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اليوم :   الساعة:

parallel and series combination of resistors experiment

Purpose

(1)   To study resistors connected in series

(2)   To study resistors connected in parallel.

(3)   To study resistors connected in series and parallel.

Apparatus

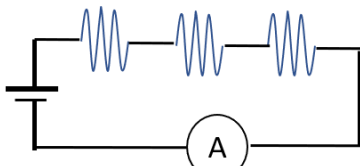Power Supply , 3 resistors , an ammeter , circuit wizard program

Circuits
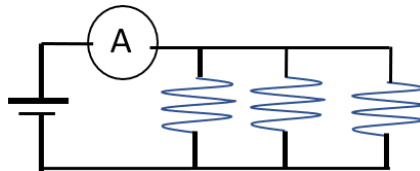

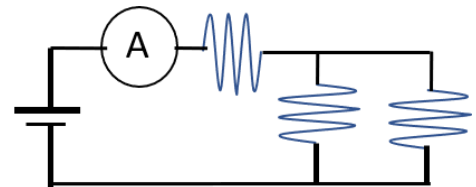Fig 1   Fig 2   Fig 3

Theory

Combinations of Resistors.

When two or more resistors (R1, R2, R3,…) are connected in series (Fig. 1) then this combination is equivalent to a single resistor of resistance R_{eq} given by equation (1).

When two or more resistors are connected in parallel (Fig. 3) then the equivalent resistance R_{eq} is given by equation (3).

When three or more resistors are connected in both parallel and series combinations within the same circuit (Fig. 4) then the equivalent resistance R_{eq} is given by using equation (2 &3).

The voltage between the end of the resistors is dependent on the current flows throw it

Equations

$V = R \cdot I$ equation (1) $R_{eq} = R_1 + R_2 + R_3$ series   equation (2)

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$ equation (3)

$P = V \cdot I$ equation (4) $P = R \cdot I^2$ equation (5)

The equations symbols meaning

symbol	meaning	unit
V		
I		
R		
R_{eq}		
p		

R1=   ohm   R2=   ohm   R3=   ohm

resistors connected in series Fig. 1

V	5	10	15	20	25
I					

For v = 20 volt find the power of R_1 , R_2 & R_3

p	R_1	R_2	R_3

R_{eq}	Theoretical from the equations	Experimental From the graph

resistors connected in parallel Fig. 2

V	5	10	15	20	25
I					

For v = 20 volt find the power of R_1 , R_2 & R_3

p	R_1	R_2	R_3

R_{eq}	Theoretical from the equations	Experimental From the graph

resistors connected in series and parallel Fig. 3

V	5	10	15	20	25
I					

For v = 20 volt find the power of R_1 , R_2 & R_3

p	R_1	R_2	R_3

R_{eq}	Theoretical from the equations	Experimental From the graph

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