O.P.Code: 23HS0838	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year II Semester Supplementary Examinations December-2025
PROBABILITY & STATISTICS
(Common to CSIT, CSE, CIC, CCC, CAI, CSM)

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

PART-A
(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Suppose a data set consists of the following observations: 0.32, 0.53, 0.28, 0.37, 0.47, 0.43, 0.36, 0.42, 0.38, 0.43. Find the mode	CO1	L2	2M
	b	Define Skewness and Kurtosis in statistics	CO1	L1	2M
	c	A family has two children. What is the conditional probability that both are boys given that at least one of them is a boy?	CO2	L2	2M
	d	Suppose X has the following probability mass function: $p(X=0)=0.2$, $p(X=1)=0.5$, $p(X=2)=0.3$. Calculate $E(X)$	CO2	L2	2M
	e	A coin is tossed 6 times. Find the probability of getting 3 heads	CO3	L2	2M
	f	If the variance of a Poisson variate is 3. Find $P(1 \le X < 4)$	CO3	L2	2M
	g	Define type-I error and type-II error.	CO4	L1	2M
	h	Define Critical region	CO4	L1	2M
	i	Define t-test for single mean	CO5	L1	2M
	j	State the Null hypothesis and Alternative hypothesis for F-test	CO6	L1	2M

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2		The first four moments of a distribution about the value 5 of the variables are 2, 20, 40 and 50. Calculate mean, Variance, β_1 and β_2 of the distribution.	CO1	L3	10M

OR

3		Ten competitors in a musical test were ranked by the three judges A, B and C in the following order	CO1	L3	10M

Ranks by A	1	6	5	10	3	2	4	9	7	8
Ranks by B	3	5	8	4	7	10	2	1	6	9
Ranks by C	6	4	9	8	1	2	3	10	5	7

Using rank correlation coefficient method, discuss which pair of judges has the nearest approach to common likings in music.

UNIT-II

4		Companies P, Q, R produce 40%,35% and 25% of the computer chips respectively. It is known that 3%,2% and 1% of the computer chips produced from P, Q, R are defectives respectively. A chip is selected at random from the production and is found to be defective. what are the respective probabilities that are produced from company P and R?	CO2	L3	10M

OR

5		Let X denote, the number of holes that for can be drilled per bit. The density for X is given the following table:	CO2	L5	10M

X	1	2	3	4	5	6	7	8
p(X)	0.02	0.03	0.05	0.2	0.4	0.2	0.07	p(8)

(i) Find p(8) and Mean of X
(ii) Find the probability that a randomly selected bit can be used to drill between three and five holes inclusive.
(iv) Find variance of X

UNIT-III

6	a	Derive the mean of Binomial distribution	CO3	L3	
	b	If 2% of light bulbs are defective. Find the probability that (i) 2 defective items (ii) at least 3 defective items (iii) $P(2 < x < 5)$in a sample of 100	CO4	L3	

OR

7		If the masses of 300 students are normally distributed with mean 68kgs and standard deviation 3kgs.How many students have masses i) Greater than 72kgs ii) Less than or equal to 64kg iii) Between 65 and 71 kgs inclusive	CO4	L3	

UNIT-IV

8	a	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.	CO5	L3	
	b	In a random sample of 125 cool drinkers 68 said they prefer Thumsup to Pepsi. Test thus null hypothesis $P = 0.5$ against the alternative hypothesis is $P > 0.5$.	CO5	L3	

OR

9		A sample of the height of 6400 Englishmen has a mean of 67.85 inches and a standard deviation of 2.5 inches while a simple sample of height of 1600 Australians has a mean of 68.55 inches and a standard deviation of 2.52 inches. Do the data indicate the Australians are on the average taller than the Englishmen?	CO5	L4	

UNIT-V

10		Samples of two types of electrical light bulbs were tested for length of life and following data were obtained	CO6	L4	

	Type I	Type II
Sample numbers	8	7
Sample mean	1234 hrs	1036 hrs
Sample S.D	36 hrs	40 hrs

Is the difference in the means sufficient to warrant that type I is superior to type II regarding length of life

OR

11		A pair of dice are thrown 360 times and the frequency of each sum is indicated below:	CO6	L4	

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	8	24	35	37	44	65	51	42	26	14	14

Would you say that the dice are fair on the basis of the chi-square test at 0.05 level of significant?

***** END *****