ACTIVITY

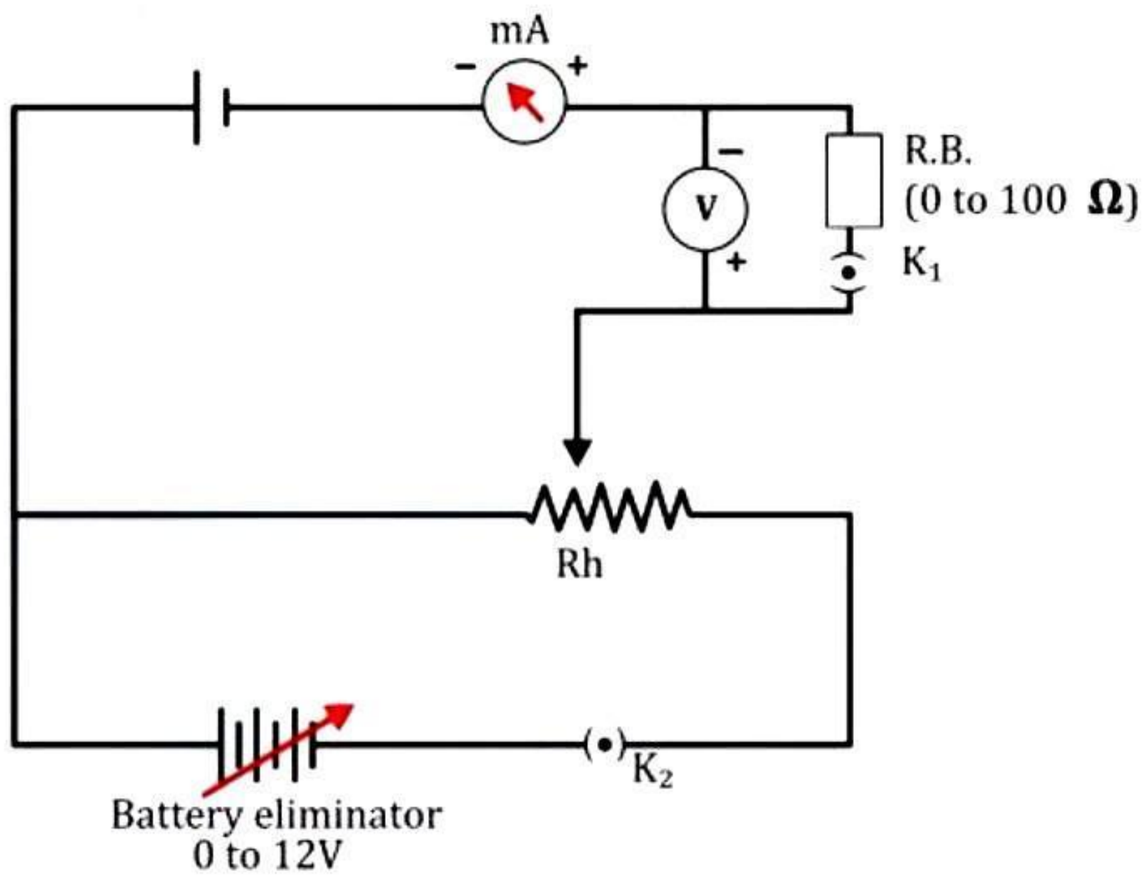
AIM

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.

MATERIAL REQUIRED

A battery eliminator or a battery (0 to 6 V), rheostat, resistance box (0 to 100 Ω), 2- one-way key, D.C. ammeter (0-3) A and a D.C. voltmeter (0-3)V, A Dry cell (1.5V).

DIAGRAM



Circuit diagram using the components such as a cell, milliammeter, resistance box, key, ammeter and voltmeter

THEORY

When various electrical components are interconnected to allow the flow of current, the circuit is considered closed. Once the plug key is withdrawn from the circuit, it becomes an open circuit, resulting in no current flow in this scenario.

PROCEDURE

1. Assemble the components according to the configuration depicted in the circuit diagram.
2. Ensure that the cell is connected in parallel with the rheostat (Rh) in a manner that the circuit includes, in series, the resistance box, milliammeter with the cell, and the voltmeter connected in parallel to the given resistance box.
3. Set up the battery, key K_2, and rheostat following the layout illustrated in the circuit diagram.
4. With K_2 open, remove a 5-ohm resistance from the resistance box. Close key K_1 and take readings from the milliammeter and voltmeter.
5. Adjust the battery eliminator to 4 volts, close key K_2, and gradually shift the rheostat from left to right.

6. Halt the movement of the rheostat contact when the milliammeter indicates zero.

RESULT

When milliammeter reads zero, no current is drawn from the cell and the circuit is said to be open.

PRECAUTIONS

1. All connections should be neat, clean and tight.
2. The insulated wires are to be used for connections.
3. A given circuit should not be checked by inserting the plug into the key. This may damage any component of the circuit.

VIVA- VOCE

Q 1. What is an open circuit?

Ans. If some electrical components are connected in such a way that no current flows through the circuit then the circuit is called an open circuit.

Q 2. How is an ammeter connected in the circuit?

Ans. An ammeter is always connected in series.

Q 3. Why is it connected in series?

Ans. Since ammeter has low resistance, it will not affect the current. So, it is connected in series.

Q 4. How is the voltmeter connected in the circuit?

Ans. It is always connected in parallel to the resistor across which the voltage has to be measured.

Q 5. What is the function of rheostat?

Ans. To provide variable resistance.

Q 6. What will be the total resistance of the rheostat wire?

Ans. The total resistance of the rheostat wire is written on the handle of the sliding contact.

Q 7. What will be the maximum current which can flow without overheating the wire?

Ans. The maximum permissible current is written on the handle of the sliding contact.