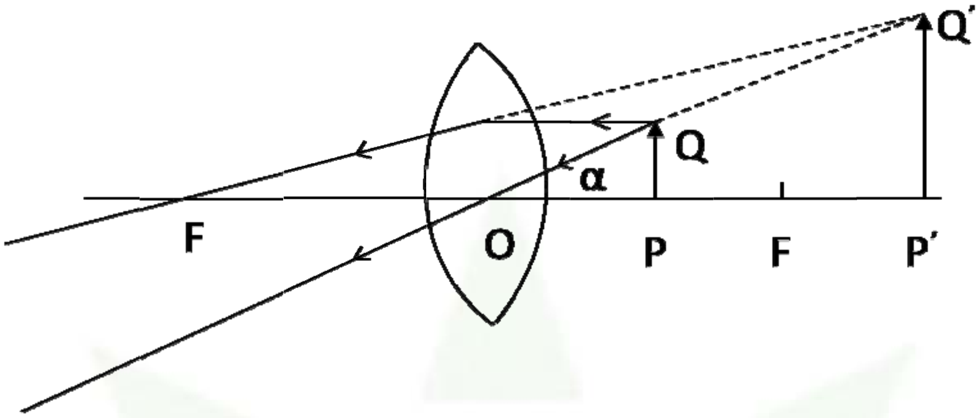
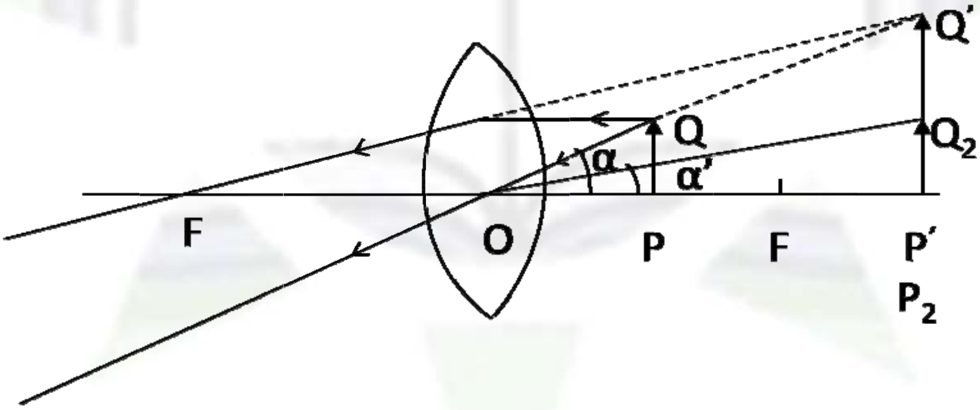
Simple Microscope (Magnifying glass):



Object is kept between the optical center and focus (o < u < f), the image is virtual erect with respect to the object magnified and is formed on the same side of the lens as the object.

$$\text{Magnifying Power} = \frac{\text{Angle subtended by the image at eye } (\alpha^{'})}{\text{Angle subtened by the object at eye when kept in the position of the image } (\alpha)}$$



$m = \frac{\alpha^{'}}{\alpha} \quad \because \alpha, \alpha^{'} \text{ are very small } \alpha \approx \tan\alpha, \alpha^{'} \approx \tan\alpha^{'}$

$From\ \Delta\text{POQ} : \tan\alpha^{'} = \frac{PQ}{OP}$

$From\ \Delta\text{P}_2OQ_2 : \tan\alpha = \frac{P_2Q_2}{OP_2}$

$$\therefore \text{m} = \frac{\frac{PQ}{OP}}{\frac{P_2Q_2}{OP_2}} = \frac{\frac{PQ}{OP}}{\frac{PQ}{OP^{'}}} = \frac{OP^{'}}{OP} = \frac{D}{f}$$

(1) For normal vision : object is at focus the image is formed at infinity but seen at least distance of distinct vision

$u = f$, $v = D$

$$m_n = \frac{D}{f}$$

(2) For distinct vision : The image lies in the position of least distance of distinct vision

Let u = object distance, v = -D

$$\frac{1}{-D} + \frac{1}{u} = \frac{1}{f}$$

$$\frac{D}{-D} + \frac{D}{u} = \frac{D}{f}$$

$$\frac{D}{u} = 1 + \frac{D}{f}$$

$$m_d = 1 + \frac{D}{f}$$