Name:

Enrolment No:



Mid Semester Examination, October 2023

Program Name: B.Tech. CSE

Course Name: Probability and Statistics Semester: III

Course Code: CSEG 2036P Time: 1.5 hours

No. of Pages: 2 Max Marks: 50

Instructions: Attempt all the questions.

						ion A Iarks					
S. No.										Marks	CO
Q1	Prove that $A - (A - B) = A \cap B$ using the properties of sets. Find $A \cup (B \cup C) \cap (\bar{A} \cap \bar{C})$, if $A = \{3x: 1 \le x \le 3\}$, $B = \{x^2: 1 \le x \le 4\}$ and $C = \{11,13\}$ if the universal set is composed of the union of the three sets.								5	CO1	
Q 2	If <i>X</i> denotes the number of heads in a single toss of four fair coins. Determine $P(X > 2) + P(X \le 1)$ and $P(1 < X \le 4)$.								5	CO1	
Q 3	Given the x $f(x)$ What is the	0	1 k	2 2k	3 2k	4 3k d standar	5 k² rd deviati	$ \begin{array}{c c} 6 \\ 2k^2 \\ \text{on of thi} \end{array} $	$ \begin{array}{c c} 7 \\ 7k^2 + k \\ \end{array} $ s dataset?	5	CO2
Q 4	Let X and Y be independent random variables that are uniformly distributed on the interval $[0, 1]$. Let $Z = X + Y$. Find $E[Z X]$.							5	CO2		
Q 5	If the first and second central moments around the point $x = 5$ is given as 1 and 5 respectively, for a distribution, find the value of $E((2 + X)^2)$ and $Var(4 + 3X)$							5	CO2		

	What is mean	t by covarian	ice and correl	ation coefficie	ent of two ran	dom		
	variables? If independent random variables <i>X</i> and <i>Y</i> have variances 24 and 19							
	respectively, what is the correlation coefficient between $X + Y$ and $X - Y$?							
			Se	ection B				
			20	0 Marks				
Q 7	(a) A pair of							
	appearing							
	Y(a,b) =							
	(b) Given the							
	x	1	2	3	4	5	10	CO1, CO2
	P(X=x)	0.05	0.30	0.25	0.15	0.25		
Q 8	highest probability of finding a value between 0 and 0.4. In a certain medical test for a rare disease, let <i>D</i> represent the event that a person has the disease, and <i>T</i> represent the event that the test result is positive. The							
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