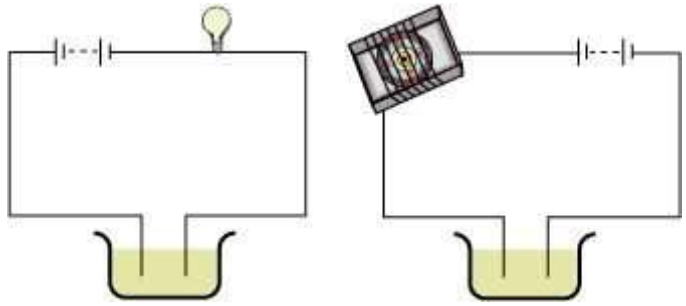
4. Current Electricity and Magnetism

- Electric potential: The Electric potential of a point in an electric field is defined as the work to be done to move a unit positive charge from infinity to that point.
- Potential difference: The potential difference between two separate points is defined as the work done to move a unit positive charge from one point to another.

$$V = \frac{W}{Q}$$

Unit: Volt

$$1 \text{ Volt} = \frac{1 \text{ joule}}{1 \text{ coulomb}} \qquad \boxed{1\,V = 1\,J\,C^{-1}}$$

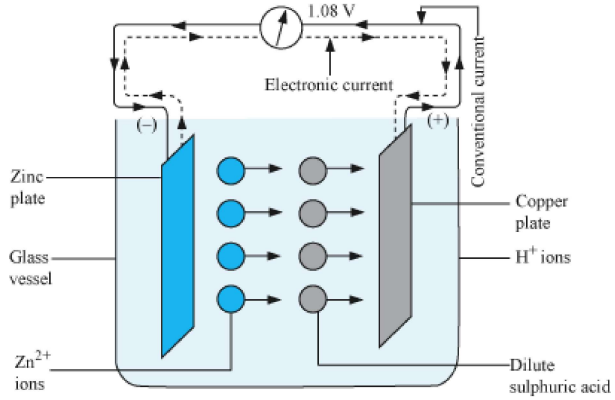


- The bulb will glow or the magnetic needle will show deflection if the liquid in the beaker is a good conductor of electricity.
- Greater the deflection of needle or brighter the light, better is the conductivity of the liquid.

Good conductor	Poor conductor
Lemon Juice	Coal tar
Vinegar	Distilled water
Acid solutions	Honey
Basic solutions	Vegetable oil
Salty water	Kerosene

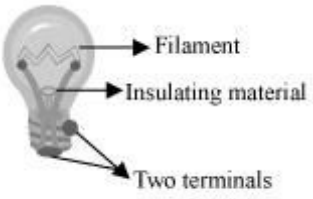
- Conducting liquids are also called electrolytes.
- The electric current passing through a conducting liquid (electrolyte) causes chemical reactions (electrolysis).

- Electricity is the flow of electric charges when the negative and positive terminals of an electric cell are connected by a certain substance.
- A simple cell consists of a vessel with two metal rods or plates, known as electrodes, and a chemical substance known as electrolyte.



- **Electric cell:** It is a source of electricity. There are two terminals of a cell – Positive (+) and Negative (–).

- Electricity is generated in a cell because of chemical reactions that take place inside it.
- When all the chemicals stored inside it are used, the cell stops generating electricity.
- **Electric Bulb**



An electric bulb

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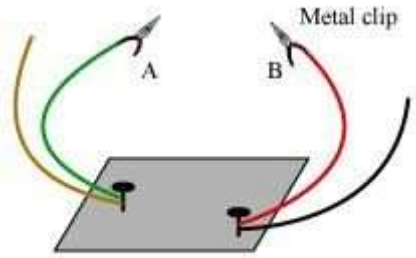
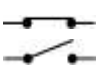
  - A bulb has a filament and two terminals.
  - The filament gives off light when an electric current flows through it.
- **Electric switch:** A switch either breaks or connects the circuit.



A simple switch

1. **Symbols of Electric components**

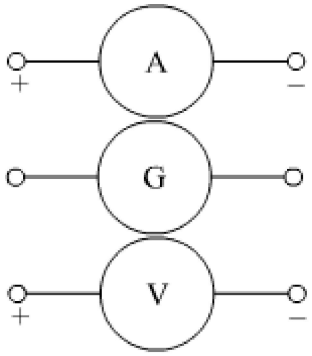
Electric component	**Symbol**
Electric cell	
Electric bulb	
Battery	
Wire	
Switch in ON position	

Switch in OFF position

Ammeter

Galvanometer

Voltmeter



2. **Combination of cells**

Positive (or negative) terminal of a cell is connected to the negative (or positive) terminal of the other cell. This combination is called a **battery**.
3.An unbroken path or line that makes electrical current flow possible through conducting wires connected to other resistances is known as an electric circuit.
4. The circuits where the appliances in connection operates simultaneously once the switch is closed are known as series circuits. In series circuit, the working of each appliance is dependent on each other.
5. The circuits where the working of each appliance present in the circuit is independent on each other are known as parallel circuits.

1. When an electric current flows through a wire, it behaves as a magnet. This is called the magnetic effect of electric current.
2. **Electric bell** works on the principle of magnetic effect of electric current.
3. A **compass needle** shows deflection when brought near a current carrying wire.
4. An iron nail behaves as a electromagnet when a current is allowed to flow through a wire, which is wrapped around the nail.
5. Magnet is used to separate iron objects from a heap of garbage.
6. **Types of electromagnet :** Bar-shaped or I-shaped electromagnet and Horse-shoe or U-shaped electromagnet
7. An electric bell works on the principle of electromagnetism.