



VIT

Vellore Institute of Technology

Established in the Year 1984 and Re-accredited by AICTE, Dec. 1994

SCHOOL OF ADVANCED SCIENCES

Winter Semester 2023-2024

Continuous Assessment Test – I

Programme Name & Branch : B.Tech

Slot: D1+TD1

Course Name & code: Probability and Statistics & BMAT202L

Class Number (s): VL2023240501672/1745/1670/2282/2299/1664/1661

Exam Duration: 90 Min.

Maximum Marks: 50

Answer ALL Questions

(Only calculator is to be permitted)

Q.No	Question	Max Marks																				
1.	<p>Calculate the missing frequency X and median for the following data:</p> <table border="1"><thead><tr><th>No. of pills</th><th>No. of people cured</th></tr></thead><tbody><tr><td>4 – 8</td><td>11</td></tr><tr><td>8 – 12</td><td>13</td></tr><tr><td>12 – 16</td><td>16</td></tr><tr><td>16 – 20</td><td>14</td></tr><tr><td>20 – 24</td><td>X</td></tr><tr><td>24 – 28</td><td>9</td></tr><tr><td>28 – 32</td><td>17</td></tr><tr><td>32 – 36</td><td>6</td></tr><tr><td>36 – 40</td><td>4</td></tr></tbody></table> <p>Given that the average number of pills to cure a person is 20.</p>	No. of pills	No. of people cured	4 – 8	11	8 – 12	13	12 – 16	16	16 – 20	14	20 – 24	X	24 – 28	9	28 – 32	17	32 – 36	6	36 – 40	4	10
No. of pills	No. of people cured																					
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24 – 28	9																					
28 – 32	17																					
32 – 36	6																					
36 – 40	4																					

2.	<p>Calculate the Quartile deviation and the Standard deviation of the number of children in 35 families for the following data:</p> <table border="1"> <tbody> <tr> <td>No. of children</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>No of families</td> <td>2</td> <td>3</td> <td>10</td> <td>15</td> <td>4</td> <td>1</td> </tr> </tbody> </table>	No. of children	0	1	2	3	4	5	No of families	2	3	10	15	4	1	10								
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No of families	2	3	10	15	4	1																		
3.	<p>A random variable X has probability density function</p> $f(x) = \begin{cases} kx^2 e^{-3x}, & x > 0 \\ 0, & x \leq 0 \end{cases}$ <p>Find (i) the constant k (ii) $P(1 < X < 2)$ (iii) $P(X \geq 3)$ (iv) $P(X < 1)$</p>	10																						
4.	<p>The joint probability mass function of two random variables X and Y is specified as follows,</p> $P[X = x, Y = y] = k(2x + 3y), \quad x = 1, 2; y = 0, 1, 2.$ <p>Obtain (i) the constant k. (ii) the marginal probability distribution of X. (iii) the conditional probability of Y given $X = 1$. (iv) $P(X > 1, Y < 2)$. (v) Check whether X and Y are independent or not.</p>	10																						
5.	<p>A sample of 10 fathers and their sons gave the following data about their heights in inches:</p> <table border="1"> <tbody> <tr> <td>Father X</td> <td>65</td> <td>63</td> <td>67</td> <td>64</td> <td>68</td> <td>62</td> <td>70</td> <td>66</td> <td>68</td> <td>67</td> </tr> <tr> <td>Son Y</td> <td>68</td> <td>66</td> <td>68</td> <td>65</td> <td>69</td> <td>66</td> <td>68</td> <td>65</td> <td>71</td> <td>67</td> </tr> </tbody> </table> <p>Calculate the correlation coefficient of X and Y and comment on the result.</p>	Father X	65	63	67	64	68	62	70	66	68	67	Son Y	68	66	68	65	69	66	68	65	71	67	10
Father X	65	63	67	64	68	62	70	66	68	67														
Son Y	68	66	68	65	69	66	68	65	71	67														