

Q. A thin convex lens made from crown glass ( $\mu = \frac{3}{2}$ ) has focal length  $f$ . When it is measured in two different liquids having refractive indices  $\frac{4}{3}$  and  $\frac{5}{3}$  and, it has the focal length  $f_1$  and  $f_2$  respectively. The correct relation between the focal lengths is : (1)  $f_2 > f$  and  $f_1$  becomes negative (2)  $f_1$  and  $f_2$  both become negative (3)  $f_1 = f_2 < f$  (4)  $f_1 > f$  and  $f_2$  become negative

[JEE-Mains-2014]

$$\frac{1}{f} = \left( \frac{3/2}{1} - 1 \right) \left( \frac{1}{R_1} - \frac{1}{R_2} \right) \quad \dots\dots (1)$$

**Sol.** (4)  $\frac{1}{f_1} = \left( \frac{3/2}{4/3} - 1 \right) \left( \frac{1}{R_1} - \frac{1}{R_2} \right) \quad \dots\dots(2)$

$$\frac{1}{f_2} = \left( \frac{3/2}{5/3} - 1 \right) \left( \frac{1}{R_1} - \frac{1}{R_2} \right) \quad \dots\dots(3)$$