Subject Code: 19MA303BS

SET-I

HT NO: 7 R

CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. III Semester Supply End Examinations, July/August-2023
Computer Oriented Statistical Methods
Common to CSE & IT

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

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	Define sample space and give an example.	2	CO1	L1
	b	If the probability density function is $f(x) = \begin{cases} kx, & 0 < x < 1 \\ 0, & Otherwise \end{cases}$ Find the value of k.	2	CO1	L2
	c	State Chebyshev's theorem.	2	CO2	L1
	d	In a geometric distribution $P(x)=2^{-x}$, x=1,2,3….then find its mean.	2	CO2	L3
	e	What are the chief characteristics of Normal distribution.	2	CO3	L1
	f	A sample of size 10 was taken from a population standard deviation of a sample is 0.03.Find the maximum error with 99% confidence.	2	CO3	L 4
	g	The variance of a population is 2. The size of the sample collected from the population is 169.What is the standard error of mean?	2	CO4	L2
	h	Explain the Null and Alternative Hypothesis.	2	CO4	L2
	i	Define a Stochastic Process and a Markov chain.	2	CO5	L1
	j	Test the matrix $\begin{bmatrix} \frac{15}{16} & \frac{1}{16} \\ \frac{2}{3} & \frac{4}{3} \end{bmatrix}$ is stochastic or not.	2	CO5	LL2

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Three machines A, B and C produce 40%,30% and 30% of the total number of items of a factory. The percentage of a defective items of these machines are 4%,2% and 3%. An item is selected at random and found to be defective. Find the probability that it is from: i) Machine-A ii) Machine-B iii) Machine-C	5	CO1	L2
	b	Explain types of Random Variables with examples.	5	CO1	L2

OR

3 State and prove the Bayes theorem 10 CO1 L2

4 A random variable X has the following probability function 10 CO2 L3

X	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Determine (i) K (ii) $P(0 \leq X \leq 4)$ (iii) Mean (iv) Variance.

OR

5 a In 256 sets of 12 tosses of a coin, in how many cases one can expect 8 heads and 4 tails. 5 CO2 L2

b If X is a Poisson variate such that $3P(X=4)=\frac{1}{2}P(X=2)+P(X=0)$ then find the Mean. 5 CO2 L3

6 a The marks obtained in Statistics in a certain examination are found to be normally distributed. If 15% of the candidates' ≥ 60 marks, 40% < 30 marks. Find the mean and standard deviation of marks 5 CO3 L3

b Write the properties of t-distribution. 5 CO3 L 1

OR

7 A population consists of five numbers 2,3,6,8, and 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find 10 CO3 L3

i)The mean of the population

ii)The standard deviation of the population

iii) The mean of the sampling distribution of means

8 a A sample of size 300 was taken whose variance is 225 and mean 54. Construct 95% confidence interval for the mean. 5 CO4 L2

b A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there150 students having mean IQ of 75 with a S.D of 15 in the second group there are 250 students having mean IQ of 70 with S.D of 20.Is there a significant difference between the means of two groups. 5 CO4

OR

9 Random samples of 400 men and 200 women in a locality were asked whether they would like to have a bus stop near their residence.200 men and 40 women in favour of the proposal. Test the significance between the difference of two proportions at 5% level. 10 CO4 L3

10 a Explain the classification of stochastic processes. 5 CO5 L2

b A training process is considered as a two state Markov chain. If it rains it is considered as 0 and if not considered as 1. The transition probability matrix of the Markov chain is 5 CO5 L3

$$P=\begin{bmatrix}0.6 & 0.4\\ 0.2 & 0.8\end{bmatrix}$$

Find the probability that it will rain after three days, assuming that the mutual probabilities of state 0 are state 1 as 0.4 and 0.6 respectively.

OR

11	The three state Markov chain is given by the transition probability matrix $P = \begin{bmatrix} 0 & \frac{2}{3} & \frac{1}{3} \\ \frac{1}{2} & 0 & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} & 0 \end{bmatrix}$. Prove that the chain is irreducible.	10	CO5	L3

CO : Course Outcomes

BL : Bloom's Taxonomy Levels

L 1 : Remembering

L 2 : Understanding

L 3 : Applying

L 4 : Analysing

L 5 : Evaluating

L 6 : Creating

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