VIT®

Vellore Institute of Technology

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

SCHOOL OF ADVANCED SCIENCES

Winter Semester 2023-2024

Continuous Assessment Test –I

Programme Name & Branch : B. Tech

Slot : B2 + TB2 + TBB2

Course Name & code : Probability and Statistics & BMAT202L

Exam Duration : 90 Min.

Maximum Marks: 50

Answer ALL Questions

Q.No	Question	Max Marks
1.	Find mean, median and mode for the following data:	10

Class interval	150-154	155-159	160-164	165-169	170-174	175-179	180-184
Frequency	10	11	11	10	7	6	6

2.	Life of bulbs produced by two factories A and B are given below: Find quartile deviation of A and B and then find its coefficients to know the bulbs of which factory are more consistent from the point of view of the length of life?	10

Length of life (in hours)	550-650	650-750	750-850	850-950	950-1050
Factory A(No. of bulbs)	10	22	52	20	16
Factory B(No. of bulbs)	8	60	24	16	12

3.	The probability density function of a random variable X is given by $f_X(x) = \begin{cases} x, & 0 < x < 1 \\ k(2-x), & 1 \le x \le 2 \\ 0, & \text{otherwise} \end{cases}$ (i) Find the value of k, (ii) Find $P(0.2 < x < 1.2)$, (iii) What is $P[\ 0.5 < x < 1.5 \,/\, x \ge 1\ ]$? (iv) Find the distribution function of $f_X(x)$.	10

4. Find all the marginal and conditional distributions for the following table which represents the joint probability distribution of the discrete random variable (X, Y). 10

Y	X = 1	X = 2	X = 3
1	$\frac{1}{12}$	$\frac{1}{6}$	0
2	0	$\frac{1}{9}$	$\frac{1}{5}$
3	$\frac{1}{18}$	$\frac{1}{4}$	$\frac{2}{15}$

5. Find the correlation coefficient between the two subjects: Mathematics and Statistics. The marks obtained by 10 students in those subjects are given below: 10

Marks in Mathematics	75	30	60	80	53	35	15	40	38	48
Marks in Statistics	85	45	54	91	58	63	35	43	45	44