Refractive Index.

Refractive index of a medium is that characteristic which decides speed of light in it. It is a scalar, unit less and dimensionless quantity.

(1) Types: It is of following two types

Absolute refractive index	Relative refractive index
(i) When light travels from air to any transparent medium then R.I. of medium w.r.t. air is called it's absolute R.I. i.e. $_{air}\mu_{medium} = \frac{c}{v}$	(i) When light travels from medium (1) to medium (2) then R.I. of medium (2) w.r.t. medium (1) is called its relative R.I. i.e. $_1\mu_2 = \frac{\mu_2}{\mu_1} = \frac{v_1}{v_2}$ (where v1 and v2 are the speed of light in medium 1 and 2 respectively).
(ii) Some absolute R.I. $_a\mu_{glass} = \frac{3}{2} = 1.5$, $_a\mu_{water} = \frac{4}{3} = 1.33$ $_a\mu_{diamond} = 2.4$, $_a\mu_{Cs_2} = 1.62$ $_a\mu_{crown} = 1.52$, $\mu_{vacuum} = 1$, $\mu_{air} = 1.0003 \approx 1$	(ii) Some relative R.I. (a) When light enters from water to glass : $_w\mu_g = \frac{\mu_g}{\mu_w} = \frac{3/2}{4/3} = \frac{9}{8}$ (b) When light enters from glass to diamond : $_g\mu_D = \frac{\mu_D}{\mu_g} = \frac{2.4}{1.5} = \frac{8}{5}$

Note: Cauchy's equation: $\mu = A + \frac{B}{\lambda^2} + \frac{C}{\lambda^4} + ...$ $(\lambda_{Red} > \lambda_{violet}$ so $\mu_{Red} < \mu_{violet})$

If a light ray travels from medium (1) to medium (2), then $_1\mu_2 = \frac{\mu_2}{\mu_1} = \frac{\lambda_1}{\lambda_2} = \frac{v_1}{v_2}$

$\mu \propto \frac{1}{\lambda}$

$\mu \propto \frac{1}{v}$

$v \propto \lambda$

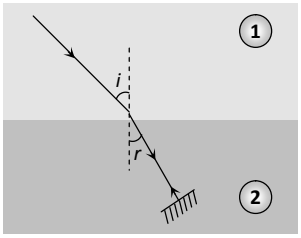
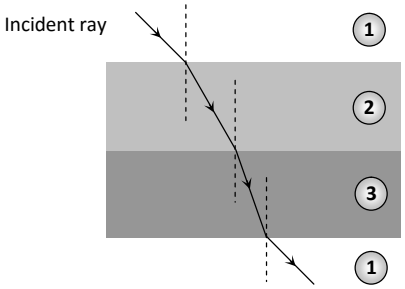
(2) Dependence of Refractive index

(i) Nature of the media of incidence and refraction.

(ii) Color of light or wavelength of light.

(iii) Temperature of the media: Refractive index decreases with the increase in temperature.

(3) Principle of reversibility of light and refraction through several media:

Principle of reversibility	Refraction through several media
	
$_1\mu_2 = \frac{1}{_2\mu_1}$	$_1\mu_2 \times {}_2\mu_3 \times {}_3\mu_1 = 1$