LEARNING

ELECTRIC FIELD INTENSITY

ELECTRIC FIELD

This is a region around which electric force is experienced. It can be mapped out by electrostatic lines of force. That is, an imaginary lie representing a line of force such as electric or magnetic field, such that the tangent to any point is the direction of the field vector at that point. Arrows on the lines of force show the direction of the field and each direction is always radially outward for a positive charge and otherwise for a negative charge. The lines of force are called “**Electric flux**”.

The force exerted on a charged body in an electric field depends on the charge of the body and on the intensity or strength of the field.

PROPERTIES OF ELECTRIC LINES OF FORCE.

1. They do not intersect with each other

2. They are continuous lines and they start from +ve to -ve charges

3. The tangent to the lines of force at every point gives the direction of the point

4. The magnitude of electric field is %alpha ti the number of lines

DEFINITION

The intensity, E of an electrostatic field at any point can be defined as force (F) per unit charge, which it exerts at that point.

The direction of the field is that of a force exerted on a +ve charge.

Mathematically,

E = F/q

F = Eq

q is the test charge.

If a charge q, is placed at the distance r from the test charge, then the force between the charges using coulomb’s law is

F = kqq\_1/r^2

At point P, the electric field is

E = F/q = kqq\_1/qr^2 = kq/r^2

The direction of the field is radially outward if the charge is positive, otherwise, it is radially inward

FLUX FROM A POINT CHARGE

Direction of lines of force do not remain constant

The intensity, E at a point can be represented by the number of lines per unit area through a surface perpendicular to the line of force at the point considered. The force through an area perpendicular to the lines of force is equal to the product of electric field strength and cross-sectional area, A

Flux = EA

Flux through an arc A, F=EA

Flux from a point charge