Electrostatic

⇒ **Charge (q)** : It is property of matter which ⊕ Create E & B.

$q = it$ $\quad i = \frac{q}{t}$

SI Unit = Amp-sec = Coulomb

$[q] = [A][T] = [AT]$

$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$

$e = 1.6 \times 10^{-19} C$

$q = ne$ [Excess of e^-]

$q = +ne$ [deficiency of e^-]

⇒ Excess of electron → −ve charge.

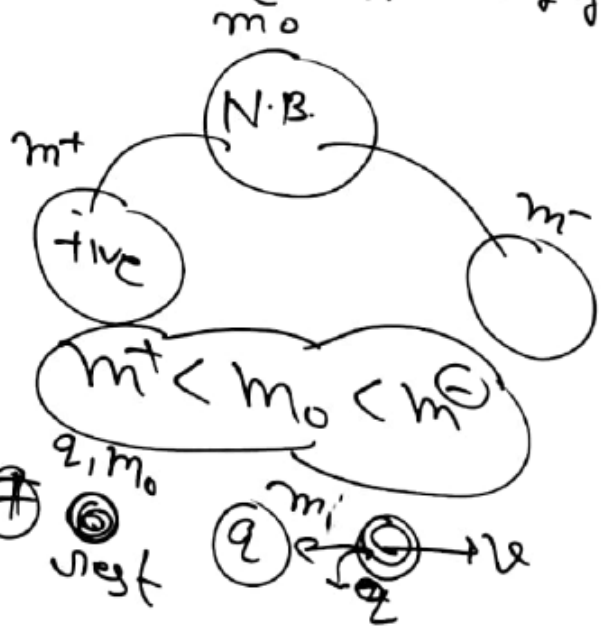
⇒ deficiency of electron → +ive charge.

⇒ No of e^- = no of e^+ = Neutral body.

(#) Quantization of charge :

$\boxed{q = \pm ne}$ $\quad n \in I^+$

$n \in I^+$ $\quad 1, 2, 3, \ldots$



Electrostatic

⇒ Properties of Charge (Q):

(a) two types of charge +ve & -ve nature

(b) Charge are quantized on a body. $[q = \pm ne]$
↳ $n \times 1.6 \times 10^{-19} C$

(c) Charge can be transfer from one body to other.

(d) Charge on a body is independent of its speed but mass depends

(e) Charge is a scalar quantity $(2c, -4c) = \text{Net} = -4+2 = -2c$

(f)

Electrostatic

Q1 Number of +ive & -ve charge in 18 gm water. [NCERT

250 g water → +ive & -ve

$\Rightarrow$ $1H_2O$ — Net charge = 0

1 molecule of H_2O — 10P, 10e

2H → 2P, 2e

O → 8P, 8e

10P, 10e⁻

Number of molecule of H_2O in 18g water.

$$\text{mole} = n = \frac{\text{mass}}{\text{molecular mass}} = \frac{18g}{18g} = 1 \text{ mole}$$

1 mole = 6.023×10^{23} molecule.

18 g में 6.023×10^{23} molecule of H_2O.

In 1 molecule no of proton = 10e⁺ & 10e⁻

6.023×10^{23} molecule = $6.023 \times 10^{23} \times 10e^+$, $6.023 \times 10^{23} \times 10e^-$

$= 6.023 \times 10^{24} e^+$

+ive charge on 18 g of H_2O –

$6.023 \times 10^{24} \times 1.6 \times 10^{-19}$

$= 6.023 \times 1.6 \times 10^5$

$= 6.023 \times 1.6 \times 10^5$ C

Electrostatic

Ex. Number of +ive & -ve charge in 18 gm of water. [NCERT]

→ Number of Proton & electron in 1 molecule of H_2O $\equiv$ 10P, 10e⁻

(H_2O: (2P, 2e) (8P, 8e))

→ find number of molecule of H_2O in 18 g water.

(a) $\text{mole} = \frac{\text{mass}}{\text{molecular mass}} = \frac{18\,g}{18\,g} = 1$

(b) Number of molecule in 1 mole H_2O = 6.023×10^{23} molecule = N_A

Proton = $10\,N_A\,e^+$

$= 10^1 \times 6.023 \times 10^{23}\,e^+$

$= 6.023 \times 10^{24} \times 1.6 \times 10^{-19}\,C$

$= 6.023 \times 1.6 \times 10^5\,C$

$10\,N_A\,e^-$

$10 \times 6.023 \times 10^{23}\,e^-$

$-6.023 \times 1.6 \times 10^5\,C$

Electrostatic

Q1) Which charge is not possible on a body.

(a) 1.6×10^{-20} C

$q = ne$

$1.6\times10^{-20} = n\times1.6\times10^{-19}$

$\frac{10^{-20}}{10^{-19}} = n \quad n = 0.1$

(b) 8×10^{-19} C

8×10^{-19}

$q = ne$

$8\times10^{-19} = n\times1.6\times10^{-19}$

$n = 5\times10^{5}$

(c) 48×10^{-20} C

$q = ne$

$48\times10^{-20} = n\times1.6\times10^{-19}$

$3 = n$

(d) 199×10^{-20}

$q = ne$

$199\times10^{-20} = n\times1.6\times10^{-19}$

$19.9\times10^{-19} = n\times1.6\times10^{-19}$

$n = \frac{19.9}{1.6}$

$= \frac{199}{16}$

$= 9 = n$