PHYSICS 231 – CHAPTER 21: ELECTRIC CHARGE AND FIELD

Coulomb's law:

$$F = \frac{1}{4\pi\epsilon_0}\frac{q_1 q_2}{r^2} \quad , \quad \frac{1}{4\pi\epsilon_0} = 8.988 \times 10^9 \; N \cdot m^2/C^2$$

Electric field:

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

due to point charge:

$$\vec{E} = \frac{1}{4\pi\epsilon_0}\frac{q}{r^2}\,\hat{\mathbf{r}}$$

Electric dipole:

- dipole moment

$$p = qd$$

- torque

$$\vec{\tau} = \vec{p} \times \vec{E}$$

- energy

$$U = -\vec{p} \cdot \vec{E}$$