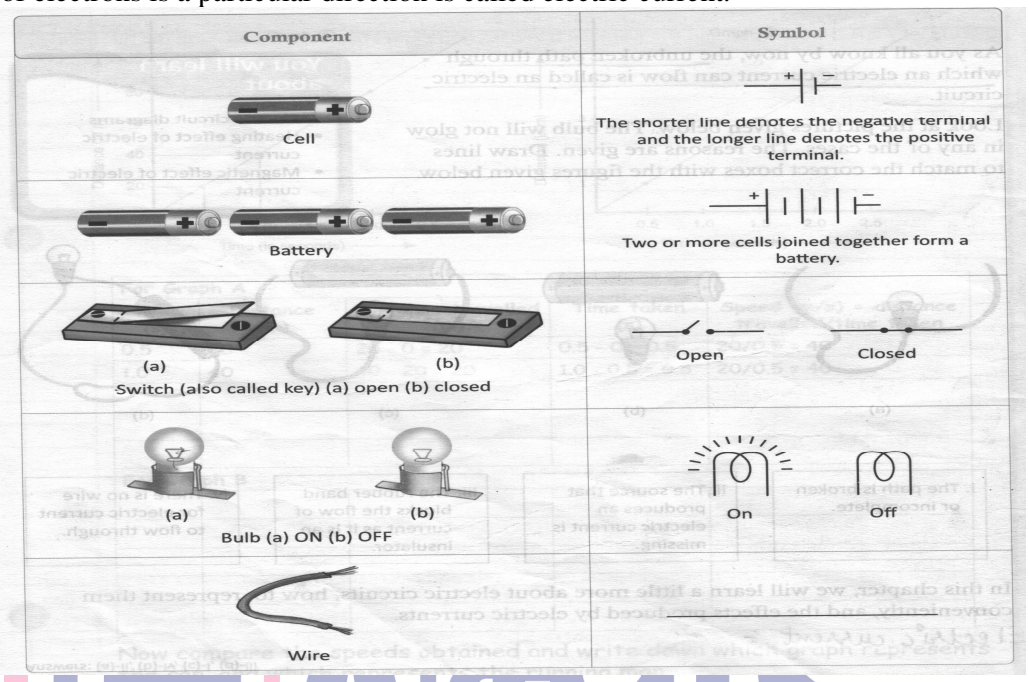
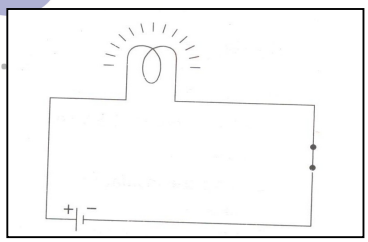
Electric current: You know that every atom contains one or more electrons. You also know that electrons have a negative charge. Most substances have electrons that can be detached from their atoms and they can move around freely. These loosely bound electrons are called free electrons. When these free electrons are forced to flow in a particular direction. The flow of electrons is a particular direction is called electric current.



Electric circuit: The unbroken path through which an electric current can flow is called an electric circuit.

The important points to remember while drawing circuit diagram are:



1. There should be a source, that is, one or more electric cells.
2. The wires should not have only discontinuity (gaps).
3. The only component that can have a discontinuity is the switch. When it is 'open', there is a discontinuity and current does not flow in the circuit.

Source of electric current: The main source form where we get electric current are:

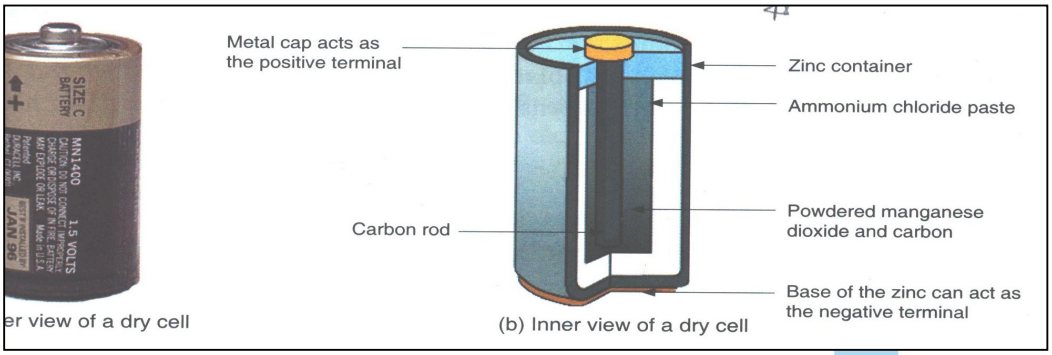
- The dry cell and battery.
- The mains provided by the electricity department.
- Electric generator, and
- A solar cell.

Structure and working of a cell: In a cell, a chemical reaction takes place, due to which chemical energy changes into electrical energy. Thus, the cell becomes a source of electricity. The most commonly used cell is a dry cell. This cell cannot be recharged. It is also called a primary cell.

1. The dry cell contains a paste of ammonium chloride inside a zinc container.
2. Inside the paste, a cardboard container containing powdered manganese dioxide and carbon is placed.

3. The cardboard container has microscopic 'holes' in it (such materials are called porous materials) through which a chemical reaction takes place between ammonium chloride paste and powered manganese dioxide.
4. A rod, usually carbon, with a metal cap is dipped into the manganese dioxide.
5. The whole thing is then sealed (with only the metal cap sticking out), so that the contents do not spill out.

Every source of electric current has two ends or terminal where conducting wires are connected to draw electric current. The tip of the metal cap and the base of the zinc can are called the positive and negative terminals of the dry cell, respectively.



When the cell is connected to a bulb, the slow ongoing chemical reaction inside the cell becomes fast and a current starts flowing through the bulb. Hence the bulb glows. These dry cells are small source of electricity.

Advantages of a dry cell:

1. Dry cells are light in weight and small size.
2. Dry cells can be transported from place to another very easily.
3. There is no fear of leakage in dry cells.
4. They can easily be used to run electrical devices.

These cells are used in a number of house hold gadgets like a radio, a transistor tape-recorder, a calculator, a clock, the remove of a t.v., torch, toys, etc.

The secondary cells are the cells which can be re-used again and again after recharging. These cells are also called storage cells. They are used in cars, trucks, inverters, etc. they are also known as accumulators. If two or more cells are used in combination, it is called a battery. A battery is used when we require more electricity.

Closed circuit: A circuit in which electric current flow from one terminal of a cell to the other is called closed circuit.

Open circuit: A circuit in which electrical contact at any point gets broken then it is called open circuit. No current flows in an open circuit.

Electric current flows in particular direction. In an electric circuit, the electric current flows from positive terminal to the negative terminal of electric cell.

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The mains: It is common source of electricity. The electricity which is produced in power station is carried through wires to different city sub- stations. From these city sub- stations it is carried to the electric poles through the transformers. Then, from these poles, electricity reaches the mains board fixed in our houses for distribution through the wires. All the electrical gadgets in your house like fans, an A.C. a geyser, a TV, an electric iron, bulbs, tube lights, etc. work using this electricity supplied from the mains.

Solar cell: The device used to convert solar energy into electrical energy is called the solar energy. Solar cell are used in calculators and wrist watches solar panels made up of hundreds solar cells are used to light up streets and many home.

S.No	Conductors	Insulators
1.	Silver	Plastic
2	Copper	Glass
3	Aluminum	Bakelite
4	Lead	Cotton
5	Tap water	Wood
6	Gold	Cork
7	Human body	Silk
8	Living plant	Pure water
9	Brass	Rubber
10	Tin	Leather
11	Iron	Ebonite
12	steel	Nylon

Conductor: Any material that allows the electric current to flow through it is called a conductor.

Insulators: The materials which do not allow an electric current to flow through them are called insulators.

Heating Effect Of Electric Current: whenever electric current is passed through a conductor. It gets heated up. This means that electrical energy gets converted into heat energy and this effect is known as joule's heating effect of eclectic current being first proposed by joule.

Uses of heating effect: Devices like an electric iron, an electric heater, an electric kettle, an electric bulb, microwave ovens etc. all work on the heating effect of electric current.

Let us take an example of an electric bulb.

In a bulb an electric current passes through a very thin wire made of a special material (such as tungsten) called the filament.

Electric fuse: To prevent electric appliances from getting damaged from an excessive flow of current, a safety device called a fuse is used. A fuse is a safety device which is used to control the current in an electric circuit.

Characteristics of a fuse: It has a short length wire with a low melting point. The fuse wire is made an alloy containing equal amounts of lead and tin. It melts at about 20^0 C.

Principle of an electric fuse: The electric fuse works on the principle of heating effect of current. The amount of heating caused depends on the amount of current. An electric fuse consists of a thin wire usually placed inside a glass or ceramic cartridge. The wire is made of a material that melts easily when heated.

When the current flow is an excess the heating in the wire causes it to melt. We say that the fuse 'blows'. This breaks the circuit and stops the flow of current in the circuit.

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