INSTRUCTIONS TO CANDIDATES

1. This 80 point examination consists of 40 multiple choice questions worth 2 points each.

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 3.

   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 000987, 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. Do all problems until you reach the last page of the examination where "END OF EXAMINATION" is marked.

4. 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.

5. 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. Verify that you have a copy of "Tables for CAS Exam 3" included in your exam packet.

6. 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.

CONTINUE TO NEXT PAGE OF INSTRUCTIONS

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7. At the end of the examination, place the short-answer card in the Examination Envelope. BEFORE YOU TURN THE EXAMINATION ENVELOPE INTO 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.

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

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

Candidates may obtain a copy of the examination from the CAS website.

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

9. Candidates must not give or receive assistance of any kind during the examination. Any cheating, any attempt to cheat, assisting others to cheat, or participating therein, or other improper conduct will result in the Casualty Actuarial Society disqualifying the candidate's paper, and such other disciplinary action as may be deemed appropriate within the guidelines of the CAS Policy on Examination Discipline.

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

END OF INSTRUCTIONS
1) XYZ Bank has issued a 5-year interest-free loan collecting annual payments of 10,000 at the end of each year. To protect itself from loan defaults, XYZ has purchased default insurance that pays the balance of the loan at the time of default. No other payments are collected once the loan defaults. The probabilities of default at each payment due date are as follows.

<table>
<thead>
<tr>
<th>Payment Number</th>
<th>Probability of Default (given no prior default)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.04</td>
</tr>
<tr>
<td>2</td>
<td>0.08</td>
</tr>
<tr>
<td>3</td>
<td>0.10</td>
</tr>
<tr>
<td>4</td>
<td>0.10</td>
</tr>
<tr>
<td>5</td>
<td>0.06</td>
</tr>
</tbody>
</table>

The annual interest rate for the default insurance is 6%.

Calculate the expected present value of the insurance benefit.

A. 7,841  
B. 7,949  
C. 8,091  
D. 8,214  
E. 8,426
2) BIB is a new insurer writing homeowners polices. You are given:

- Initial Surplus = $15
- Number of insured homes = 3
- Premium per home = $10
- Premiums are paid at the start of each year.
- Size of each claim = $40
- Claims are paid immediately.
- There are no expenses.
- There is no investment income.

Each homeowner files at most one claim per year. The probability that a given homeowner files a claim in year 1 is 20%, and in year 2 it is 10%. Claims are independent.

Calculate the probability that BIB has positive surplus at the end of year 2.

A. Less than 75%
B. At least 75%, but less than 80%
C. At least 80%, but less than 85%
D. At least 85%, but less than 90%
E. 90% or more
3) You are given:

- $L$ is the loss random variable for a fully continuous whole life insurance.
- The force of mortality is a constant, $\mu_x = 0.04$.
- The force of interest $\delta = 0.06$.
- The premium is determined by the equivalence principle.

Calculate $\text{Var}(L)$.

A. 0.10  
B. 0.25  
C. 0.40  
D. 0.55  
E. 0.70
4) Well-Traveled Insurance Company sells a travel insurance policy that reimburses travelers for any expenses incurred for a planned vacation that is cancelled because of airline bankruptcies. Individual claims follow a Pareto distribution with $\alpha = 2$ and $\theta = 500$. Because of financial difficulties in the airline industry, Well-Traveled imposes a limit of $1,000 on each claim. If a policyholder’s planned vacation is cancelled due to airline bankruptcies and he or she has incurred more than $1,000 in expenses, what is the expected non-reimbursed amount of the claim?

A. Less than $500
B. At least $500, but less than $1,000
C. At least $1,000, but less than $1,500
D. At least $1,500, but less than $2,000
E. $2,000 or more
5) "Actuary Today," the magazine, offers 1-year subscriptions for $25, payable at the start of the year.

Given a renewal rate of 90% per year, what is the actuarial present value of a new subscriber? (Assume a discount factor of 0.95.)

A. Less than $150
B. At least $150, but less than $160
C. At least $160, but less than $170
D. At least $170, but less than $180
E. $180 or more
6) For a portfolio of 2,500 policies, claim frequency is 10% per year and severity is distributed uniformly between 0 and 1,000. Each policy is independent and has no deductible. Calculate the reduction in expected annual aggregate payments, if a deductible of $200 per claim is imposed on the portfolio of policies.

A. Less than $46,000
B. At least $46,000, but less than $47,000
C. At least $47,000, but less than $48,000
D. At least $48,000, but less than $49,000
E. $49,000 or more
7) An insurance company pays claims at a Poisson rate of 2,000 per year. Claims are divided into three categories: "minor," "major," and "severe," with payment amounts of $1,000, $5,000, and $10,000, respectively. The proportion of "minor" claims is 50%. The total expected claim payments per year is $7,000,000.

What proportion of claims are "severe"?

A. Less than 11%
B. At least 11%, but less than 12%
C. At least 12%, but less than 13%
D. At least 13%, but less than 14%
E. 14% or more
8) An insurance company increases the per claim deductible of all automobile policies from $300 to $500. The mean payment and standard deviation of claim severity are shown below.

<table>
<thead>
<tr>
<th>Deductible</th>
<th>Mean Payment</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$300</td>
<td>1,000</td>
<td>256</td>
</tr>
<tr>
<td>$500</td>
<td>1,500</td>
<td>678</td>
</tr>
</tbody>
</table>

The claims frequency is Poisson distributed both before and after the change of deductible. The probability of no claim increases by 30%, and the probability of having exactly one claim decreases by 10%.

Calculate the percentage increase in the variance of the aggregate claims.

A. Less than 30%
B. At least 30%, but less than 50%
C. At least 50%, but less than 70%
D. At least 70%, but less than 90%
E. 90% or more
9) Annual losses for the New Widget Factory can be modeled using a Poisson frequency model with mean of 100 and an exponential severity model with mean of $10,000.

An insurance company agrees to provide coverage for that portion of any individual loss that exceeds $25,000.

Calculate the standard deviation of the insurer’s annual aggregate claim payments.

A. Less than $36,000
B. At least $36,000, but less than $37,000
C. At least $37,000, but less than $38,000
D. At least $38,000, but less than $39,000
E. $39,000 or more
10) Low Risk Insurance Company provides liability coverage to a population of 1,000 private passenger automobile drivers. The number of claims during a given year from this population is Poisson distributed.

If a driver is selected at random from this population, his expected number of claims per year is a random variable with a Gamma distribution such that $\alpha = 2$ and $\theta = 1$.

Calculate the probability that a driver selected at random will not have a claim during the year.

A. 11.1%
B. 13.5%
C. 25.0%
D. 33.3%
E. 50.0%
11) For Broward County, Florida, hurricane season is 24 weeks long. It is assumed that the time between hurricanes is exponentially distributed with a mean of 6 weeks.

It is also assumed that 30% of all hurricanes will hit Broward County.

Calculate the probability that in any given hurricane season, Broward County will be hit by more than 1 hurricane.

A. Less than 15%
B. At least 15%, but less than 20%
C. At least 20%, but less than 25%
D. At least 25%, but less than 30%
E. 30% or more
12) The number of cars entering a tunnel is 10 times the number of trucks. The inter-arrival time of each vehicle follows an exponential distribution.

Determine the probability that 20 cars enter the tunnel before 4 trucks enter.

A. Less than 72%
B. At least 72%, but less than 77%
C. At least 77%, but less than 82%
D. At least 82%, but less than 87%
E. 87% or more
13) During the hurricane season (August, September, October, and November),
hurricanes hit the US coast with a monthly Poisson rate of 1.25 and each hurricane during
the period has a 20% chance of being "major." Outside of hurricane season (the other
months), hurricanes hit at a Poisson rate of 0.25 per month, and each such hurricane has
only a 10% chance of being "major."

Determine the probability that a hurricane selected at random is "major."

A. Less than 14%
B. At least 14%, but less than 15%
C. At least 15%, but less than 16%
D. At least 16%, but less than 17%
E. 17% or more
EXAM 3, SPRING 2005

14) The number of accidents on a highway follows a Poisson process, with the rate of accidents varying during the day, as shown below.

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Accidents per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 midnight – 7 am</td>
<td>0.05</td>
</tr>
<tr>
<td>7 am – 10 am</td>
<td>0.10</td>
</tr>
<tr>
<td>10 am – 4 pm</td>
<td>0.08</td>
</tr>
<tr>
<td>4 pm – 7 pm</td>
<td>0.07</td>
</tr>
<tr>
<td>7 pm – 12 midnight</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Calculate the probability that three or more accidents occur in one day.

A. 0.12
B. 0.18
C. 0.24
D. 0.27
E. 0.32
15) A service guarantee covers 20 television sets. Each year, each set has a 5% chance of failing. These probabilities are independent.

If a set fails, it is replaced with a new set at the end of the year of failure. This new set is included under the service guarantee.

Calculate the probability of no more than 1 failure in the first two years.

A. Less than 40.5%
B. At least 40.5%, but less than 41.0%
C. At least 41.0%, but less than 41.5%
D. At least 41.5%, but less than 42.0%
E. 42.0% or more
16) Which of the following are true regarding sums of random variables?

1. The sum of two independent negative binomial distributions with parameters \( (r_1, \beta_1) \) and \( (r_2, \beta_2) \) is negative binomial if and only if \( r_1 = r_2 \).
2. The sum of two independent binomial distributions with parameters \( (q_1, m_1) \) and \( (q_2, m_2) \) is binomial if and only if \( m_1 = m_2 \).
3. The sum of two independent Poisson distributions with parameters \( \lambda_1 \) and \( \lambda_2 \) is Poisson if and only if \( \lambda_1 = \lambda_2 \).

A. None are true
B. 1. only
C. 2. only
D. 3. only
E. 1. and 3. only
17) An insurer selects risks from a population that consists of three independent groups.

- The claims generation process for each group is Poisson.

- The first group consists of 50% of the population. These individuals are expected to generate one claim per year.

- The second group consists of 35% of the population. These individuals are expected to generate two claims per year.

- Individuals in the third group are expected to generate three claims per year.

A certain insured has two claims in year 1.

What is the probability that this insured has more than two claims in year 2?

A. Less than 21%
B. At least 21%, but less than 25%
C. At least 25%, but less than 29%
D. At least 29%, but less than 33%
E. 33% or more
18) The following sample is taken from the distribution

\[ f(x, \theta) = \left( \frac{1}{\theta} \right) e^{-\frac{x}{\theta}} \]

<table>
<thead>
<tr>
<th>Observation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>0.49</td>
<td>1.00</td>
<td>0.47</td>
<td>0.91</td>
<td>2.47</td>
<td>5.03</td>
<td>16.09</td>
</tr>
</tbody>
</table>

Determine the Maximum Likelihood Estimator of \( c \), where \( P(X > c) = 0.75 \).

A. Less than 1.0
B. At least 1.0 but less than 1.2
C. At least 1.2 but less than 1.4
D. At least 1.4 but less than 1.6
E. 1.6 or more

CONTINUED ON NEXT PAGE
19) Four losses are observed from a Gamma distribution.

The observed losses are: 200, 300, 350, and 450.

Find the method of moments estimate for $\alpha$.

A. 0.3  
B. 1.2  
C. 2.3  
D. 6.7  
E. 13.0
20) Blue Sky Insurance Company insures a portfolio of 100 automobiles against physical damage. The annual number of claims follows a binomial distribution with m=100.

For the last 5 years, the number of claims in each year has been:

<table>
<thead>
<tr>
<th>Year</th>
<th>Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>5</td>
</tr>
<tr>
<td>Year 2</td>
<td>4</td>
</tr>
<tr>
<td>Year 3</td>
<td>4</td>
</tr>
<tr>
<td>Year 4</td>
<td>9</td>
</tr>
<tr>
<td>Year 5</td>
<td>3</td>
</tr>
</tbody>
</table>

Two methods for estimating the variance in the annual claim count are:

Method 1: Unbiased Sample Variance
Method 2: Maximum Likelihood Estimation

Use each method to calculate an estimate of the variance. What is the difference between the two estimates?

A. Less than 0.50
B. At least 0.50, but less than 0.60
C. At least 0.60, but less than 0.70
D. At least 0.70, but less than 0.80
E. 0.80 or more
21) An actuary obtains two independent, unbiased estimates, \( Y_1 \) and \( Y_2 \), for a certain parameter. The variance of \( Y_1 \) is four times that of \( Y_2 \).

A new unbiased estimator of the form \( k_1 Y_1 + k_2 Y_2 \) is to be constructed. What value of \( k_1 \) minimizes the variance of the new estimate?

A. Less than 0.18
B. At least 0.18, but less than 0.23
C. At least 0.23, but less than 0.28
D. At least 0.28, but less than 0.33
E. 0.33 or more
22) Drivers are to be classified as "good" or "bad." Results of the classification are assumed to be binomially distributed, with the probability of being "good" equal to \( p \).

A sample consists of 100 drivers.

Determine the critical value for testing the hypothesis \( p < 0.5 \) with significance level \( \alpha \) of at most 0.05 using the normal approximation.

A. Less than 52
B. At least 52, but less than 54
C. At least 54, but less than 56
D. At least 56, but less than 58
E. 58 or more
23) YG Insurance (YGI) estimates that 30% of its policyholders will file at least 1 claim each year. However, YGI also has reason to believe that policyholders who drive customized cars will file fewer claims than other policyholders.

YGI has sampled 100 policyholders with customized cars and has determined the number of sampled policyholders with at least 1 claim in the last year.

YGI will charge a lower premium to owners of customized cars, if the sample results show that fewer than 30% of owners of customized cars file at least 1 claim each year. YGI requires that the sample results be subject to no more than 2% Type I error.

Calculate the maximum allowable number of sampled policyholders with at least 1 claim in the last year.

A. Less than 16
B. At least 16 but less than 18
C. At least 18 but less than 20
D. At least 20 but less than 22
E. 22 or more
24) Which of the following statements about hypothesis testing are true?

1. A Type I error occurs if $H_0$ is rejected when it is true.
2. A Type II error occurs if $H_0$ is rejected when it is true.
3. Type I errors are always worse than Type II errors.

A. 1. only
B. 2. only
C. 3. only
D. 1. and 3. only
E. 2. and 3. only
25) The probability density of the $k^{th}$ order statistic of size $n$ is:

$$
\frac{n!}{(k-1)!(n-k)!} F(y)^{k-1} [1-F(y)]^{n-k} f(y)
$$

Samples are selected from a uniform distribution on [0, 10].

Determine the expected value of the fourth order statistic for a sample of size five.

A. Less than 6.5
B. At least 6.5, but less than 7.0
C. At least 7.0, but less than 7.5
D. At least 7.5, but less than 8.0
E. 8.0 or more
EXAM 3, SPRING 2005

26) A group of 8,157 club members all age (20) pay into an account which will pay a death benefit of $100,000 to the last 2,000 of them to die, the others get nothing.

- Mortality exactly follows the Illustrative Life Table
- The interest rate, i, is 6%
- Deaths are uniformly distributed during the year of death
- Death benefits are payable at the end of the year of death

How much does each member need to pay into the account today to fund it?

A. Less than $400
B. At least $400, but less than $405
C. At least $405, but less than $410
D. At least $410, but less than $415
E. $415 or more
27) Given the following information:

\[ \sum X_i = 144 \]
\[ \sum Y_i = 1,742 \]
\[ \sum X_i^2 = 2,300 \]
\[ \sum Y_i^2 = 312,674 \]
\[ \sum X_iY_i = 26,696 \]
\[ n = 12 \]

Determine the least squares equation for the following model:

\[ Y_i = \beta_0 + \beta_1 X_i + \epsilon \]

A. \( \hat{Y}_i = -0.73 + 12.16X_i \)
B. \( \hat{Y}_i = -8.81 + 12.16X_i \)
C. \( \hat{Y}_i = 283.87 + 10.13X_i \)
D. \( \hat{Y}_i = 10.13 + 12.16X_i \)
E. \( \hat{Y}_i = 23.66 + 10.13X_i \)
28) You are given a negative binomial distribution with \( r = 2.5 \) and \( \beta = 5 \).

For what value of \( k \) does \( p_k \) take on its largest value?

A. Less than 7
B. 7
C. 8
D. 9
E. 10 or more
EXAM 3, SPRING 2005

29) For a life aged (x), the m-year deferred probability of death is:

\[ \frac{m}{1275} \text{ for } m = 0, 1, \ldots, 50 \]

Calculate the probability that (x) lives at least 23 full years, but less than 30 full years.

A. Less than 0.11  
B. At least 0.11, but less than 0.13  
C. At least 0.13, but less than 0.15  
D. At least 0.15, but less than 0.17  
E. 0.17 or more
30) Acme Products will offer a warranty on their products for $x$ years, where $x$ is the largest integer for which there is no more than a 1% probability of product failure.

Acme introduces a new product with a hazard function for failure at time $t$ of $0.002t$.

Calculate the length of the warranty that Acme will offer on this new product.

A. Less than 3 years  
B. 3 years  
C. 4 years  
D. 5 years  
E. 6 or more years
31) You are given the following.

- $q_{70} = 0.04$
- $q_{71} = 0.05$
- Deaths are uniformly distributed within each year of age.

Calculate the probability that (70) will die between ages 70.5 and 71.5.

A. Less than 0.0432
B. At least 0.0432, but less than 0.0437
C. At least 0.0437, but less than 0.0442
D. At least 0.0442, but less than 0.0447
E. 0.0447 or more
32) John, age 40, and Mary, age 50, are independent lives following the same mortality, as follows.

<table>
<thead>
<tr>
<th>Age(x)</th>
<th>(10q_x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>0.039</td>
</tr>
<tr>
<td>50</td>
<td>0.085</td>
</tr>
<tr>
<td>60</td>
<td>0.192</td>
</tr>
</tbody>
</table>

Calculate the probability that John and Mary both live at least 10 years and then both die during the following 10 years.

A. Less than 0.015
B. At least 0.015, but less than 0.095
C. At least 0.095, but less than 0.175
D. At least 0.175, but less than 0.255
E. 0.255 or more
33) Assuming that the time-until-death random variables for (x) and (y) are independent, which of the following are true?

1. \( T(xy) + T(xy) = T(x) + T(y) \)
2. \( r_{xy}^+ + r_{xy}^- = r_x^+ + r_y^- \)
3. \( A_{xy} + A_{xy}^- = A_x + A_y \)

A. 1. only
B. 3. only
C. 1. and 2. only
D. 2. and 3. only
E. 1., 2., and 3.
34) Claims can either be settled or dropped. A new claim has a 3% chance of being settled in year 1 and a 6% chance of being dropped. A one-year old claim has a 4% chance of being settled and a 7% chance of being dropped. A two-year old claim has a 5% chance of being settled and an 8% chance of being dropped. A three-year old claim has a 6% chance of being settled and a 9% chance of being dropped.

Calculate the probability that a new claim is dropped within three years.

A. Less than 0.187  
B. At least 0.187, but less than 0.189  
C. At least 0.189, but less than 0.191  
D. At least 0.191, but less than 0.193  
E. 0.193 or more
35) An insurance company offers two types of policies, Type Q and Type R. Type Q has no deductible, but a policy limit of 3,000. Type R has no limit, but an ordinary deductible of \( d \). Losses follow a Pareto distribution with \( \theta = 2,000 \) and \( \alpha = 3 \).

Calculate the deductible, \( d \), such that both policy types have the same expected cost per loss.

A. Less than 50  
B. At least 50, but less than 100  
C. At least 100, but less than 150  
D. At least 150, but less than 200  
E. 200 or more
36) XYZ Insurance issues 1-year auto policies.

- The probability that a new insured had no accidents last year is 0.70.
- The probability that an insured who was accident-free last year will be accident-free this year is 0.80.
- The probability that an insured who was not accident-free last year will be accident-free this year is 0.60.

What is the probability that a new insured with an unknown accident history will be accident-free in the second year of coverage?

A. Less than 71%
B. At least 71%, but less than 72%
C. At least 72%, but less than 73%
D. At least 73%, but less than 74%
E. 74% or more
37) Twenty years ago, Oldco and Newco merged. At that time, Oldco had 3,000 workers aged (60) and Newco had 1,000 workers aged (30).

Since then there have been no departures from the combined firm except for mortality, which has exactly followed the Illustrative Life Table (ILT).

Today the company purchases a death benefit of 1,000 on each of the remaining workers. This benefit is priced using mortality from the ILT and $i = 6\%$.

What is the average cost per remaining worker for this death benefit?

A. Less than 525
B. At least 525, but less than 550
C. At least 550, but less than 575
D. At least 575, but less than 600
E. 600 or more
EXAM 3, SPRING 2005

38) A fund is established to pay a death benefit of 1,000 for each of 5,000 independent lives age (40).

You are given the following information.

- Mortality follows the Illustrative Life Table.
- \( i = 6\% \)
- Death benefits are payable at the end of the year of death.

Using a normal approximation, what is the initial amount the fund must have in order to have a 90% chance of paying all claims?

A. Less than 810,000
B. At least 810,000, but less than 820,000
C. At least 820,000, but less than 830,000
D. At least 830,000, but less than 840,000
E. 840,000 or more

CONTINUED ON NEXT PAGE
38
39) Longterm Insurance Company insures 100,000 drivers who have each been driving for at least five years.

Each driver gets "violations" at a Poisson rate of 0.5/year.

Currently, drivers with 1 or more violations in the past three years pay a premium of 1000.

Drivers with 0 violations in the past three years pay 850.

Your marketing department wants to change the pricing so that drivers with 2 or more accidents in the past five years pay 1,000 and drivers with zero or one violations in the past five years pay X.

Find X so that the total premium revenue for your firm remains constant when this change is made.

A. Less than 900
B. At least 900, but less than 925
C. At least 925, but less than 950
D. At least 950, but less than 975
E. 975 or more
EXAM 3, SPRING 2005

40) An insurance company has two independent portfolios.

In Portfolio A, claims occur with a Poisson frequency of 2 per week and severities are distributed as a Pareto with mean 1,000 and standard deviation 2,000.

In Portfolio B, claims occur with a Poisson frequency of 1 per week and severities are distributed as a log-normal with mean 2,000 and standard deviation 4,000.

Determine the standard deviation of the combined losses for the next week.

A. Less than 5,500
B. At least 5,500, but less than 5,600
C. At least 5,600, but less than 5,700
D. At least 5,700, but less than 5,800
E. 5,800 or more

END OF EXAMINATION
40
Spring 2005 Exam 3  Preliminary Answer Key

1 E
2 B
3 B
4 D
5 D
6 A
7 A
8 D
9 E
10 C
11 E
12 D
13 E
14 B
15 A
16 A
17 C
18 B
19 E
20 D
21 B
22 E
23 D
24 A
25 B
26 C
27 E
28 B
29 C
30 B
31 C
32 A
33 E
34 B
35 D
36 E
37 A
38 C
39 A
40 A