F.Y.B.SC. SEM – II (2014 Course) : WINTER - 2018
SUBJECT: STATISTICS : DISCRETE PROBABILITY AND PROBABILITY DISTRIBUTIONS – II (S – 22)

Day: Saturday
Date: 20/10/2018

W-2018-0792

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 and prove additive property of two independent binomial random variables (r.v.s.).

b) If (X,Y) is a bivariate discrete r.v.s. with joint probability mass function (pmf):
$P(x, y) = k(x+y)$; $x = -1, 1$; $y = 1, 2$; $k > 0$.
$= 0$; otherwise.
Find the value of k. Also, find marginal distribution of X.

c) Let X and Y be two independent Poisson random variables with means 4 and 6 respectively. Find :
i) Standard deviation of (X+Y)
ii) $P[X = 3 | X + Y = 4]$.

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

a) i) Define the joint probability mass function of two dimensional discrete r.v.s..
ii) Define the conditional mean and conditional variance of (X,Y).

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

X \ Y	1	2	3
-1	0.1	0.2	0.5
1	0.3	0.15	0.2

Find : i) $P[X + Y > 1]$.
ii) $P[X < 0, Y > 2]$
iii) $P[X = 1 | Y = 2]$.

c) If X and Y are two discrete r.v.s. with Var (X) = 4, Var (Y) = 9 and Cov (X,Y) = 5 . Find :
i) Var (2X + 3Y).
ii) Cov (2X, 3 – 2Y).
iii) Corr (X, Y).

P.T.O

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

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

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

X \ Y	1	2
0	0.1	0.4
1	0.35	0.15

Obtain the covariance between X and Y.

c) If X is geometric r.v. over range set 1,2..... with mean = 4 and variance = 16, find the parameter for distribution of X and P [X> 1].

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

a) Define joint distribution function of X and Y.

b) State mean and variance of Geometric distribution with non–negative r.v.

c) Let X be Poisson r.v. with P [X = 1] = P [X = 2], find standard deviation of X.

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

e) State additive property of Poisson distribution.

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

g) With usual notation, prove that Cov (X,X) = Var (X).

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