Reg. No.:

Name :

VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test (CAT)-I – January 2023

Programme	:	B.Tech	Semester	:	Winter Semester 2023
Course Code	:	BMAT202L	Class Nbr(s)	:	CH2022235002615,17,19, 21,23,35,32,30,28,25,37
Course Title	:	Probability and Statistics			
Faculty(s)	:	Dr. Kaliyappan M, Dr. Revathi G K, Dr. Jaganathan B, Dr. Hannah Grace G, Dr. Sudip Debnath. Dr. Mythili G. Y, Dr. K. Sethu Kumarasamy, Dr. Sushmitha P, Dr. Kamalesh Acharya, Dr. Ashish Kumar Nandi, Dr. Sandip Daluil	Slot	:	E1+TE1
Time	:	90 Minutes	Max. Marks	:	50

Answer all the Questions

(5 X 10 = 50 Marks)

<table>
<tr><th>Q. No.</th><th>Sub-division</th><th>Question Text</th><th>Marks</th></tr>
<tr><td>1.</td><td></td><td>The marks obtained by a set of students is tabulated below. Find the median and mode of the data given that the mean marks (rounded off to decimal places) is 43.48.
<table>
<tr><td>Marks</td><td>10-19</td><td>20-29</td><td>30-39</td><td>40-49</td><td>50-59</td><td>60-69</td><td>70-79</td></tr>
<tr><td>Students</td><td>4</td><td>8</td><td>11</td><td>?</td><td>12</td><td>6</td><td>3</td></tr>
</table></td><td>10</td></tr>
<tr><td>2.</td><td>(a)

(b)</td><td>For a group of 100 candidates, the mean and standard deviation of their marks were found to be 60 and 15 respectively. Later on it was found that the scores 45 and 72 were wrongly entered as 40 and 27. Find the corrected mean and standard deviation.

Find the co-efficient of quartile deviation and the co-efficient of range for the following data:
<table>
<tr><td>Salary (Rs.)</td><td>30-32</td><td>32-34</td><td>34-36</td><td>36-38</td><td>38-40</td><td>40-42</td><td>42-44</td></tr>
<tr><td>Workers</td><td>12</td><td>18</td><td>16</td><td>14</td><td>12</td><td>8</td><td>6</td></tr>
</table></td><td>5+5</td></tr>
</table>

3.		If X is a random variable whose probability distribution function is given by $$f(x) = \begin{cases} px^2, & x = 1,2,3 \\ 0, & otherwise \end{cases}$$ Find the value of p, hence find the mathematical expectation, variance and moment generating function of X.	10
4.		Let the two-dimensional random variable (X, Y) have the joint probability density function $$f_{XY}(x,y) = \begin{cases} k(x+y^2) & 0 < x < 1, 0 < y < 1 \\ 0, & \text{otherwise.} \end{cases},$$ Then (i) Find the value of k. (ii) Find the marginal probability density functions $f_X(x)$ and $f_Y(y)$. (iii)Are the random variables X and Y indpendent? (iv)Find $P(X+Y<1)$	10
5		Marks obtained by 5 students in Algebra and Geometry are given below: <table><tr><td>Algebra</td><td>16</td><td>15</td><td>***k***</td><td>10</td><td>8</td></tr><tr><td>Geometry</td><td>11</td><td>18</td><td>10</td><td>20</td><td>17</td></tr></table> Compute the value of k from the above table if the Pearson correlation coefficient is ***- 0.424***	10