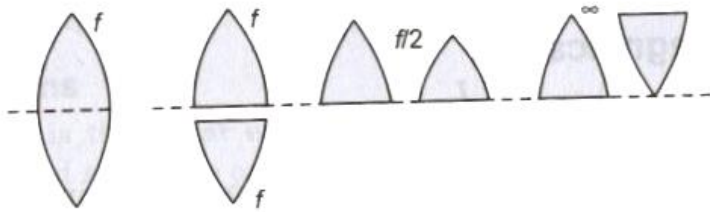


Answer on Question #55338-Physics-Optics

The question says that a convex lens with focal length 'F' is cut along the principal axis and the cut parts are arranged with both their pointed ends up (they are touching each other) and in the second case, one pointed end up and the other down. We have been asked to find the focal length in both cases.

Solution

If a symmetrical convex lens of focal length F is cut into two parts along the principal axis, then focal length of each part remains unchanged as F. If these two parts are joined with curved ends as one side, focal length of the combination is F/2. But on joining two parts in opposite sense the net focal length becomes infinity.



a.

$$\frac{1}{F'} = \frac{1}{F} + \frac{1}{F} = \frac{2}{F} \rightarrow F' = \frac{F}{2}.$$

b.

$$\frac{1}{F'} = \frac{1}{F} - \frac{1}{F} = 0 \rightarrow F' = \infty.$$