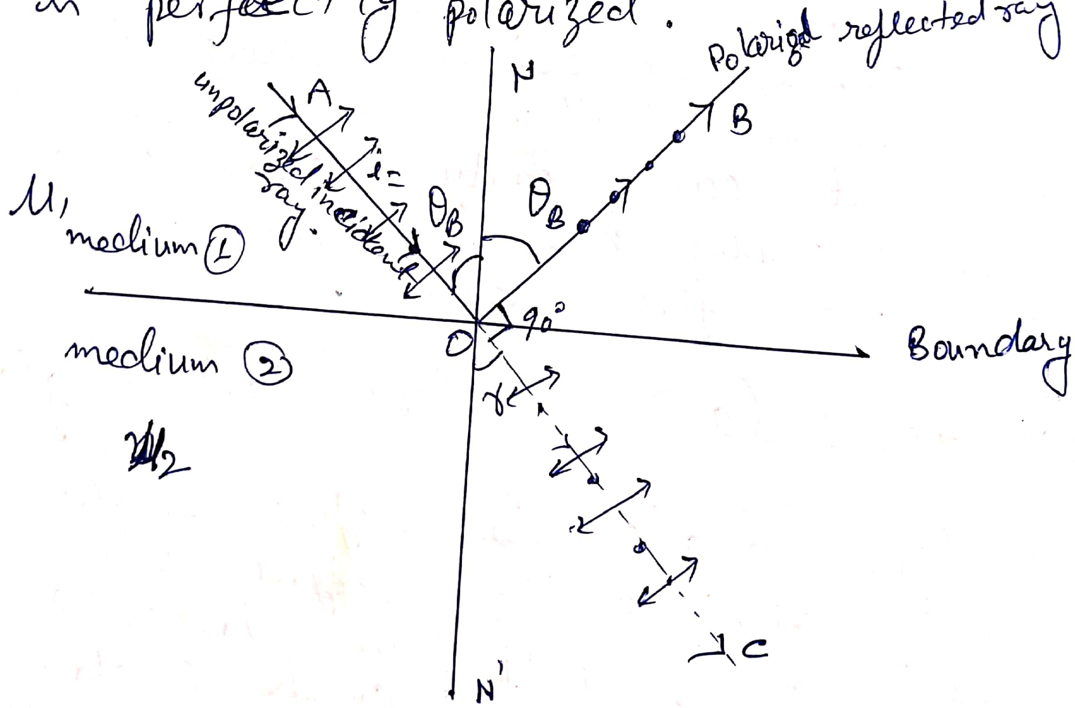
Brewster's law :→ Brewster's angle :→

Brewster's angle is define as the angle of incident at which light with a specific polarization is perfectly transmitted without any reflection through a transparent Dielectric surface. It is also called angle of polarization.

Teacher's Signature ____________________

Brewster's angle θ_B is the angle of incidence for light ray polarized in a certain way (p) and of given wave length for which there is no reflection of light from the boundary. All the light is perfectly transmitted through the medium 2.

Usually the reflected ray is partially polarized in the electric field. The reflected ray is polarized too. If an unpolarized light ray is incident on the interface boundary of medium and medium ② at this angle (θ_B). The reflected ray is perfectly polarized.



If the angle i and 'r' are such that the angle BOC is 90°, then reflected light is in the direction perpendicular to the transmitted ray. As transmitted ray is 'p' polarized the direction of orientation of dipole will be in the direction of expected reflected ray OB.

Finally, the condition is

$$i + r = 90^\circ \qquad \text{but } i = \theta_B.$$

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

$$r = 90^\circ - \theta_B$$

According to Snell's law of refraction

$$\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$$

So

$$\frac{\sin \theta_B}{\sin(90 - \theta_B)} = \frac{\mu_2}{\mu_1}$$

$$\frac{\sin \theta_B}{\cos \theta_B} = \frac{\mu_2}{\mu_1} \qquad \left(\because \sin(90-\theta_B) = \cos\theta_B\right)$$

$$\tan \theta_B = \frac{\mu_2}{\mu_1}$$

$$\boxed{\theta_B = \tan^{-1}\left(\frac{\mu_2}{\mu_1}\right)}$$

Brewster's angle.