ELECTRIC CHARGES AND FIELDS MINDMAP...

Coulomb's Law: →

Force b/w 2 charges.

$$\boxed{F = \frac{Kq_1q_2}{r^2}}$$

In air/vaccum, $\boxed{K = \frac{1}{4\pi\epsilon_0}}$

In medium with dielectric const. K, $\boxed{K = \frac{1}{4\pi K\epsilon_0}}$

Charge: →

- properties of charge
  - Quantization
  - Conservation
- Ways of Charging
  - Friction / Rubbing
  - Induction
  - Conduction

Electric Dipole ($\vec{p}$): →

$-q \xleftrightarrow{2d} q$ $\boxed{\vec{P} = q(2d)}$

- Imp. for studing polar molecules

* $\vec{E}_{axial} = \boxed{\frac{2K\vec{p}}{r^3}}$ * $\vec{E}_{equitorial} = \boxed{\frac{-K\vec{p}}{r^3}}$

* $E_{general} = \boxed{\frac{Kp}{r^3}\sqrt{1+3\cos^2\theta}}$

Electric Flux and Gauss's Law →

Electric Flux (ϕ): Measure of electric field lines crossing an area.

$$\boxed{d\phi = E\,dA\cos\theta}$$

$$\boxed{\phi = \vec{E}\cdot\vec{A}}$$

Gauss Law: $\boxed{\oint \vec{E}\cdot\vec{ds} = \frac{q_{enc}}{\epsilon_0}}$

Note:

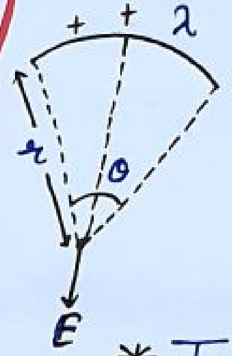
$\cdot q_1$ $\quad -q_2$ $\quad \boxed{\phi = \frac{q_1}{\epsilon_0}}$

Electric Field lines →

* Properties
* Represent direction of force on +ve charge

Electric Field (E) →

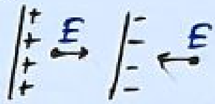
* Force on a unit positive charge.
* Due to point charge, $\boxed{E = \frac{Kq}{r^2}}$
* Circular arc subtending θ angle at center.



$$\boxed{E = \frac{2K\lambda}{r}\sin\left[\frac{\theta}{2}\right]}$$

along angular bisector

* Infinate sheet, $\boxed{E = \frac{\sigma}{2\epsilon_0}}$



* Spherical Conductor / Hollow Sphere →

$\boxed{E = 0}$ $(r < R)$

$\boxed{E = \frac{Kq}{r^2}}$ $(r \geq R)$

* Solid Non-Conducting Sphere →

$\boxed{E = \frac{Kqr}{R^3}}$ $(r < R)$

$\boxed{E = \frac{Kq}{r^2}}$ $(r \geq R)$