

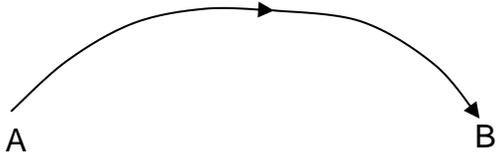
WEEK 6

TOPIC: ELECTRIC LINES OF FORCE AND PRODUCTION OF CHARGES

Introduction:

Electric field is a region where a charged body experiences an electric force.

The direction of electric lines of force or field at any point is given by the direction of the force acting on a small positive charge placed at the point.



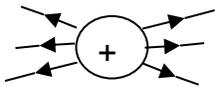
Lines of Force

The curve line such as AB represents on electric lines of force. The arrow indicates the direction of motion of a small positive charge placed at such point and hence the direction of the field of lines of force of such points.

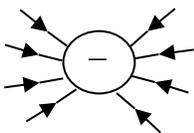
Electric Lines of Force

Electric lines of force are imaginary lines drawn in an electric field in such a way that the direction at any point gives the direction of electric field at that point.

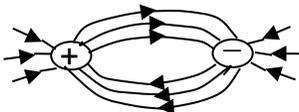
Patterns of electric lines of force.



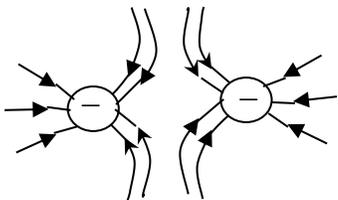
Lines of force around a positive charged body



Lines of force around a negative charge body



Lines of force of unlike charges.



Lines of force due to like charges.

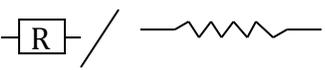
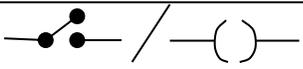
Properties Of Field Lines

1. Lines of force start at on the positive charges and end on the negative charges.
2. Lines of force do not cross each other
3. In a uniform field, the lines of forces are straight, parallel and uniformly space.
4. Lines of force are continuous in any region with free charges
5. Lines of force indicate the direction of electric field.

PRODUCTION OF CHARGES

The discovery of electricity brought about invention of modern some modern gadgets.

Electric Components

	Electric Symbol	Name	Function
1.		Resistor	Opposes the flow of current
2.		Rheostat or Variable Resistor	Opposes the flow of current
3.		Key/switch	Break or complete the flow of current
4.		Ammeter	Measures the amount of current
5.		Voltmeter	Measures the potential difference between two points
6.		Galvanometer	Detects and measures small amount of current.
7.		Cell	It produces electric current
8.		Lamp	Bulb placement
9.		Capacitor	Produce charges
10.		Inductor	Stores charges when current passes through it.
11.		Alternating E.M.F	Produces alternating current.

Electric Current (I)

Electric current is a measure of flow of charge with time mathematically, $I = Q/t$

Where Q is quantity of charge in Coulomb (c)

t is the time taken for the flow of charge in second.

I is the current in coulomb per second (c/s) or amperes (A)

The SI unit of current is amperes (A)

Example a charge of 20C flows for 4s what is the magnitude of the currents?

Solution

$$I = Q/t$$

$$Q = 20C$$

$$T = 4s$$

$$I = 20/4 = 5A$$

Production of Current

Electric Current can be produced by the following methods:

- i. Mechanical,
- ii. Chemical
- iii. Thermoelectric effect.
- iv. Solar method

- i. **Mechanical Methods:** Of producing current entails the conversion of mechanical energy (kinetic energy) into electric energy by special equipment.
- ii. **Chemical Method:** of producing currents entails the conversion of chemical energy stored in the equipment to electrical energy. Example of devices that stores chemical energy are touch and car batteries.
- iii. **Thermoelectric Effect:** is another method of producing current. It involves bringing the two ends of two different metals or wires together and subject the two ends to different temperature.
- iv. **Solar Method** Is a method that involves the use of solar panel to convert energy from the sun to electric energy that produces current.

ELECTRIC CIRCUIT

Potential difference is the work done when one coulomb of charge move from one point to another. The unit of potential difference is volts.

Electric Circuit

Electric circuits is an electric diagram showing the positioning of electric components. It shows how component should be or will be connected together.

