F.Y.B.SC. SEM – II (2014 COURSE) : WINTER - 2017

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

Day: **Friday**

Date: **03/11/2017**

W-2017-0607

Time: **03.00 PM TO 05.00 PM**

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 the p. m. f of Poisson distribution with parameter m. Give three real life situations where Poisson distribution is experienced.

b) State and prove lack of memory property of a geometric distribution.

c) Let X $\rightarrow$ Poisson (m) such that

$P(X=2)=\frac{3}{4}P(X=1)$, Find mean, and variance of X.

Also find P (X = 0) .

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

a) Let X and Y be two discrete r. v. s. having joint p. m. f.

P (x, y) = kxy ; x = 1, 2, 3

y = 1, 2, 3

= o; otherwise.

Find i) k ii) P (X + Y > 5).

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

c) Let X and Y be two discrete r. v. s. having joint probability distribution as :

X \ Y	-2	0	2
-1	0.1	0.2	0.1
0	0.2	0.1	0.1
	0.1	0.1	0.0

Find i) Marginal p. m. f. s of X and Y

ii) Conditional probability distribution of X given Y = 2

P.T.O.

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

a) For two discrete r. v. s. (X, Y) ; Var (X) = Var (Y) = 1 and

Cov (X, Y) = $\frac{1}{2}$.

Find :

i) Var (2X – 3 Y)

ii) Cov (3X, – 6 Y)

iii) $\rho\left(\frac{X-5}{10}, \frac{Y-3}{5}\right)$

b) Let(X, Y) has joint probability distribution :

X \ Y	-1	0	1
0	0.1	0.1	0.1
2	0.1	0.2	0.1
4	0.1	0.1	0.1

Obtain conditional mean and variance of X given Y = 0.

c) Suppose X and Y are two discrete r. v. s with joint probability distribution

{ (x_i, y_j , p_{ij}) , i = 12---m , j = 1,2,--n }

Prove that E (X + Y) = E(X) + E(Y).

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

a) If X → G (0.3) then state mean and S.D. of X.

b) State the M.G.F. of Geometric (p).

c) State additive property of Poisson distribution.

d) $\rho(X,Y)=0.75$ *then find*:

$i)\, \rho(3X,-5Y)$

$ii)\, \rho\left(\frac{X}{10},\frac{Y}{10}\right)$.

e) Define covariance between two r. v. s.

f) If Y → Poisson (4) then state the mean and variance of Y.

g) Define a bivariate discrete r. v.