R20

Code No: R20A0024

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech I Semester Supplementary Examinations, June 2025

Probability and Statistics

(CSE, IT, CSE-CS, CSE-AIML, CSE-DS, CSE-IOT & B.Tech-AIDS)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

***

SECTION-I

			BCLL	CO(s)	Marks
1	***A***	A random variable X has the following distribution	**L2**	**CO-I**	**[7M]**

X	1	2	3	4	8		9
P(x)	k	3k	5k	7k	9k		11k

Determine(i) k (ii) mean (iii) variance (iv) $P(X) > 2$

	B	Consider two random variables X and Y with joint PMF given in below Table	**L2**	**CO-I**	**[7M]**

	Y=1	Y=2	Y=3	Y=4
X=1	6C	3C	2C	4C
X=2	4C	2C	4C	0
X=3	2C	C	0	2C

a. Find C
b. Calculate the Marginal distributions.

OR

2	***A***	If $f(x) = kx^2e^{-x}$ is pdf in $0< x < \infty$ find the value of k and mean of random variable.	**L2**	**CO-I**	**[7M]**
	B	Let X and Y be jointly continuous random variables with joint PDF	**L2**	**CO-I**	**[7M]**

$$f_{X,Y}(x,y) = \begin{cases} x + cy^2 & 0 \le x \le 1, 0 \le y \le 1 \\ 0 & otherwise \end{cases}$$

a. Find the constant C
b. Find $P(0 \le X \le \frac{1}{2}, 0 \le Y \le \frac{1}{2})$

SECTION-II

3	***A***	If X is a Poisson variate such that $3p(x=4)=\frac{1}{2}p(x=2)+p(x=0)$, find mean of X and $P(X \leq 2)$.	**L3**	**CO-II**	**[7M]**
	B	In normal distribution exactly 7% of the items are under 35 and 89% are under 63. What are mean and standard deviation of the distribution?	**L3**	**CO-II**	**[7M]**
		OR			
4	***A***	Ten coins are thrown simultaneously. Find the probability of getting at least seven heads.	**L3**	**CO-II**	**[7M]**
	B	In a sample of 1000 cases, the mean of certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal, find (i) how many students score between 12 and 15(ii) how many score above 18(iii) how many score below 18?	**L3**	**CO-II**	**[7M]**
		SECTION-III			
5	***A***	Compute the correlation coefficient between x and y from the following data	**L2**	**CO-III**	**[7M]**

x	6	2	10	4	8
y	9	11	5	8	7

B	Obtain the lines of regression from the following data					**L2**	**CO-III**	**[7M]**

x	1	2	3	4	5	6	7
y	9	8	10	12	11	13	14

OR

6	***A***	The following zero order correlation coefficients are given: $r_{12}=0.6, r_{13}=0.4$ & $r_{23}=0.35$ Calculate multiple correlation coefficient treating first variable as dependent and second & third variables as independent.	**L2**	**CO-III**	**[7M]**
	B	For the given lines of regression 3x-3y=5 and x-4y=7. Find (a) Regression coefficients (b) Coefficient of correlation.	**L2**	**CO-III**	**[7M]**
		SECTION-IV			
7	***A***	A population consists of five numbers 2,3,6,8,11. Consider all possible samples of size two which can be drawn without replacement from the population. Find (a) the mean of the population (b) the standard deviation of population (c) mean of the sampling distribution of means.	**L2**	**CO-IV**	**[7M]**
	B	A coin is tossed 960 times and head turned up 183 times. Is the coin unbiased?	**L3**	**CO-IV**	**[7M]**
		OR			
8	***A***	If 80 patients are treated with an antibiotic 59 got cured. Find a 99% confidence limit to the true proportion curve.	**L3**	**CO-IV**	**[7M]**
	B	If two independent random samples of size $n_1=13$ and $n_2=7$ are taken from a normal population, what is the probability that the variance of the first sample will be at least four times as large as that of the second sample?	**L3**	**CO-IV**	**[7M]**
		SECTION-V			
9	***A***	An auditor claims that he takes on an average 10.5 days to file	**L3**	**CO-V**	**[7M]**

income tax returns (I.T. returns). Can this claim be accepted if a random sample shows that he took 13, 19, 15, 10, 12, 11, 14, 18 days to file I.T returns?

B Two independent sample of 8 and 7 items respectively had the following values. **L3 CO-V [7M]**

Sample-I	11	11	13	11	15	9	12	14
Sample-II	9	11	10	13	9	8	10	-

Is the difference between the means of samples significant?

OR

10 ***A*** The measurements of the output of two units have given the following results. Assuming that the both samples have been obtained from the normal population at 5% significant level, test whether two populations have the same variance. **L3 CO-V [7M]**

Unit-A	14.1	10.1	14.7	13.7	14.0
Unit-B	14.0	14.5	13.7	12.7	14.1

B From the following data find whether there is any significant linking in the habit of taking soft drinks among the categories of employees. **L3 CO-V [7M]**

Soft Drinks	Clerks	Teaches	Officers	Total
Pepsi	10	25	65	100
Thumps Up	15	30	65	110
Fanta	50	60	30	140
Total	75	115	160	350

***