

VARIATION OF RESISTANCE

(with respect to Temperature)

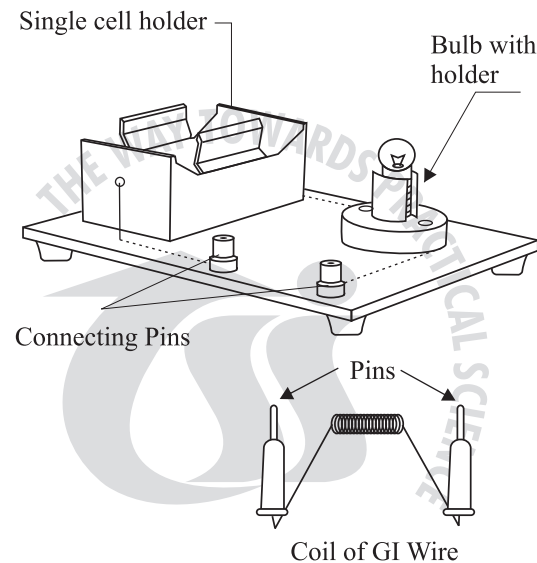
The resistance of a conductor increases with increase in temperature.

Assembly :

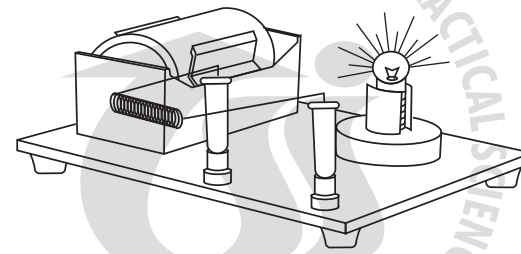
Consists of a simple circuit in which a single Dry cell holder is fixed on a acrylic base. This cell holder is connected in series with a bulb holder and two connecting pins.

A coil made of Galvanised Iron (GI) wire of 26 guage and of length 65 cm is provided. Ends of the coil are soldered to two male connecting pins.

The circuit arrangement is such that with cell in the cell holder and coil when inserted in the connecting pins makes the circuit closed and bulb glows.



To do and observe :



Step 1 :

Insert the dry cell in the cell holder.

Step 2 :

Insert GI coil in the connecting pins. You will notice that the bulb glows.

Step 3 :

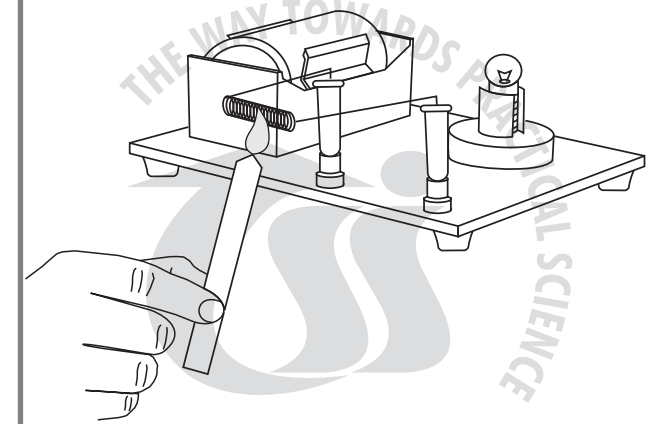
Take a candle and light it.

Step 4 :

Start heating the coil evenly using the candle. As you start heating you notice that the intensity of the bulb goes on decreasing. Continue heating till the intensity of the bulb becomes zero.

Step 5 :

Put off the candle and stop heating the coil. Now observe that the intensity of the bulb starts increasing slowly and reaches to its maximum intensity level.



What is going on :

As you heat the coil its temperature goes on increasing. The resistance of a pure conductor increases with increase in temperature. The increase in resistance reduces the amount of current in the circuit. As a result the intensity of the bulb decreases

Temperature of the coil starts decreasing when you stop heating the coil. This in turn decreases the resistance. Therefore the intensity of the bulb gradually increases and reaches the maximum value.

Note :

1. In case of an alloy, such as nichrome, the resistance is very large and shows small variation with temperature. e.g. Manganin which an alloy of copper, nickel, iron and manganese has a resistance which is 30 to 40 times as that of pure copper for the same dimensions, but its temperature coefficient is very



small (i.e. $0.00001^{\circ}/c$). For this reason it is an excellent substance to be used for the construction of a standard resistance coil.

2. The variation of resistance with temperature in case of semiconductors is different from that in case of a conductor. The resistance of a semiconductor has an exponential dependence and negative on temperature.

If we use thermistor we can demonstrate exactly reverse effect.



GEORGE SIMON OHM



Born : 16 March 1789(1789-03-16)
Erlangen, Germany
Died : 6 July 1854 (aged 65)
Munich, Germany
Residence : Germany
Nationality : German
Fields : Physics
Institutions : University of Munich
Alma mater : University of Erlangen
Doctoral advisor : Karl Christian von Langsdorf
Known for : Ohm's law
Ohm's phase law
Ohm's acoustic law
Notable awards : Copley Medal (1841)



VARIATION OF RESISTANCE (with respect to Temperature)

TARANG SCIENTIFIC INSTRUMENTS

DHARWAD

Phone : 0836-2775204

Cell : 94482 31960

