MCAC 103
Quiz 3
(Joint distributions/Expectation etc./Discrete and Continuous Distributions)
Time : 30 minutes
Marks: Q1 -3 carry 6 marks each. Q 4 – 5 carry each (Total 25 marks)

Instructions: Upload questionwise PDF. If answers are found to be similar zero will be given.

Q1. For the given joint pmf, find the marginal mass functions, and check if the rvs are independent.

$$p_{XY}(x,y) = \begin{cases} 0.5, & \text{for } (x,y) = (1,1); \\ 0.1, & \text{for } (x,y) = (1,2); \\ 0.1, & \text{for } (x,y) = (2,1); \\ 0.3, & \text{for } (x,y) = (2,2). \end{cases}$$

Q2. For the given joint pdf, determine the value of 'a'.

$$f_{XY}(x,y) = \begin{cases} a(x+y), & \text{for } 0 < x \le 1, \text{and } 1 < y \le 2; \\ 0, & \text{elsewhere.} \end{cases}$$

Q3. For the given joint pdf of X and Y, show that E[X|Y=y] = 0.

$$f(x,y) = \frac{(y^2 - x^2)}{8} e^{-y}, \quad 0 < y < \infty, \quad -y \le x \le y$$

Q4. Suppose the average daily household income in an Indian city is INR900 and standard ddeviation is 200INR. Assuming a normal distribution of incomes, compute the proportion of middle class whose income is between INR600 and 1200. Also compute P(Income > 1200).

Q5. The lifetime risk of developing cancer is about 1 in 78. If you ask people in a city until the first says that he/she is a cancer patient, What is the probability that you ask 20 persons. Find mean and standard deviation.