

### ACTIVITY 3

#### AIM

To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.

#### APPARATUS AND MATERIAL

**Apparatus.** No apparatus required in assembling a circuit.

**Material.** Three bulbs (6 V, 1 W) each, fuse of 0.6 A, main switch a power supply (battery eliminator), three (on/off) switches flexible connecting wire with red and black plastic covering, a fuse wire.

**Supplementary.** Main electric board with a two-pin socket and main switch.

#### THEORY

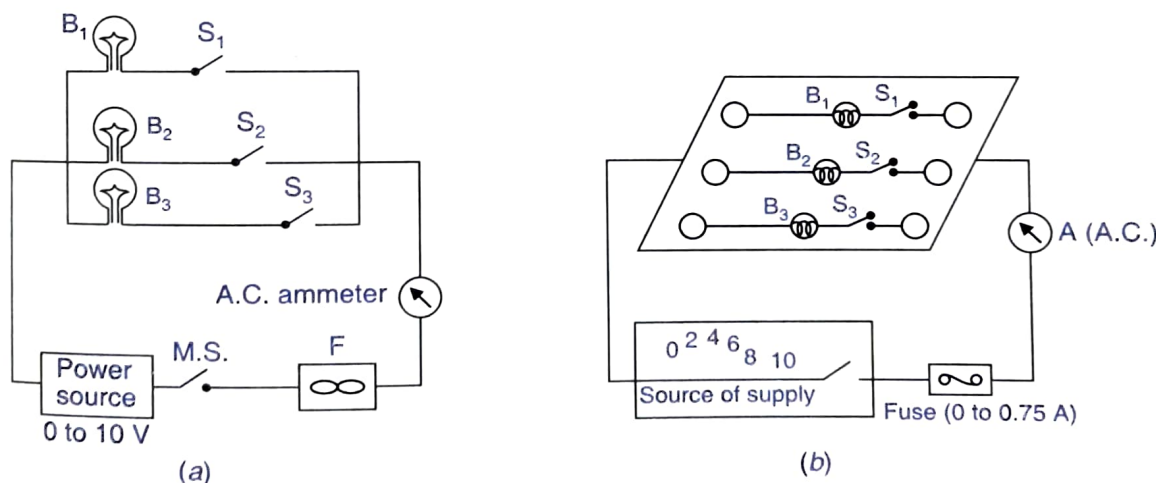
Electricity supplied to us for domestic purposes is 220 V A.C. and 50 Hz. The household circuit, all appliances are connected in "parallel" with mains. The switches are connected in series with each appliances in **live** wire. 5 A switches are required for normal appliances like, bulbs, fluorescent tubes fans etc. 15 A sockets and switches are required for heavy load appliances like, refrigerator, air conditioner, geyser, hot plates etc. All appliances must have three wires called live, neutral and the earth. Total power consumption ' $P$ ' at a time

$$P = P_1 + P_2 + P_3 + \dots$$

where  $P_1, P_2, P_3$  are the powers drawn by appliances.

To protect the appliances from damage when unduly high currents are drawn fuse of little higher rating, 10 to 20% higher than the current normally drawn by all appliances. For further safety, a suitable value MAINS FUSE like rating 32 A is connected in series with supply source.

#### DIAGRAM



(a) Circuit diagram, (b) Actual layout.

#### PROCEDURE

1. Connect the bulbs  $B_1, B_2$  and  $B_3$  in series with switches  $S_1, S_2$  and  $S_3$  respectively and connect each set of B-S in parallel with each other.
2. Connect main supply to a step-down transformer (battery eliminator) to get required voltage from 0 to 10 V (0, 2, 4, 6, 8 and 10 V).

3. Connect the mains fuse M.S. in series with the power supply (battery eliminator).
4. Connect an A.C. ammeter in series with the B-S set.
5. Connect one end of power supply to one end of B-S set.
6. Check the circuit one again to ensure that household circuit is complete.
7. Gradually increase the current to 0.75 A, the fuse must burn off at about 0.6 A.



### ACTIVITY 4

#### AIM

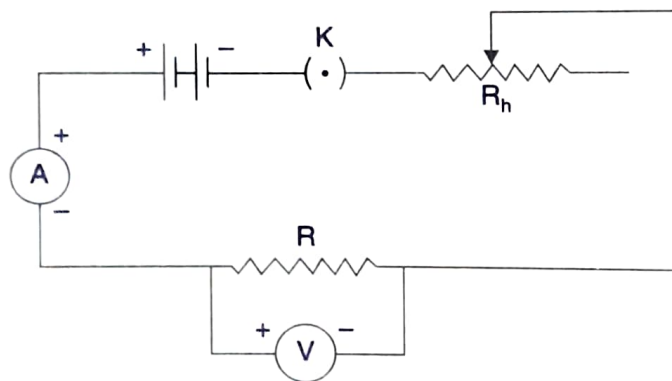
*To assemble the components of a given electrical circuit.*

#### APPARATUS AND MATERIAL

**Apparatus.** A voltmeter and an ammeter of appropriate range, a battery, a rheostat, one way key.

**Material.** An unknown resistance or resistance coil, connecting wires, a piece of sand paper.

#### DIAGRAM



#### PROCEDURE

1. Connect the components (Resistors, inductors etc.) in series with each other as shown in diagram and then in series with the battery.
2. Connect the ammeter in series with the circuit, to measure the current.
3. Connect the voltmeter in parallel to the resistor, to measure the potential difference.
4. Connect the switch in series with the battery.
5. Assembly of the electrical components in electric circuit is complete.

#### UTILITY

It is used for measuring an unknown resistance (see Experiment 2 : Section A).



## ACTIVITY 6

### AIM

*To draw the diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.*

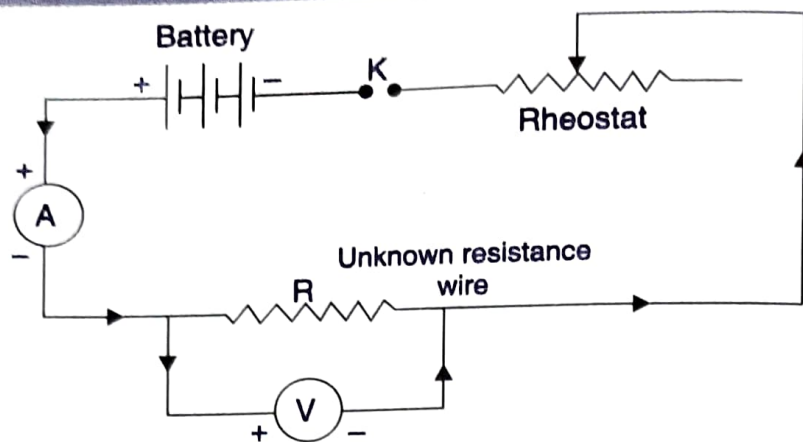
### APPARATUS AND MATERIAL

A battery eliminator or a battery (0 to 6 V), rheostat, resistance box (0 to 100  $\Omega$ ), two or one way key. D.C. ammeter (0–3) A and a D.C. voltmeter (0–3) V.

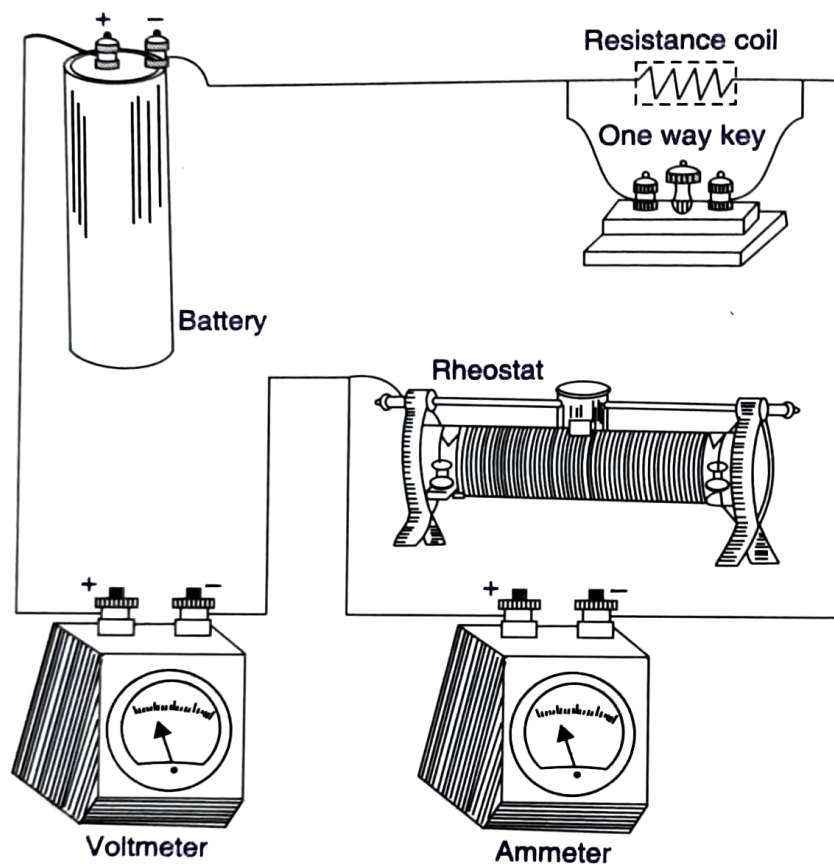
### THEORY

An open circuit is the combination of primary components of electric circuit in a such a manner that on closing the circuit no current is drawn from the battery.





DIAGRAM



**Open circuit diagram (Components not connected in proper order).**

## PROCEDURE

**Ammeter.** It should be connected in series, with the battery eliminator.

**Voltmeter.** It should be connected in parallel to the resistor.

**Rheostat.** It should be connected in series (in place of resistance coil) with the battery eliminator.

**Resistance coil.** It should be connected in parallel (in place of rheostat).

**One way key.** It should be connected in series to the battery eliminator.

**Correct circuit diagram (Components connected in proper order)**