Course Code: CSE 124
Course Title: Basic Electrical Engineering Lab
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Batch & Section: 62nd (A)

Lab Classes	Topics Covered	Date	Teacher's Signature
Lab 1	Verification of Ohm's Law	19-05-25	
Lab 2	Verification of series & parallel circuit	26-05-25	26.05.25
Lab 3	Verification of parallel circuit	02-06-25	02.06.25
Lab 4			
Lab 5			
Lab 6			
Lab 7			
Lab 8			
Lab 9			
Lab 10			
Lab 11			
Lab 12			
Lab 13			
Lab 14			
Lab 15			
Lab 16			

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EXPERIMENT NO: 02

NAME OF THE EXPERIMENT:

VERIFICATION OF SERIES AND PARALLEL CIRCUIT

OBJECTIVE:

Our objective is to –

- Know the relationship between current & voltage for a resistor
- To know the characteristics of series & parallel resistive network

PART A – SERIES CIRCUIT

THEORY:

When resistors R1, R2, and R3 etc. are joined end to end, they are said to be connected in series. It can be proved that the equivalent resistance is equal to the sum of the three individual resistances.

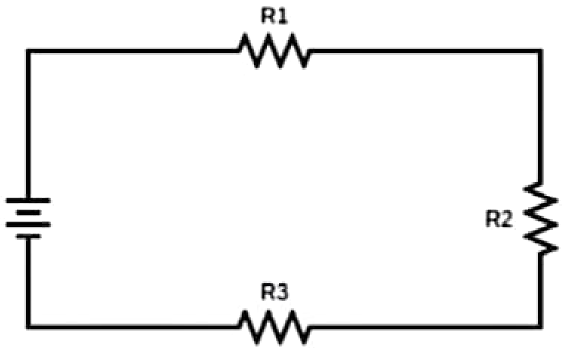
In this case:

- *Current is the same through all the resistors.*
- *Different resistors have their individual voltage drops.*
- *Sum of the voltage drops is equal to the voltage applied across the three conductors.*

APPARATUS:

- Power supply
- Ammeter
- Multi-meter
- 3 Resistors

CIRCUIT DIAGRAM:



From figure, we can write equivalent resistance

Req = R1 + R2 + R3

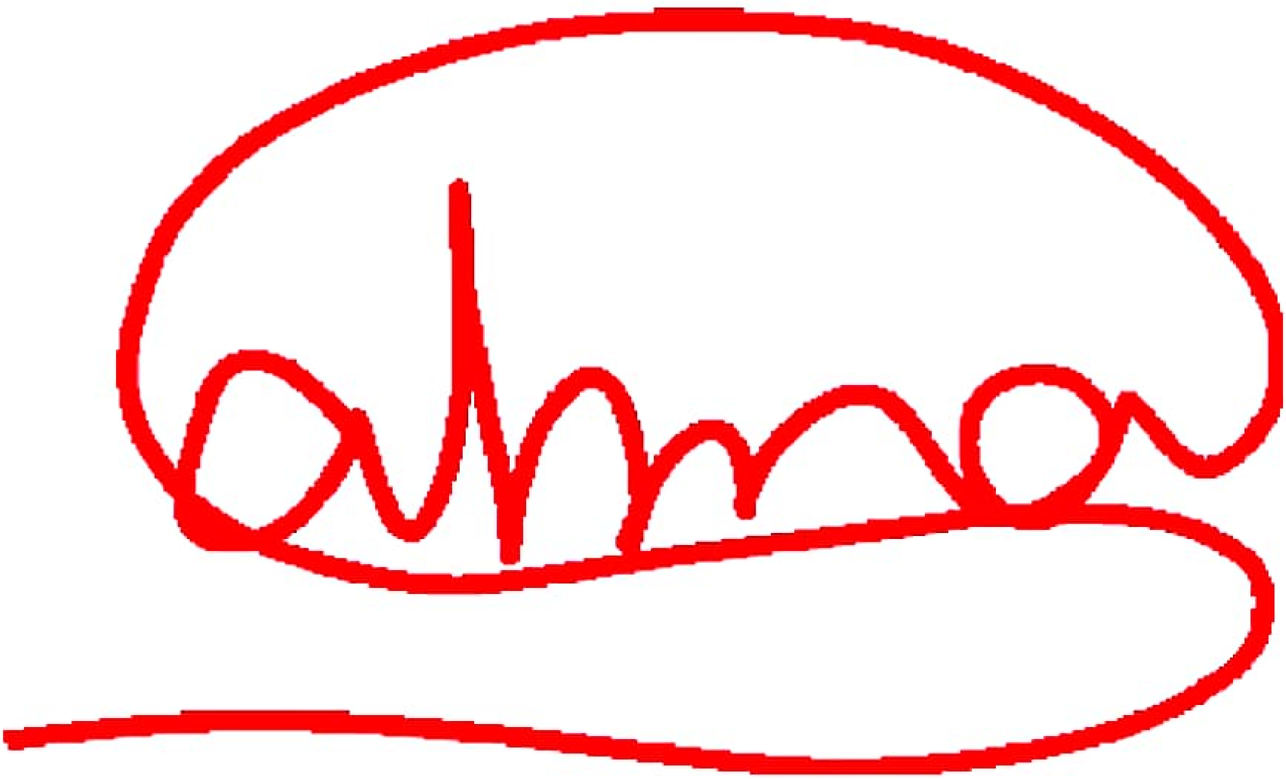
Circuit current, I = V / Req = V / (R1 + R2 + R3)

So,

Voltage across R1 = V1 = I * R1 = V * R1 / Req

Voltage across R2 = V2 = I * R2 = V * R2 / Req

Voltage across R3 = V3 = I * R3 = V * R3 / Req



DATA TABLE:

NO. Of Observation	Supply Voltage	Resistance (Ω)			Current (mA)		Voltage (Volt)					
							Calculated			Measured		
		R1	R2	R3	Calculated	Measured	V1	V2	V3	V1	V2	V3
01	10.99	975	559	219	6.27	6.69	6.11	3	1.37	5.8	2.59	1.48
02	4.95				2.82	3.38	2.75	1.57	0.61	2.07	1.29	0.74

DISCUSSION:

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6.69 ... s ... m ... ibute ... co
resis ...

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... 2. ... 8V

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mea ...
fluc ... voltag ... 0.61V)
co ... o me ... (2.07V, 1.29v, ...
re ... nt remains constant, as ... a series ci...

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PART B – PARALLEL CIRCUIT

THEORY:

When resistors R1, R2, and R3 are joined as shown in fig-3, they are said to be connected in parallel.

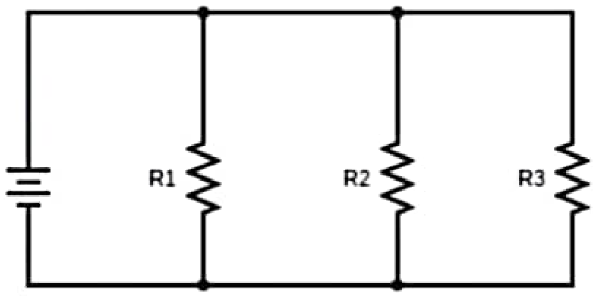
In this case, voltages across all the resistors are same, but current in each is different.

Total current is the sum of the separate currents.

APPARATUS:

- Power supply
- Multi-meter
- 3 Resistors

CIRCUIT DIAGRAM:



From figure, we get:

$R_{eq} = R_1R_2R_3 / (R_1R_2 + R_2R_3 + R_1R_3)$

Total current,

$I = V / R_{eq} = V (R_1R_2 + R_2R_3 + R_1R_3) / (R_1 * R_2 * R_3)$

Current across R1 = I1 = I*R2*R3 / (R1R2 + R2R3 + R1R3)

Current across R2 = I2 = I*R1*R3 / (R1R2 + R2R3 + R1R3)

Current across R3 = I3 = I*R1*R2 / (R1R2 + R2R3 + R1R3)

DATA TABLE:

NO. Of Observation	Supply Voltage	Resistance (Ω)			Total Current (mA)		Branch Current (mA)					
							Calculated			Measured		
		R1	R2	R3	Calculated	Measured	I1	I2	I3	I1	I2	I3
01	4.96	2180	976	981	11.92	12.2	2.27	5.08	5.05	2.25	5.01	4.99
02	9.97				23.96	24.8	4.57	10.21	10.16	4.56	10.14	10.8

DISCUSSION:

For the para[illegible] branch [illegible] total current were observed [illegible] with [illegible] first obse[illegible]n, resistors of 2180Ω, [illegible] 981[illegible] used with a [illegible] voltage of 4.96V. [illegible]lated current [illegible] the measured was [illegible] mA — a very close [illegible]ch. [illegible]vidual branch cu[illegible] [illegible]ly matc[illegible]:

Calc[illegible] [illegible] 5.05 [illegible]
Mea[illegible]ed: [illegible] mA

In th[illegible] ob[illegible] n [illegible]
meas[illegible]

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[illegible] mA, [illegible] mA
• [illegible] 10.[illegible] 10.

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PROBLEMS:

1. Will current be the same through resistors in a Series Circuit? What about Parallel Circuit?

Yes, current is the same through all resistors. Because there is only one path for current to flow, the same current passes through each component.
But for Parallel connection, current is divided among the branches. Each resistor gets a different amount of current depending on its resistance (Ohm's Law: $I = V/R$), but the total current is the sum of the individual branch currents.

2. Will voltage be the same across resistors in Series? What about Parallel?

No, voltage is divided across resistors in Series connection. Each resistor has a different voltage drop based on its resistance. The sum of all voltage drops equals the total supply voltage.

For Parallel connection, voltage is the same across all resistors. All branches are directly connected across the same two points, so they share the same potential difference (voltage).