</td>
<td>$8,000</td>
</tr>
</tbody>
</table>

CONTINUED ON NEXT PAGE
28. (2 points)

An insured has an ISO Personal Automobile Policy with Bodily Injury Liability and Property Damage Liability limits of $100,000/$300,000/$50,000. The insured is involved in a multi-car accident that goes to trial, and is found liable for the accident, with damages for the claimants as listed below.

The insurer appeals the verdict. In the appeal, the original verdict is upheld. How much is the insurer legally obligated to pay? Show all work.

<table>
<thead>
<tr>
<th></th>
<th>Claimant 1</th>
<th>Claimant 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Damage</td>
<td>$40,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>Bodily Injury</td>
<td>$25,000</td>
<td>$150,000</td>
</tr>
<tr>
<td>Pre-trial interest awarded</td>
<td>$1,000</td>
<td>$6,000</td>
</tr>
<tr>
<td>Post-trial interest awarded</td>
<td>$2,000</td>
<td>$12,000</td>
</tr>
</tbody>
</table>

- Total defense costs are $20,000.

29. (3 points)

Bill is driving Carl’s car with permission, with Carl and Ann as passengers, when Bill causes an accident with Greg. Bill is determined to be 100% at fault. Using the insurance and injury information below, how much will be paid under each policy? Show break down by coverage.

- All policies use the ISO Personal Automobile Policy form.
- Bill and Ann are married.

Coverage:

<table>
<thead>
<tr>
<th></th>
<th>Carl’s policy</th>
<th>Bill’s policy</th>
<th>Greg’s policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single limit bodily injury and property damage liability</td>
<td>$50,000</td>
<td>$100,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>Medical payments</td>
<td>No coverage</td>
<td>$5,000</td>
<td>$2,000</td>
</tr>
<tr>
<td>Collision coverage</td>
<td>No coverage</td>
<td>$250 deductible</td>
<td>$500 deductible</td>
</tr>
</tbody>
</table>

Losses:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Greg’s car</td>
<td>$15,000</td>
</tr>
<tr>
<td>Greg’s medical expenses</td>
<td>$40,000</td>
</tr>
<tr>
<td>Carl’s car</td>
<td>$4,000</td>
</tr>
<tr>
<td>Bill’s medical expenses</td>
<td>$7,000</td>
</tr>
<tr>
<td>Ann’s medical expenses</td>
<td>$6,000</td>
</tr>
</tbody>
</table>

CONTINUED ON NEXT PAGE
30. (1 point)

Underwriting authority can be centralized or decentralized. Describe a situation where it would be appropriate to centralize underwriting authority and explain why it would be appropriate.

31. (2 points)

Other than policy limits, state and describe the two other commonly used measures of potential loss severity in property underwriting.

32. (2 points)


a. Compare the two distribution systems with regard to the following attributes:

1. (0.5 point)

   Compensation methods

2. (0.5 point)

   Ownership of expirations

b. (1 point)

   Identify which distribution system is best suited for commercial insurance. Explain your answer.
33. (2.5 points)
   a. (1 point)

       Identify two points in time when the statute of limitations may begin to run in medical malpractice cases.

   b. (0.5 point)

       In general, how does the statute of limitations apply in the case of minors?

   c. (1 point)

       State and describe two defenses, other than the statute of limitations, that a medical professional might use to respond to an allegation of negligence.

34. (3 points)

   An insured’s health insurance plan has the following provisions:
   - $500 calendar year deductible
   - 80% coinsurance provision
   - $1,000 stop-loss limit

   The insured incurs $6,000 in covered medical expenses as a result of injuries sustained in an accident at home. The insured paid $150 in covered medical expenses related to other illnesses so far this year.

   a. (2 points)

       Identify how much the insured and the insurer will each pay for this loss. Show all work.

   b. (1 point)

       Provide two reasons for coinsurance provisions.
35. (2 points)

State the four ratemaking principles of the Casualty Actuarial Society.

36. (2 points)

a. (1 point)

Bouska, in “Exposure Bases Revisited,” emphasizes the following two characteristics of exposure bases. Briefly explain each statement.

1. The exposure base is not the true exposure.
2. The exposure base is not a rating variable.

b. (1 point)

“Miles driven” is a potential exposure base for Personal Auto Liability Insurance. Give one reason for and one reason against its use as an exposure base.
37. (4 points)
Given the information below, answer the following questions. Show all work.

<table>
<thead>
<tr>
<th>Calendar/ Accident Year</th>
<th>Average Written Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>$1,000.00</td>
</tr>
<tr>
<td>2003</td>
<td>$ 933.33</td>
</tr>
<tr>
<td>2004</td>
<td>$ 882.00</td>
</tr>
</tbody>
</table>

- The planned effective date for a rate change is January 1, 2006.
- Rates are reviewed every 18 months.
- All policies are annual, and are written uniformly throughout the year.
- A 20% rate decrease was implemented effective July 1, 2003.
- A separate analysis has determined that a shift in the limit distribution from 2002-2004 has resulted in a +3% annual premium trend. This shift is not expected to continue past 2004.

a. (3.5 points)
Using two-step trending, determine the total premium trend factors for each year above.

b. (0.5 point)
Why is two-step trending a more suitable procedure for trending premium than for trending loss frequency or severity?

38. (1.5 points)
The parallelogram method is used to adjust calendar year 2003 earned premium to current rate level. Given the following information, will the parallelogram method understate, overstate, or accurately state the on-level factor applied to calendar year 2003 earned premium? Explain your answer.

- There was a 10% rate increase effective on January 1, 2003.
- The written exposures grew 5% each month in 2003.
39. (4 points)

Given the information below, answer the following questions. Show all work.

A healthcare provider, XYZ, has the following distribution of annual losses per member.

<table>
<thead>
<tr>
<th>Claim Size Interval</th>
<th>Average Claim Size in Interval</th>
<th>Probability of Claim in Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
<td>$ 0</td>
<td>0.940</td>
</tr>
<tr>
<td>$1 - $20,000</td>
<td>$ 12,000</td>
<td>0.020</td>
</tr>
<tr>
<td>$20,001 - $50,000</td>
<td>$ 33,000</td>
<td>0.014</td>
</tr>
<tr>
<td>$50,001 - $100,000</td>
<td>$ 76,000</td>
<td>0.012</td>
</tr>
<tr>
<td>$100,001 - $300,000</td>
<td>$ 180,000</td>
<td>0.010</td>
</tr>
<tr>
<td>Greater than $300,000</td>
<td>$500,000</td>
<td>0.004</td>
</tr>
</tbody>
</table>

- Fixed expenses are $100 per month.
- Expenses that vary with premium are 20%.
- Deductible applies on a per claim basis.

a. (1.5 points)

Calculate XYZ’s net claim cost per member per month with a $50,000 deductible.

b. (0.5 point)

Calculate XYZ’s net claim cost per member per month with a $50,000 deductible and a 10% coinsurance clause.

c. (0.5 point)

Calculate XYZ’s gross premium per member per month with a $50,000 deductible and a 10% coinsurance clause.

d. (1.5 points)

Going forward, XYZ will enter a Managed Care contract that will reduce costs uniformly by 50%. Calculate the net claim cost per member per month with a $50,000 deductible and a 10% coinsurance clause under the new Managed Care contract.
40. (1 point)

Briefly explain both the direct and indirect effects of a legislative change that increases the statutory Workers Compensation indemnity benefit by 15%.

41. (2 points)

You are given the following information for Commercial General Liability. Calculate the adjusted expected loss ratio. Show all work.

- Total Production Cost Allowance = 20%
- General Expense = 10%
- Underwriting Profit and Contingencies = 5%
- Taxes, Licenses and Fees = 3%

- Annual Frequency Trend = 3%
- Annual Severity Trend = 6%
- Annual Exposure Trend = 2%

- Last Approved Effective Date = January 1, 2004
- Indicated Change = 15%
- Approved Change = 8%

- Proposed Effective Date = January 1, 2006

42. (2 points)

Assume the fixed expense provision in a statewide rate level indication is based on a countrywide historical multi-year average of the ratios of actual expenses to actual earned premiums.

a. (1 point)

State two items that can cause this methodology to create inaccurate and inequitable indicated rate changes.

b. (1 point)

For each of the two items stated above, give a potential solution to correct for the inaccuracy.

CONTINUED ON NEXT PAGE
43. (4 points)

Use Werner’s proposed methodology in “Incorporation of Fixed Expenses” and the information below to answer the following questions for the projected annual policy period beginning July 1, 2005. Show all work.

<table>
<thead>
<tr>
<th>Statewide Projected Average Premium at Present Rates</th>
<th>$850.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statewide Projected Loss and LAE Ratio</td>
<td>68.0%</td>
</tr>
<tr>
<td>Profit and Contingencies Provision</td>
<td>5.0%</td>
</tr>
<tr>
<td>Annual Fixed Expense Trend</td>
<td>3.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Annual Policy Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
</tr>
<tr>
<td></td>
<td>2004</td>
</tr>
<tr>
<td>Countrywide General Expenses</td>
<td>$25,000</td>
</tr>
<tr>
<td></td>
<td>$28,000</td>
</tr>
<tr>
<td>Fixed General Expense as percentage of General Expenses</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>Countrywide Earned Exposures</td>
<td>625</td>
</tr>
<tr>
<td></td>
<td>645</td>
</tr>
<tr>
<td>Countrywide Written Exposures</td>
<td>640</td>
</tr>
<tr>
<td></td>
<td>700</td>
</tr>
<tr>
<td>Countrywide Earned Premium</td>
<td>$435,000</td>
</tr>
<tr>
<td></td>
<td>$450,000</td>
</tr>
<tr>
<td>Countrywide Written Premium</td>
<td>$460,000</td>
</tr>
<tr>
<td></td>
<td>$475,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Fixed</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Acquisition</td>
<td>$60.00</td>
<td>2.5%</td>
</tr>
<tr>
<td>Taxes, Licenses, and Fees</td>
<td>$2.50</td>
<td>2.0%</td>
</tr>
<tr>
<td>Commissions and Brokerage</td>
<td>None</td>
<td>12.0%</td>
</tr>
</tbody>
</table>

- Assume expenses are incurred evenly throughout the policy period.

a. (2 points)

Calculate the fixed expense provision.

b. (1 point)

Calculate the variable expense provision.

c. (1 point)

Calculate the statewide indicated rate change.
EXAM 5, SPRING 2005, SECTION II

44. (2 points)

Use the following information to determine the indicated rate level change. Show all work.

<table>
<thead>
<tr>
<th>Policy Year</th>
<th>Earned Premium at Current Rates</th>
<th>Projected $25,000 Basic Limits Incurred Losses</th>
<th>Number of Incurred Claims</th>
<th>Policy Year Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$123,000</td>
<td>$98,000</td>
<td>338</td>
<td>0.2</td>
</tr>
<tr>
<td>2002</td>
<td>$157,000</td>
<td>$143,000</td>
<td>507</td>
<td>0.3</td>
</tr>
<tr>
<td>2003</td>
<td>$218,000</td>
<td>$137,000</td>
<td>480</td>
<td>0.5</td>
</tr>
</tbody>
</table>

- Credibility standard = 3,000 claims
- Credibility complement = 0.68
- Expected loss and LAE ratio = 66.5%
- Losses shown include all loss adjustment expense

45. (2 points)

Finger, in “Risk Classification,” discusses the effect of market forces on the refinement of insurance classification plans.

a. (1 point)

Describe how the behavior of policyholders creates pressure on insurers to refine classification plans.

b. (1 point)

Explain why classification plans may also become more refined as insurance coverage becomes more expensive. Discuss the perspective of both the insurer and the policyholder.
46. (5 points)

Given the following data for private passenger auto bodily injury basic limits, answer the questions below. Show all work.

- Policies are annual.
- Proposed Effective Date = July 1, 2005
- Rates are in effect for one year.
- Current Rate = 225

<table>
<thead>
<tr>
<th>Calendar Accident Year</th>
<th>Earned Exposures</th>
<th>Loss &amp; ALAE as of December 31, 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>450</td>
<td>$52,000</td>
</tr>
<tr>
<td>2003</td>
<td>500</td>
<td>$54,000</td>
</tr>
<tr>
<td>2004</td>
<td>530</td>
<td>$40,000</td>
</tr>
</tbody>
</table>

- Age-to-age loss development factors
  - 12-24 months = 1.50
  - 24-36 months = 1.15
  - 36-48 months = 1.05
  - 48 – ultimate = 1.06
- Frequency trend = 2%
- Severity trend = 5%
- Target loss ratio = 65%

a. (4 points)

Calculate the indicated statewide rate level change using the loss ratio method.

b. (1 point)

Using your results from part a. above, illustrate the equivalency of the loss ratio method and the pure premium method.
47. (3 points)
   a. (1 point)
      Explain efficiency and its importance in classification system design.
   b. (2 points)
      Calculate the efficiency of the following classification system. The coefficient of
      variation of the insured population is 0.95. Show all work.
      
      | Class | Relativity | Number of Exposures |
      |-------|------------|---------------------|
      | 1     | 0.70       | 500                 |
      | 2     | 1.00       | 1,000               |
      | 3     | 1.50       | 300                 |
      | 4     | 3.00       | 200                 |

48. (2 points)
   Using the information below, calculate the premium for a $10,000 deductible policy. Show all work.
   
   - Standard Premium = $250,000
   - Expected Loss Ratio = 60%
   - ALAE as a percentage of loss = 15%
   - Commission as a percentage of premium = 20%
   - Other variable expenses = 10%
   - Fixed expenses = $15,000
   - Loss Elimination Ratio at a $10,000 deductible = 0.25
   - Assume that ALAE is not subject to the deductible.
49. (3 points)

Using a loss ratio approach, calculate the territorial relativities indicated by the following information. Show all work.

- Territory A is the base class.
- 2005 earned premium is an accurate estimate of next year’s writings.
- Incurred losses are for the experience period 2003-2004 and are fully trended and developed.
- The full credibility standard is 1,082 claims. Partial credibility is determined using the square root rule.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.00</td>
<td>$500,000</td>
<td>$600,000</td>
<td>$600,000</td>
<td>$50</td>
<td>$55</td>
<td>$55</td>
<td>$500,000</td>
<td>$1,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0.40</td>
<td>$100,000</td>
<td>$200,000</td>
<td>$200,000</td>
<td>$40</td>
<td>$40</td>
<td>$60</td>
<td>$300,000</td>
<td>$300</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

50. (1 point)

Explain two reasons why claim inflation produces larger cost trends on increased limits coverage than on basic limits coverage.
EXAM 5, SPRING 2005, SECTION II

51. (2 points)

Using the following information, answer the questions below. Show all work.

- All properties are valued at $500,000.
- The company writes 1,000 policies.
- Each policy has a face value equal to the value of the insured property.
- Assume only one loss per policy per period is possible, and exactly 20 insureds will incur a loss of some size during any one policy period.
- Assume no coinsurance clause or deductible applies

Assume losses are distributed as shown:
50% at $50,000
20% at $250,000
30% at $500,000

a. (1 point)

Calculate the pure premium rate per $100 of insurance for a policy face equaling $300,000.

b. (1 point)

Does the pure premium rate per $100 of insurance for a $500,000 policy face differ from the rate for the $300,000 policy face? Briefly explain your answer.

52. (3 points)

In determining loss costs in states with significant hurricane exposure, there are several limitations of traditional loss smoothing approaches. State and describe three of these limitations.
53. (1 point)

Answer the following questions regarding the ISO Commercial General Liability Experience and Schedule Rating Plan.

a. (0.5 point)

Explain why the plan uses basic limits losses, and limits losses and allocated loss adjustment expenses to a maximum single loss limitation (MSL).

b. (0.5 point)

Explain why the MSL increases as the size of the risk (as measured by premium or credibility) increases.

54. (2 points)

Given the following information for an insured, determine the General Liability premium after adjustments for experience and schedule rating. Show all work.

- Manual premium = $75,800

Experience rating information:
- Reported Limited Losses and ALAE = $93,500
- Expected Unreported Limited Losses and ALAE = $25,200
- Company Subject Basic Limits Loss and ALAE Costs = $153,900
- Credibility = 0.35
- Expected Experience Ratio = 0.92

The underwriter has determined that the following schedule rating modifications are appropriate:

- Premises – Condition, Care = +4%
- Equipment – Type, Condition, Care = -7%
- Classification Peculiarities = -8%
- Employees – Selection, Training, etc. = +3%
EXAM 5, SPRING 2005, SECTION II

55. (3 points)

Using the procedure described in Burger et al., “Incorporating a Hurricane Model into Property Ratemaking,” and the following data, answer the questions below. Show all work.

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Amount of Ins.</th>
<th>Mean Damage Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Territory Y</td>
</tr>
<tr>
<td>A</td>
<td>1.00</td>
<td>0.080%</td>
</tr>
<tr>
<td>B</td>
<td>0.20</td>
<td>0.100%</td>
</tr>
<tr>
<td>C</td>
<td>0.70</td>
<td>0.100%</td>
</tr>
<tr>
<td>D</td>
<td>0.10</td>
<td>0.090%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Latest Year Coverage A</th>
<th>Latest Year Coverage A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Territory</td>
<td>Amount of Ins.</td>
</tr>
<tr>
<td>Y</td>
<td>$20,000,000</td>
</tr>
</tbody>
</table>

- Prospective Non-hurricane Base Class Loss Cost = $120
- Current Base Class Loss Cost = $200
- Loss Adjustment Expense Factor = 1.10
- Latest Year Current Cost/Amount Factor = 1.01
- Composite Projection (Trend) Factor = 1.05
- Latest Year Class and Coverage Factor = 1.20
- Assume no adjustment is needed for deductibles.

a. (1 point)

Calculate the expected statewide hurricane losses.

b. (1 point)

Calculate the prospective hurricane base class loss cost.

c. (1 point)

Calculate the statewide indicated loss cost level change.

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56. (3 points)

Given the information below, use an asset share pricing approach to determine whether a company should write this business. Show all work and explain your answer.

<table>
<thead>
<tr>
<th>Policy Year</th>
<th>Premium</th>
<th>Present Value of Losses</th>
<th>Expenses</th>
<th>Annual Persistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$ 500</td>
<td>$ 415</td>
<td>$ 100</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>$ 550</td>
<td>$ 440</td>
<td>$ 110</td>
<td>85%</td>
</tr>
<tr>
<td>3</td>
<td>$ 605</td>
<td>$ 460</td>
<td>$ 121</td>
<td>85%</td>
</tr>
</tbody>
</table>

- Equities of similar risk are yielding 10% per year.
2005 EXAM 5 PRELIMINARY MC SOLUTIONS

1. C
2. D
3. B
4. B
5. C
6. A
7. E
8. E
9. C
10. A
11. A
12. E
13. E
14. B
15. B
16. D
17. B
18. B
19. D
20. A
21. C
22. C