May, 2012

ASSOCIATESHIP/FELLOWSHIP EXAMINATION

FOUNDATIONS OF CASUALTY ACTUARIAL SCIENCE - PART-1

(Non-Life)

Time: 3 Hours

Reg. No.

[ Total Marks: 100

Answer EIGHT questions only. Question number TEN carries 16 marks but this is not compulsory. All other questions carry 12 marks each.

Q.1 Answer any 3 of the 4 sub-questions.

a) Define ‘Risk’ and different types of Risks.

b) Write True or False against the following statements:
   • Loss Ratio Method requires well-defined, responsive Exposures.
   • Pure Premium Method cannot be used for a New Line.
   • Pure Premium Method is preferable where On-Level Premium is difficult to calculate.
   • Pure Premium Method is based on Exposure.
   • Pure Premium Method does not require Existing Rates.
   • Loss Ratio Method produces Indicated Rates.
   • Loss Ratio Method is based on Premium.
   • Pure Premium Method requires Existing Rates.

c) What are the characteristics of an ideally Insurable Exposure?

d) Define ‘Utility Theory.’

Q.2 Answer any 3 of the 4 sub-questions:

a) What are the 5 elements of Total Loss Reserve?

b) What are the 4 basic principles of Loss Adjustment Expense Reserve?

c) What are the 4 phases of a Reserve Valuation Problem?

d) What is the importance of Data Analysis?

Q.3 Answer any 3 of the 4 sub-questions:

a) State different ways of Risk Financing by which Risks can be managed.

b) Discuss the differences between Pure Premium and Loss Ratio Methods of Manual Rate-Making.

c) Discuss the four phases of Reserve Estimation Strategy.

d) What operational considerations need to be taken into account while developing a Risk Classification System.

Q.4 Answer any 2 of the 3 sub-questions.

a) List 12 Rating Factors which may be used to calculate the Premium of Personal Motor Insurance.

Marks

4 Each

6 Each
b) List 12 Rating Factors which may be used to calculate the Premium of Commercial Fire Insurance.

c) The two basic approaches to address the problem of Manual Rate-Making are the Pure Premium Method and the Loss Ratio Method. Give Examples as to which approach is more appropriate in a given situation.

Q.5 a) You are given the following information for four policies with annual policy terms: (Any Two)

<table>
<thead>
<tr>
<th>Policy</th>
<th>Effective Date</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>January 1, 2009</td>
<td>1,200</td>
</tr>
<tr>
<td>B</td>
<td>July 1, 2010</td>
<td>2,400</td>
</tr>
<tr>
<td>C</td>
<td>November 1, 2010</td>
<td>3,600</td>
</tr>
<tr>
<td>D</td>
<td>April 1, 2010</td>
<td>600</td>
</tr>
</tbody>
</table>

Based on these four Policies, calculate:

a. 2009 Written Premium.
b. 2009 Earned Premium.
c. 2009 Policy Year Premium.

b) You are given the following information:

First Premium: ₹ 5,00,000
Ground-Up Expected Loss Ratio: 60%
Excess Ratio: 20%
A.L.A.E. (as a percent of Total Losses): 10%
Commission: 15%
Other Variable Expenses: 7%
Fixed Expenses: ₹ 25,000
Profit and Contingencies: 5%

Calculate the Premium for a Policy with a ₹ 1,00,000/- Deductible.

c) Given the following information for an Insurance Company:

Unearned Premium Liability as of December 31, 2011: ₹ 10,00,000/-

December 31, 2011 Estimate of Losses from the run-off of the December 31, 2011 Unearned Premium: ₹ 9,00,000/-

December 31, 2011 Estimate of Expenses remaining from the run-off of the December 31, 2011 Unearned Premium: ₹ 1,50,000/-

Annual Fixed and General Overhead Expenses: ₹ 75,000/-

Calculate the Premium Deficiency Reserve as of the December 31, 2011, Balance Sheet date.
Q.6 Given the following data as of December 31, 2011:

<table>
<thead>
<tr>
<th>Calendar Accident Year</th>
<th>Earned Risk Pure Premium</th>
<th>On-Level Premium</th>
<th>Aggregate Reported Loss</th>
<th>Aggregate Report Lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>5,000</td>
<td>7,000</td>
<td>5,000</td>
<td>98%</td>
</tr>
<tr>
<td>2008</td>
<td>7,500</td>
<td>8,500</td>
<td>6,500</td>
<td>87%</td>
</tr>
<tr>
<td>2009</td>
<td>8,000</td>
<td>9,500</td>
<td>2,000</td>
<td>73%</td>
</tr>
<tr>
<td>2010</td>
<td>9,600</td>
<td>10,000</td>
<td>7,500</td>
<td>65%</td>
</tr>
<tr>
<td>2011</td>
<td>11,500</td>
<td>11,500</td>
<td>6,500</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>41,600</strong></td>
<td><strong>46,500</strong></td>
<td><strong>27,500</strong></td>
<td></td>
</tr>
</tbody>
</table>

i) Calculate the Total I.B.N.R. as of December 31, 2011 using the Chain Ladder Method.

ii) State and explain one disadvantage of the Chain Ladder Method.

Q.7. Discuss the importance of Marketing and Underwriting for Pricing Business.

Q.8 What is Increased Limits Rate-Making and describe three methods available for the Review of Increased Limits Experience.

Q.9 Describe two criteria for selecting Rating Variables.

Q.10 XYZ Metal Company is interested in insuring its Workers Compensation Exposure with ABC Insurance Company through a Large Rupee Deductible (L.R.D.) Plan. With this plan, XYZ Metal Company will reimburse ABC Insurance Company for losses and A.L.A.E. up to ₹ 2,00,000/- per accident, but will not reimburse more than ₹ 10,00,000/- in total for the Policy Period. For this Policy, the following apply:

Excess Loss Pure Premium Factor at ₹ 2,00,000/-
Insurance Charge at ₹ 1,00,00,000/-
U.L.A.E.
Loss-Based Assessment
General Overhead Expense
Credit Risk Charge
Acquisition Expense
Taxes
Profit

As a percent of
10% Loss and A.L.A.E.
4% Loss and A.L.A.E.
7% Loss and A.L.A.E.
6% Loss and A.L.A.E.
8% Standard Premium
2% Standard Premium
3% Net Premium
4% Net Premium
2% Net Premium

Assume:

Standard Premium = ₹ 10,00,000/- Expected Loss and A.L.A.E. = ₹ 8,00,000/-

i) Calculate the Premium for the Large Rupee Deductible Workers Compensation Policy.

ii) Calculate the Expense Ratio, excluding A.L.A.E., for the Large Rupee Deductible Workers Compensation Policy.

THE END
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