Code No: 153AJ **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, October - 2020
COMPUTER ORIENTED STATISTICAL METHODS
(Common to CSE, IT)

Time: 2 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) State Baye's theorem. Two factories produce identical clocks. The production of the first factory consists of 10,000 clocks of which 100 are defective. The second factory produces 20,000 clocks of which 300 are defective. What is the probability that a particular defective clock was produced in the first factory?

b) Given $f(x)=\begin{cases} ax^2, & for\ 0<x<1 \\ 0, & elsewhere \end{cases}$

Find the constant Also find distribution function F(x), mean and variance of X. [8+7]

2.a) If A and B are any two events (subsets of the sample space S) and are not disjoint, then prove that $P(A\cup B)=P(A)+P(B)-P(A\cap B)$.

b) If two dice are thrown, what is the probability that the sum is (i) greater than 8, and (ii) neither 7 nor 11 ? [8+7]

3.a) State and prove Chebyshev's Theorem.

b) Show that in a Poisson distribution with unit mean, the mean deviation about the mean is $2/e$ times the standard deviation. [8+7]

4.a) Derive the mean and variance of Poisson distribution.

b) The incidence of occupational diseases in an industry is such that the workmen have a 10% chance of suffering from it. What is the probability that in a group of 7, five or more will suffer from it? [8+7]

5.a) Explain normal distribution. If X is normally distributed with mean 1 and standard deviation 0.6, obtain $P(x>0)$ $and\ P(-1.8\le X\le 2.0)$.

b) Ten individuals are chosen at random from a normal population and their heights are found to be 63, 63,66,67,68, 69, 70, 70, 71, 71 inches. Test if the sample belongs to the population whose mean height is 66 inches. [7+8]

6.a) Explain exponential distribution and show that exponential distribution tends to normal distribution for large values of the parameter λ.

b) A random sample of 16 values from a normal population has a mean of 41.5 inches and sum of squares of deviations from the mean is equal to 135 inches. Another sample of 20 values from an unknown population has a mean of 43.0 inches and sum of squares of deviations from their mean is equal to 171 inches. Show that the two samples may be regarded as coming from the same normal population. [7+8]

7.a) A manufacturer claimed that at least 98% of the steel pipes which he supplied to a factory conformed to specifications. An examination of a sample of 500 pieces of pipes revealed that 30 were defective. Test this claim at a significance level of 0.05.

b) A machine puts out 16 imperfect articles in a sample 500. After machine is overhauled, it puts out 3 imperfect articles in a batch of 100. Has the machine improved? Test at 5% level of significance. [7+8]

8.a) Define Markov chain and classify its states.

b) Suppose there are two market products of brand A and B, respectively. Let each of these two brands have exactly 50% the total market in same period and let the market be of a fixed size. The transition matrix is given as follows:

		To	
		A	B
From	A	0.9	0.1
	B	0.5	0.5

If the initial market share breakdown is 50% for each brand, then determine their market shares in the steady state. [7+8]

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