

## BREWSTER'S LAW OF POLARISATION 87

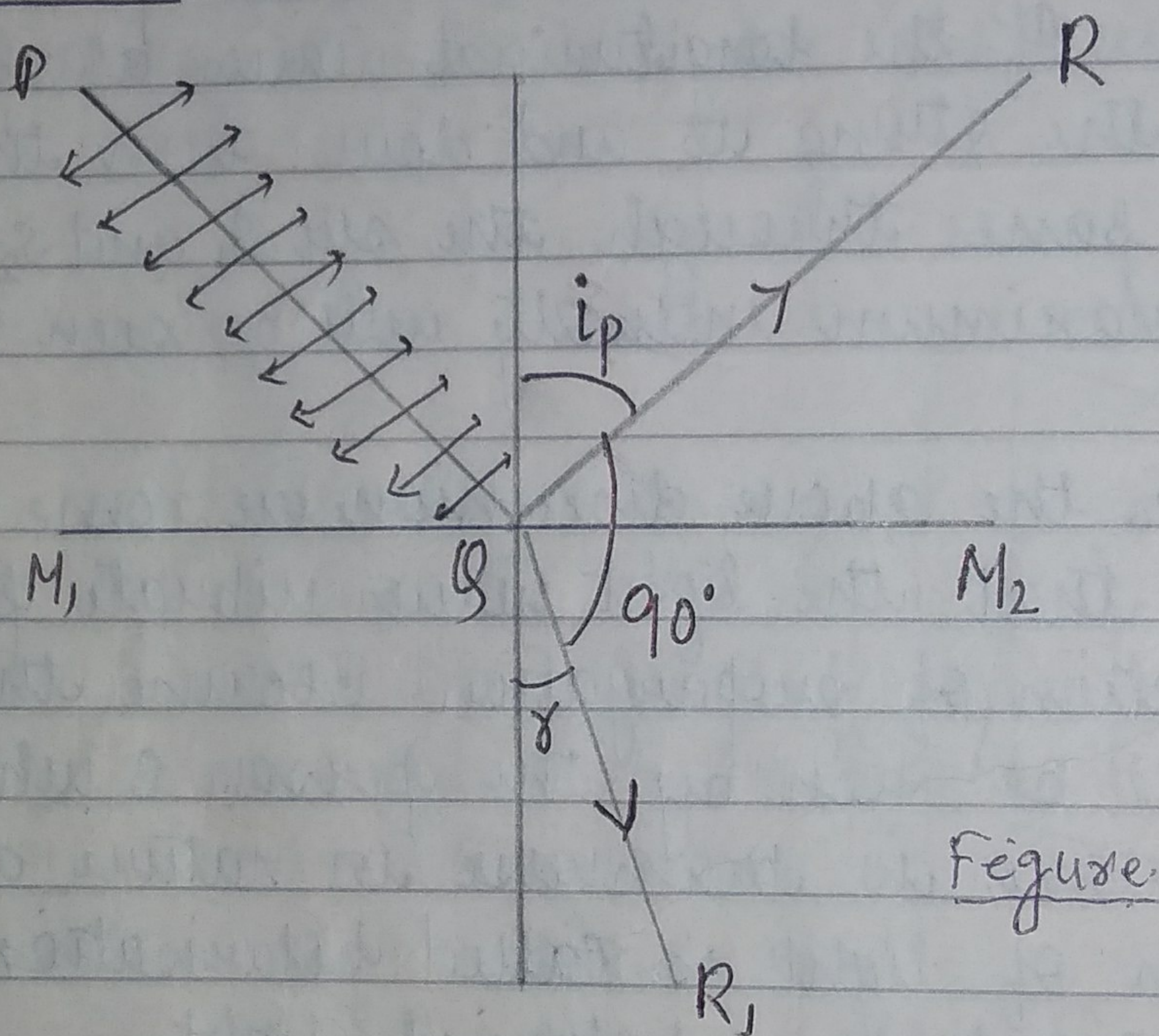
OF LIGHT :  $\rightarrow$

### • Statement:-

When the plane polarised light is passing through all to a medium such that the angle between the reflected ray and the refracted ray is equal to  $90^\circ$  then the refractive index of the medium is equal to the tangent of the angle of polarisation or angle of incidence.

$$\mu = \tan i_p$$

### • Explanation:-



Let  $M_1, M_2$  be a separating surface separating the two media i.e. air and a medium of refractive index ' $\mu$ '. Let  $PQ$  be the plane polarised light be incident on the surface at an angle of is known as angle of polarisation then,  $QR$  and  $QR_1$  be the reflected and refracted ray such that the angle between them is  $90^\circ$ . Let ' $r$ ' be the angle of refraction.



Hence by Snell's law:-

$$\mu = \frac{\sin i_p}{\sin r} \quad \text{--- (1)}$$

from the diagram

$$i_p + 90^\circ + r = 180^\circ$$

$$i_p + r = 90^\circ$$

$$r = (90^\circ - i_p)$$

Putting this value of  $r$  in eq (1)

$$\mu = \frac{\sin i_p}{\sin(90^\circ - i_p)}$$

$$\mu = \frac{\sin i_p}{\cos i_p}$$

$\therefore \mu = \tan i_p$  ; which is Brewster's law.

Hence in this way the Brewster's law can be explained.