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Electric Charge, Definition, Properties of Electric Charge, Columb's Law (For CBSE, ICSE, IAS, NET, NRA 2022)

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Electric Charge

- It is a physical property of matter that causes it to experience a force when kept in an electromagnetic field.
- Two types of electric charges, commonly carried by charge carriers' protons and electrons.
 - Positive charges
 - Negative charges
- When the net charge of an object equals to zero, the object is said to be neutral.
- The movement of electric charges is responsible for the production of one of the many types of energy known as electrical energy.

Definition

“The Property of Subatomic Particles That Causes It to Experience a Force when Placed in an Electromagnetic Field”

How is Electric Charge Measured?

- The electric charge is measured using coulomb.
- 1 coulomb is the quantity of charge transferred in one second.
- Given by:

$$Q = I \times t$$

Where,

- Q is the electric charge
- I is the electric current
- t is the time.

Details About Electric Charge

Definition	The physical properties of matter which allows it to experience a special kind of force when kept under the influence of the electromagnetic field is called Electric Charge
Symbol	Q
Formula	$Q = I. t$

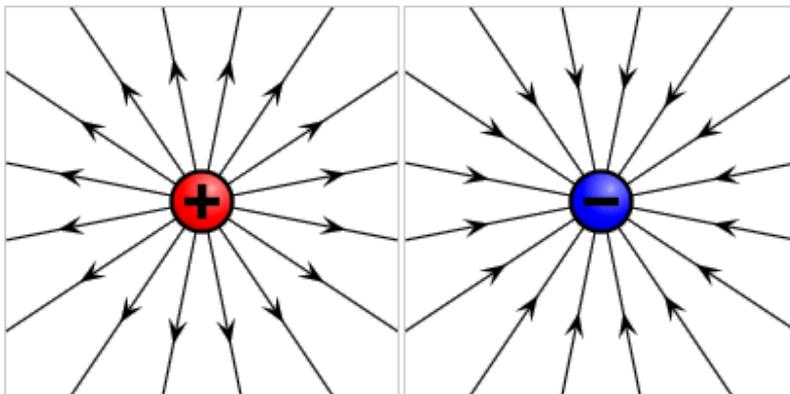
SI unit	Coulomb
Other units	Elementary charge
	Faraday
	ampere-hour
<i>Details About Electric Charge</i>	

Properties of Electric Charge

The properties of charge include the following

- Additivity of Electric Charge
- Conservation of Electric Charge
- Quantization of Electric Charge

Types of Electric Charge



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1. Positive (+) charge

2. Negative (-) charge

- Neutral do not refer to the third type of charge, but it is a region between the positive and negative charges.
- Suppose if there are identical positive and negative charges and their sum will be zero. This means they are electrically neutral.

How Charges Are Produced?

If we run a plastic comb through our hair and then bring it near small pieces of paper, the comb attracts them. Similarly, amber when rubbed with silk, attracts small pieces of paper. This property of attraction or repulsion between substances is due to the electric charges they acquire rubbing.

Comb Rubber Band



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- We Can Produce an Electric Charge by Rubbing a Neutral Body with Another Neutral Body.

- The Following Activities Show That We Can Produce Two Types of Electric Charges through the Process of Rubbing.
- Take a Plastic Rod. Rub It with Fur and Suspend It Horizontally by Silk Thread in the Above Figure.
- Now Take Another Plastic Rod and Rub It with Fur and Bring It Near to the Suspended Rod.
- We Will Observe That Both the Rods Will Repel Each Other. It Means During the Rubbing Both the Rods Were Charged.

Columb's Law

- We know that like charges repel each other and unlike charges attract each other.
- Coloumb's Law provides a means to calculate the strength of the force between two points.
- Coloumb's Law states that, "The magnitude of the electrostatic force of attraction or repulsion between two-point charges is directly proportional to the product of the magnitudes of charges and inversely proportional to the square of the distance between them"

Methods of Charging

- **Induction**
- **Conduction**
- **Triboelectricity**

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