



The fraction of light intensity reflected and transmitted (refracted) from an air-glass interface at normal ($\theta = 0^\circ$) incidence is

- A) $\frac{I_{refl}}{I_0} = \left(\frac{2n_1}{n_2 + n_1}\right)^2$ and $\frac{I_{trans}}{I_0} = \left(\frac{2n_2}{n_2 + n_1}\right)^2$.
- B) $\frac{I_{refl}}{I_0} = \left(\frac{2n_1}{n_2 + n_1}\right)^2$ and $\frac{I_{trans}}{I_0} = \left(\frac{n_2 - n_1}{n_2 + n_1}\right)^2$.
- C) $\frac{I_{refl}}{I_0} = \left(\frac{n_2 - n_1}{n_2 + n_1}\right)^2$ and $\frac{I_{trans}}{I_0} = \left(\frac{2n_1}{n_2 + n_1}\right)^2$.

The amplitudes are $A_{trans} = \frac{2 \sin \theta_2 \cos \theta_1}{\sin(\theta_1 + \theta_2)} A_0$ and $A_{refl} = -\frac{\sin(\theta_1 - \theta_2)}{\sin(\theta_1 + \theta_2)} A_0$.

When $\theta_1 = \theta_2 = 0^\circ$, using $\cos 0^\circ = 1$ and $\frac{\sin \theta_1}{\sin \theta_2} = \frac{n_2}{n_1}$, we have $A_{trans} =$

$\frac{2n_1}{n_1 + n_2} A_0$ and $A_{refl} = \frac{n_2 - n_1}{n_1 + n_2} A_0$. Light intensity is proportional to the

square of the amplitude, $\frac{I_{refl}}{I_0} = \left(\frac{n_2 - n_1}{n_1 + n_2}\right)^2$ and $\frac{I_{trans}}{I_0} = \left(\frac{2n_1}{n_1 + n_2}\right)^2$.

Answer C.