“QUESTION PAPER MUST BE ATTACHED ALONGWITH THE ANSWER BOOK.”

A-3

May, 2015

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) Explain in a single sentence the ways in which insurers measure exposures.
b) Briefly explain with examples, the two ways in which Loss Adjustment Expenses can be separated.
c) How does the difference between the Ultimate Loss and Reported Loss arise?
d) State two forms of fundamental Insurance Equation and key points to achieve balance in fundamental equation.

Marks
4 each

Q.2  Answer any three of the following:

a) State the general objectives for data aggregation for rate making purpose and state four common methods for data aggregation.
b) Briefly explain usage of external data and their common sources.
c) What are earned and unearned exposures and how they are related to each other?
d) Describe Underwriting cycle.

Marks
4 each

Q.3  Answer any three of the following:

a) State the rating variables and underwriting characteristics considered in ratemaking of homeowners insurance and medical malpractice cover.
b) Explain the purpose and any 4 contents of underwriting guidelines.
c) Write a short note on two step trending.
d) Write a short note on one step trending.

Marks
4 each

Q.4  Answer any two of the following:

a) What is meant by territorial ratemaking? Describe the two phase on this ratemaking process.
b) State the various qualities to consider in choosing the ‘complement of credibility’. Explain any four methods for developing these complements during ‘First dollar’ ratemaking.
c) Given the following information, for Rs. 2,00,000 policy limit, compute the indicated ILF, assuming a basic limit of Rs. 1,00,000/-

<table>
<thead>
<tr>
<th>Size of Loss</th>
<th>Policies with Rs. 1,00,000 limit</th>
<th>Policies with Rs. 2,00,000 limit</th>
<th>Policies with Rs. 5,00,000 limit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Claims</td>
<td>Losses</td>
<td>Claims</td>
</tr>
<tr>
<td>X ≤ 1,00,000</td>
<td>110</td>
<td>80,00,000</td>
<td>40</td>
</tr>
<tr>
<td>1,00,000 &lt;</td>
<td>45</td>
<td>74,00,000</td>
<td>25</td>
</tr>
<tr>
<td>X ≤ 2,00,000</td>
<td>15</td>
<td>52,00,000</td>
<td></td>
</tr>
<tr>
<td>X ≤ 5,00,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit</td>
<td>Indicated factor (Pure premium using GLM)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,00,000</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,00,000</td>
<td>0.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5,00,000</td>
<td>1.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q.5  Answer any two of the following: 6 each
   a) Write a note on the treatment of extra ordinary losses in ratemaking.
   b) Outline with a brief explanation, of the various steps in a parallelogram method.
   c) Explain the social and legal criteria for evaluating rating variables.

Q.6  Answer any two of the following:
   a) List out and very briefly explain the factors that affect an insured’s propensity to renew an existing product or purchase a new product. 6
   b) i) List out the marketing information to be considered along with traditional actuarial rate indication to determine set of rates. 2
       ii) Give formula and examples of two ratios involved in the marketing information. 4
   c) i) List out the three approaches for deriving the proposed base rate. 2
       ii) What are the different ways by which the comparison of experience and expected components can be performed in an Experience Rating?

Q.7  a) What are the various factors of past experience that need to be adjusted during ratemaking? 4
     b) What are the merits and demerits of using internal and external data in ratemaking? List the types of internal and external data available to an insurer 8

Q.8  a) i) Give the formula for Indicated Change Factor Under Loss Ratio Method clearly giving in words the terms involved. 1
     ii) Calculate the Indicated Change and express the result in words.
         Projected Fixed expense ratio = 5%
         Variable Expense Ratio =20%
         Target Profit Percentage = 15%
         Projected ultimate loss and LAE Ratio =0.60
     b) Explain briefly on Salvage and Subrogation 4
     c) Write Short notes on Reinsurance 4

Q.9  a) Calculate the Bühlmann credibility weighted estimate assuming the following:
     The prior mean is $225
     The observed value based is $200 based on 21 observations
     The Variance of Hypothetical means is 0.5
     The expected value of the process variance is 2.00
     b) Compute premiums for a large deductible Commercial General Liability policy based on the following:
        (Write down the formula and show the details of items arrived at to be used in the formula in separate tables)
        • The deductible is Rs.5,00,000 per occurrence.
        • The insurer will handle all claims including those that fall entirely below the
The deductible is not expected to reduce ALAE costs. ALAE costs are estimated to be 11% of total losses.

- The deductible applies to losses only. The total ground-up losses without recognition of a deductible are estimated to be Rs.10,00,000.
- The fixed expenses are assumed to be Rs.50,000.
- Variable expenses are assumed to be 13% of premium.
- The insurer will make the payment on all claims and will seek reimbursement for amounts below the deductible from the insured. The cost of processing the deductibles is estimated to be 4% of the losses below the deductible.
- Deductible recoveries will not be fully collateralised and the associated credit risk is estimated to be 1% of the expected deductible payments.
- The desired underwriting profit for a full coverage (no deductible) premium is 2%. The insurer includes an additional risk margin of 10% of excess losses for policies with a deductible of Rs.5,00,000.
- The percent of total losses below the deductible (i.e., Loss Elimination Ratio or LER) and the percent of total losses above the deductible (i.e., excess ratio) are summarised in the table below.

<table>
<thead>
<tr>
<th>Loss Limit</th>
<th>LER</th>
<th>Excess Ratio = (1 – LER)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs.1,00,000</td>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Rs.2,50,000</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Rs.5,00,000</td>
<td>95%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Q.10 a) Briefly Explain Insurance To Value.

b) i) Explain Coinsurance giving the details of all notations and the formula for indemnity payment.

ii) Give the definition for Coinsurance penalty and the three conditions to apply the penalty and indicate the amount of penalty in terms of notations.

iii) Consider a home valued at Rs.5,00,000 that is only insured for Rs.3,00,000. Coinsurance requirement is 80%. Calculate the Indemnity payments and Coinsurance Penalties after working out the apportionment ratio.

A) For a loss of Rs.2,00,000

B) For a loss of Rs.3,50,000

C) For a loss of Rs.4,50,000

END