SPECIALISED DIPLOMA EXAMINATION
(CASUALTY ACTUARIAL SCIENCE NON-LIFE)
BASIC RATEREMAKING

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

Answer EIGHT questions only. Q.No. TEN 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 the following (any three):
   a) Define Exposure. List four common methods of data aggregation.
   b) Discuss underwriting expenses.
   c) Distinguish between Adjacency based smoothing and distance based smoothing.
   d) List three general objectives of aggregating data for ratemaking.

   Marks 4 each

Q.2 Answer the following (any three):
   a) Give example of exposure base that can be used for following Line of business:-
      (i) Commercial general liability (ii) Home owners.
      (iii) Professional liability (iv) Personal Article Floaters.
   b) What are the different regulatory constraints possible on a company when ratemaking?
   c) Explain how Rating manual can be used in premium calculation.
   d) Distinguish between Calendar year V/s Policy year for premium aggregation.

   Marks 4 each

Q.3 Answer the following (any three):
   a) Explain how are catastrophe losses treated in the ratemaking process.
   b) When writing a rating algorithm, list the various instructions that need to be followed.
   c) Describe factor analysis and cluster analysis.
   d) Define combined ratio and operating expense ratio.

   Marks 4 each

Q.4 Answer the following (any two):
   a) Write a short note on ‘Two -Step trending’ method, as used to adjust past data for trends.
   b) What is meant by schedule rating? Explain the process .
   c) Outline the various factors that influence an insured’s propensity to renew a product or purchase a new product.

   Marks 6 each

Q.5 Answer the following (any two):
   a) Write a short Note on-
      (i) Composite ratemaking (ii) Loss- rated composite ratemaking.
   b) What are the two methods for adjusting historical data for premium trend? Explain any one of them.
   c) Discuss any four factors that necessitate a restatement of past experience.

   Marks 6 each

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Q.6 Answer the following (any two):
   a) Explain Pure Premium Method.
   b) Give example of underwriting characteristics used in following insurance class-
      (i) Workmen Compensation. (ii) Medical Malpractice.
      (iii) Home Owners (iv) Personal Automobile.
   c) Write a short note on “Increased Limit Factors”.

Q.7 (a) Derive the loss ratio indicated rate change formula. Explain all terms used in both derivations above.
     (b) What are the advantages of using deductible pricing to insurers and insureds?

Q.8 (a) Write a note on any two criteria used for evaluating rating variables.
     (b) Explain the classical credibility approach using statistical arguments.

Q.9 a) What are the five principles of claims-made policies?
     b) List major steps involved in the calculations of parallelogram method.

Q.10 Consider a multiplicative personal car rating model.
The model uses two rating variables: gender and area. The relativities of gender can be expressed as \( g_1 \) (male) and \( g_2 \) (female). The relativities of area can be expressed as \( a_1 \) (urban) and \( a_2 \) (rural). The base level can be assumed as a female from a rural area. Following actual loss costs (in units of $) and exposure distribution data are available:

<table>
<thead>
<tr>
<th>Actual loss costs (in $)</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>650</td>
<td>300</td>
</tr>
<tr>
<td>Female</td>
<td>250</td>
<td>240</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exposure distribution</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>170</td>
<td>90</td>
</tr>
<tr>
<td>Female</td>
<td>105</td>
<td>110</td>
</tr>
</tbody>
</table>

Use the minimum bias method of classification ratemaking to calculate the relativities and hence the base loss cost.

END