23-2094

PHY 217B

LAB REPORT 2

RESISTORS IN SERIES AND PARALLEL

OBJECTIVE

The objective of the experiment is to demonstrate that when resistors are placed in series the current remains the same all through the changing voltages and when in parallel voltage remains the same.

Resistors used:

5600 ohms

3300 ohms

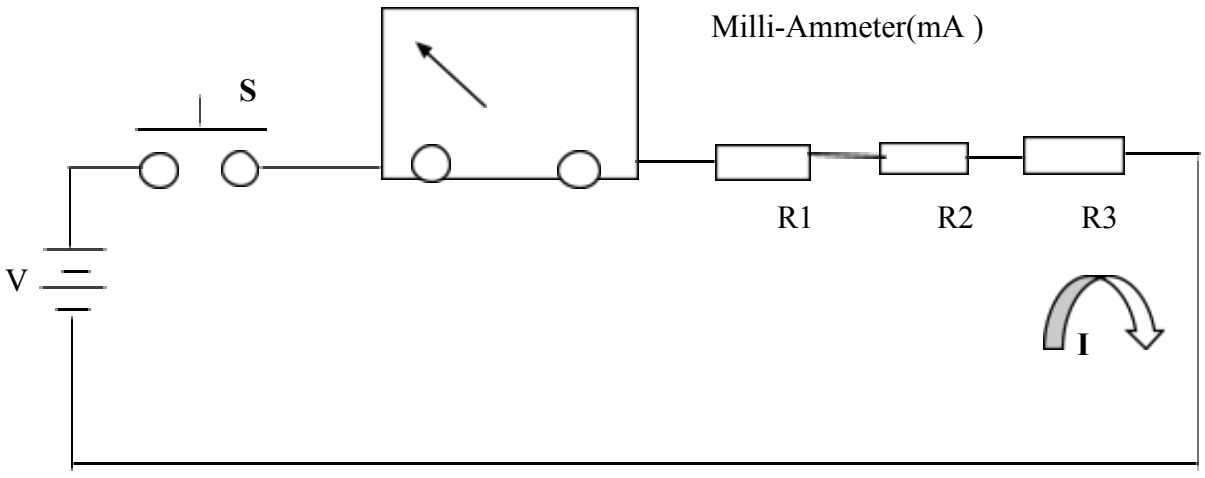
10000 OHMS

PROCEDURE

IN SERIES:

The resistors were connected through the milliameter to a 9vdc SOURCE.One resistor was added at a time and the calue of the current noted down.

The value of each resistor was noted down separately at first followed by the total of all the three resistors in the series.The voltage was measured across each resistor.



	R1		R1+R2		R1+R2+R3	
Voltage	I	Ω	I	Ω	I	Ω
1.5	0.16	9.375	1.0	1.5	0.8	1.88
3.0	0.34	8.82	0.22	13.64	0.18	16.67
4.5	0.50	9.0	0.34	13.24	0.26	17.31
6.0	0.64	9.38	0.43	13.95	0.36	16.67
7.5	0.79	9.49	0.52	14.42	0.44	17.05
9.0	0.94	9.57	0.62	14.52	0.52	17.31

1. **Does the sum of total resistance equal the sum of all resistances/**

R1=8.82 Ω

R1+R2=13.6 Ω

R1+R2+R3=16.7 Ω

Calculate R2&R3

R2=(R1+R2)-R1=13.64-8.82=4.8 Ω

R3=(R1+R2+R3)-(R1+R2)=16.67-13.64=3.0 Ω

Sum of individual resistances

R1+R2+R3=8.82+4.82+3.03=16.7 Ω

This confirms that the total resistance is equal to the sum of individual resistances, meaning the resistors are connected in series**.**

2. **Does the sum of the voltages across each resistor equal the total voltage?**

IR1=0.34A, R1=8.8 Ω

IR1+R2= 0.22A, R2=4.8 Ω

IR1+R2+R3= 0.18A R3= 3.0 Ω

calculating voltages:

V1=IR1×R1=0.34×8.82=3.0 V

V2=IR1+R2×R2=0.22×4.82=1.1 V

V3=IR1+R2+R3×R3=0.18×3.03=0.6 V

Voltage Sum

3.00V≠1.06V+0.55V=1.6 V

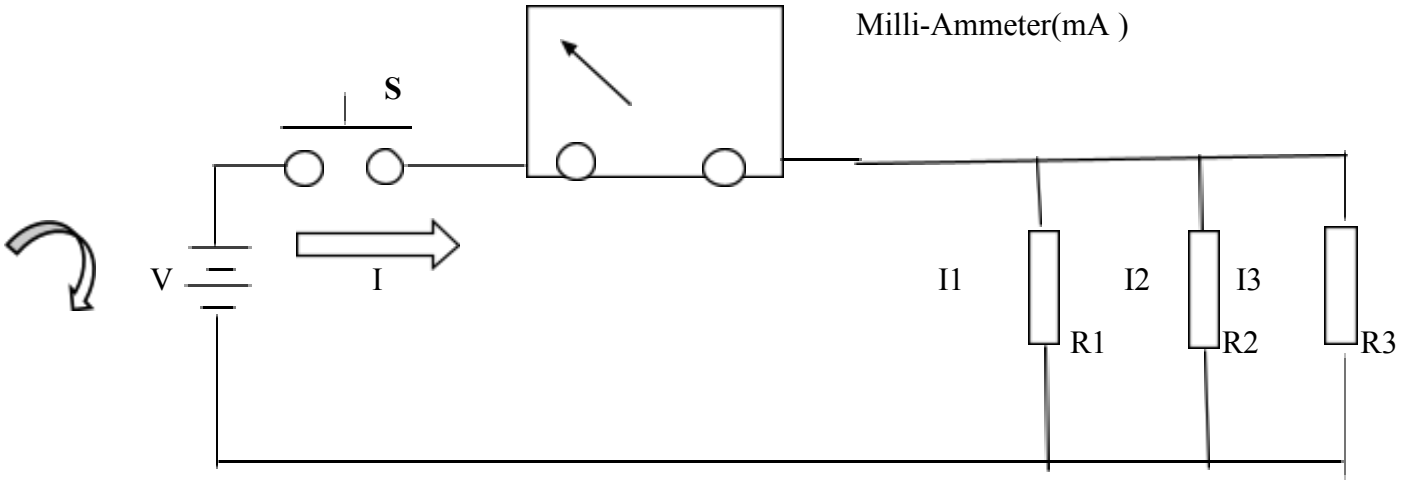
Since the sum of individual voltages does not equal the total applied voltage, this suggests one of the following:

1. Resistors might not be purely in series, meaning there might be measurement errors or different current values in each stage.
2. There could be parallel components affecting voltage drops.
3. Experimental inconsistencies in current measurements.

RESISTORS IN PARALLEL

Procedure:

The three resistors were connected in parallel and connected to a 6VDC source.The resistors were added one at a time and the current noted down.



Resistors used

2200 ohms

6200 ohms

5600 ohms

After connecting the current is 1.8mA

R=V/I

R=1.5/(1.18*10^3)

=127.12 ohms(this is less than the resistors used)

Conclusion

In series circuit the total resistance is the same of individual resistance and current remains the same. Thus the sum of each resistance is the total resistance.

In parallel, voltage remains the same. This confirms that the reciprocal of the total resistance is the sum of each resistance's reciprocal.