H.T No

(An Autonomous Institution)

Regulations: A20

Code No: 8HC16 **Date: 04-Aug-2023 (FN)**

B.Tech II-Year II- Semester External Examination, Aug - 2023 (Regular & Supplementary)

PROBABILITY AND STATISTICS - (EEE, CSE, IT and ECM)

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

Note: *a) No additional answer sheets will be provided.*
b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.
c) Missing data can be assumed suitably.

Bloom's Cognitive Levels of Learning (BCLL)

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

Part - A Max.Marks:20

ANSWER ALL QUESTIONS

		BCLL	CO(s)	Marks
1	A number is picked from 1 to 30, both inclusive find the probability that it is prime.	L2	CO1	[2M]
2	Find the value of the finite population correction factor for n =10 and N = 100.	L2	CO2	[2M]
3	Define the level of significance.	L2	CO3	[2M]
4	Find $t_{0.025}$ when $\nu = 12.$	L2	CO4	[2M]
5	Define Skewness and kurtosis	L2	CO5	[2M]
6	Write the normal equations for straight line by the method of least squares.	L2	CO6	[2M]
7	State Bayes theorem.	L2	CO1	[2M]
8	Write the statistic for test concerning difference between two means for large samples.	L2	CO3	[2M]
9	Explain scatter diagram.	L2	CO5	[2M]
10	A population consists of six numbers 4, 8, 12, 16, 20, 24, find the population mean.	L2	CO2	[2M]

Part – B Max.Marks:50

ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS.

			BCLL	CO(s)	Marks
11.	a)	A businessman goes to hotels X, Y, Z, 20%,50%, 30% of time respectively. It is known that 5%,4%, 8% of the rooms in X, Y, Z. hotels faulty plumbing. What is the probability that business man's room having faulty plumbing is assigned to hotel Z.	L3	CO1	[5M]
	b)	If f(x) = 3^{x^2} ,when $0 \leq x \leq 1$ be the probability density function of a continuous random variable X. Determine a and b such that P (X $\leq a) = P(X > a)$ and P (X $> b)$ =0.5.	L3	CO1	[5M]
12.	a)	Determine the expected number of samples of size 25 whose mean lies between 66.8 and 69.8. If normal population mean is 68 and standard deviation is 3 and the number of samples 70.	L3	CO2	[5M]
	b)	A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence?	L3	CO2	[5M]

13. a) A coin is tossed 960 times and head turns up 183 times. Is coin biased? L3 CO3 [5M]

b) A lady stenographer claims that she can take dictation at the rate of 118 words per minute can we reject her claim on the basis of 100 trails in which she demonstrates a mean of 116 words and a S.D. of 15 words. L3 CO3 [5M]

14. Two independent samples of 7 items had the following values. L3 CO4 [10M]

Sample1	14	12	9	15	11	13	11
Sample2	10	8	9	13	10	11	9

Is the difference between the means of samples significant?

15. Calculate the correlation between the heights of fathers(x) and their sons(y) L3 CO5 [10M]

x	65	66	67	67	68	69	70	72
y	67	68	65	68	72	72	69	71

16. Fit a parabola y = a + bx + c x^2 for the following data L3 CO6 [10M]

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

17. a) If the mean and S.D. of Normal distribution are 70 and 16 respectively, find P(38 < X < 46). L3 CO1 [4M]

b) Let $U_1 = (1,3,5), U_2 = (3,8)$ find $\mu_{U_1+U_2}$, $\mu_{U_1-U_2}$. L3 CO2 [3M]

c) In a city 250 men out of 750 were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers? L3 CO3 [3M]

18. a) Two random samples of sizes 15 and 25 are taken from a normal population, find the probability that the ratio of the sample variance does not exceed 2.28. L3 CO4 [4M]

b) Write the properties of correlation coefficient. L3 CO5 [3M]

c) Explain linear regression and multiple regression. L3 CO6 [3M]

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