''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 4- Important Definitions

1. Electric Field

An electric field is an electric property associated with any point in space where a charge exists in any form. The electric force per unit charge is another way to characterize an electric field. Changing magnetic fields or electric charges are the most common causes of electric fields. The strength of an electric field is measured in the SI unit volt per metre (V/m).

According to mathematical definition, an electric field is a vector field that may be connected to each point in space and represents the force per unit charge

applied to a positive test charge that is at rest at that location. The electric field's equation is as follows:

E = F /QWhere,E is the electric field. F is the force. Q is the charge.

The force acting on the positive charge is assumed to be exerted in the direction of the field. The electric field is directed radially in the direction of the negative point charge and radially outward from the positive charge.Electric charge or magnetic fields with variable amplitudes can produce an electric field. The attraction forces that keep together atomic nuclei and electrons on an atomic scale are brought about by the electric field.

Finding Electric Field by Guass Law

We should first determine the charge distribution's spatial symmetry (spherical, cylindrical, or planar).The Gaussian symmetry, which is identical to the symmetry of spatial arrangement, must then be found. **T**o find the flow, first determine the integral along the Gaussian surface. Locate the charge bounded by the Gaussian surface.Find the electric field caused by a point charge or the electric field of charge distribution.

2. Electric dipole

Electric dipole is Separated, especially by a small distance, are two equal and opposite electric charges. For instance, a body (like an atom) or system (like a molecule) possesses these charges. In simple words, a pair of opposing charges, "q" and "-q," separated by a distance, "d," are referred to as an electric dipole. Electric dipoles always point in the direction of positive charge "q" from negative charge "-q" in space by default. The dipole's center is defined as the location where "q" and "-q" meet. A pair of electric charges with two opposite signs and equal magnitudes spaced apart is the most basic type of electric dipole. In chemistry as well as electrostatics, the electric dipole is frequently employed. The distance between two charges in most molecules is zero because

the centers of the positive and negative charges all lie at the same location. Methane and carbon dioxide are considered to have zero dipole moments. Non-polar molecules are this kind of molecule. Polar molecules are those whose centers of positive and negative charge do not coincide and have a persistent dipole moment.

Fig. Illustration of a dipole

3. Electric dipole Moment

The separation of positive and negative electrical charges inside a system, or the system's overall polarity, is measured by the electric dipole moment. The coulomb-meter (Cm) is the SI unit for the electric dipole moment. Another unit of measurement in atomic physics and chemistry is the debye (D).The moment of the electric dipole is a vector quantity. It moves in a certain direction, from negative charge to positive charge. It's vital to keep in mind, however, that only in physics does this norm of direction apply. In chemistry, it is accepted that the convention is from positive to negative. The axis of the dipole is the line that runs in the direction of an electric dipole.

4. Torque

The force that can cause an object to rotate along an axis is termed as torque. Similar to how force accelerates an item in linear kinematics, torque accelerates an object in an angular direction.Torque is a vector quantity. The direction of the torque vector depends on the direction of the force on the axis.

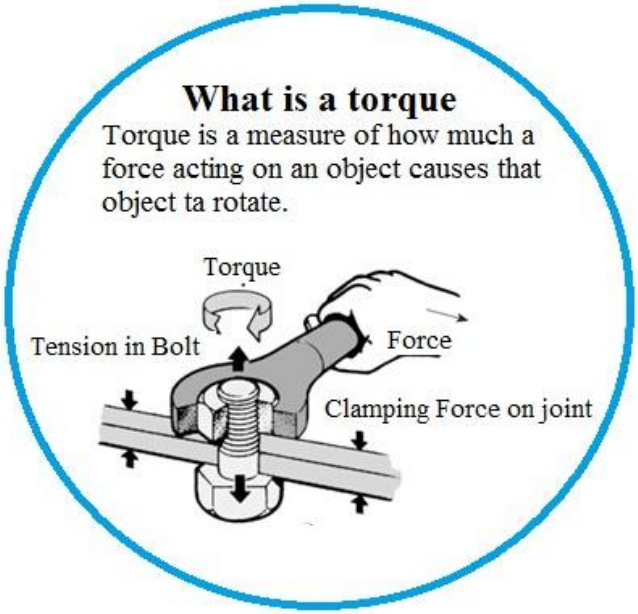

Fig.: Example of Torque