

ELECTRIC CURRENT AND ITS EFFECTS

ELECTRIC CURRENT:

Rate of flow of charge carriers is called ELECTRIC CURRENT. In an electric circuit, the charge is often carried by moving electrons.

SI unit of electric current is Ampere (A).

SI unit of electric charge is Coulomb.

ELECTRIC CIRCUIT:


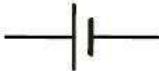










The closed path through which electric charge moves is called ELECTRIC CIRCUIT.

SYMBOLS IN ELECTRIC CIRCUIT:

Different components of electric circuit are shown by certain symbols. Use of symbols makes it easy to represent an electric circuit.

For example; a TV mechanic can identify different components of a TV by looking at its circuit diagram.

Symbols of electric components

<u>Electric component</u>		<u>Symbol</u>
i) Electric cell		
ii) Electric bulb		
iii) Switch in OFF position		
iv) Switch in ON position		
v) Battery		
vi) Wire		

ELECTRIC CELL:

It is a device which produces electric charge because of some chemical reactions. The cell which is used in a torch is called dry cell. The wet cells are used in car batteries. A normal dry cell gives an output of 1.5 Volt (V).

BATTERY: A group of cells is called battery. More than one cell is used in most of the devices; because these devices need more than 1.5 V of power.

CLOSED CIRCUIT: When the circuit is complete, it is called closed circuit. Current flows only in a closed circuit.

OPEN CIRCUIT: When the circuit is incomplete, it is called open circuit. Current does not flow in an open circuit.

Review Questions:

1. What is the SI unit of electric current?

Answer: Ampere

2. What is an electric cell?

Answer: It is device which produces electric charge because of some chemical reaction.

HEATING EFFECT OF ELECTRIC CURRENT:

When electric current flows through a conducting wire, the temperature of wire increases. This is called HEATING EFFECT OF ELECTRIC CURRENT.

APPLIANCES OFFERING HEATING EFFECT OF ELECTRIC CURRENT:

- 1) Incandescent bulb is an example of a device which works because of the heating effect of electric current. The filament of bulb is made of **TUNGSTEN**. Tungsten has very high melting point and that is the reason it is used in electric bulb. Moreover, argon gas is filled inside the bulb. Argon prevents the filament from catching fire.

PROPERTIES OF TUNGSTEN:

High resistance and High Melting point

- 2) Other devices are: Electric iron, water heater, geyser, toaster, etc.

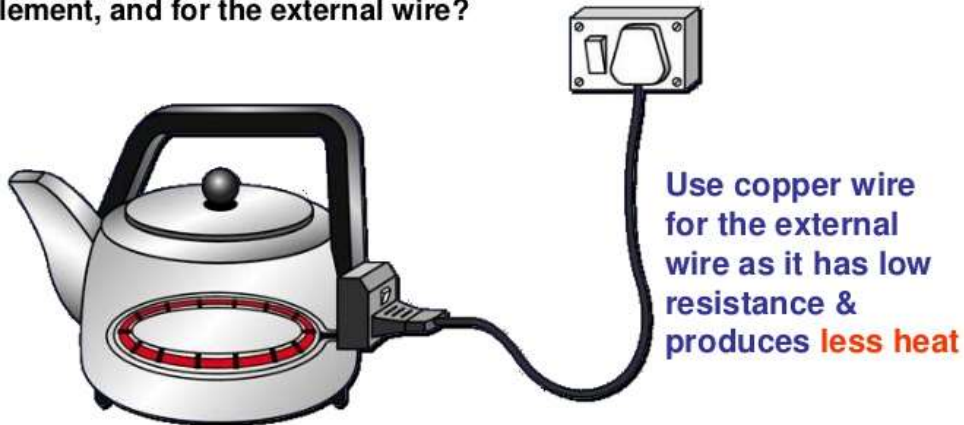
HEATING ELEMENTS OF HEATING APPLIANCES:

A heating appliance has a **highly coiled wire** or a **metallic rod**. The highly coiled structure increases the surface area and thus provides more heat. The elements are usually made of **constantan** which is a metal with very **high melting point**.

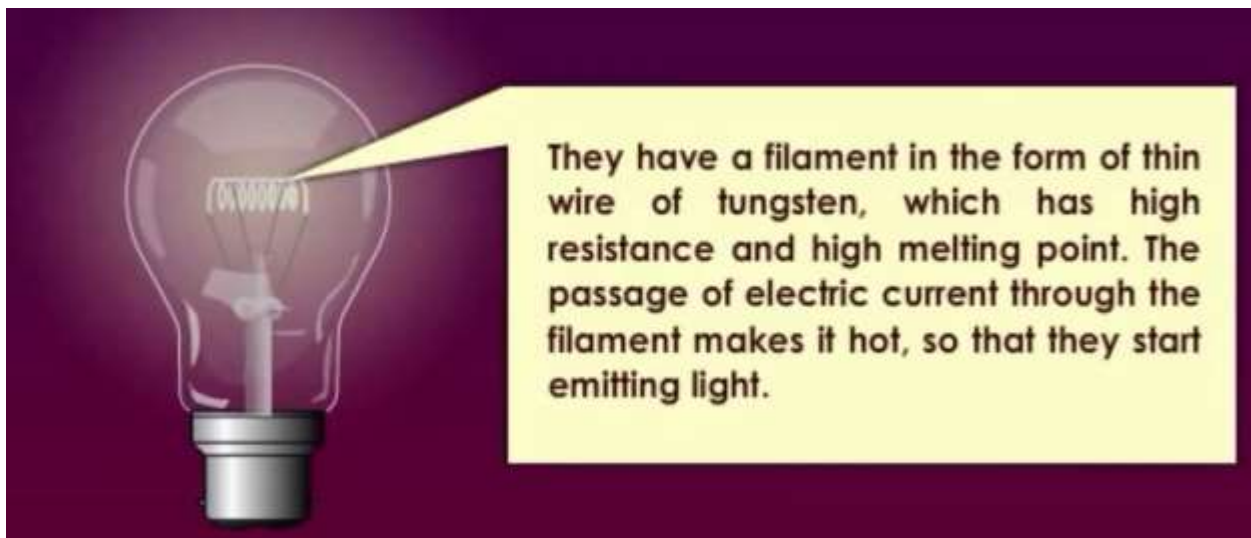
A kettle uses both **copper** and **nichrome** wires.

Copper has **low resistance** while nichrome has **high resistance**.

Which material, copper or nichrome, should be used for the heating element, and for the external wire?



Use **nichrome wire** for the heating element as it has high resistance & produces **a lot of heat**



3) ELECTRIC FUSE:

Electric fuse is a safety device which is used in household wirings and in many appliances. Electric fuse has body made of ceramic and two points for attaching the fuse wire. The fuse wire melts whenever there is overload in the wiring. This breaks the circuit and helps in preventing damage to costly appliances and to the wiring. In electrical devices a glass fuse is often used. This is a small glass tube, in which lies the fuse wire.

MCBs (Miniature Circuit Breaker):

MCBs have been replacing electric fuse from wirings at most of the places. The electric fuse has a big practical problem. Whenever the wire fuses, one needs to replace the wire to resume electric supply. More often than not, this proves to be a cumbersome task. Miniature circuit breakers break the circuit automatically. One just needs to switch it on to resume the electric supply. Many models of MCBs have a built in mechanism by which the electric supply is automatically resumed.

Review Questions

1. The electric bulb works on which property of electric current?
[Answer: Heating effect of electric current.](#)
2. What is the full form of MCB?
[Answer: Miniature Circuit Breaker](#)

MAGNETIC EFFECT OF ELECTRIC CURRENT:

When an [electric current](#) flows through a wire, the wire behaves like a [magnet](#). This is known as the [magnetic effect of electric current](#)

ELECTROMAGNET:

When electric current flows through a wire wound around an iron bar, the bar behaves like a magnet. This magnet is called an [electromagnet](#).

For this, wire is wrapped around an iron rod in many turns and electric current is supplied to the wire. As long as the current is supplied the iron rod behaves like a magnet. More number of turns makes more powerful magnet.

Electromagnet is used in electric bells and also in powerful cranes. Cranes are used for separating magnetic materials from junk and to lift cars and other heavy objects. Eye doctors use electromagnets to remove tiny pieces of magnetic material that have accidentally fallen in the eye.

ELECTRIC BELL:

CIRCUIT:

An electric bell consists of an iron core, on which is wound a wire as a coil. One end of the coil is connected to one terminal of a battery, and the other end to a steel rod that acts like a spring for the hammer touching the screw contact. The other terminal of the battery is connected to the screw contact with a switch in the middle.

WORKING:

Electric current flows through the coil when the switch is ON, and the iron core acts as an electromagnet. The iron core attracts the hammer towards it. The hammer hits the bell and produces a sound. The circuit breaks at the screw contact when the hammer moves towards the iron core. At this point, the iron core ceases to be an electromagnet. The hammer is pulled back to its original position due to the spring action of the steel rod, and then touches the contact again to complete the circuit. The circuit is completed and current flows through the coil again, and the hammer strikes the bell again. The process repeats itself and you hear a ringing sound since the hammer keeps hitting the bell, until the switch is released.

