MANAV RACHNA UNIVERSITY, FARIDABAD
Department of Mathematics

Course: B.Tech. **Semester: IV** **Session: 2020-21**

Subject: Probability & Statistics

Tutorial

Q1. Two balls are selected at random from a box containing three red, two green and four white. If X and Y are the number of red balls and green balls respectively included among the two balls drawn from the box ,find

(i) Joint probability of X and Y
(ii) Marginal Probability of X and Y
(iii) Conditional distribution of X given Y=1

Q2. The Joint probability mass function of f(x,y) is given by $P(x,y)=k(2x+3y);x=0,1,2;y=1,2,3$

Find

(i)k

(ii) marginal pmf of X and Y

(iii)conditional pmf of x given y=1

(iii) conditional pmf of y given x=2

(iv)Probability distribution of x+y

Q3. Six dice are rolled. Let:

X = number of dice with score a multiple of 2

Y = number of dice with score a multiple of 3

Z = number of dice with score a multiple of 4

Find the joint p.m.f. of (X, Y, Z). Also find the marginal p.m.f. of X, (x, Z), (Y, Z) and the conditional p.m.f. of X given (Y, Z).

Q4. Suppose 2 cards are drawn from a deck of 52 cards. Let X = number of aces obtained and Y = number of queens obtained. Discuss whether or not random variable X, Y are independent.

Q5. Suppose a two dimensional random variable has a joint p.d.f.:

$f_{X,Y}(x, y) = \begin{cases} kx(x - y), & 0 < x < 2, -x < y < x \\ 0, & \text{otherwise} \end{cases}$

(a) Evaluate the constant k

(b) Compute $P(X + Y < 1)$, $P(XY < 1)$

(c) Compute $P(Y > -1/2 | X = 1)$