

# AI1103

## Assignment 3

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Download Python code and Latex from below link :

<https://github.com/KRISHNASAI1105/demo/tree/main/Assignment3>

Hence, The probability of two or more defective resistors in the circuit is 0.26.

### **Problem number GATE EE 2019 Q.40**

The probability of a resistor being defective is 0.02. There are 50 such resistors in a circuit. The probability of two or more defective resistors in the circuit (round off to two decimal places) is —

### **Solution**

Consider, Probability of a defective resistor =  $P = 0.02$ .

Total number of resistors =  $n = 50$ .

From Poisson distribution, Mean =  $\lambda = nP$   
(0.0.1)

$$\implies \lambda = 50 * 0.02 = 1. \quad (0.0.2)$$

Let  $X$  be number of defective resistors.

By Poisson distribution,

$$Pr(X) = \frac{e^{-\lambda} \lambda^X}{X!} \quad (0.0.3)$$

$$Pr(X = 0) = \frac{e^{-\lambda} \lambda^0}{0!} = e^{-1} \quad (0.0.4)$$

$$Pr(X = 1) = \frac{e^{-\lambda} \lambda^1}{1!} = e^{-1} \quad (0.0.5)$$

$$Pr(X \geq 2) = 1 - Pr(X < 2)$$

$$\implies Pr(X \geq 2) = 1 - [Pr(X = 0) + Pr(X = 1)]$$

$$\implies Pr(X \geq 2) = 1 - \left[ \frac{e^{-\lambda} \lambda^0}{0!} + \frac{e^{-\lambda} \lambda^1}{1!} \right]$$

$$\implies Pr(X \geq 2) = 1 - [e^{-1} + e^{-1}]$$

$$\implies Pr(X \geq 2) = 1 - \frac{2}{e}$$

$$\implies Pr(X \geq 2) = 0.2642$$