AI5002: Assignment 2

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1 PROBLEM

In a box containing 100 bulbs, 10 are defective. The probability that out of a sample of 5 bulbs, none is defective is

1) 10^{-1}
2) $\left(\frac{1}{2}\right)^5$
3) $\left(\frac{9}{10}\right)^5$
4) $\frac{9}{10}$

2 SOLUTION

Total number of bulbs = 100
Number of defective bulbs = 10
Probability of a bulb being defective $= \frac{10}{100} = \frac{1}{10}$
Probability of a bulb not being defective
$= 1 - \frac{1}{10} = \frac{9}{10}$
∴ Out of a sample of 5 bulbs, the probability that none are defective is

$$Pr = \frac{9}{10} * \frac{9}{10} * \frac{9}{10} * \frac{9}{10} * \frac{9}{10} \qquad (2.0.1)$$

$$= \left(\frac{9}{10}\right)^5 \qquad (2.0.2)$$

Hence, Option (3) is the required answer.