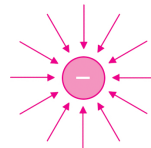


Positive charge

4. ELECTRIC CHARGES & FIELDS

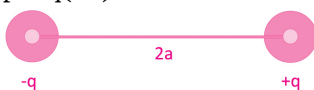


Negative charge

IMP DEFINITIONS & FORMULAS

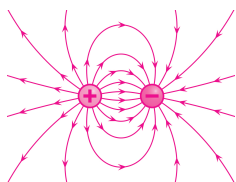
- Electric charge** occurs in a body due to excess or deficient of charged particles (– or +) on it.
- Charge of a body is always quantised.
Thus $q = \pm ne$, $e = 1.6 \times 10^{-19} \text{ C}$
and $n = 1, 2, 3, \dots$ is number of electrons
- Like charges repel and unlike charges attract each other.
- Electric field Intensity** is the measure of force exerted by one charged body on another.
- Electric Dipole:** A pair of equal and opposite point charges (q and $-q$) separated by a distance ($2a$) is called electric dipole.
Dipole moment $\vec{p} = q(2\vec{a})$
It is a vector .
SI units: C-m.
- Couple (Torque) acting on dipole placed in a uniform electric field is
 $\tau = pE \sin \theta \Rightarrow \vec{\tau} = \vec{p} \times \vec{E}$
- Coulomb's law:** The force between two charges in air or vacuum is
$$F = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r^2} \text{ and } \frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2 \text{C}^{-2}$$

where ϵ_0 is the permittivity of free space
- Electric flux** is a measure of electric field through a given surface
$$\Delta\phi = \vec{E} \cdot \Delta\vec{S} = E\Delta S \cos \theta$$
- Gauss' law:** $\phi = \frac{1}{\epsilon_0} (q_{\text{net}})$



BULLET MASTER'S

PHYSI BEATS!

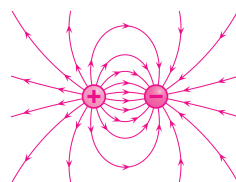


Positive & Negative

4) ELECTRIC CHARGES & FIELDS [1 SAQ]

Warm welcome to the

First chapter of the unit Electricity



Positive & Negative

• **Electric charges** లో మూడు ముఖ్యమైన విషయాలు:

Coulomb's law, Gauss' law, Electric dipole

- ప్రతి మనిషికి ఒక నిర్దిష్ట సహజ ఆవేశం (Positive or negative) మరియు ఒక ఆరా (Circle) ఉన్నట్లే ప్రతి **body** కి కొంత Electric Charge మరియు దాని చుట్టూ కొంత Electric Field ఉంటుంది.
- Electric field is the measure of force per unit charge.
- ప్రతి **body** కి ఉండే Charge ఎంత బలంగా ఉందో తెలిపేదే దాని Electric Field Intensity
- వివిధ సందర్భాలలో Electric Field Intensity ఎలా ఉంటుందో ఈ చాప్టర్ లో వివరిస్తారు.

IPE View

☞ **IMP SAQ :** Coulomb's law, Gauss' law, Couple on an electric dipole,
Intensity of electric field on the Axial line , Equatorial plane