Bhartiya Vidya Bhavan's

Sardar Patel Institute of Technology

(Autonomous Institute Affiliated to University of Mumbai)

Department of Master of Computer Application

MSE Oct 2022

Max. Marks: 20 | Duration: 1 hr
Class: FYMCA | Semester: II
Course Code: MA503 | Date: 18 / 10 /2022
Subject: Probability and Statistics | Time: –

Instructions: (1) Attempt any FOUR questions.
(2) Use of non-programmable scientific calculator is allowed.
(3) Assume any necessary data but justify the same.

Q.N		Marks	CO
1.	A binary communication channel carries data as one of two types of signals denoted by 0 and 1. Owing to noise, a transmitted 0 is sometimes received as 1 and a transmitted 1 is sometimes received as 0. For a given channel, assume a probability of 0.94 that a transmitted 0 is correctly received as a 0 and a probability of 0.91 that a transmitted 1 is correctly received as a 1. Further assume a probability of 0.45 of transferring a 0. If a signal is sent, determine probability of an error.	[5]	3
2.	Two discrete random variables X and Y have joint pmf given by the following table. Y / X: 1 → 2/16, 2/16, 1/16; 2 → 3/16, 2/16, 1/16; 3 → 2/16, 1/16, 2/16 Compute the probability that: (i) $X \leq 1\frac{1}{2}$ (ii) XY is even	[5]	3
3.	The number of hardware failure system in a week of operation has the following probability mass function. No. of failures: 0, 1, 2, 3, 4, 5, 6 Probability: 0.18, 0.28, 0.25, 0.18, 0.06, 0.04, 0.01 Find the expectation and variance of the number of failure. **OR** Let X be a random variable for which E(X)=10 and V(X)=25. Find the values of a and b such that Y=aX-b has expectation zero and variance 1.	[5] [5]	3 3
4	It is given that 2% of the electric bulbs manufactured by a company are defective. Using Poisson distribution, find the probability that a sample of 200 bulbs will contain (i) no defective bulbs (ii) 2 defective bulbs. OR The mean and variance of binomial distribution are 4 and $\frac{4}{3}$ respectively. Find $P(x \geq 1)$.	[5] [5]	4 4