Continuous Assessment Test I (CAT I) – JANUARY 2025

Programme	:	B.Tech.	Semester	:	WINSEM 2024-25
Course Code & Course Title	:	BMAT202L Probability and Statistics	Slot	:	F2+TF2
Faculty	:	Dr.Uma Maheswari S, Prof.Aarthy B Prof.Anitha G,Prof S. Sumathi Prof. K. Sakthidevi, Prof.Yuvarani C Prof.Vaishnavi S	Class Number	:	CH2024250500979, 982,983,984,985,988 989
Duration	:	90 Minutes	Max. Mark		50

General Instructions:
- Write only your registration number on the question paper in the box provided and do not write other information.
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	CO/BT	Marks
1.		From the following distribution, find the Quartile Deviation and its coefficient. Central Size: 1,2,3,4,5,6,7,8,9,10 Frequency: 2,9,11,14,20,24,20,16,5,2	CO1/3	10

Central Size	1	2	3	4	5	6	7	8	9	10
Frequency	2	9	11	14	20	24	20	16	5	2

Q. No	Sub Sec.	Description	CO/BT	Marks
2.	(a)	A study of the age of 100 persons grouped in the intervals of $20 - 22, 22 - 24, ...$ etc. revealed the Mean age and Standard deviation to be 32.02 and 13.18 respectively. While checking it was discovered that the observation 57 was misread as 27. Calculate the correct Mean age and Standard deviation.	CO1/5	5
	(b)	A trader is actively engaged in the future trading of gold, silver and copper. He maintains elaborate record of prices of these metals on his computer. Based on the records of the last 36 months, the following calculations were obtained: (table below) Calculate: (i) Rate of which of these metals is more consistent? (ii) Which of these metals the trader should sell?	CO1/3	5

For Q2(b):

Metal	Current Rate	Average Rate	Standard Deviation
Gold	Rs. 9,800 per 10 grams	Rs. 8,000 per 10 grams	Rs. 750
Silver	Rs. 18,500 per kg	Rs. 14,000 per kg	Rs. 1800
Copper	Rs. 245 per kg	Rs. 200 per kg	Rs. 28

Q. No	Sub Sec.	Description	CO/BT	Marks
3.	(a)	The joint probability density function of two-dimensional random variable (X,Y) is given by $f(x,y) = xy^2 + \dfrac{x^2}{8}, 0 \le x \le 2, 0 \le y \le 1$. Compute (i) Marginal probability distribution of X and Y (2Marks) (ii) $P\left(Y < \frac{1}{2} \mid X > 1\right)$ (2 Marks) (iii) $P(X + Y \le 1)$. (3 Marks)	CO2/3	7

	(b)	Let X and Y be two random variables having the joint density function, $$f(x,y) = \frac{(2x+y)}{27}$$ where x and y can assume only the integer values $0,1,2$. Find the conditional distribution of Y for $X = x$. Tabulate the results in a table form.	CO2/3	3
4.		A continuous random variable $'X'$ has the probability density function $$f(x) = kx^2 e^{-x}, x > 0.$$ Find the mean, variance and $P(X \leq 1.5)$.	CO2/3	10
5.		Let X denote the ratio of gallium to arsenide and Y denote the functional wafers retrieved during a 1-hour period. The joint probability density function of the random variable X and Y is given by, $$f(x,y) = \begin{cases} \dfrac{x(1+3y^2)}{4} & ,0 < x < 2, 0 < y < 1 \\ 0, otherwise \end{cases}$$ Does the ratio of gallium to arsenide affects the functioning of gallium-arsenide wafers? Find the variance of the random variable $Z = 3X - 2Y + 5$.	CO2/3	10

BL-Bloom's Taxonomy Levels - (1. Remembering, 2. Understanding, 3. Applying, 4. Analysing, 5. Evaluating, 6. Creating)

**********All the best *************