

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)**

II B.Tech II Semester Regular/Supplementary Examinations, May-2024

PROBABILITY AND STATISTICS

(Common to CSE, CSE(AI&ML), CSE(AI) and CSE(DS))

Time: 3 hours

Max. Marks: 70

**Answer ONE Question from each Unit
All Questions Carry Equal Marks**

Q. No.	Question										BTL	CO	Marks		
UNIT – I															
1.	a)	Explain the measures of central tendencies.										K2	CO1	7M	
	b)	Calculate the mean and median from the following table:										K3	CO1	7M	
		Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70						
		frequency	8	12	25	38	27	9	4						
OR															
2.	a)	Explain about data visualization and data types.										K2	CO1	7M	
	b)	Calculate the variance and standard deviation of the following continuous frequency distribution.										K3	CO1	7M	
		Class interval	10-20	20-30	30-40	40-50	50-60	60-70	70-80						
		frequency	10	18	28	32	37	45	12						
UNIT – II															
3.	a)	The following are the numbers of minutes it took 10 mechanics to assemble a piece of machinery in the morning, x , and late afternoon, y :										K3	CO2	7M	
		x	11.1	10.3	12.0	15.1	13.7	18.5	17.3	14.2	14.8				15.3
		y	10.9	14.2	13.8	21.5	13.2	21.1	16.4	19.3	17.4	19.0			
		Calculate the correlation coefficient between x and y .													
	b)	Fit a second-degree polynomial $y = a + bx + cx^2$ by the method of least squares:										K3	CO2	7M	
		x	0	1	2	3	4	5	6	7	8				
		y	12.0	10.5	10.0	8.0	7.0	8.0	7.5	8.5	9.0				
OR															
4.	a)	The following are measurements of the air velocity and evaporation coefficient of burning fuel droplets in an impulse engine:										K3	CO2	7M	
		Air Velocity	20	60	100	140	180	220	260	300	340				380
		Evo. Coeff	0.18	0.37	0.35	0.78	0.56	0.75	1.18	1.36	1.17				1.65
		Fit a simple linear regression line to the above data.													
	b)	An experiment gave the following values:										K3	CO2	7M	
		x	61	26	7	26									
		y	350	400	500	600									
		Use the principle of least squares, fit a curve $y = ax^b$.													

UNIT – III

5.	a)	Fit a binomial distribution to the following data:	K3	CO3	7M										
		<table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>f</td><td>2</td><td>14</td><td>20</td><td>34</td><td>22</td><td>8</td></tr></table>				x	0	1	2	3	4	5	f	2	14
x	0	1	2	3	4	5									
f	2	14	20	34	22	8									
	b)	Two dice are thrown. Let X assign to each point (a, b) in S the maximum of its numbers i.e. $X(a, b) = \max(a, b)$. Find the probability distribution X is a random variable with $X(s) = \{1, 2, 3, 4, 5, 6\}$. Also find the mean and variance of the distribution.	K3	CO3	7M										

OR

6.	a)	Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each draw. Find the probability that (i) both are white (ii) First is red and second is blue	K3	CO3	7M															
	b)	<div>The probability density function of a variable X is as follows</div> <table><tr><td>$X = x$</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>$f(x)$</td><td>k</td><td>$3k$</td><td>$5k$</td><td>$7k$</td><td>$9k$</td><td>$11k$</td><td>$13k$</td></tr></table> <div>(i) Find k (ii) Evaluate $P(X > 3)$ and $P(0 < x < 5)$</div>	$X = x$	0	1	2	3	4	5	6	$f(x)$	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$	K3	CO3
$X = x$	0	1	2	3	4	5	6													
$f(x)$	k	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$													

UNIT – IV

7.		A population consists of six numbers 5, 10, 14, 18, 13, 24. Consider all samples of size two which can be drawn without replacement from this population. Find	K3	CO4	14M
	a)	The population mean.			
	b)	The population standard deviation			
	c)	The mean of the sampling distribution of means			
	d)	The standard deviation of the sampling distribution of means.			

OR

8.	a)	If the mean breaking strength of copper wire is 575 lbs, with a standard deviation of 83 lbs. How large a sample must be used in order that there will be one chance in 100 that the mean breaking strength of the sample is less than 572 lbs.	K3	CO4	7M
	b)	The mean and standard deviation of a population are 11,795 and 14,054 respectively. If $n = 50$, find 95% confidence interval of the mean.	K3	CO4	7M

UNIT – V

9.	a)	An ambulance service claims that it takes on average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 minutes and the variance of 16 minutes. Test the claim at 0.05 level of significance.	K3	CO5	7M
	b)	In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that majority of men in this city are smokers.	K3	CO5	7M

OR

10.	a)	The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68 inches respectively. Can the samples be regarded as drawn from the same population of standard deviation 2.5 inches.	K3	CO5	7M
	b)	In two large populations, there are 30% and 25% respectively of fair-haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations.	K3	CO5	7M