Lecture-2 Drift Velocity and resistance

★ $\vec{V_d} = -\frac{eE}{m}\tau$

$I\Delta t = \frac{e^2 A}{m} n \tau \Delta t |E|$

$I = |j| A$ where $j \rightarrow$ Current density

$\therefore |j| = \frac{ne^2}{m}\tau |E|$

$\vec{j} = \frac{ne^2}{m}\tau \vec{E}$

★ Conductivity (σ)

$\sigma = \frac{ne^2}{m}\tau$

★ Ohm's Law

$V \propto I$ where $V \rightarrow$ Voltage
$I \rightarrow$ Current
$R \rightarrow$ Resistance
$A \rightarrow$ Area
$l \rightarrow$ Length
$\rho \rightarrow$ Resistivity

$V = RI$

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

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

$\therefore R = \rho \frac{l}{A}$

$V = I \times R = \frac{I \rho l}{A}$