

Physics 200 Formula Sheet

$$F = k \frac{q_1 q_2}{r^2}$$

$$k = 8.99 \times 10^9 \text{ N m}^2 / \text{C}^2$$

$$e = 1.60 \times 10^{-19} \text{ C}$$

$$\vec{E} = \frac{\vec{F}}{q_0}$$

$$\vec{E} = k \sum_i \frac{q_i}{r_i^2} \hat{r}$$

$$\vec{E} = k \int \frac{dq}{r^2} \hat{r}$$

$$\phi_E = \int \vec{E} \cdot d\vec{A}$$

$$\int \vec{E} \cdot d\vec{A} = \frac{q_{in}}{\epsilon_0}$$

$$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 / \text{N m}^2$$

$$\Delta U = -q_0 \int_A^B \vec{E} \cdot d\vec{s}$$

$$\Delta V = \frac{\Delta U}{q_0}$$

$$\Delta V = - \int_A^B \vec{E} \cdot d\vec{s}$$

$$V = k \frac{q}{r} \quad (\text{for a point charge})$$

$$U = k \frac{q_1 q_2}{r_{12}} \quad (\text{for two point charges})$$

$$1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$$

$$E_x = - \frac{\partial V}{\partial x}$$

$$C = \frac{Q}{V}$$

$$C_{eq} = \sum C_i \quad (\text{parallel})$$

$$\frac{1}{C_{eq}} = \sum \frac{1}{C_i} \quad (\text{series})$$

$$U = \frac{Q^2}{2C}$$

$$u = \frac{\epsilon_0 E^2}{2}$$

$$V = \frac{V_0}{\kappa}$$

$$C = \kappa C_0$$

$$i = \frac{dQ}{dt}$$

$$j = \frac{i}{A}$$

$$\vec{j} = \sigma \vec{E}$$

$$i = \frac{V}{R}$$

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

$$R_{eq} = \sum R_i \quad (\text{series})$$

$$\frac{1}{R_{eq}} = \sum \frac{1}{R_i} \quad (\text{parallel})$$

$$P = iV$$

$$P = i^2 R$$

$$\sum \Delta V = 0 \quad (\text{around loop})$$

$$\sum i_{in} = \sum i_{out}$$

$$q(t) = Q_{max} [1 - e^{-t/RC}] \quad (\text{charging})$$

$$q(t) = Q_{max} [e^{-t/RC}] \quad (\text{discharging})$$