FOUNDATION OF CASUALTY ACTURIAL SCIENCE PART-I

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

All question are compulsory.

Marks

Multiple - Choice Questions ( All Multiple-Choice Questions carries Two marks each )

Q.1 Which of the below can not be used as a Rating Variable for Automobile Liability Insurance -
   a) Age, gender, marital status of driver
   b) Salary of the driver
   c) Use of the Vehicle
   d) Geography

Q.2 Selecting a wrong Loss Development factor resulting in erroneous experience loss, is an example of which type of risk -
   a) Process Risk
   b) Underwriting Risk
   c) Investment Risk
   d) Parameter Risk

Q.3 Which of the below sentence is False -
   a) Under Accural basis, revenues are recognized when earned.
   b) Under Accural basis, costs are reported as expense in the same period as the revenues giving rise to those costs are recognized.
   c) A Accural basis of accounting simply recognizes revenues when they are received.
   d) A Cash basis of accounting reports expenses when they are made.

From the given information, you are required to answer Q.No. 4, 5 and 6. for six polices with annual policy terms :

<table>
<thead>
<tr>
<th>Policy</th>
<th>Effective Date</th>
<th>Premium (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1/01/2009</td>
<td>2000</td>
</tr>
<tr>
<td>B</td>
<td>1/06/2011</td>
<td>500</td>
</tr>
<tr>
<td>C</td>
<td>1/01/2010</td>
<td>1000</td>
</tr>
<tr>
<td>D</td>
<td>1/03/2009</td>
<td>1500</td>
</tr>
<tr>
<td>E</td>
<td>1/04/2010</td>
<td>2500</td>
</tr>
<tr>
<td>F</td>
<td>1/07/2009</td>
<td>1000</td>
</tr>
</tbody>
</table>

Q.4 Which of the below is correct Earned Premium for year 2009 -
   a) 3750   b) 4500
   c) 4000   d) 5500
Q.5 Which of the below is correct Inforce Premium as on 1/01/2010 -
   a) 3500  b) 8000  
   c) 2500  d) 1000

Q.6 Which of the below is correct Written Premium for year 2010 -
   a) 2500  
   b) 3750  
   c) 3500  
   d) 3625

Q.7 **Column “A”**
   A.1 Carried Loss Reserve  B.1 It is the difference between carried reserve & required reserve.
   A.2 Loss Reserve Margin  B.2 It is the result of the actual analysis of a reserve as of given accounting date conducted as of a certain valuation date.
   A.3 Required Loss Reserve  B.3 It is the amount of unpaid claim liability shown on external or internal financial statements.
   A.4 Indicated Loss Reserve  B.4 As of given accounting date, it is the amount that must ultimately be paid to settle all claim liabilities.

Which of the below Match is False
   a) A.1 & B.3.  
   b) A.2 & B.1.  
   c) A.4 & B.2.  
   d) A.3 & B.2.

Q.8 When calculating the credibility weighted estimate for a motor policy, which of the below is not required?
   a) Complement of credibility obtained from market statistics  
   b) Claims severity information for the motor business  
   c) Commercial rates for motor line of business  
   d) Company’s business share in various classes

Q.9 Risk management is a process. It is carried out to achieve goals such as:
   a) generate high profits at the cost of high expenses  
   b) maintain excessive reserves to deal with eventualities  
   c) have no interruption in operations  
   d) have massive systems in place to handle the process

Q.10 Underwriting profit for an insurer can be defined as:
   a) Premiums - claims - expenses - commission + interest  
   b) Premiums earned - claims and expenses incurred  
   c) Premium written - claims paid + interest income  
   d) Premium earned - claims incurred + expenses incurred

Q.11 For a policy, variable expense factor is 15% and profit factor is 5%. The average loss per unit of exposure is 80 units and fixed expenses per unit of exposure is 20 units. The rate per unit of exposure is:
   a) 110 units  b) 125 units  
   c) 95 units  d) 115 units
Q.12 Adverse selection is a term used to describe the following situation:
   a) Insurance company writing greater number of good risks
   b) Policyholders representing ‘higher risk’ are attracted to the company in question
   c) Policyholders representing ‘lower risk’ are attracted to the company in question
   d) Company in question changes its rating algorithm but policyholder base remains same

Q.13 Impact of the Severity increase on a layer (U excess L) can be expressed as:

<table>
<thead>
<tr>
<th>Loss size (x)</th>
<th>Rate of increase in layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) x ≤ L</td>
<td>Undefined</td>
</tr>
<tr>
<td>ii) L &lt; x ≤ (\frac{U}{1+T})</td>
<td>(\frac{TX}{X-L})</td>
</tr>
<tr>
<td>iii) U &lt; X</td>
<td>0</td>
</tr>
</tbody>
</table>

T : Severity increase rate
Which of the above are true?
   a) (i) and (ii)
   b) (i), (iii) and not (ii)
   c) (i), (ii) and (iii)
   d) (ii) and (iii) Only

Q.14 Dynamic financial analysis can be described as:
   a) It is the ongoing valuation of business keeping all parameters constant
   b) It is a perspective, not a statistical tool
   c) It is a model where the parameters are fixed at outset
   d) It is a model where financial variables are kept fixed

Q.15 Which of the following is not a type of unallocated loss adjustment expense
   a) Salary of the staff handling claims
   b) Rent for the space occupied by claim handling department
   c) Fees paid for the claim surveyor
   d) Computer usage charges for the office

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

Q.16 a) Discuss four phases of Reserve Estimation Strategy.
    b) Derive a relationship between Pure premium & Loss ratio method.

Q.17 a) List out the characteristics of ideally insurable exposure.
    b) Define Back dated liability insurance and Retroactive liability insurance.

Q.18 What is Increased Limit Rate-making. Describe three methods available for review of Increased limit experience.

Q.19 a) Explain the five step risks management process.
    b) As part of risk management, what are the five ways in which an insurer controls its risk?
Q.20  

a) Consider the following data:

<table>
<thead>
<tr>
<th>class/Territory</th>
<th>Relativity to class ‘A’</th>
<th>On-level Premium earned</th>
<th>losses Experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.00</td>
<td>£ 14,000</td>
<td>£ 11,500</td>
</tr>
<tr>
<td>B</td>
<td>1.45</td>
<td>£ 9,000</td>
<td>£ 6,400</td>
</tr>
<tr>
<td>C</td>
<td>1.80</td>
<td>£ 8,500</td>
<td>£ 5,700</td>
</tr>
</tbody>
</table>

Using the above information for a three class classifications calculate the indicated relativity to territory / class ‘A’.

b) Distinguish between the Loss ratio method and Pure premium method of rating.

Q.21  

Discuss what is meant by the “Overlap Fallacy” with the help of an example.

Q.22  

Given below is a loss ratio triangle. Use the chain ladder method to estimate the ultimate loss ratio in each year. The earned premium for each of the years 2005 to 2008 is £ 1.42m, £1.64m, £1.73m and £1.82m respectively. You may use the average ratios as your selection and the year 2005 is fully developed.

<table>
<thead>
<tr>
<th>Accident year</th>
<th>Development in months</th>
<th>12</th>
<th>24</th>
<th>36</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>47%</td>
<td>63%</td>
<td>70%</td>
<td>74%</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>48%</td>
<td>62%</td>
<td>71%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>49%</td>
<td>60%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>