

# AI1103 Assignment-6

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Download all python codes from

<https://github.com/CS20BTECH11062/AI1103/tree/main/Assignment-6/codes>

and latex-tikz codes from

<https://github.com/CS20BTECH11062/AI1103/tree/main/Assignment-6/Assignment-6.tex>

QUESTION (CSIR UGC NET JUNE 2016 Q.104)

The joint probability density function of (X,Y) is

$$f(x, y) = \begin{cases} 6(1-x) & \text{if } 0 < y < x < 1 \\ 0 & \text{otherwise} \end{cases} \quad (0.0.1)$$

Which among the following are correct?

1) X and Y are not independent

2)  $f_Y(y) = \begin{cases} 3(y-1)^2 & \text{if } 0 < y < 1 \\ 0 & \text{otherwise} \end{cases}$

3) X and Y are independent

4)  $f_Y(y) = \begin{cases} 3\left(y - \frac{1}{2}y^2\right) & \text{if } 0 < y < 1 \\ 0 & \text{otherwise} \end{cases}$

## SOLUTION

Given joint probability density function of X and Y, marginal probability density functions are as follows:

$$f_X(x) = \int_{-\infty}^{\infty} f(x, y) dy \quad (0.0.2)$$

$$f_Y(y) = \int_{-\infty}^{\infty} f(x, y) dx \quad (0.0.3)$$