PHYSICS 231 – CHAPTER 25: CURRENT, RESISTANCE AND EMF

Current and current density:

$$I = \frac{dQ}{dt} = n|q|v_d A \quad , \quad \vec{J} = nq\vec{v}_d$$

Resistivity:

$$\rho = \frac{E}{J}$$

Variation with temperature:

$$\rho(T) = \rho_0[1 + \alpha(T - T_0)]$$

Ohm's law:

$$V = IR \quad , \quad R = \frac{\rho L}{A}$$

Power into a resistor:

$$P = VI = I^2R = \frac{V^2}{R}$$