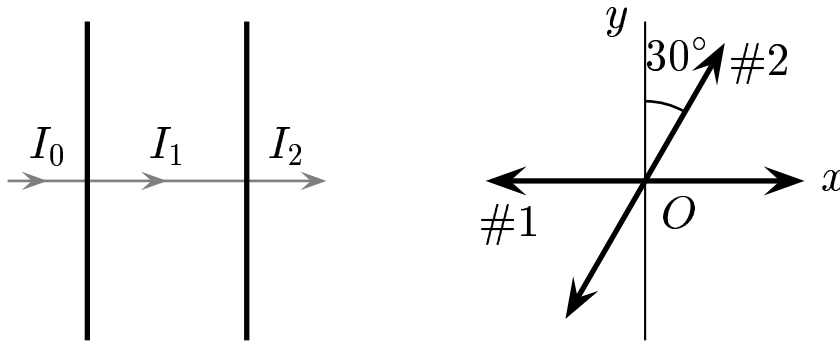


Consider the setup shown. Incident beam with intensity I_0 is unpolarized. Assume #1 transmission axis is along the x -axis and #2 is 30° with respect to y -axis.



Find the intensity I_1 and I_2 .

- A) $I_1 = \frac{I_0}{2}$ and $I_2 = \frac{I_1}{4}$.
- B) $I_1 = \frac{3I_0}{4}$ and $I_2 = \frac{I_1}{4}$.
- C) $I_1 = \frac{I_0}{2}$ and $I_2 = \frac{3I_1}{4}$.
- D) $I_1 = \frac{3I_0}{4}$ and $I_2 = \frac{3I_1}{4}$.

Polarized light $I = I_0 \cos^2 \alpha$.

Unpolarized light $I = \frac{I_0}{2}$

Since the incident light is unpolarized, $I_1 = \frac{I_0}{2}$.

When the intermediate ray passes through the second polarizer,

$$I_2 = I_1 \cos^2 60^\circ = \frac{I_1}{4}.$$

Answer **A**.