

Q1. Can a beam of white light when passed through a hollow prism give spectrum? Explain.

A No, when a beam of light passes through a prism, there is no spectrum. Spectrum is produced by deviation of different colours due to the refraction of light. When a white light passes through hollow prism, it escapes out as it entered because no refraction takes place.

Q2. Why do different components of white light deviate by a different amounts when passed through a prism?

A The rays of different colours have different speed in certain medium so refractive index of prism is different index of prism is different for different colour, so, white light gets dispersed into different colours.

Q3. The angle of prism is 60° . What is the angle of incidence for minimum deviation for the prism with refractive index n_2 .

$$A \quad A + d_m = i + r$$

$$\Rightarrow i = \frac{A + d_m}{2} \text{ for } \delta \text{ minimum } i = r$$

$$\mu = \frac{\sin \left(\frac{A + d_m}{2} \right)}{\sin A/2}$$

$$= \frac{\sin i}{\sin A/2}$$

$$\sin i = \mu \sin A/2$$

$$\sin i = \mu \sin \left(\frac{60^\circ}{2} \right)$$

$$= \sqrt{2} \sin 30^\circ = \frac{1}{\sqrt{2}}$$

$$\Rightarrow i = 45^\circ$$

$$i = 45^\circ$$