Electrostatics - Class 12 Physics Notes

1. Coulomb's Law:
Force between two point charges q1 and q2 separated by distance r is:
F = (1 / (4π■0)) * (q1q2 / r²)
- Force is attractive for unlike charges, repulsive for like charges.

2. Electric Field (E):
E = F/q (Force per unit positive charge)
For a point charge: E = (1 / (4π■0)) * (q / r²)

3. Electric Dipole:
Dipole: Two equal and opposite charges separated by distance d.
Dipole moment (p) = q × 2d (direction from -q to +q).

4. Electric Potential (V):
Work done to bring unit positive charge from infinity to a point.
For point charge: V = (1 / (4π■0)) * (q / r)

5. Gauss Theorem:
Net electric flux through a closed surface = (1/■0) × (Charge enclosed)
■ E·dA = Q / ■0

6. Applications of Gauss Law:
- Field due to infinite line charge
- Field due to uniformly charged sphere
- Field due to plane sheet of charge

7. Capacitance:
C = Q / V
Parallel plate capacitor: C = (■0 A) / d
With dielectric: C = (■ A) / d, where ■ = K■0

8. Energy stored in Capacitor:
U = 1/2 C V²