RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

FIRST YEAR B.A./B.SC. SECOND SEMESTER (January – June) 2014 Mid-Semester Examination, March 2014

Date : 26/03/2014

STATISTICS (General) Paper : II

Time : 11 am – 12 noon

Full Marks : 25

[5]

[5]

[Use a separate Answer Book for each group]

<u>Group - A</u>

- 1. Define correlation coefficient. Show that the value of correlation coefficient lies between -1 and +1. [5]
- 2. Find out the angle between two regression lines. How will the lines be if— i) r = 0 and

ii) r = 1

where r = correlation coefficient of the two variables concerned.

<u>Group – B</u>

(Answer any three questions)

3. Let X have the triangular p.d.f as follows

 $f(x) = \begin{cases} x & , & 0 < x \le 1 \\ 2 - x & , & 1 < x \le 2 \\ 0 & , & \text{otherwise} \end{cases}$

Find the cumulative distribution function of X.

4. Show that the function,
$$f(x) = \frac{1}{2}e^{-|x|}, -\infty < x < \infty$$
 is a p.d.f. [5]

5. Check whether X & Y are independent, if their joint probability distribution is given by

a) $f(x, y) = \frac{1}{4}$ for $\begin{cases} x = -1 & \text{and} & y = -1 \\ x = -1 & \text{and} & y = 1 \\ x = 1 & \text{and} & y = -1 \\ x = 1 & \text{and} & y = 1 \end{cases}$

b)
$$f(x,y) = \frac{1}{3}$$
 for $x = 0$ and $y = 0$
 $x = 1$ and $y = 1$
 $x = 1$ and $y = 1$

6. Given the joint probability density

$$f(x, y) = \begin{cases} \frac{2}{3}(x + 2y) &, & \text{for } 0 < x < 1, 0 < y < 1 \\ 0 &, & \text{elsewhere} \end{cases}$$

Find the marginal densities of X & Y.

7. a) Given two random variables X & Y, jointly distributed with p.m.f f(x,y), Prove EE(X | Y) = E(X).

b) If X be the number of points rolled with a balanced die, find the expected value of $g(x) = (2x^2 + 1) \cdot [3+2]$

[5]

[2+3]