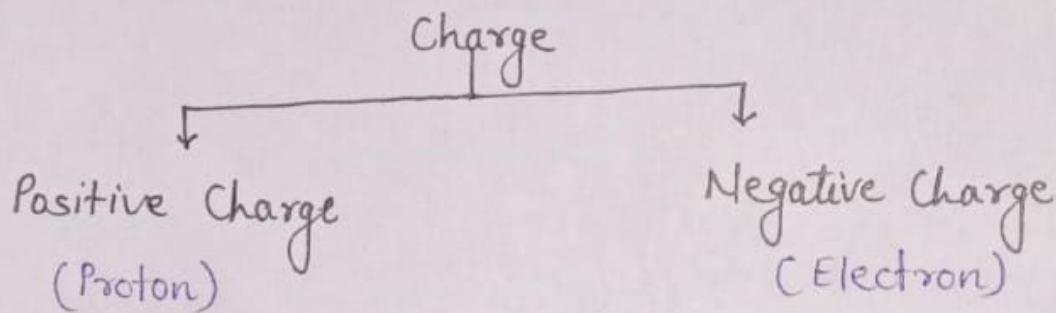


## Chapter - 1 (Electricity)

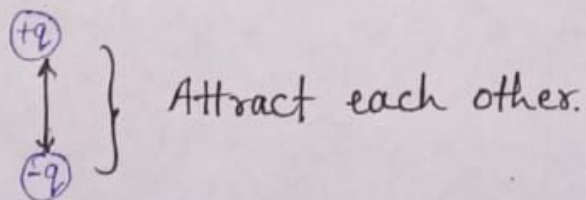
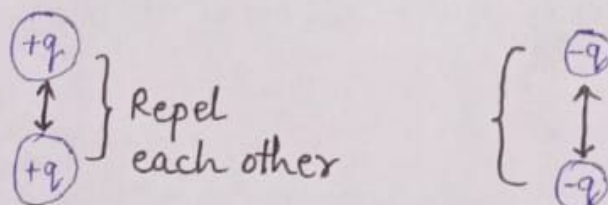
Charge :- There are two types of charges -



Properties of electric Charges :-

- (i) Opposite Charges attract to each other.
- (ii) Similar Charges repel each other.

for ex-



Note :- (i) Symbol of charge is  $q$  or  $Q$ .

(ii) SI unit of charge is Coulomb (C).

$$\text{Charge on an electron} = -1.6 \times 10^{-19} \text{ C}$$

$$\text{Charge on a proton} = +1.6 \times 10^{-19} \text{ C}$$

Charge on a body :-

If,

Body contains 1 electron

then charge on body = Charge of  $1 e^-$

If Body contains  $2e^-$

then, total charge on body =  $2e^-$

If Body contains  $n$  number of electron

$$\boxed{Q = ne} \text{ Coulomb}$$

1

Find the number of electrons in 1C of charge —

Given :-  $Q = 1 \text{ Coulomb}$

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

$$n = ?$$

we have,

$$Q = ne$$

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

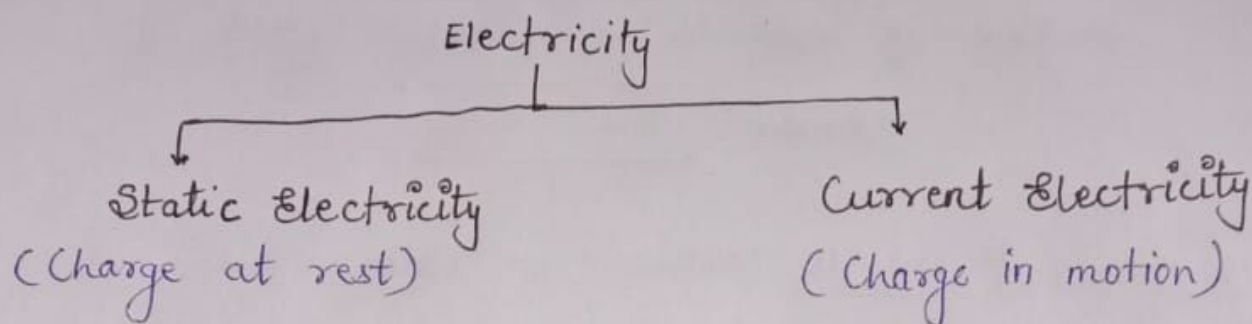
$$\boxed{n = 6.25 \times 10^{18}}$$

Ans.

Conductors :- These substances through which electricity can flow are called conductors.  
Ex- Silver, Copper, Aluminium etc.

Insulators :- These substances through which electricity can not flow are called insulators.  
Ex- Glass, Rubber, dry wood, cotton etc.

Note :- The presence of "free electrons" in a substance make it a conductor of electricity.



Electric Potential :- The electric potential at a point in an electric field is defined as the work done in moving a unit positive charge from infinite to that point.  
• It is denoted by V.

Potential difference :- The potential difference between two points in an electric circuit is defined as the amount of work done in moving a unit charge from one point to other point.

$$\text{Potential difference} = \frac{\text{Work done}}{\text{Quantity of charge moved}}$$

So,

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

where,  $V$  = Potential difference

$W$  = Work done

$Q$  = Quantity of charge moved.

Note:- The SI unit of potential difference is Volt.

1 Volt :- The potential difference between two points is said to be 1 volt if 1 joule of work is done in moving 1 coulomb of electric charge from one point to other point.

- (i) The potential difference is measured by means of an instrument called voltmeter.
- (ii) A voltmeter has a high resistance.
- (iii) Voltage is the other name for potential difference

Ex- How much energy is given to each coulomb of charge passing through a 6V battery?  
we have,

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

Given:-  $V = 6 \text{ Volt}$ ,  $Q = 1 \text{ Coulomb}$ .

$$W = V \times Q$$

$$W = 6 \times 1 \text{ joules}$$

$$W = 6 \text{ J}$$

Ans.

## Questions

Que ① What is meant by conductors and insulators?  
Give two examples of conductors.

Que ② State the relation between potential difference, work done and charge moved.

Que ③ How much work is done in moving of  $2\text{ C}$  across two points having a potential difference of  $12\text{ V}$ ?

Que ④ Name a device that helps to measure the potential difference across a conductor.

Que ⑤ What is the potential difference between the terminals of a battery of  $250$  joules of work is required to transfer  $20\text{ C}$  of charge from one terminal of battery to the other?

Que ⑥ Define one coulomb charge.

Que ⑦ What is meant by conductors' potential at a point is  $1\text{ volt}$ ?

Que ⑧ How much energy is transferred by a  $12\text{ V}$  power supply to each coulomb of charge which it moves around a circuit?