

UNIT 8 ELECTRICITY

1.- DEFINITIONS.

Electricity: It is a form of energy which is based on moving charges through conductor materials.

Electric charge: it is a property of all objects and it is responsible for electrical phenomena. These phenomena are caused by the electrical forces of attraction and repulsion.

There are two types of electrical charges:

- protons, which have positive charge.
- electron, with negative charge.

Electric current is a continuous movement of electrons through a conductor material.

Conductors are materials that allow electric current to pass through them, examples are metals, water, salt.

Insulators are materials that do not allow electric current to pass through them, examples: air, wood, rubber, paper, plastic, etc.

2.- ELECTRIC CIRCUIT

Electric circuit is a set of connected components through which an electric current circulates. We need an electrical circuit to use electrical devices.

Components of an electric circuit:

- **Generator:** element that provides electrical energy.
- **A wire conductor.**
- **Control and protection components.** A switch (to turn on and off the circuit)
- **Receptors:** transform electrical energy into light, motion, heat, sound like bulbs, motors...

3.- ELECTRIC QUANTITIES

The basic electric quantities are voltage, current, resistance, power and electrical energy.

- **Voltage:** is the difference between the electrical energy at two points in a circuit. The charge always moves from the point where the energy is highest to the lowest point. In the International System of Units it is measured in volts (V). This is also called potential difference (p.d.).
- **The current** is the number of electrons that pass through a specific point in 1 second. It is represented by the letter I. It is measured in amperes or amps (A).
- **The resistance** is the opposition of the components of a circuit to the flow of the electric current. It is represented by the letter R and it is measured in Ohms (Ω).

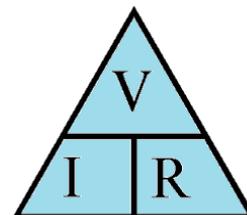
4.- OHM'S LAW

Ohm's law expresses the relationship between voltage, current and resistance. Ohm's law can be expressed by this formulas:

$$V = I \cdot R$$

$$I = \frac{V}{R}$$

$$R = \frac{V}{I}$$



$$V = I \times R$$

$$I = V / R$$

$$R = V / I$$

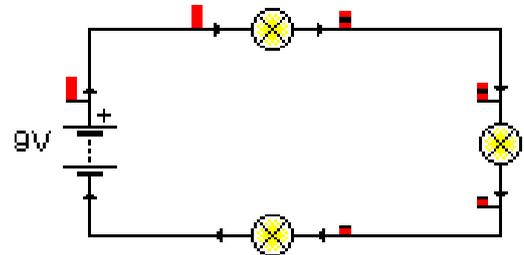
5.- ELECTRICAL CONNECTIONS: SERIES AND PARALLEL

There are different ways to connect devices in circuits, but the simplest ones are series circuit and parallel circuit.

5,1.- Series circuit:

All the components are connected one after another, in the same wire, so there is only one path for electricity to flow.

- The current is the same through all devices.
- If one lamp blows, the others won't work.



5,2.- Parallel Circuit:

The components are connected in different branches, so there are several paths for electricity to flow through.

- The voltage is the same in all components.
- If one lamp blows, the others will continue lighting.

