

Question:

A glass prism of refracting angle 60 degrees gives a minimum deviation of 47degrees. What is the refractive index of the glass?

1.61

1.20

1.52

1.41

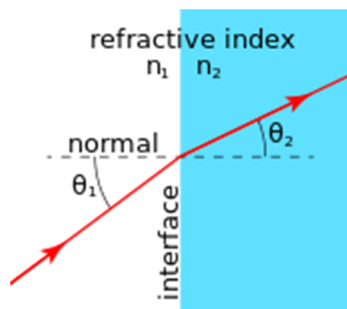
Answer:

In optics the refractive index or index of refraction n of a substance (optical medium) is a dimensionless number that describes how light, or any other radiation, propagates through that medium.

The light is traveling through air with refracting index n_1 , crosses the edge air-glass and continues to traveling in glass. Due to the different refraction indexes of air and glass, light beam changes its trajectory.

The refractive index can be calculated using Snell's law:

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$



In our case $\theta_1 = 60^\circ$, $n_1 = 1.00029 \approx 1$ (for air), $\theta_2 = 47^\circ$. The refraction index of glass n_2 is unknown.

From Snell's law:

$$n_2 = \frac{n_1 \sin \theta_1}{\sin \theta_2} = \frac{1 \times \sin 60^\circ}{\sin 47^\circ} = \frac{1 \times 0.866}{0.731} = 1.18 \approx 1.20$$