

Q. What is meant by electric charge?

Ans - An electric charge is an ~~an~~ intrinsic property of elementary particles of matter which gives rise to electric force between various objects.

An electric charge is a scalar quantity
SI unit of electric charge is Coulomb (C)

Remarks

- ① A proton has a positive charge (+e)
- ② An electron has a negative charge (-e)
- ③ $1e = 1.6 \times 10^{-19} \text{ C}$.

Q. Write properties of electric charge.

Ans - Properties of electric charge are as below —

- ① Unlike charges attract each other.
- ② Like charges repel each other.

Q. What is meant by electric current?

Ans. The continuous flow of charges (electrons) in a conductor under the influence of potential difference is called electric current. It is denoted by I .

Electric current is a scalar quantity.

The SI unit of electric current - Ampere (A)

Q. Write the direction of electric current.

Ans. The conventional direction of electric current is from the positive terminal of the source of electric current (cell or battery) to its negative terminal.

Q. What is electric potential?

Ans. The amount of work done in bringing a unit positive charge from infinity to a point in the electric field of the charge is called electric potential.

Electric potential is denoted by V .

SI unit of electric potential is Volt (V)
We have

$$\text{Electric potential} = \frac{\text{Work done}}{\text{charge}}$$

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

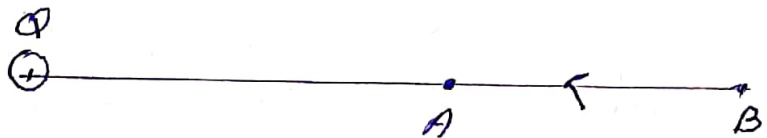
Q. What is meant by 1V?

Ans - when 1 joule of work is done in moving 1 coulomb positive charge from infinity to a point in the electric field of the charge is called 1 Volt.

$$1V = \frac{1J}{1C} = 1JC^{-1}$$

Q. What is meant by potential difference?

Ans - The amount of work done in moving a unit charge from one point to the other point is called potential difference.



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

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

The SI unit of potential difference - Volt (V)

Q. What is meant by 1 Volt potential difference (3)

Ans - When 1 joule of work is done to move one coulomb of charge from one point to another point is called 1V potential difference.

Q. What is a Voltmeter?

Ans - The potential difference is measured by an instrument called voltmeter. The voltmeter is always connected in parallel.

Q. How much work is done in moving a charge of 3C across two points having a potential difference 15V.

Soln We have,

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

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

$$\therefore W = V \times Q$$

$$= 15 \times 3$$

$$= 45 \text{ J}$$

Q. How much energy is given to each coulomb of charge passing through a 6V battery.

Soln We have,

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

$$\therefore W = V \times Q$$

$$= 6 \times 1$$

$$= 6 \text{ J}$$

The required energy is 6 J

Q.3 If $3 \times 10^{-3} \text{ J}$ of work is done in moving a particle carrying a charge of $15 \times 10^{-6} \text{ C}$ from infinity to a point P. What will be the potential at that point? (4)

Soln We have,

$$\begin{aligned} V &= \frac{W}{Q} \\ &= \frac{3 \times 10^{-3} \text{ J}}{15 \times 10^{-6} \text{ C}} \\ &= 200 \text{ V} \end{aligned}$$

ASSIGNMENT

Q.1. If 4×10^{-3} joules of work is done in moving a particle carrying a charge of $16 \times 10^{-6} \text{ C}$ from infinity to a point P. What will be the potential at point P.

Q.2 How much work is done in moving a charge of 4 C across two points having a potential difference 10 V ?

Q.3 A battery of 12 V supplies a charge of 1000 C to an electric device. How much work is done by the battery in moving the charge?