Physics 23: Possibly Useful Formula

Electrical Properties of Materials:

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

$$\Delta V = iR$$

$$E = E_0/\kappa, \qquad \kappa > 1$$

Capacitance:

$$q = C\Delta V$$

$$C = 4\pi\epsilon_0 \frac{r_1 r_2}{r_2 - r_1}$$

$$U = \frac{1}{2}C(\Delta V)^2 \Rightarrow u = \frac{1}{2}\epsilon_0 E^2$$

$$\oint \kappa \vec{E} \cdot d\vec{A} = \frac{q}{\epsilon_0}$$

DC Circuits

$$P = i^2 R = \frac{(\Delta V)^2}{R}$$

$$q = CV_0(1 - e^{-t/RC})$$