SNIST
Sreenidhi Institute of Science and Technology
AUTONOMOUS

H.T No

Regulations: A20

B.Tech II-Year II- Semester External Examination, July/August - 2022 (Regular)
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.

ANSWER ANY 5 OUT OF 8 QUESTIONS. EACH QUESTION CARRIES 14 MARKS.

Bloom's Cognitive Levels of Learning (BCLL)

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

			BCLL	CO(s)	Marks
1.	a)	The probability density p(x) of a continuous random variable is given by $p(x) = y_0 e^{-|x|}, -\infty < x < \infty$ prove that $y_0 = \frac{1}{2}$ find the mean and variance of the distribution.	L3	CO1	[7M]
	b)	Given that f(x) = (k/2)x is a probability distribution for a random variable X that can take on the values X = 0, 1, 2, 3 and 4 i) find k ii) mean and variance of X.	L3	CO1	[7M]
2.	a)	Consider the population: 12, 25, 18, and 23. Construct a sampling distribution of the sample mean when random samples of size 2 are selected from the population with replacement.	L3	CO2	[7M]
	b)	What is the maximum error one can expect to make with probability 0.9, when using the mean of a random sample of size 66 to estimate the mean of a population with variance 2.56?	L3	CO2	[7M]
3.	a)	Discuss the procedure to test a Hypothesis.	L3	CO3	[7M]
	b)	In a sample of 500 from a village in telangana, 280 are found to be rice eaters and the rest wheat eaters. Can we assume that both articles are equally popular?	L3	CO3	[7M]
4.	a)	Explain t-distribution and point out its uses. Heights of ten members are found to be 63,63,66,67,68,69,70,70,71 and 71 inches. For this data discuss suggestion that the mean height of the population is 66 inches.	L3	CO4	[7M]
	b)	The time taken by workers in performing a job by method I and method II is given below: Method-I 20 16 26 27 23 22 Method-II 27 33 42 35 32 34 38 Do the data show that the variances of time distribution from population from which these samples are drawn do not differ significantly?	L3	CO4	[7M]

			BCLL	CO(s)	Marks
5.	a)	Find the median to the following datat	L3	CO5	[7M]

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	16	60	100	40	6	4

	b)	The variables X and Y are connected by the equation aX+bY+c=0.Show that the correlation between them is –1 if the sign of a and b are all alike and +1 if they are different.	L3	CO5	[7M]
6.	a)	Fit a curve of the form $y = a + bx$ to the following data.	**L3**	**CO6**	**[7M]**

X	1	5	7	9	12
Y	10	15	12	15	21

b) Fit a curve of the form $y=ae^{bx}$ to the following data: L3 CO6 [7M]

X	**1.0**	**1.2**	**1.4**	**1.6**
Y	**40.170**	**73.196**	**133.372**	**243.02**

7. a) Define Poisson process with example and show that mean = variance for a poisson distribution. L3 CO1 [5M]
   b) Define standard error. A sample of size 1400 is taken from a population whose S.D is 16. Find the standard error. L3 CO2 [5M]
   c) The means of samples of sizes 1000 and 2000 are 67.5 and 68 respectively. Can the samples be regarded as drawn from the same population of S.D. 2.5 ? L3 CO3 [4M]

8. a) Define t-distribution and write its properties. L3 CO4 [5M]
   b) Calculate the mean and standard deviation for the following: L3 CO5 [5M]

Size	6	7	8	9	10	11	12
frequency	3	6	9	13	8	5	4

   c) Explain the least squares methods. L3 CO6 [4M]

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