

ELECTRIC CURRENT **&** **ITS EFFECTS**



Electricity is one of the most versatile forms of energy. It is the kind of energy that powers electric trains, vacuum cleaners, ovens, radios, television sets, computers and many more devices.

ELECTRIC CHARGE

Electrical charge is a property of matter.

PROPERTIES OF ELECTRIC CHARGE

Electric charge is a scalar quantity.

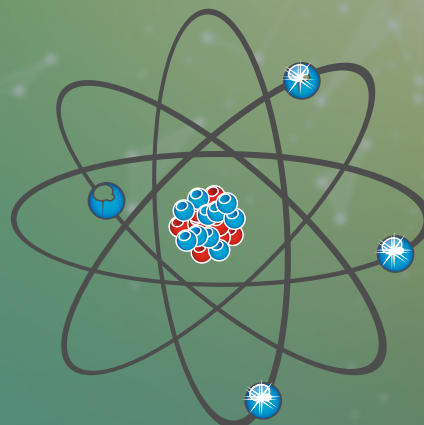
It can be of two types only : positive and negative

Electric charge is measured in a unit 'Coulomb'.

Like charges repel each other while unlike charges attract each other.

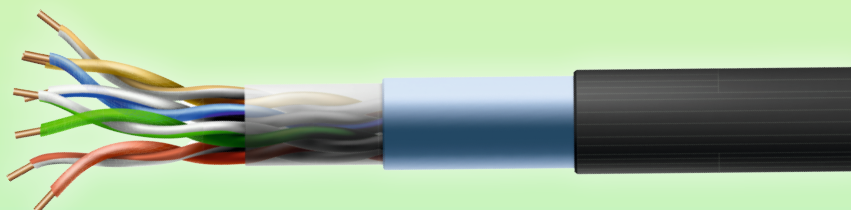
Matter consists of tiny particles called atoms. Atoms contain particles called protons, neutrons and electrons.

Neutrons	→	No electric charge.
Protons	→	Positive electric charge
Electrons	→	Negative electric charge.



★ Conductors

- Conductors are 'materials which allow electric current to pass through them are conductors of electricity'.
- e.g., copper and silver are good conductors of electricity. Metals are good conductors as they have large number of free electrons.

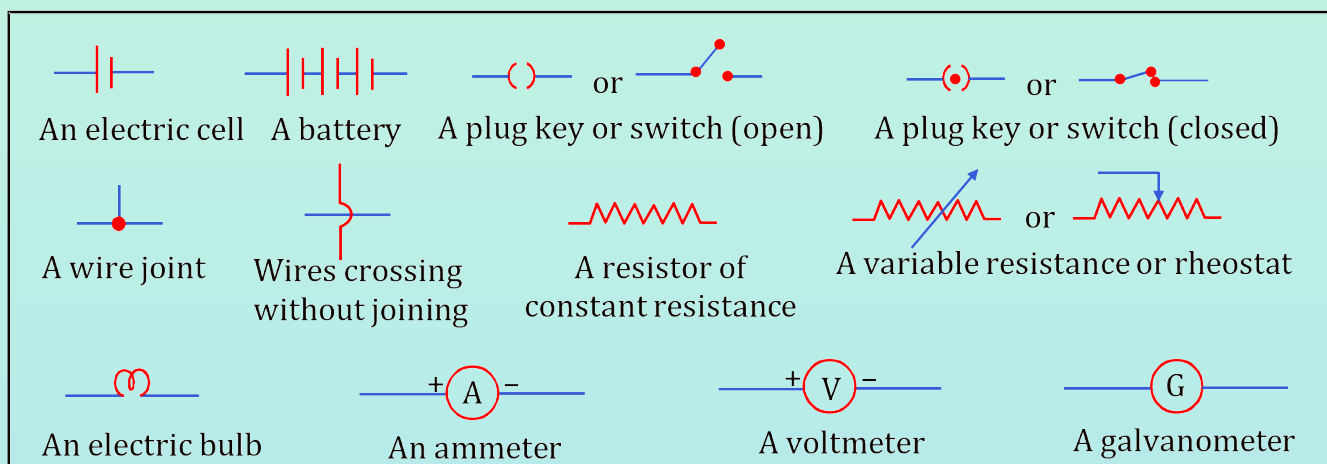


★ Insulators

- The substances which do not allow the electric current to flow through them are called insulators. They do not have free electrons.
- Examples of insulators: Rubber, glass, wood, plastics, porcelain, pure water, sugar, etc.

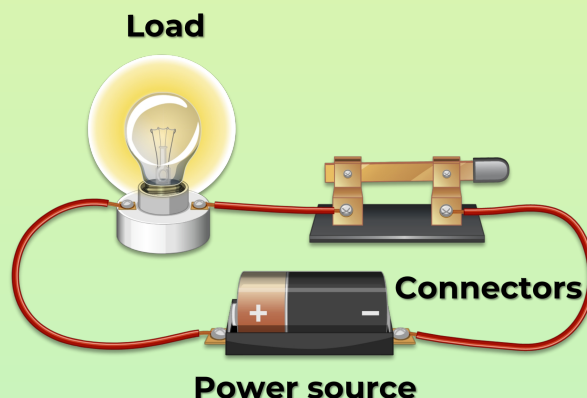


Symbols of some commonly used components in circuit diagrams

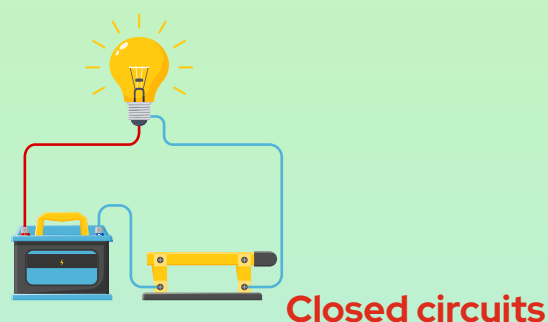
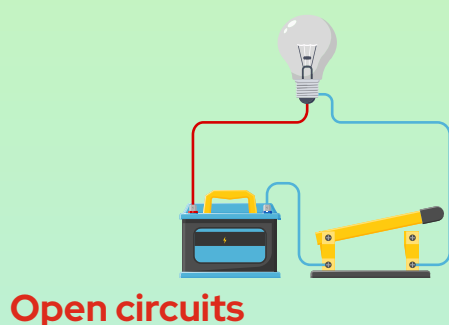


Electric circuit

→ A continuous path which consists of various electric devices is called 'electric circuit'.



- **Open circuits** : The circuit has any breaks or openings, it is called an open circuit.
- **Closed circuits** : A complete, unbroken circuit is called a closed circuit.

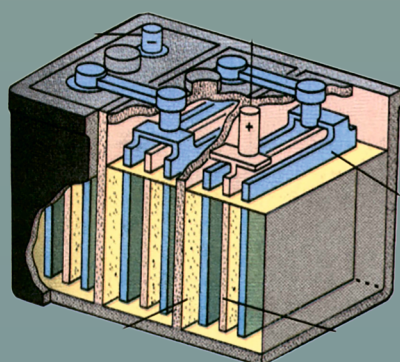


ELECTRIC CELL

An electric cell produces electricity from the chemicals stored inside it. In an electric cell 'chemical energy is converted into electric energy'.

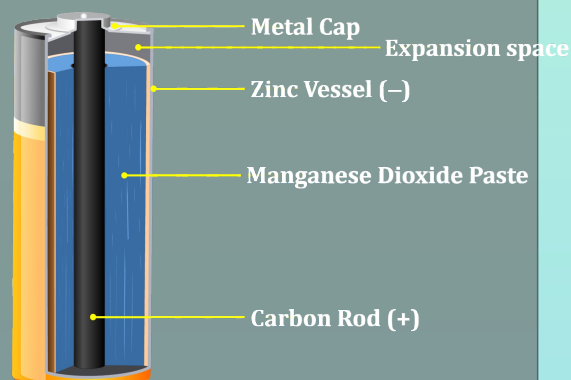
Battery

A combination of two or more cell is called a battery. Batteries are often called power source or voltage sources.



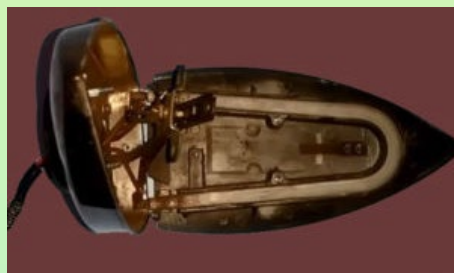
Dry Cell

It is a portable version of Leclanche cell.



Heating effect of electric current

→ If an electric circuit is purely resistive, that is, it consists of resistors only connected to a battery, the source energy gets dissipated entirely in the form of heat. This heating effect is utilised in devices such as electric geysers, electric heater, electric iron, etc.



An electric iron



Different types of electric heaters

Electric bulb

In a bulb, the electric current pass through a very thin wire made up a special material (such as tungsten) called the filament.

When a bulb fuses, it can no longer glow because a broken filament breaks the circuit and current can no longer flow through it.



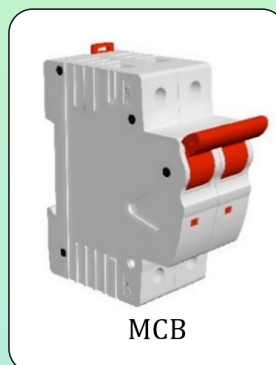
Compact fluorescent lamps

Incandescent electric bulbs are used of lighting but they also give heat. Compact fluorescent lamps (CFLs) are better electricity efficient lighting source.

Fuse and MCB

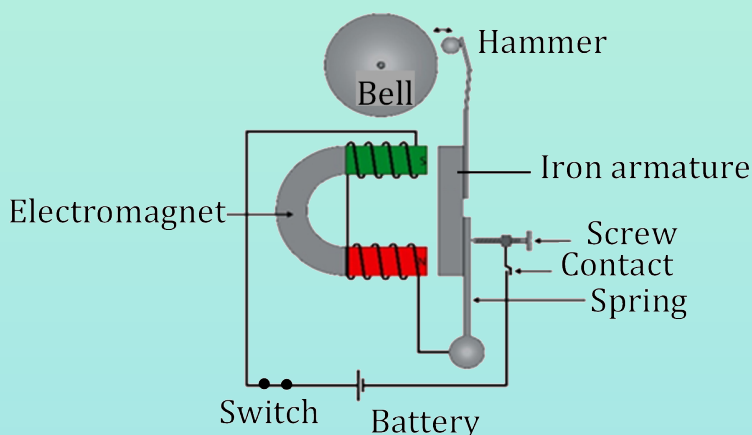
Fuse An electric fuse is a safety device that is used to protect electric circuits and electric appliances against high current caused by short circuiting.

MCB Nowadays, devices called miniature circuit breakers (MCB in short) are widely used instead of fuses.



Electric bell

→ Electric bell is based on the principle of an electromagnet, "a temporary strong magnet acquires magnetic properties when an electric current flows through it, and loses its magnetic properties as soon as the current is stopped".



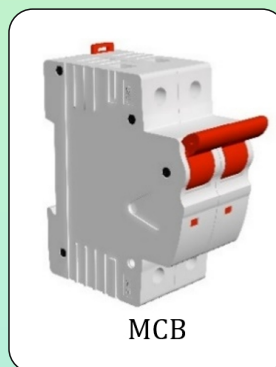
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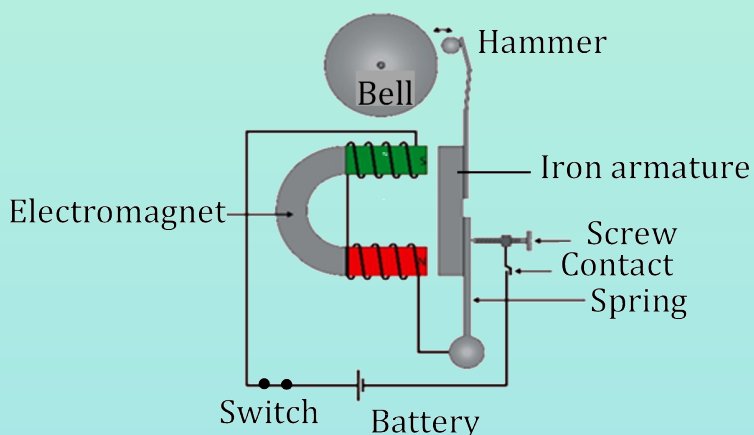
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Hazards of electricity

Electricity is one of the most popularly used forms of energy in the modern society. However, electricity can be dangerous if proper precautions are not taken. The following are the hazards of electricity which should be taken care of:

- (i) Touching a live electric wire gives a dangerous shock. When current passes through our body, it damages the cells and tissues.
- (ii) As water can conduct electricity, it is extremely dangerous to touch electrical appliances with wet hands.
- (iii) Fuse wires of specified thickness should be used in fuse boxes.
- (iv) One must have maintenance check in house wiring and appliances for broken insulations, loose connections, worn out switches and moisture accumulation.
- (v) House wiring must have proper earthing and appliances must use a three-pin plug.

Conserve electricity

Each one of us has a responsibility to prevent misuse of electricity by developing proper habits.

- (i) Put off all electrical appliances when not in use.
- (ii) Encourage use of CFL and LED lightings.