May, 2014

FOUNDATION OF CASUALTY ACTUARIAL
SCIENCE PART-II

[Time : 3 Hours] [Total Marks: 100]

All questions are compulsory.

Multiple-Choice Question (All Multiple-Choice Questions carries Two Marks Each)

Q.1 How many Claims are required for Full Credibility if one requires that there be a 99% Chance of the Estimated Frequency being within ± 2.5% of the True Value?
   a) 10,617  
   b) 10,671  
   c) 10,761  
   d) 10,716  

Q.2 If an Actuary wishes to generate the most accurate Insurance Rate with Least Squares as the Measure of Fit, he will choose --.
   a) Bayesian Analysis Model.  
   b) Buhlman Credibility Model.  
   c) Classical Credibility Model.  

Q.3 Elements of an Insurer’s Operations which should be considered by a Dynamic Financial Analysis (D.F.A.) Model does not include the following:
   a) Taxes  
   b) Rates  
   c) Ceded Re-Insurance  
   d) Inflation  

Q.4 Based on the following Data:
   PVRELC = Rupees 1,00,00,000/-  
   RTER = 25%  
   RIXL = 20%  
   RCR = 25%  
   RBF = 20%  
   What is RPP?
   a) Rupees 1,33,33,333/-  
   b) Rupees 2,44,44,444/-  
   c) Rupees 3,33,33,333/-  
   d) Rupees 4,33,33,333/-
Q.5 Based on the following Data:
PVREL = Rupees 1,00,00,000/-
RTER = 25%
RIXL = 20%
RCR = 25%
RBF = 20%
What is RP?
a) Rupees 1,01,01,010/-
b) Rupees 2,02,02,020/-
c) Rupees 3,03,03,030/-
d) Rupees 4,04,04,040/-

Q.6 Assume that 25% of Men are Colour-Blind, while 2.5% of Women are Colour-Blind.
A Colour-Blind Person is Picked out of a Population made-up of 25% of Men and remaining of Women. What are the Chances that the Colour-Blind Person is a Man and a Woman?
a) 23% and 77%
b) 68% and 32%
c) 77% and 23%
d) 32% and 68%

Q.7 M.P.L. stands for –
a) Minimum Possible Loss.
b) Minimum Probable Loss.
c) Maximum Possible Loss.
d) Maximum Probable Loss.

Q.8 --- can be the Primary Cause behind Property / Casualty Insurer’s Insolvency.
a) Catastrophe Losses
b) Deficient Loss Reserves (Inadequate Pricing)
c) Over-Stated Assets
d) Re-Insurance Failure

Q.9 Which of the reinsurance categories’ statements with respect to claim reporting and development is incorrect?
a) Treaty casualty excess are usually long tailed.
b) Treaty property catastrophe are usually short tailed.
c) Treaty property excess are usually short tailed.
d) Casualty aggregate excess are usually short tailed.

Q.10 The distribution of annual claims frequencies μ within a population of insured is Gamma with parameters α=3.0 and λ=1.5. An insured is selected at random. If the insured is observed to have a total of 0 claims during a one year observation period, what is the expected value of μ for the insured?
a) 1.5
b) 1.2
c) 2.2  
d) 1.3

Q.11 Which of the following relationship is correct?  
a) Modified duration = {1 / (1+r)} * Macaulay Duration  
b) Modified duration = (1 / r) * Macaulay Duration  
c) Modified duration = (1+r) * Macaulay Duration  
d) Macaulay duration = [1 / (1+r)] * Modified Duration

Q.12 Suppose x=0,1,2,3,... Parameters: k≥0, 0<p<1, q=1-p  
Probability Density Function \( f(x) = \left(\frac{x}{x-1}\right)^k p^k q^x \)  
The information relates to:  
a) Binomial Distribution  
b) Lognormal Distribution  
c) Weibull Distribution  
d) Negative Binomial Distribution

Q.13 Which of the below is not a type of Securitized Insurance Products?  
a) Risk exchanges  
b) Catastrophe equity Puts  
c) Risk equity calls  
d) Catastrophe Bonds

Q.14 As per ALM, if assets and liabilities are not matched, then banks are exposed to:  
a) Underwriting Risk  
b) Expense Risk  
c) Interest Rate Risk  
d) Solvency Risk

Q.15 Loss Portfolio Transfer is a very prevalent form for:  
a) Quota share reinsurance  
b) Finite reinsurance  
c) Excess of Loss reinsurance  
d) Catastrophe reinsurance

(Essay type questions: All essay type questions carry Ten marks each).

Q.16 a) What are the Items to be considered in Determining the Credibility of the Experience Loss Cost Estimate?  
b) Write a Short Note on Allocation of Surplus.

Q.17 Write a Note on Ratios which measure Liquidity, Financial Leverage or Capital Structure, Profitability, and Market Value.
Q.18  a) Explain, in brief, the General Considerations for Re-Insurance Loss Reserving
     b) Explain, in brief, the Technical Problems that make Re-Insurance Loss Reserving somewhat more difficult than Loss Reserving for a Primary Company.

Q.19  Briefly discuss different sources of data available (both internal and external) to the insurance industry for performing analysis.

Q.20  Write a short note on:
     a) Catastrophe Bonds
     b) Clash treaty
     c) CAPM

Q.21  A medium size general insurance company mainly selling Automobile insurance is in process of deciding its investment strategy. List the types of investment instruments in which company can invest and outline the basic features of investment instrument.

Q.22  There are two types of urns, each with many balls labelled Rs. 1000 and Rs. 2000.

<table>
<thead>
<tr>
<th>Type of Urn</th>
<th>A Priori Chance of This Type of Urn</th>
<th>Percentage of Rs. 1000 Balls</th>
<th>Percentage of Rs. 2000 Balls</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>80%</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>II</td>
<td>20%</td>
<td>70%</td>
<td>30%</td>
</tr>
</tbody>
</table>

a) You pick an urn at random and pick one ball. If the ball is Rs. 2000, what is the expected value of the next ball picked from the same urn?
b) You pick an urn at random (80% chance it is of Type I) and pick three balls, returning each ball to the urn before the next pick. If two of the balls were Rs. 1000 and one of the ball was Rs. 2000, what is the expected value of the next ball picked from that same urn?

END