

Formula sheet - Phys 272 Exam #1

$$\vec{F}_{12} = \frac{kq_1q_2}{r_{12}^2} \hat{r}_{12}$$

$$\vec{E} = \frac{\vec{F}}{q}, \vec{E}_P = \sum_i \vec{E}_{iP}$$

$$\vec{p} = q\vec{L}, \vec{\tau} = \vec{p} \times \vec{E}, U = -\vec{p} \cdot \vec{E}$$

$$\phi = \int_{\text{surface}} \vec{E} \cdot \hat{n} dA, \oint \vec{E} \cdot \hat{n} dA = \frac{Q_{\text{enclosed}}}{\epsilon_0}$$

$$\Delta V = V_b - V_a = -\int_a^b \vec{E} \cdot d\vec{l}$$

$$V = \frac{kq}{r}, U = qV, v = \sum_i \frac{kq_i}{r_i}$$

$$k = 9 \times 10^9 \frac{N \cdot m^2}{C^2}, \epsilon_0 = 8.85 \times 10^{-12} \frac{C^2}{N \cdot m^2}, k = \frac{1}{4\pi\epsilon_0}$$