

HW

1. How can a beam of light when passed through a hollow prism give spectrum?
2. Why do different components of white light deviate by a different amount when passed through a prism.
3. The angle of prism is 60° . What is the angle of incidence for minimum deviation for the prism with refractive index $\sqrt{2}$.
2. The rays of different colours have different speed in certain medium so the refractive index of the prism is different for light of different colours.

3. Refractive index of the prism $\mu = \sqrt{2}$

Angle of the prism $A = 60^\circ$

$i = \frac{A + \delta_m}{2}$, where δ_m is minimum deviation angle

$$\mu = \frac{\sin\left(\frac{A + \delta_m}{2}\right)}{\sin\frac{A}{2}} = \frac{\sqrt{2} = \sin 1}{\sin\frac{60}{2}}$$

$$\Rightarrow \sin i = \frac{\sqrt{2} \times 1}{2}$$

Multiply and divide by $\sqrt{2}$ we get

$$\sin i = \frac{1}{\sqrt{2}} = i = 45^\circ$$

\therefore For order that a ray suffers minimum deviation it should be incident at an angle 45°