

## WEEK 5

### DESCRIPTION OF FIELD AND PROPERTIES OF FIELD AND GRAVITATIONAL FIELD.

#### Introduction:

A field is a concept used in physics to explain or describe the space or region or area where the effects of an object is experienced by another objects.

There are three types of field which are gravitational, magnetic and electric field.

#### Gravitational Field

Gravitational field is the region within the earth's atmosphere where every object within this region experience the downward pull of the earth force.

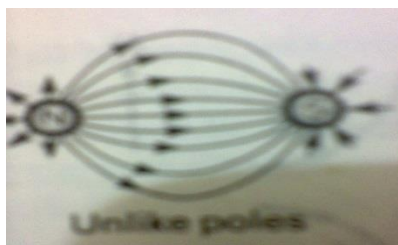
Isaac Newton discovered a universal law known as newton's law of gravitation. This law stated that the force of attraction between two masses  $M$  and  $m$  is directly proportional to the product of their masses and inversely proportional to the square of their distance apart.

#### Magnetic Field

Magnetic field is the region around a bar magnet where magnetic force is experienced by a metals.

Magnetic lines of force or magnetic flux are imaginary lines that represent the direction and strength of the field at that point.

Conventionally, the direction of magnetic flux at any point is chosen to be from north pole to south pole.



Line of force between unlike poles



Line of force due to bar magnet

#### Electric Field

An electric field is a region in which there would be force upon a charge brought into that region.

The magnitude of the field is called the electric field strength or intensity. The electric intensity or strength ( $E$ ) at any point is defined as force per unit charge acting on a small charged place at that point.

## ACCELERATION DUE TO GRAVITY

### **Introduction:**

Gravitational field previously is defined as a space or region within the earth atmosphere where an object feels the impact of force due to gravity (downward pull of the earth). The acceleration of a body falling under the force of gravity is called acceleration due to gravity (g). It varies from place to place slightly but has been given a constant value of 9.8 m/s<sup>2</sup> conventionally.

### **Variation of Acceleration due to Gravity (g)**

The acceleration of free fall due to gravity, “g” is the acceleration imparted on a body due to its own weight.

The earth is not a perfect sphere. Points on the earth’s surface near the equator are further from the center than points on the polar axis of the earth. This is because the earth is not a perfect sphere, hence, distance from polar axis is less than distance from equator. Acceleration due to gravity is observed to be greater in magnitude at the poles than at the equator. Hence “g” varies from place to place.

### **Weight and Its Variation:**

Weight of an object is the gravitational pull on an object. It is dependent on acceleration due to gravity. It is given by

$W = Mg$  i.e. weight = Mass  $\times$  acceleration due to gravity (g) since “g” varies from place to place, weight of an object varies from place to place due to variation in g.