22CMP214N/ 22CMP214

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2024
(Second Semester)

Branch – **COMPUTER SCIENCE**

STATISTICS FOR COMPUTER SCIENCE

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The coefficient of correlation is independent of (a) change of scale only (b) change of origin only (c) both change of scale and origin (d) none of the above	K1	CO1
	2	Scatter diagram of the variate values (X,Y) gives the idea about: (a) functional relationship (b) regression model (c) distribution of errors (d) none of the above	K2	CO1
2	3	Classical probability is measured in terms of: (a) an absolute value (b) a ratio (c) absolute value and ratio both (d) none of the above	K1	CO2
	4	If an event B has occurred and it is known that P(B)=1, the conditional probability P(A/B) is equal to: (a) P(A) (b) P(B) (c) one (d) zero	K2	CO2
3	5	If X and Y are two random variables such that their expectations exist and $P(x \leq y)=1$, then (a) $E(X) \leq E(Y)$ (b) $E(X) \geq E(Y)$ (c) $E(X)=E(Y)$ (d) none of the above	K1	CO3
	6	The height of persons in a country is a random variable of the type: (a) continuous random variable (b) discrete random variable (c) neither discrete nor continuous (d) continuous as well as discrete random variable	K2	CO3
4	7	The hypothesis under test is: (a) simple hypothesis (b) alternative hypothesis (c) null hypothesis (d) none of the above	K1	CO4
	8	Which of the following is a research hypothesis? (a) Two population means are equal (b) Intelligent people have more reading habit (c) population correlation coefficient is zero (d) Two populations follows the same distribution	K2	CO4
5	9	If all the frequencies of classes are same, the value of χ^2 is: (a) 1 (b)∞ (c) zero (d) none of the above	K1	CO5
	10	Degrees of freedom for Chi-square in case of contingency table of order (4x3) are: (a) 12 (b) 9 (c) 8 (d) 6	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

<table>
<tr><th>Module No.</th><th>Question No.</th><th>Question</th><th>K Level</th><th>CO</th></tr>
<tr><td rowspan="3">1</td><td>11.a.</td><td>Calculate Spearman's rank correlation coefficient between advertisement cost and sales from the following data.
<table>
<tr><td>Advertisement cost (Rs. 1000)</td><td>39</td><td>65</td><td>62</td><td>90</td><td>82</td><td>75</td><td>25</td><td>98</td><td>36</td><td>78</td></tr>
<tr><td>Sales (Rs. '00,000)</td><td>47</td><td>53</td><td>58</td><td>86</td><td>62</td><td>68</td><td>60</td><td>91</td><td>51</td><td>84</td></tr>
</table></td><td rowspan="3">K3</td><td rowspan="3">CO1</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>11.b.</td><td>Explain Scatter Diagram.</td></tr>
<tr><td rowspan="3">2</td><td>12.a.</td><td>State and prove multiplication theorem on probability.</td><td rowspan="3">K3</td><td rowspan="3">CO2</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>12.b.</td><td>An urn contain 4 black ball and 6 white balls. If 3 balls are drawn at random. Find the probability that
(i) all are black
(ii) all are white.</td></tr>
<tr><td rowspan="3">3</td><td>13.a.</td><td>A box contains 6 red and 4 white balls. Three balls are drawn at random obtain the probability distribution of the number of white balls drawn.</td><td rowspan="3">K4</td><td rowspan="3">CO3</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>13.b.</td><td>In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution.</td></tr>
<tr><td rowspan="3">4</td><td>14.a.</td><td>Explain the following topics
(i) Test of Significance
(ii) Paired t-test.</td><td rowspan="3">K4</td><td rowspan="3">CO4</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>14.b.</td><td>In a random sample of 1000 persons from town A, 400 are found to be consumers of wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B so far as the proportion of wheat consumer is concerned?</td></tr>
<tr><td rowspan="3">5</td><td>15.a.</td><td>The following table gives the yields of 15 samples of plot under three varieties of seed.
<table>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>20</td><td>18</td><td>25</td></tr>
<tr><td>21</td><td>20</td><td>28</td></tr>
<tr><td>23</td><td>17</td><td>22</td></tr>
<tr><td>16</td><td>15</td><td>28</td></tr>
<tr><td>20</td><td>25</td><td>32</td></tr>
</table>
Test using analysis of variance whether there is a significant difference in the average yield of seeds.</td><td rowspan="3">K5</td><td rowspan="3">CO5</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>15.b.</td><td>From the following table test whether the colour of the son's eye is associated with that of the father
<table>
<tr><td rowspan="2">Eye colour in father</td><td></td><td colspan="3">Eye colour of sons</td></tr>
<tr><td></td><td>Not light</td><td>Light</td><td>Total</td></tr>
<tr><td></td><td>Not light</td><td>230</td><td>148</td><td>378</td></tr>
<tr><td></td><td>Light</td><td>151</td><td>471</td><td>622</td></tr>
<tr><td></td><td>Total</td><td>381</td><td>619</td><td>1000</td></tr>
</table>
You may use the following value of $\chi^2_{0.05}$=3.84 for V=1, 5.99 for V=2, 7.82 for V=3.</td></tr>
</table>

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

<table>
<tr><th>Module No.</th><th>Question No.</th><th>Question</th><th>K Level</th><th>CO</th></tr>
<tr><td>1</td><td>16</td><td>Calculate the two regression equations of X on Y and Y on X from the data given below, taking deviations from actual means of X and Y
<table>
<tr><td>Price (Rs)</td><td>10</td><td>12</td><td>13</td><td>12</td><td>16</td><td>15</td></tr>
<tr><td>Amount Demanded</td><td>40</td><td>38</td><td>43</td><td>45</td><td>37</td><td>43</td></tr>
</table>
Estimate the likely demand when the price is Rs.20.</td><td>K4</td><td>CO1</td></tr>
<tr><td>2</td><td>17</td><td>State and prove addition theorem on probability.</td><td>K4</td><td>CO2</td></tr>
<tr><td>3</td><td>18</td><td>If X and Y are two random variables having joint density function
$F(x,y)=\begin{cases}\frac{1}{8}(6-x-y); 0 \le x < 2, 2 \le y < 4\\ 0, otherwise\end{cases}$
Find (i) $P(X<1 \cap Y<3)$ (ii) $P(X+Y<3)$
(iii) $P(X<1 \mid Y<3)$.</td><td>K4</td><td>CO3</td></tr>
<tr><td>4</td><td>19</td><td>A sample of ten house owners is drawn and the following values of their incomes are obtained. Mean Rs. 6,000; standard deviation Rs. 650. Test the hypothesis that the average income of house owners of the town is Rs. 5,500.</td><td>K5</td><td>CO4</td></tr>
<tr><td>5</td><td>20</td><td>Perform Two-way ANOVA for the data given below
<table>
<tr><td>plots of Land</td><td colspan="4">Treatment</td></tr>
<tr><td></td><td>A</td><td>B</td><td>C</td><td>D</td></tr>
<tr><td>i</td><td>38</td><td>40</td><td>41</td><td>39</td></tr>
<tr><td>II</td><td>45</td><td>42</td><td>49</td><td>36</td></tr>
<tr><td>iii</td><td>40</td><td>38</td><td>42</td><td>42</td></tr>
</table>
Use coding method, subtracting 40 from the given number.</td><td>K5</td><td>CO5</td></tr>
</table>

Z-Z-Z END