

Q 1. A source of light is placed in front of a screen. Intensity of light on the screen is I . Two Polaroids P_1 and P_2 are so placed in between the source of light and screen that the intensity of light on screen is $I/2$. P_2 should be rotated by an angle of _____ (degrees) so that the intensity of light on the screen becomes $\frac{3I}{8}$. [NA, Aug. 26, 2021 (II)]

Ans (30) Initially polaroids have angle of 0° between them. From the law of Malus,

$$I = \frac{I_0}{2} \cos^2 \theta$$

Here I = resultant intensity on screen

$$\therefore \frac{I}{2} \cos^2 \theta = \frac{3I}{8} \quad (\text{theta})$$

$$\Rightarrow \cos^2 \theta = \frac{3}{4}$$

$$\Rightarrow \cos^2 \theta = \frac{\sqrt{3}}{4}$$

$$\Rightarrow \theta = 30^\circ$$