(New Syllabus) (2013-14 and Onwards) (F + R)
COMMERCE
3.6 : Quantitative Analysis For Business Decisions – II

Time: 3 Hours
Max. Marks: 100

Instruction: Answers should be written fully in English or Kannada.

SECTION – A

Answer any ten sub-questions. Each question carries two marks. (10x2=20)

1. a) Distinguish between correlation and regression.
   
   b) Mention the uses of correlation.
   
   c) State the assumptions of Karl Pearson’s co-efficient of correlation.
   
   d) Calculate two regression co-efficients when \( r = 0.8, \sigma_x = 5 \) and \( \sigma_y = 7 \).
   
   e) What are the uses of analysis of time series?
   
   f) Define time series. What are its components?
   
   g) Distinguish between interpolation and extrapolation.
   
   h) Expand \((y - 1)^5\).
   
   i) What are the conditions on which Binomial expansion method of interpolation is applied?
   
   j) If two regression coefficients are 1.2 and 0.8, find correlation through regression co-efficient.
   
   k) What is Random sampling?
   
   l) Define probability.
SECTION - B

Answer any four of the following. Each question carries eight marks. \( (4\times8=32) \)

2. From the following table find correlation co-efficient between age and percentage of players of students.

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of players</td>
<td>70</td>
<td>50</td>
<td>40</td>
<td>30</td>
<td>10</td>
</tr>
</tbody>
</table>

3. Interpolate the production for the year 2005.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Production (in '000 tonnes)</td>
<td>20</td>
<td>22</td>
<td>26</td>
<td>30</td>
<td>35</td>
<td>?</td>
<td>43</td>
</tr>
</tbody>
</table>

4. Fit the straight line trend to the following figures by the method of least squares:

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (in '000 tonnes)</td>
<td>50</td>
<td>60</td>
<td>65</td>
<td>63</td>
<td>68</td>
<td>70</td>
</tr>
</tbody>
</table>

5. From a pack of playing cards a card is drawn at random. What is the probability that it is:
   a) Red
   b) Queen
   c) Either queen or Ace
   d) A spade or a king.

6. If the population standard deviation is 150. What should be the sample size to estimate population means with allowable error 10 at (a) 90% confidence level (b) 95% confidence level.

Note: At 90% value of confidence co-efficient is 1.64 and at 95% value of confidence co-efficient is 1.96.
SECTION – C

Answer any three of the following. Each question carries sixteen marks. (3×16=48)

7. From the following table find the number of students who have obtained less than 55 marks using Newton's method:

<table>
<thead>
<tr>
<th>Marks</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
<th>70-80</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Students</td>
<td>31</td>
<td>42</td>
<td>51</td>
<td>35</td>
<td>31</td>
</tr>
</tbody>
</table>

8. The number of units of a product exported during 2005-2012 are given below. Compute the trend values by the method of least squares and prove that \( \sum (y - y_c) = 0 \).

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exports (₹ in lakhs)</td>
<td>24</td>
<td>26</td>
<td>26</td>
<td>32</td>
<td>38</td>
<td>46</td>
<td>42</td>
<td>46</td>
</tr>
</tbody>
</table>

9. Following are the results of B.Com. examination of a college. Calculate the Karl Pearson's co-efficient of correlation between the age and success of candidates.

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>14-15</th>
<th>15-16</th>
<th>16-17</th>
<th>17-18</th>
<th>18-19</th>
<th>19-20</th>
<th>20-21</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Candidates appeared</td>
<td>300</td>
<td>100</td>
<td>50</td>
<td>150</td>
<td>400</td>
<td>250</td>
<td>150</td>
</tr>
<tr>
<td>No. of Candidates passed</td>
<td>180</td>
<td>65</td>
<td>34</td>
<td>90</td>
<td>250</td>
<td>145</td>
<td>81</td>
</tr>
</tbody>
</table>
10. A survey was conducted to study the relationship between sales (X) and advertisement (Y) and the following results were obtained:

<table>
<thead>
<tr>
<th>Sales (₹ in crores)</th>
<th>Advertisement (₹ in lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>115</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>10</td>
</tr>
<tr>
<td>Correlation co-efficient</td>
<td>0.75</td>
</tr>
</tbody>
</table>

a) Calculate the two regression equations.
b) Find the likely sales when advertisement is ₹ 100 lakhs.
c) Find the likely advertisement when sales is ₹ 150 crores.

1. a) $\sum x_i \cdot \sum y_i$
    $\sum x_i^2 \cdot \sum y_i$  
   b) $\sum x_i^2 \cdot \sum y_i$  
   c) $\sum x_i \cdot \sum y_i$  
   d) $r = 0.8$, $\sigma_x = 5$ and $\sigma_y = 7$ when $\sigma_x = 2$  
      $\sum x_i \cdot \sum y_i$  
   e) Is the regression line significant?  
   f) Is the slope of the regression line significant?  
   g) Find the standard error of the regression line.  
   h) Find $\mu_x$ : $(y - \mu)^2$  
   i) Is the slope of the regression line significant?  
   j) Find the estimated sales when sales is 1.2  
      $\sigma_y = 0.8$ and sales is 1.5  
   k) Is the regression line significant?  
   l) $\sum x_i \cdot \sum y_i$