F.Y.B.SC. SEM – II (2014 COURSE) : SUMMER - 2018

SUBJECT: STATISTICS : DISCRETE PROBABILITY AND PROBABILITY DISTRIBUTIONS – II (S – 22)

Day: **Monday** | Time: **03.00 PM TO 05.00 PM**

Date: **23/04/2018** | **S-2018-0699** | Max Marks. 40

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagrams **WHEREVER** necessary.
4) Use on algorithmic table, statistical table and pocket **CALCULATOR** is allowed.

Q.1 Attempt any **TWO** of the following: **(10)**

a) State and prove additive property of two independent Poisson random variables (r.v.s.)

b) If (X,Y) is a bivariate discrete r.v.s with joint probability mass function (pmf).

$P(x, y) = kxy$; $x = 0,1; y = 1,2; k > 0.$

$= 0$; otherwise.

Find the value of k. Also, find marginal distribution of X.

c) If the probability that a certain test yields a positive reaction is equal to 0.4, what is probability that less than 4 negative reactions occur before the first positive one?

Q.2 Attempt any **TWO** of the following: **(10)**

a) Define the joint distribution function of two dimensional discrete r.v.s. Also state its important properties.

b) Let (X,Y) be a bivariate discrete r. v. s. with joint probability distribution:

X \ Y	0	1
-1	0.1	0.3
1	0.35	0.25

Find : i) Conditional probability distribution of X given Y = 1.
ii) Conditional mean of X given Y = 1.

c) If X and Y are two discrete r.v.s with Var. (X) = 9, Var (Y) = 4 and Cov.(X,Y) = 3,

Find : i) Correlation coefficient between X and Y (Corr (X,Y)).
ii) Corr (2X, 3 – 2Y).

P.T.O.

Q.3 Attempt any **TWO** of the following: **(10)**

a) Obtain the conditional distribution of X given (X + Y = n) for binomial distribution.

b) If X is geometric r.v. over range set 0,1,2… with mean = 4 and variance = 16, find the parameter for distribution of X.

c) Let (X, Y) be a bivariate discrete r.v.s. with joint probability distribution:

X \ Y	1	2
0	0.1	0.3
1	0.35	0.25

Obtain the marginal distribution of X and Y. Also, verify independence of X and Y.

Q.4 Attempt any **FIVE** of the following **(10)**

a) Define joint probability mass function.

b) State m. g.f. of Geometric distribution with non–negative r.v.

c) Let X be Poisson r.v. with P [X = 1] = P [X = 2] , Find variance of X.

d) If E [X] = 3 and E [Y] = 4 then under independence, find E [XY].

e) State additive property of binomial distribution.

f) Define raw moments of bivariate discrete r.v.s.

g) State one real life example for Geometric distribution.

* * *