Monday, May 18, 2020
12:42 PM

Electricity.

it is study of charge those are in motion.

Charge.

it is internal properties of body, due to body attract and repel to each other.

Charge.
- +ve Charge
- -ve charge

SI unit of charge is Coulomb's. it is denoted. → C

All the body formed by the smallest charge particles this is called
- # proton
- # electrons
- # Neutron

charge on one proton

$$1P = +1.6 \times 10^{-19} C$$

charge on one electron

$$1e = -1.6 \times 10^{-19} C$$

charge on the body is equal to

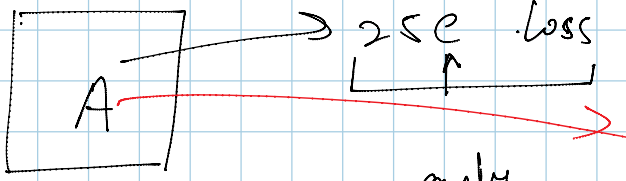
$$Q = \pm n \cdot e$$

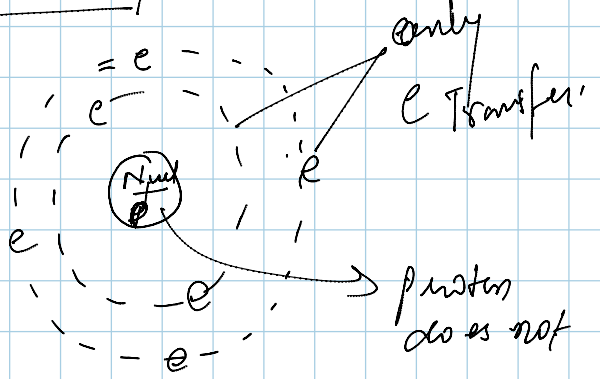
e → charge on one e^-

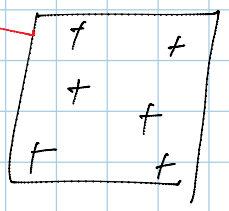
n → No of e^- loss and gain

* if a body gain of e^- it make -ve charge

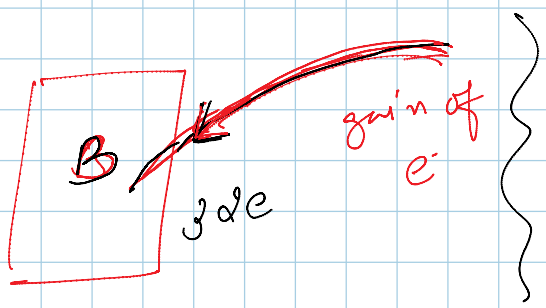
* If a body loss of e^- it make +ve charge.







$$Q = 25e$$
$$= [+ 25 \times 1.6 \times 10^{-19}] C$$



$$Q = -(32 \times 1.6 \times 10^{-19} C)$$

charge on the body B.

Quest. → Find the no of e in one coulomb's charge.

$1.6 \times 10^{-19} C = 1e$

$$1C = \frac{1}{1.6 \times 10^{-19}} e$$

$$= \frac{5}{16} \times 10^{19} e$$

$= \frac{10}{16} \times 10^{19}\ e$

$= \frac{10}{8} \times 10^{19}\ e$

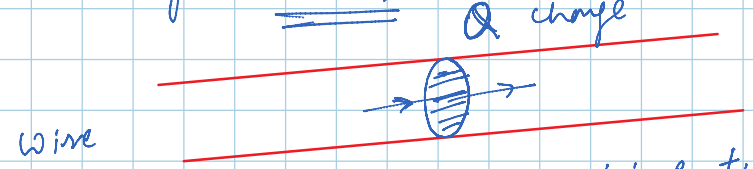
$= 0.625 \times 10^{19}\ e$

$1C = 6.25 \times 10^{18}$

6.20 pm → Math.

Electric current

The electric current is defined as the rate of flow of charge from any cross-section area of conductor.



in time t

Then

$$\text{Electric current} = \frac{\text{charge}}{\text{Time}}$$

$$I = \frac{Q}{t}$$

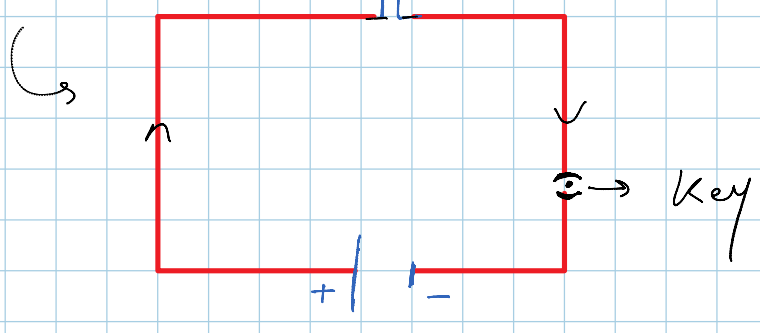
SI unit of electric current C/s [Coulomb's/sec]

$1\ C/s = 1$ Ampere

electric current is scalar quantity,

Cell is denoted by

Electric circuit. Bulb.



The flow of current in the circuit is going from +Ve Terminal to -Ve Terminal.

Example 1 — 6×10^{12} e passing through cross-section area of conductor in time 1 min. Then find the magnitude of current in the conductor.

2 Flow of current is 2 A then find the no of e⁻ passing through the conductor in 12 min.

Soln

No of e = 6×10^{12}

$q = ne$

$= 6 \times 10^{12} \times 1.6 \times 10^{-19}$

$t = 1 \text{ min} = 60 \text{ sec}$

$I = \frac{Q}{t} = \frac{6 \times 10^{12} \times 1.6 \times 10^{-19}}{60}$

$= 1.6 \times 10^{-8} A$

$I = \frac{Q}{t}$

$Q = It = 2 \times 12 \times 60$

$= 1440 A$

$Q = ne$

$n = \frac{1440}{1.6 \times 10^{-19}}$

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

$$= 900 \times 10^{15}$$

$$q = 9 \times 10^{21}\ e.$$

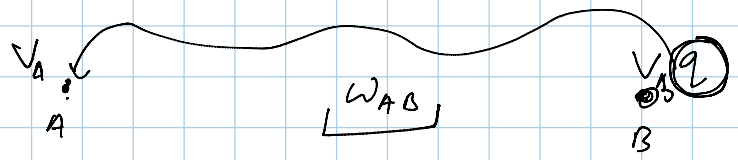
Potential difference.

The potential difference of the point is define as the work done per unit charge bringing from one point to another point.

$$\text{Potential difference} = \frac{\text{Work done.}}{\text{Charge.}}$$

it is denoted by V

$$V = \frac{W}{q}$$



If any charge particle q bringing from B to A then the work done on the charge particles W_{AB}

Then

$$V_{AB} = \frac{W_{AB}}{q}$$

V_A = Electric potential at point A

V_B = Electric potential at point B

Then p.d bet^n A and B is $V_A - V_B = V_{AB}$

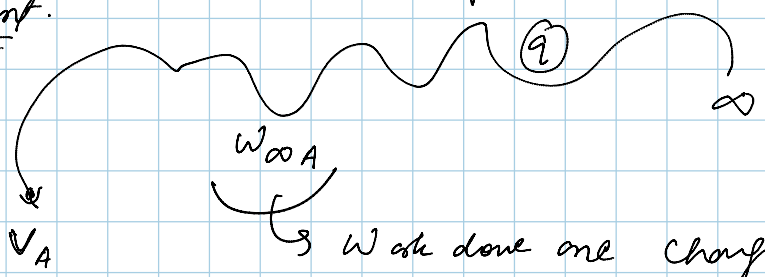
electric Potential difference is scalar quantity

SI unit of electric potential is Volt.

$$1\ \text{Volt} = \frac{1\ \text{Joule}}{1\ \text{coulom}}$$

$$\boxed{1V = 1J/C}$$

electric potential at point is define as the work done per unit charge bringing from ∞ to that point.



$W_{\infty A}$ → Work done one charge particles bringing from ∞ to point A.

Then

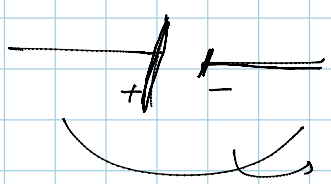
$$\text{electric potential} = \frac{W_{\infty A}}{q}$$

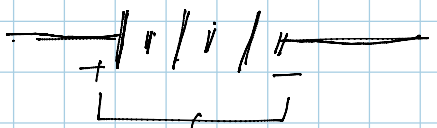
#

$$\boxed{V_A = \frac{W_{\infty A}}{q}}$$

Battry

Cell → it is single source of electric potential and it denoted by





↳ groups cell is called Battery

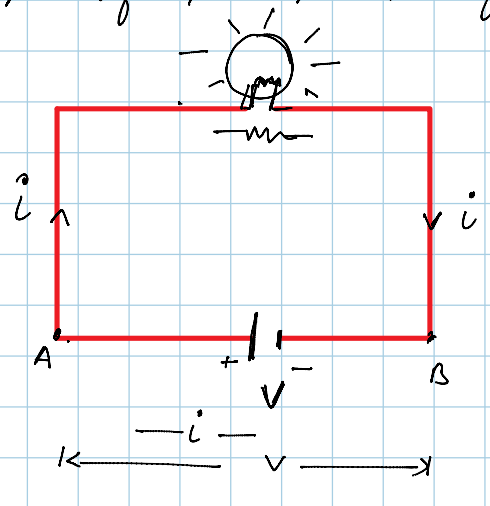
The electric current flow in the circuit is +Ve terminal to -Ve terminal.

+Ve Terminal of the battery denoted the higher potential end and -Ve Terminal of the battery denoted lower potential.

the electric current always flow from Higher potential to Lower potential.

Ohm's Law-

A/c to the Ohm's Law at the constant Temperature the flow of current in the circuit is directely proportional to the p.d of two point of circuit.



V ↑	i ↑
V ↓	i ↓

Then $V \propto I$

$V = IR$

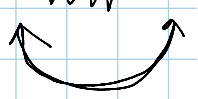
↳ R is the proportionality constant.

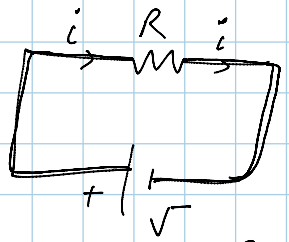
This constant is known as

Resistance of circuit.

$$V = IR$$

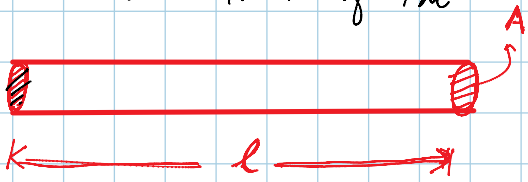
SI unit of Resistance is. Ω [ohm]
↳ denoted.

The Resistance of Resistor denoted by 



The Resistance of Resistor depend on
(1) Length of wire
(2) Cross-section area
(3) Material of wire.

Consider a conductor of Length l and its cross section area A Then of the



of The Resistance of wire R

$$R \propto l$$

$$R \propto 1/A$$

$$R \propto \frac{l}{A}$$

$$R = \frac{\rho l}{A}$$

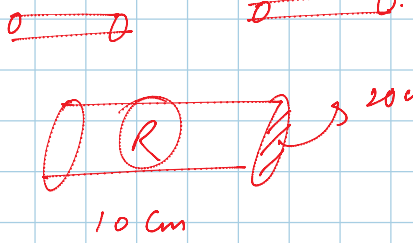
Where ρ is the Resistivity of Materials. and it is depend on the nature of Materials

Rho → ρ

Al Cu

(Al) (Cu)

and it is depend on the nature of materials



$$R = \frac{\rho l}{A}$$