# Electrostatics

## 1 Electric Charge

- Charge is characteristic property of fundamental particles due to which it produces and experiences electrical and magnetic effects.
- Excess or defficiency of $e^-$ on any body gives concept of charge.
- Only $e^-$ are responsible for electrificaton of any body.
- SI Unit $1Amp \cdot 1Sec = 1Coulomb$,
  $1C = 3 \cdot 10^9 esu, 1emu = 10esu, 1esu = 1Franklin, 1Faraday = 96500C =$ *charge on* $1\ mol\ e^-$

## 2 Properties of Charge

1. Charge is Transferable

   Induction Method (In case of non-conducting bodies)

   $$Q_i = -Q\left(1 - \frac{1}{k}\right)$$

   $$\begin{cases} Q_i = \text{Induced charge on body} \\ Q = \text{Charge on inducing agent} \\ k = \text{Dielectric Constant of body being charged} \end{cases}$$

   Conduction Method (In case of Conducting bodies)

   $$Q_1 = \left(\frac{C_1}{C_1 + C_2}\right)(q_1 + q_2)Q_2 =$$

## 3 Coulomb's Law

$$F = \frac{1}{4\pi\epsilon_0} \cdot \frac{q_1 q_2}{r^2} \qquad \frac{1}{4\pi\epsilon_0} = 9 \cdot 10^9 Nm^2C^{-2}$$