

St. Peter's Engineering College (Autonomous) Dullapally (P), Medchal, Hyderabad – 500100. I - Mid Term Examination – September 2024				Dept.	:	AIDS/CSE/ CSG
				Academic Year 2024-25		
Subject Code	:	AS22-00BS09	Subject	:	PROBABILITY AND STATISTICS	
Class/Section	:	B. Tech	Year	:	II	Semester : II
Duration	:	120 Min	Max. Marks	:	30	Date: : 02.09.2024

BLOOMS LEVEL					
Remember	L1	Understand	L2	Apply	L3
Analyze	L4	Evaluate	L5	Create	L6

PART – A (10x1M = 10M)**Note: Answer all Questions. Each Question carries equal marks.**

Q. No	Question (s)	Marks	BL	CO
UNIT - I				
1	a) Define random variable.	1M	L1	C221.1
1m 1b	b) Define Expectation and variance of discrete random variable	1M	L2	C221.1
	c) Write probability distribution function of continuous random variable	1M	L1	C221.1
	d) Define Mode and Median of continuous random variable.	1M	L2	C221.1
UNIT – II				
	e) Write the conditions of Binomial distribution 1m 1b	1M	L3	C221.2
	f) Define Poisson Distribution 1m 1c	1M	L2	C221.2
	g) A fair coin is tossed ten times. Find the probability of getting at least 6 heads. 3m 2a	1M	L3	C221.2
	h) Derive mean of Poisson Distribution 5m 3b	1M	L1	C221.2
UNIT – III				
	i) Define Null Hypothesis.	1M	L1	C221.3
	j) Define acceptance Region. 1m 1b	1M	L1	C221.3

PART – B (20M)

Q. No	Question (s)	Marks	BL	CO
UNIT - I				
2	<p>a) If X is a continuous random variable and k is a constant. Then prove that:</p> <p>(i) $Var(X + K) = Var(X)$ pg 20</p> <p>(ii) $Var(KX) = K^2 Var(X)$</p>	4M	L3	C221.1
	<p>b) Let X denote the minimum of two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Discrete probability distribution, (ii) Expectation 11</p>	4M	L6	C221.1
OR				
3	<p>a) A continuous random variable has the probability density function</p> $f(x) = \begin{cases} kxe^{-x\lambda} & \text{for } x \geq 0, \lambda > 0 \\ 0 & , \text{otherwise} \end{cases}$ <p style="text-align: right; color: blue;">pg 9</p> <p>Determine (i) k (ii) Mean (iii) Variance.</p>	8M	L3	C221.1
UNIT – II				
4	<p>a) The marks obtained in mathematics by 1000 students is normally distributed with mean 78% and standard deviation 11%.</p> <p>(i) Determine how many students got marks above 90%. 5m 3d</p> <p>(ii) what was the highest mark obtained by the lowest 10% of the Students.</p>	4M	L3	C221.2
	<p>b) Find the mean and variance of the distribution. In a Normal distribution, 7% of the items are under 35 and 89% are over 63. 5m 3e</p>	4M		
OR				
5	<p>a) Derive mean and variance of binomial distribution 10m 4a</p>	4M	L3	C221.2
	<p>b) If a Poisson distribution is such that $P(x=1) \frac{3}{2} = P(x=3)$, Find (i) $P(x \geq 1)$ (ii) $P(x \leq 3)$ and (iii) $P(2 \leq x \leq 5)$. 5m 3c</p>	4M	L3	C221.2
UNIT – III				
6	<p>A sample of 64 students has a mean weight of 70kg. Can this be regarded as a sample from a population which mean weight 56kgs and standard deviation 25kgs. pg 2</p>	4M	L2	C221.3
OR				
7	<p>A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population.</p>	4M	L4	C221.3