

35. Let I_0 be the intensity of the unpolarized light that is incident on the first polarizing sheet. The transmitted intensity is $I_1 = \frac{1}{2}I_0$, and the direction of polarization of the transmitted light is $\theta_1 = 40^\circ$ counterclockwise from the y axis in the diagram. The polarizing direction of the second sheet is $\theta_2 = 20^\circ$ clockwise from the y axis, so the angle between the direction of polarization that is incident on that sheet and the polarizing direction of the sheet is $40^\circ + 20^\circ = 60^\circ$. The transmitted intensity is

$$I_2 = I_1 \cos^2 60^\circ = \frac{1}{2}I_0 \cos^2 60^\circ ,$$

and the direction of polarization of the transmitted light is 20° clockwise from the y axis. The polarizing direction of the third sheet is $\theta_3 = 40^\circ$ counterclockwise from the y axis. Consequently, the angle between the direction of polarization of the light incident on that sheet and the polarizing direction of the sheet is $20^\circ + 40^\circ = 60^\circ$. The transmitted intensity is

$$I_3 = I_2 \cos^2 60^\circ = \frac{1}{2}I_0 \cos^4 60^\circ = 3.1 \times 10^{-2} .$$

Thus, 3.1% of the light's initial intensity is transmitted.