H.T No

(An Autonomous Institution)

Regulations: A14

Code No: 4HC16 **Date: 28-July-2022 (FN)**

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

PROBABILITY AND STATISTICS (Common to All Except ECE)

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)	In a bolt factory machines A, B, C manufacture 20%, 30% and 50% of the total of their output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A (ii) Machine B (iii) Machine C	L4	CO1	[7M]
	b)	20% of items produced from a factory are defective. Find the probability that in a sample of 5 chosen at random (i) none is defective (ii) one is defective (iii) $P(1 < X < 4)$	L5	CO1	[7M]
2.	a)	The mean of Binomial distribution is 3 and the variance is 9/4. Find i) P(x≥7) ii) P(1≤x<6)	L3	CO2	[7M]
	b)	In a Normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution.	L5	CO2	[7M]
3.		Draw the possible samples of size 2 by with replacement from the population 5, 7, 11, 13, 17. Find. i) The Population mean ii) The Population standard deviation (iii) The Standard deviation of sample means (iv) The mean of sampling distribution of mean	L4	CO3	[14M]
4.	a)	Find 95% confidence limits for the mean of a normally distributed population from which the following sample was taken 15, 17, 10, 18, 16, 9, 7, 11, 13, 14.	L3	CO4	[7M]
	b)	The average marks scored by 32 boys is 72 with a S.D of 8. While that of 36 girls is 70 with a S.D of 6. Does this indicate that the boys perform better than girls at level of significance 0.05?	L5	CO4	[7M]
5.	a)	Find 95% confidence limits for the mean of a normally distributed population from which the following sample was taken 15, 17, 10, 18, 16, 9, 7, 11, 13, 14.	L5	CO5	[7M]
	b)	The average marks scored by 32 boys is 72 with a S.D of 8. While that of 36 girls is 70 with a S.D of 6. Does this indicate that the boys perform better than girls at level of significance 0.05?	L4	CO5	[7M]

6. The average percentage of defectives in 27 samples of size 1500 each was found 13.7%. Construct p-chart for this situation. Explain how the control chart is used to control the quality. L5 CO6 [14M]

7. a) The mean of Binomial distribution is 3 and the variance is 9/4. Find L5 CO1 [7M]
   i) $P(x \geq 7)$ ii) $P(1 \leq x < 6)$

   b) The average mark scored by 32 boys is 72 with a standard deviation of 8. While that for 36 girls is 70 with a standard deviation of 6. Does this indicate the boys perform better than girls at a 5% of level significance. L4 CO2 [7M]

8. a) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with atleast 95% confidence L3 CO4 [5M]

   b) Two independent samples of 8 and 7 times respectively had the following values of variables. L3 CO5 [5M]

Sample I:	9	11	13	11	15	9	12	14
Sample II:	10	12	10	14	9	8	10	-

   Do the estimates of population variance differ significantly?

   c) Explain types of control charts for variables. L2 CO6 [4M]

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