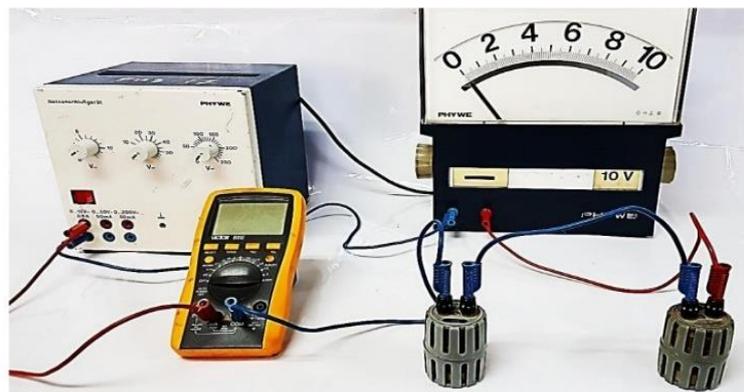# connecting resistors in series

the purpose of the experiment-:

1. **Realization of Ohm's Law.**
2. **Calculate the value of the equivalent resistance.**
3. **Learn how to connect electrical resistors.**

The equipment used in the experiment:

1. **Variable resistors**
2. **Power supply source**
3. **A device for measuring current (ammeter)**
4. **Connecting wires**

Experience theory:

Series connection means that the components of the closed electrical circuit are connected in succession, so that the end of each component of the circuit is connected to one end of the component that follows it, and it allows only one path for electrons in this circuit. The following figure shows a simple circuit for a group of resistors connected in series.
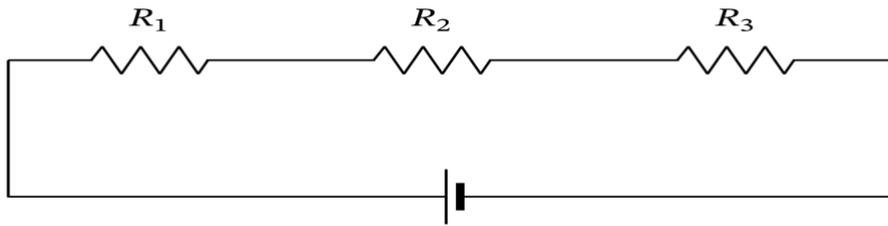
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Figure (1)

In the electrical circuit shown above, it includes a battery, an ammeter, a rheostat and a switch, all connected in series, and the electrical circuit is locked and the rheostat resistance is adjusted to enable the passage of the appropriate electric current of intensity I (A).

$I_{total} = I_1 = I_2 = I_3$

Then the voltage difference between the two ends of the resistance (R1), let it be (V1), the potential difference between the two ends of the resistance (R2), let it be (V2), and the potential difference between the two ends of the resistance (R3) let it be (V3), and the total potential difference between the two ends of the group is measured, let it be (V).

$V_{total} = V1 + V + V3$

- **By Ohm's law**

$V = I * R$

$V1 = I * R1, \quad V2 = I * R2, \quad V3 = I * R3$

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The law of total equivalent resistance for connection in series:

Req=R1+R2+R3

How the experiment works:

1- We connect the electrical circuit shown in Figure (1).
2- Input an appropriate current from the battery by changing the value of the rheostat.
3- Record the value of both current and potential difference in the table.
4- Draw the graphic relationship between the current on the horizontal axis and the voltage on the vertical axis, we will get a straight line whose slope determines the value of the resistors in a row.

accounts sheet :-

R (k Ω)	V(volt)	I(A)	R(Ω)
1	5.2	5.2	
560	2.9	5.2	
330	1. 7	5.2	

Applying Ohm's law R=V\I

R=R1+R2

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