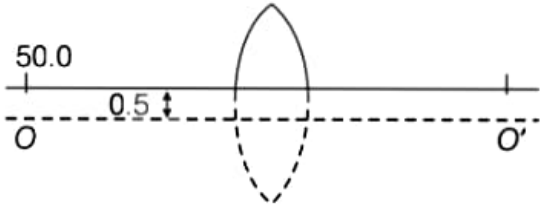
Q. A thin convex lens of focal length 25 cm is cut into two pieces 0.5cm above the principal axis. The top part is placed at (0,0) and an object placed at (– 50 cm, 0). Find the coordinates of the image.



Ans. If there was no cut, then the object would have been at a height of 0.5 cm from the principal axis OO'.

Applying lens formula , we have

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\therefore \quad \frac{1}{v} = \frac{1}{u} + \frac{1}{f} = \frac{1}{-50} + \frac{1}{25} = \frac{1}{50}$$

$$\therefore \quad v = 50\,\text{cm}$$

$$\text{Mangnification is } m = \frac{v}{u} = -\frac{50}{50} = -1$$

Thus, the image would have been formed at 50 cm from the pole and 0.5 cm below the principal axis. Hence, with respect to the X-axis passing through the edge of the cut lens, the coordinates of the image are (50 cm, –1 cm).