Malus' Law

Solution:

The correct answer is d.)

The big hint for this question is in the title of the slide - recall Malus' law:

$$I = I_0 \cos^2 \theta$$

Clearly, when rotated to a 45° position relative to the transmitter, the intensity of the received waves goes as the square of the cosine of the angle:

$$I = (I_0)\left(\frac{1}{\sqrt{2}}\right)^2 = \frac{I_0}{2}$$

Thus, the intensity of the light bulb is halved at the 45° position.