

AI 1103 Assignment-3

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Upon further solving

$$\frac{a}{4} = 1 \quad (3)$$

$$\text{So, } a = 4 \quad (4)$$

Therefore, the correct option is (A).

Download all latex-tikz codes from

https://github.com/Shantanu467/AI1103/blob/main/Assignment_3/Assignment3.tex

PROBLEM

Gate 2010 (MA): QUESTION-48

Let X and Y be continuous random variables with joint probability density function

$$f(x, y) = \begin{cases} a \times e^{-2y} & 0 < x < y < \infty \\ 0 & \text{otherwise} \end{cases}$$

The value of a is

- (A) 4
- (B) 2
- (C) 1
- (D) 0.5

SOLUTION

Using, Total PDF ($\Pr(-\infty < X < \infty) = 1$)
So,

$$\int_{-\infty}^{+\infty} \int_{-\infty}^{+\infty} f(x, y) dx dy = 1 \quad (1)$$

$$0 + \int_0^{+\infty} \int_0^{+\infty} a \times e^{-2y} dx dy = 1 \quad (2)$$