SPECIALISED DIPLOMA EXAMINATION
(CASUALTY ACTUARIAL SCIENCE NON-LIFE)

BASIC RATEMAKING

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

Answer EIGHT questions only. Q.No.10 is compulsory which carries 16 marks.
Any SEVEN questions from Q.No.1 to Q.No.9 which carries 12 marks each.

Q.1 Answer any three of the following:
   a) What is factor analysis and cluster analysis?
   b) Outline the possible regulatory constraints on general insurance companies.
   c) Explain Permissible Loss Ratios.
   d) State four benefits of Multivariate Methods.

Q.2 Answer any three of the following:
   a) Distinguish between Calendar year and Policy year for premium aggregation.
   b) Discuss four reasons of popularity of deductibles among both insureds and insurers.
   c) Explain Retention Ratio and Close Ratio.
   d) Define Frequency and Severity with examples.

Q.3 Explain briefly any three of the following:
   a) Operational criteria for evaluating rating variables.
   b) Explain the statement: “Ratemaking is Prospective.”
   c) What are the common factors affecting insured’s propensity to renew an existing product or purchase a new one?
   d) Which issues should be considered while rating a large deductible policy?

Q.4 Answer any two of the following:
   a) How are large losses and catastrophic losses treated in the ratemaking process?
   b) Discuss the classical credibility theory usage in context of ratemaking.
   c) Describe the Parallelogram method used in premium adjustments. Mention the steps involved.

Q.5 Answer any two of the following:
   a) Outline the two methods used for adjusting historical data for premium trend.
   b) Given the following information for a Homeowners company:
      • The 4th Calendar quarter of 2011 (4Q2011) Average Written Premium is Rs.560/-
      • The proposed effective date of the next rate change is July 1, 2012.
      • Assume a + 5% prospective annual premium trend.
      • Rate review is performed every 2 years.
<table>
<thead>
<tr>
<th>Calendar Year Ending</th>
<th>Earned Exposures (House Years)</th>
<th>Earned Premium at Current Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 31, 2009</td>
<td>10,000</td>
<td>Rs.50,00,000</td>
</tr>
<tr>
<td>December 31, 2010</td>
<td>10,000</td>
<td>Rs.52,50,000</td>
</tr>
<tr>
<td>December 31, 2011</td>
<td>10,000</td>
<td>Rs.55,12,500</td>
</tr>
</tbody>
</table>

i) Use two-step trending method to calculate the projected earned premium for the calendar year ending December 31, 2009.

ii) After completing the analysis, the actuary determines that the assumed annual increase in the amount of insurance to account for inflation was materially reduced post January 1, 2012. Discuss any necessary adjustments to the completed analysis in part I above.

c) Define complement of Credibility. What are the desirable qualities of a complement of Credibility? Discuss each briefly.

Q.6 Answer any two of the following: 6 each
a) What are the five principles of claims-made policies?
b) Outline the shortcomings of univariate method.
c) Define Underwriting Expenses. Discuss the four categories of underwriting expenses.

Q.7 Answer the following:

a) Discuss Pure Premium Method. Derive Pure Premium indicated rate formula. Explain all the terms used. Given the following information:
   - Projected Pure Premium including LAE = Rs.300
   - Projected fixed UW expense per exposure = Rs.25
   - Variable expense % = 25%
   - Target UW Profit % = 10%
   Calculate indicated average rate per exposure.
b) Write a short note on favorable selection.

Q.8 Answer the following: 4 each
a) What is a Coinsurance Clause?
b) Define coinsurance apportionment ratio. Using appropriate notations state the formula for apportionment ratio and indemnity payment. Define all the notations used.
c) Define coinsurance penalty and state the conditions required for the penalty to be imposed. Give the formula for the amount of penalty using the notation defined earlier.

Q.9 Answer the following: 6 each
a) Discuss the fields that are captured in a policy database.
b) List the typical rating variables used when writing homeowners, WC, medical malpractice, commercial automobile, personal automobile products.

Q.10 Data for a multiplicative personal car rating model is as below: 16
Exposure distribution is as below:

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural</th>
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<tbody>
<tr>
<td>Male</td>
<td>170</td>
<td>90</td>
</tr>
<tr>
<td>Female</td>
<td>105</td>
<td>110</td>
</tr>
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</table>
Actual loss costs:

<table>
<thead>
<tr>
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<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>$650</td>
<td>$300</td>
</tr>
<tr>
<td>Female</td>
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<td>$240</td>
</tr>
</tbody>
</table>

Use the minimum bias method of classification rating to calculate the base loss cost. The model has two rating variables gender & territory. Base level can be assumed as a rural female.

END