

Electricity

Electric field

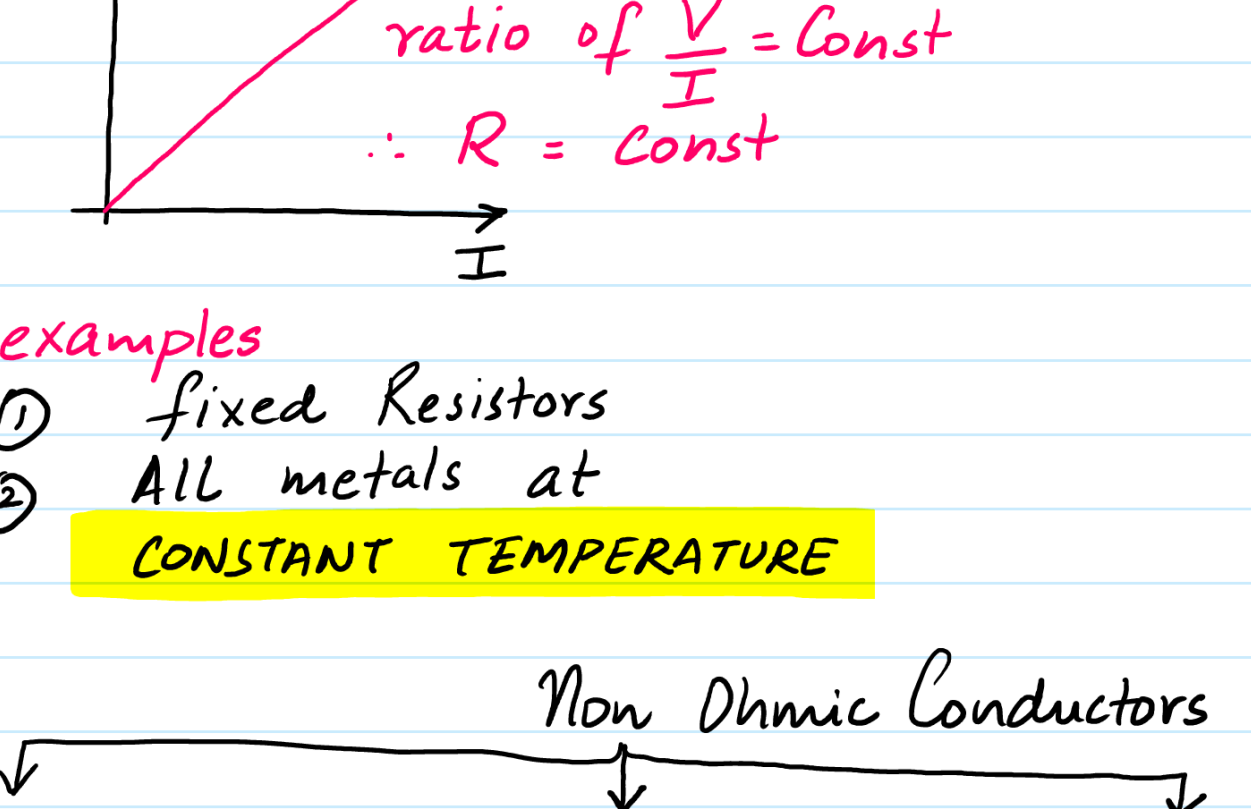
Current Electricity :-

OHM'S LAW :-

$V \propto I$ provided that Length, Area & Temp remains constant

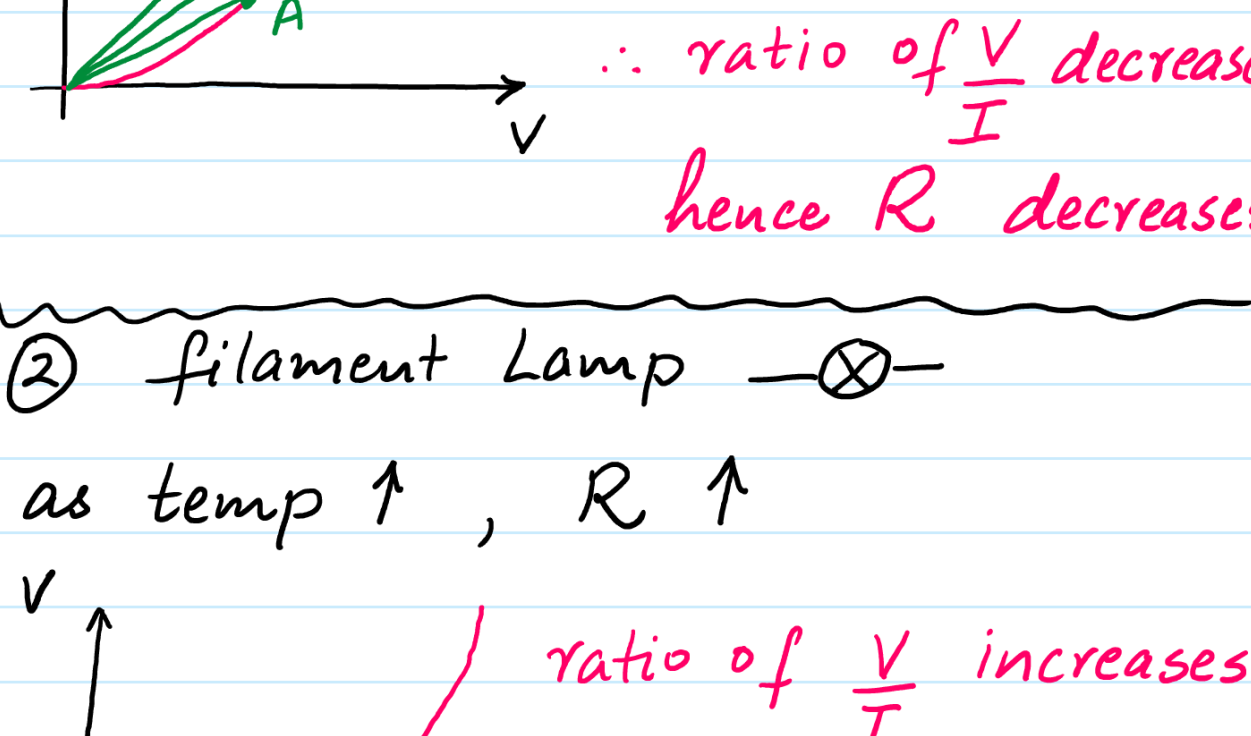
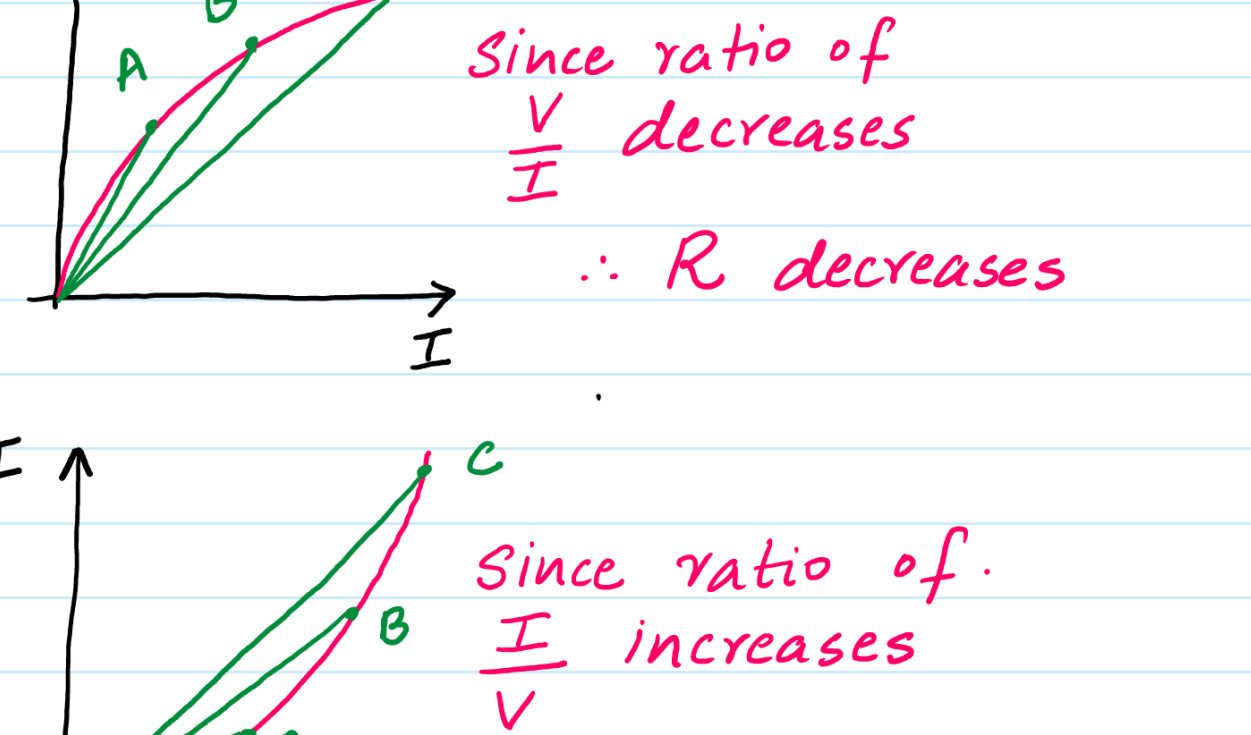
$$V = IR$$

define Resistance \therefore Ratio of $\frac{V}{I}$.

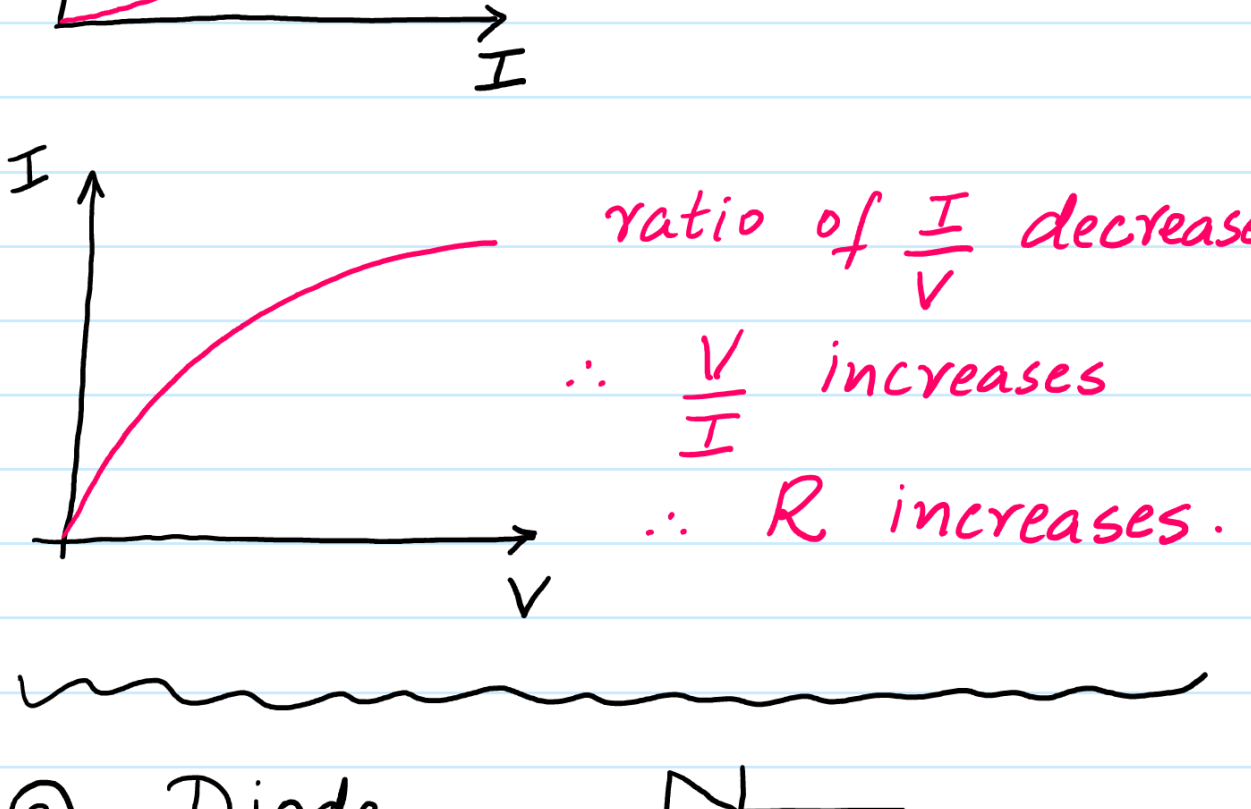


examples

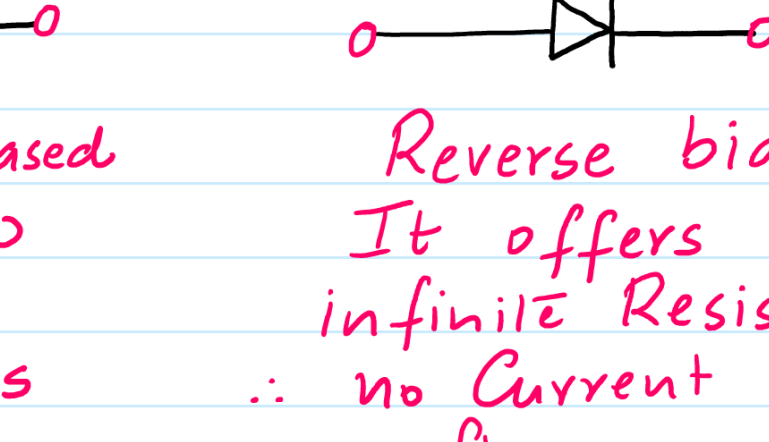
- fixed Resistors
- All metals at **CONSTANT TEMPERATURE**



(2) filament Lamp

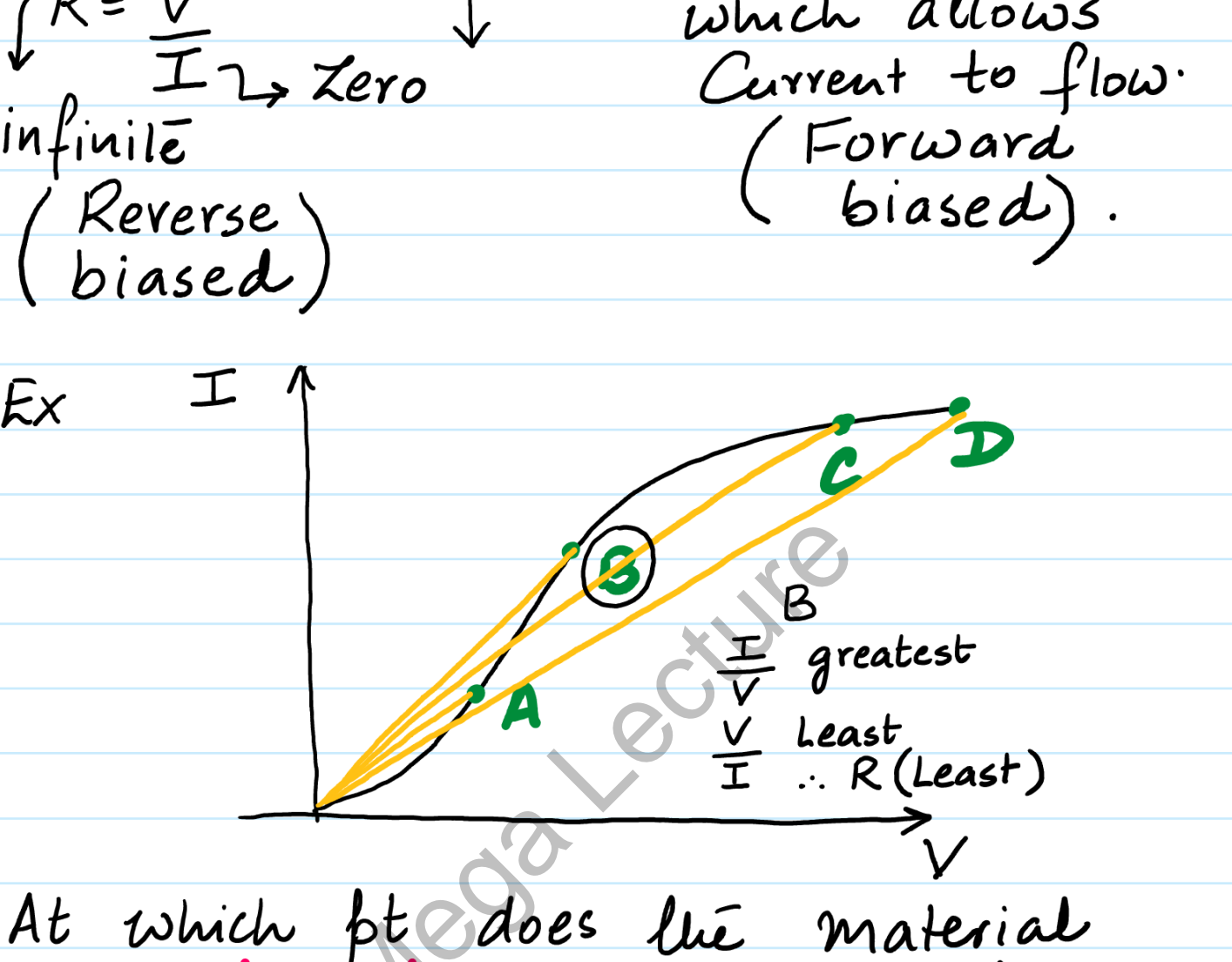


(3) Diode



forward biased It offers Low Resistance \therefore Current flows

Reverse biased It offers infinite Resistance \therefore no Current flows



At which pt does the material offer **Least** resistance (B).

* Factors which affect Resistance

$$R \propto L$$

$$R \propto \frac{1}{A}$$

$$R \propto \frac{L}{A}$$

$$R = \frac{\rho \cdot L}{A}$$

ρ is a constant known as Resistivity of the material.

units of ρ (Ωm) $\rho = \frac{R \cdot A}{L} = \frac{\Omega m^2}{m}$

define resistivity ρ \therefore The resistivity of a material is said to be equal to its resistance provided that the material is of unit Length & offers a unit cross-sectional area

Conductivity (σ) Sigma :-
Conductivity is Inverse of Resistivity

formula $\sigma = \frac{L}{RA}$

units $(\Omega m)^{-1}$ or $\Omega^{-1} m^{-1}$.

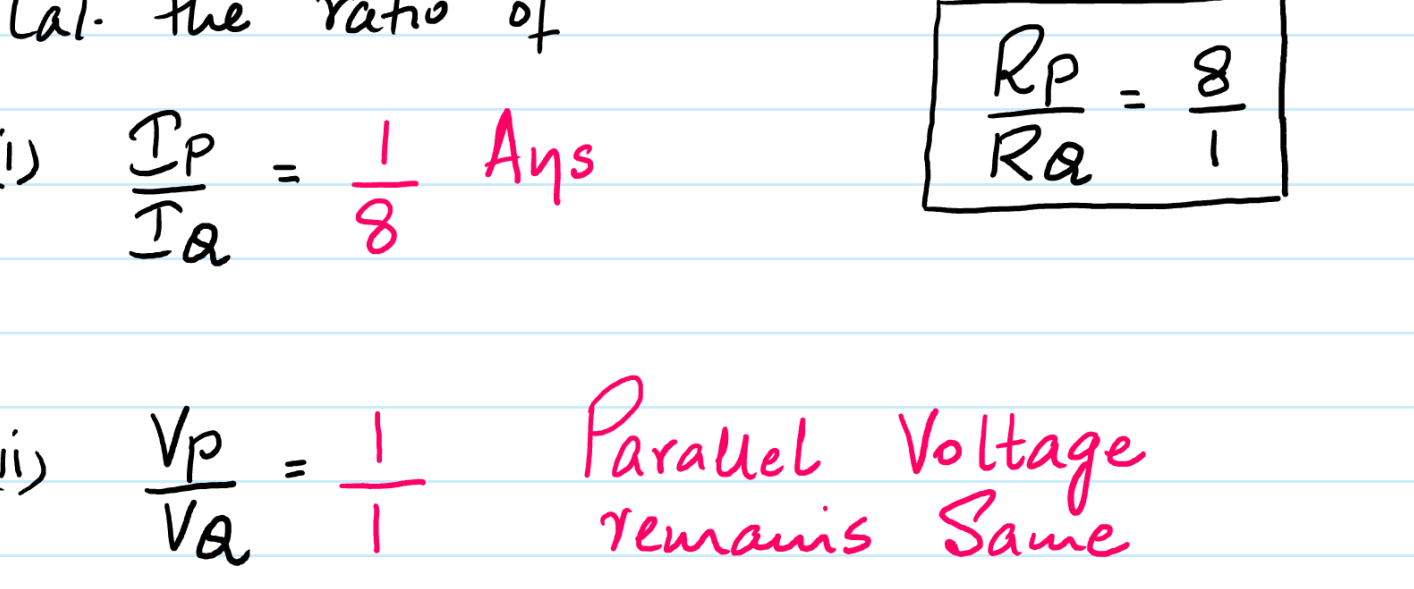
Ex. A cylindrical material offers a resistance of 10Ω . Cal its new resistance if its Length is doubled & its volume remain unchanged.

$$V = A \times L$$

Const half double

$$R = \rho \frac{L}{A}$$

R increases 4 times i.e 40Ω



Cal. the ratio of

(i) $\frac{I_p}{I_q} = \frac{1}{8}$ Ans $\frac{R_p}{R_q} = \frac{8}{1}$

(ii) $\frac{V_p}{V_q} = \frac{1}{1}$ Parallel Voltage remains Same

Ex.3 Copper Steel

$2L$	L
$3R$	R
ρ	2ρ

Cal ratio of diameter of Copper diameter of Steel $\frac{dc}{ds}$

Copper $3R = \rho \cdot \frac{2L}{\frac{\pi dc^2}{4}}$

Steel $R = \frac{2\rho \cdot L}{\frac{\pi ds^2}{4}}$

$$3 \left(\frac{2\rho \cdot L}{\frac{\pi dc^2}{4}} \right) = \frac{2\rho \cdot L}{\frac{\pi ds^2}{4}}$$

$$\frac{3}{ds^2} = \frac{1}{dc^2}$$

$$\frac{dc}{ds} = \sqrt{\frac{1}{3}} \text{ Ans}$$

"Continue with theory. of Current Electricity." [youtube.com/c/MegaLecture](https://www.youtube.com/c/MegaLecture)