



“बेटी बचाओ, बेटी पढ़ाओ”

JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR

Faculty of Education & Methodology

Faculty Name	-	JV'n Ms. Harshpreet Cheema
Program	-	B.Sc. III Semester
Course Name	-	Electricity and Electromagnetism
Session No.& Name	-	1. Electrostatic and Electric Current

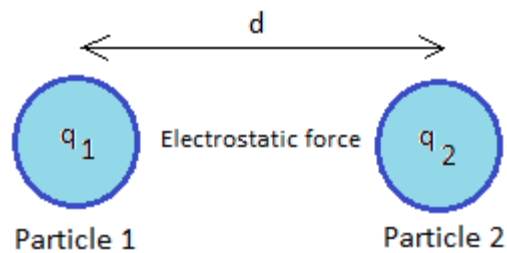
Academic Day starts with –

- Greeting with saying ‘**Namaste**’ by joining Hands together following by 2-3 Minutes Happy session, Celebrating birthday of any student of respective class and **National Anthem**.

Topic-3: Coulomb's Law in Electrostatics

There is no contact force between charged bodies. It occurs over a distance, and every electrical exchange contains a force. The force's power and influence are determined by the charges and the distance between the charged bodies. Whether it's a plastic comb attracting paper scraps or two electrons rejecting each other, the same force exists. The force of attraction or repulsion between two charged bodies is directly proportional to the product of their charges and inversely proportional to the square of the distance between them, according to Coulomb's law. It acts along the line that connects the two charges that are called point charges.

Coulomb's Law in Scalar form



Coulomb's law

In a vacuum, the force (F) between two point charges q_1 and q_2 separated by a distance r is proportional to the product of the charges, as we know.

$$F \propto q_1 q_2$$

F is inversely proportional to the square of the distance between them.

$$F \propto q_1 q_2 / r^2$$

$$F = k q_1 q_2 / r^2 \text{ then}$$

k is the proportionality constant

Stability condition for Coulomb's Law

When two charges are positioned in a straight line AB and one charge q is slightly moved toward A , the force acting on A F_A increases while the force acting on B F_B decreases. As a result, the net force on q changes towards A . As a result, we can state that the equilibrium is unstable for axial displacement.

If q is moved perpendicular to line AB , the forces F_A and F_B are altered to return the charge to its previous location. We may now say that the equilibrium is stable for perpendicular displacement.

Applications of Coulomb's Law

Coulomb's Law is a fundamental physical law. It is used for a variety of reasons, some of which are listed here.

1. It calculates the distance and force between two charges.
2. It is utilized to keep the charges in a constant balance.
3. The electric field is calculated using Columbus' law.

Drawbacks of Coulomb's Law

Coulomb's Law has some restrictions, which are explored further below in the article.

1. Coulomb's Law applies to point charges that are at rest.
2. Coulomb's Law is only relevant when the inverse square law is applied.
3. Coulomb's Law is only applicable to charges that are considered spherical.
4. Coulomb's Law does not apply to charges with arbitrary forms since we cannot know the distance between the charges.