

diameter of a plane convex lens is 6cm and thickness at the centre is 3mm. if speed of light in material of lens is 2×10^8 m/s, the focal length of the lens is?

Solution

Let R be the radius of curvature of the convex surface.

Given that $AB = 3 \text{ mm} = 0.3 \text{ cm}$, $AD = \frac{CD}{2} = 3 \text{ cm}$, refractive index (n) = 1.5

By the property of circles,

$$AB = \frac{AD^2}{2R}$$

Therefore, $R = \frac{AD^2}{2AB} = \frac{9}{2 \times 0.3} = 15 \text{ cm}$

According to thin lens formula,

$$\frac{1}{f} = \frac{n-1}{R} \rightarrow f = \frac{R}{n-1} = \frac{15}{1.5-1} = 30 \text{ cm}$$

Answer: 30 cm.