Hall Ticket No.: | | | | | | | | | | |

Set-1

Course Code: **23MTCST01**

MALINENI LAKSHMAIAH WOMEN'S ENGINEERING COLLEGE

(AUTONOMOUS)

I-M.Tech. I-Semester (MR23) Regular Examinations, March - 2024

Mathematical Foundations for Computer Science (MFCS)

COMPUTER SCIENCE & ENGINEERING

Time: 3 hours Max. Marks: 75

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*Answer **ALL** the questions – **5*15=75 Marks***

Q. No.		Question	Marks	CO	BL
1	a)	Suppose $fx = c\ 3xforx$=1,2,3.....$n$the probability function of a random variable X , then (i) determine the value of c (ii) find the distribution function of X &$P(X\geq 3)$	(8M)	CO1	L2
	b)	The joint probability function of two discrete random variables X and Y is given by f(x,y) = c (2x +y) where X and Ycan assume all integers such that 0 ≤ x ≤ 2, 0 ≤ y ≤3 and f(x,y) =0 other wise. Find i) the value of c ii) E (X) iii) E(Y) iv) Var(X) and Var(Y).	(7M)	CO1	L3
		(OR)			
2	a)	Let X and Y have joint density function $fx,y = 2e- x+yforx\geq 0;y\geq 0$ 0 *otherwise* Then find conditional expectation of(i) Y on X (ii) X on Y	(7M)	CO2	L1
	b)	A businessman goes to hotels X, Y, Z, 20%,50%,30% of the times respectively. It is known that 5%,4%,8% of the rooms in X, Y, Z hotels have faulty plumbing's. What is the probability that businessman room having faulty plumbing is assigned to hotel Z.	(8M)	CO2	L2

3	a	It has been claimed that in 60% of all solar installations 'utility bill reduced to by one- third.Accordingly, what are probabilities utility bill reduced to by at least one- third (i) in fr of five installations and (ii) at least fr of five installations	(8M)	CO2	L2
	b	Derive the mean, variance, coefficient skewness& kurtosis for Poisson's distribution	(7M)	CO2	L3
		(OR)			
4	a	If 20% of memory chips made in a certain plant are defective, then what are the probabilities, that a randomly chosen 100 chips for inspection (i) at most 15 will defective (ii) at least25 will be defective (iiiin between 16 and 23 will be defective	(8M)	CO2	L2
	b	Derive the mean and variance of Exponential distribution.	(7M)	CO2	L3

5	a	The following shows corresponding values of three variables X,Y,Z. Find least square regression equation Z= a+bx+cy x 1 2 1 2 3 y 2 3 1 1 2 *z* 12 19 8 11 18	(7M)	CO3	L2
	b	Explain the procedure for fitting an exponential curve of the form y = aebx.	(8M)	CO3	L3
(OR)					
6	a	What the properties of a good estimator. Explain each of them	(8M)	CO3	L2
	b	Suppose that n observations *X*1,2……*Xnaremade* from normal distribution and variance is unknown. Find the maximum likelihood estimate of the mean.	(7M)	CO3	L3

7	a	Prove that in any non- directed graph there is even number of vertices of odd degree.	(7M)	CO4	L2
	b	State and prove Euler's formula for planar graphs.	(8M)	CO4	L3
(OR)					
8	a	Prove that a tree with 'n' vertices have n-1 edges.	(8M)	CO4	L2
	b	If T is a binary tree of n vertices,show that the number of pendant vertices is *n*+1 /2	(7M)	CO4	L3

9	a	Using the principles of Inclusion and exclusion find the number of integers between 1 and 100 that are divisible by 2 ,3 or 5.	(7M)	CO5	L2
	b	Find the number of integral solutions for *x*1+*x*2+*x*3+*x*4+*x*5=50where*x*1≥ 4, *x*2≥7, *x*3≥14, *x*4≥10, *x*5≥0	(8M)	CO5	L3
(OR)					
10	a	Solve the recurrence relation 0 12 7 2 1 =+–– n nn a aa for n 00202≥ using Generating function method.	(8M)	CO5	L2
	b	Solve an-7a(n-1)+10a(n-2)=4n for n >=2	(7M)	CO5	L3

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