

TOPIC

Engineering Probability and Statistics – Section II – Question 2

QUESTION

Suppose that the life of light bulbs forms a normal distribution with a mean life of 5000 hours and a standard deviation of 1000 hours. The probability that the life of a randomly selected light bulb will last more than 6500 hours most nearly is

- (A) 0.0500
- (B) 0.0668
- (C) 0.1023
- (D) 0.1732

HINT

If X is a normal random variable with a mean μ and a standard deviation σ , then

$$Z = \frac{X - \mu}{\sigma}$$

is a standard normal random variable.

SOLUTION

Let X be the life of a light bulb selected at random. Then X is normal with $\mu = 5000$ and $\sigma = 1000$.

Hence

P(the life of a randomly selected light bulb will last more than 6500 hours)

$$\begin{aligned} &= P(X > 6500) \\ &= P\left(Z > \frac{6500 - 5000}{1000}\right) \\ &= P(Z > 1.5) \\ &= 0.0668 \end{aligned}$$

ANSWER

(B)

CONTRIBUTOR

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