Brainbox learn easy

Chapter 04

REFRACTION OF LIGHT AT CURVED SURFACES

Power of the Lens:

The focal power (P) of a lens is numerically equal to the reciprocal of its focal length in meters.

a) When 'f' is measured in meters then $\left[P=\frac{1}{f}\right]$ diopter.

b) When 'f' is measured in centimeters. $\left[P=\frac{100}{f}\right]$ diopter.

S.I unit of focal power is diopter (D).

Power of a convex lens i

s positive and for concave lens is negative.

If two lenses are separated by a distance 'd' then the effective focal length of the combination is given by

$\frac{1}{f}=\frac{1}{f_1}+\frac{1}{f_2}-\frac{d}{f_1 f_2}$.

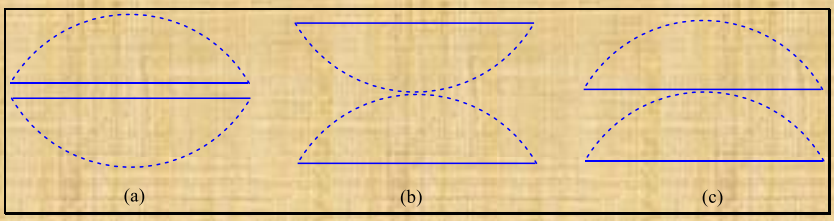
(Proper sign must to be given to $f_1 \; and \; f_2$)

If two lenses of focal powers P_1 and P_2 are separated by distance 'd' then effective focal length power of a combination is given by (Proper sign must be given to P_1, P_2)

$\left[P=P_1+P_2-dP_1P_2\right]$

If two convex lenses of focal lengths, f_1 , f_2 are separated by distance ‘d’ such that the combination will act as parallel sided glass slab. Then $[d = f_1 + f_2]$.

An equi :- Convex lens of focal length ‘f’ is cut into two equal plano-convex lenses. When they arranged as shown; their equivalent focal length is unchanged.



(Treat lenses in contact in these figures)

Focal length of each small lens becomes 2f.

$$\therefore \frac{1}{F} = \frac{1}{2f} + \frac{1}{2f} = \frac{1}{f}$$

$$\therefore F = f .$$