Code No: P21BST07

HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END REGULAR EXAMINATIONS, JAN - 2023
PROBABILITY & STATISTICS
(Common to CE,CSE,CSIT Branches)

Time: 3 hours Max. Marks: 70

Answer all the questions from each UNIT (5X14=70M)

<table>
<tr><th colspan="2">Q.No.</th><th>Questions</th><th>Marks</th><th>CO</th><th>KL</th></tr>
<tr><td colspan="6">UNIT-I</td></tr>
<tr><td>1.</td><td>a)</td><td>Calculate the median and mode for the distribution of the weights of 150 students from the data given below
<table>
<tr><td>Weight in kg</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td><td>70-80</td><td>80-90</td></tr>
<tr><td>Frequency</td><td>18</td><td>37</td><td>45</td><td>27</td><td>15</td><td>8</td></tr>
</table></td><td>[7M]</td><td>1</td><td>3</td></tr>
<tr><td></td><td>b)</td><td>Lives of two models of refrigerators A and B are given below. Find which team may be considered more consistent?
<table>
<tr><th>No of goals scored in a match</th><th>Team A</th><th>Team B</th></tr>
<tr><td>0</td><td>27</td><td>17</td></tr>
<tr><td>1</td><td>9</td><td>9</td></tr>
<tr><td>2</td><td>8</td><td>6</td></tr>
<tr><td>3</td><td>5</td><td>5</td></tr>
<tr><td>4</td><td>4</td><td>3</td></tr>
</table></td><td>[7M]</td><td>1</td><td>3</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>2.</td><td>a)</td><td>Calculate Karl Pearson coefficient of Skewness from the following data
<table>
<tr><td>x</td><td>14.5</td><td>15.5</td><td>16.5</td><td>17.5</td><td>18.5</td><td>19.5</td><td>20.5</td><td>21.5</td></tr>
<tr><td>f</td><td>35</td><td>40</td><td>48</td><td>100</td><td>125</td><td>87</td><td>43</td><td>22</td></tr>
</table></td><td>[7M]</td><td>1</td><td>3</td></tr>
<tr><td></td><td>b)</td><td>Distinguish between Skewness and Kurtosis and bring out their importance in describing frequency distribution.</td><td>[7M]</td><td>1</td><td>2</td></tr>
<tr><td colspan="6">UNIT-II</td></tr>
<tr><td>3.</td><td>a)</td><td>Fit second degree parabola to the following data and estimate y value x=2
<table>
<tr><td>x</td><td>10</td><td>12</td><td>15</td><td>23</td><td>20</td></tr>
<tr><td>y</td><td>14</td><td>17</td><td>23</td><td>25</td><td>21</td></tr>
</table></td><td>[7M]</td><td>2</td><td>3</td></tr>
<tr><td></td><td>b)</td><td>Fit a power curve of the type $y = ab^x$ to the following data
<table>
<tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>y</td><td>10</td><td>21</td><td>35</td><td>59</td><td>92</td><td>200</td><td>400</td><td>610</td></tr>
</table></td><td>[7M]</td><td>2</td><td>3</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>4.</td><td>a)</td><td>Explain Rank correlation.</td><td>[7M]</td><td>2</td><td>2</td></tr>
<tr><td></td><td>b)</td><td>Calculate coefficient of correlation from the following data
<table>
<tr><td>x</td><td>43</td><td>44</td><td>46</td><td>40</td><td>44</td><td>42</td><td>45</td><td>42</td><td>38</td><td>40</td><td>42</td><td>57</td></tr>
<tr><td>y</td><td>29</td><td>31</td><td>19</td><td>18</td><td>19</td><td>27</td><td>27</td><td>29</td><td>41</td><td>30</td><td>26</td><td>10</td></tr>
</table></td><td>[7M]</td><td>2</td><td>3</td></tr>
<tr><td colspan="6">UNIT-III</td></tr>
</table>

<table>
<tr><td>5.</td><td>a)</td><td>In a factory, machine A produces 40% of the output and machine B produces 60%. On the average, 9 items in 1000 produces by A are defective and 1 item in 250 produces by B is defective. An item drawn at random from a day's output is defective. What is the probability that it was produced by A or B.</td><td>[7M]</td><td>3</td><td>3</td></tr>
<tr><td></td><td>b)</td><td>A random variable X has the following probability function<br>Find (i) K (ii)Mean (iii)Variance
<table>
<tr><td>x</td><td>0</td><td>1</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>P(x)</td><td>0</td><td>K</td><td>2K</td><td>2K</td><td>3K</td><td>$K^2$</td><td>$7K^2+K$</td></tr>
</table></td><td>[7M]</td><td>3</td><td>3</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>6.</td><td>a)</td><td>Fit a binomial distribution to the following data
<table>
<tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>f</td><td>142</td><td>156</td><td>69</td><td>27</td><td>5</td><td>1</td></tr>
</table></td><td>[7M]</td><td>3</td><td>3</td></tr>
<tr><td></td><td>b)</td><td>In a Normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance if the distribution.</td><td>[7M]</td><td>3</td><td>5</td></tr>
<tr><td colspan="6">UNIT-IV</td></tr>
<tr><td>7.</td><td>a)</td><td>A population consists of five numbers 2, 3, 6, 8 and 11 by drawing samples of size two with replacement. Determine<br>(i) the Population mean (ii) The population standard deviation<br>(iii) the mean of sampling distribution of means<br>(d) the variance of sampling distribution of means<br>Verify the results</td><td>[7M]</td><td>4</td><td>5</td></tr>
<tr><td></td><td>b)</td><td>The mean of certain normal population is equal to the standard error of the mean of the samples of 64 from that distribution. Find the probability that the mean of the sample size 36 will be negative.</td><td>[7M]</td><td>4</td><td>3</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>8.</td><td>a)</td><td>What are principal steps in a sample survey.</td><td>[7M]</td><td>4</td><td>1</td></tr>
<tr><td></td><td>b)</td><td>A random sample of size 25 from a normal population has the mean $\bar{x}=47.5$ and standard deviation S=8.4. Does this information tend to support or refute the claim that the mean of the population is $\mu=42.5$</td><td>[7M]</td><td>4</td><td>4</td></tr>
<tr><td colspan="6">UNIT-V</td></tr>
<tr><td>9.</td><td>a)</td><td>Experience had shown that 20% of a manufactured product if of the top quality. In one day's production of 400 articles only 50 are of top quality. Test the hypothesis t 0.05 level.</td><td>[7M]</td><td>5</td><td>4</td></tr>
<tr><td></td><td>b)</td><td>Explain test of significance for difference of means of two large samples.</td><td>[7M]</td><td>5</td><td>2</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>10.</td><td>a)</td><td>A random sample of 10 boys had the following I.Q's:<br>70,120,110,101,88,83,95,98,107,100. (i) Do these data support the assumption of a population mean I.Q of 100. (ii) Find a reasonable range in which most of the mean I.Q values of samples of 10 boys lie.</td><td>[7M]</td><td>5</td><td>4</td></tr>
<tr><td></td><td>b)</td><td>To examine the hypothesis that the husbands are more intelligent than the wives, an investigator took a sample of 10 couples and administered them a test which measures the I.Q. The results are as follow
<table>
<tr><td>Husbands</td><td>117</td><td>105</td><td>97</td><td>105</td><td>123</td><td>109</td><td>86</td><td>78</td><td>103</td><td>107</td></tr>
<tr><td>Wives</td><td>106</td><td>98</td><td>87</td><td>104</td><td>116</td><td>95</td><td>90</td><td>69</td><td>108</td><td>85</td></tr>
</table>
Test the hypothesis with a reasonable test at the level of significance of 0.05.</td><td>[7M]</td><td>5</td><td>4</td></tr>
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