Formula Sheet

Electrostatics Formula Sheet

k = $9.00 \times 10^9 \frac{Nm^2}{C^2}$

elementary charge = $\pm 1.602 \times 10^{-19}$ C

1 C = 6.2422×10^{18} electrons

1 eV = 1.602×10^{-19} J

Sine and Cosine Laws

Force $\vec{F}_E = \frac{kQ_1Q_2}{R^2}$ betwn charges

Elec. Field Strength $\vec{E} = \frac{\vec{F}}{Q_t}$ — felt by test charge; Q_t — test charge

" $\vec{E} = \frac{kQ_s}{R^2}$ — source charge; distance from Q_s (non-uniform)

Potential Energy $\Delta E_p = Q_t \vec{E} \Delta d$ — distance moved between plates

like charges / opposite charges $\pm E_p = \frac{kQ_1Q_2}{R}$ source charge

potential difference $\Delta V = \frac{\Delta E_p}{Q_t}$ — charge in electric field

electric potential $V = \frac{kQ_s}{R}$ — creating the field; distance from Q_s

Electric Field $\vec{E} = \frac{\Delta V}{d}$ — pot. diff betwn plates; distance between plates

100V 300V

$\Delta V = 200V$

Accel voltage $V_a = \frac{E_k}{Q_e}$ Cathode ray tube

$= \frac{\frac{1}{2}mv^2}{Q_e}$

Vectors

- must do vector addition

- in equation, do not use charges' signs

Scalars

- just add (no triangle)
- use signs of charges in equations