

EXPERIMENT – 1
(A) VERIFICATION OF OHM'S LAW

1. AIM:

To verify Ohm's law for a given resistive network.

2. APPARATUS REQUIRED:

| S. No | Apparatus Name | Range | Type | Quantity |
|-------|------------------|-------|------|----------|
| 1 | RPS | | | |
| 2 | Ammeter | | | |
| 3 | Voltmeter | | | |
| 4 | Resistor | | | |
| 5 | Rheostat | | | |
| 6 | Bread Board | | | |
| 7 | Connecting Wires | | | |

3. CIRCUIT DIAGRAM:

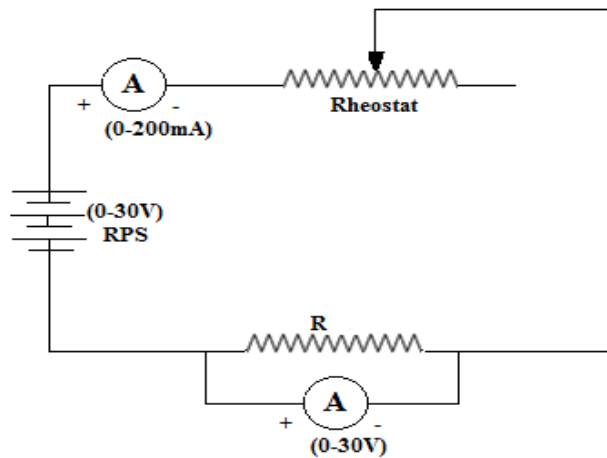


Fig – 2.1 Circuit Diagram

4. PROCEDURE:

1. Make the connections as per circuit diagram.
2. Switch ON the power supply to RPS and apply a voltage (say 10V) and take the reading of voltmeter and ammeter.
3. Adjust the rheostat in steps and take down the readings of ammeter and voltmeter.
4. Plot a graph with **V** along x-axis and **I** along y-axis.
5. The graph will be a straight line which verifies Ohm's law.
6. Determine the slope of the V-I graph. The reciprocal of the slope gives resistance of the wire.

5. OBSERVATIONS:

| S. No. | Voltage (V) | Current (mA) |
|--------|-------------|--------------|
| | | |

6. MODEL GRAPH:

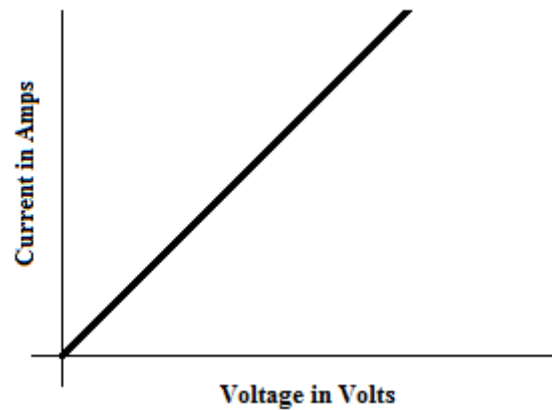


Fig: 2.2 Voltage and Current Characteristics

7. PRECAUTIONS:

1. Take care to connect the ammeter and voltmeter with their correct polarity.
2. Make sure of proper color coding of resistors.
3. The terminal of the resistance should be properly connected.

8. RESULT:

9. PRE LAB QUESTIONS:

1. What is current?
2. What is voltage?
3. Define charge.
4. Define power.

5. What is the resistance?
6. What is ohm's law?

10. POST LAB QUESTIONS:

1. What do you mean by junction?
2. What is the colour coding of resistors?
3. What are the precautions to be taken while doing the experiment?
4. What is the range of ammeters and voltmeters you used in this experiment?
5. What are the limitations of ohm's law?
6. What is the condition of ohm's law?

(B) VERIFICATION OF KIRCHHOFF'S CURRENT AND VOLTAGE LAWS

1. AIM:

To verify Kirchhoff's voltage law (KVL) and Kirchhoff's current law (KCL) in a passive resistive network

2. APPARATUS REQUIRED:

| S. No | Apparatus Name | Range | Type | Quantity |
|-------|------------------|-------|------|----------|
| 1 | RPS | | | |
| 2 | Ammeter | | | |
| 3 | Voltmeter | | | |
| 4 | Resistors | | | |
| 5 | Bread Board | | | |
| 6 | Connecting Wires | | | |

3. CIRCUIT DIAGRAMS:

Circuit to verify KVL:

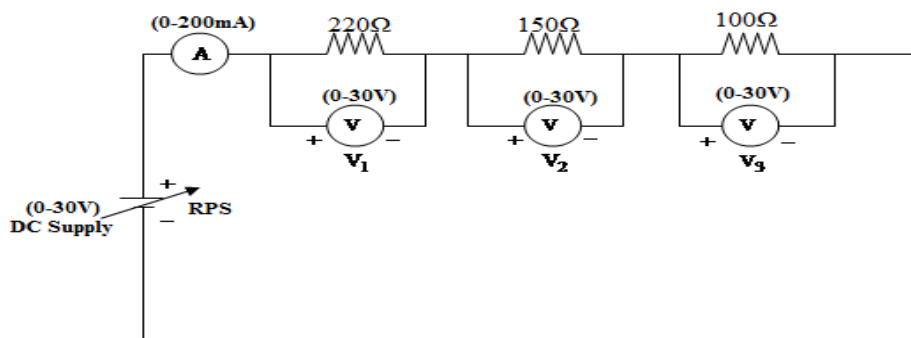


Figure - 1

To Verify KCL:

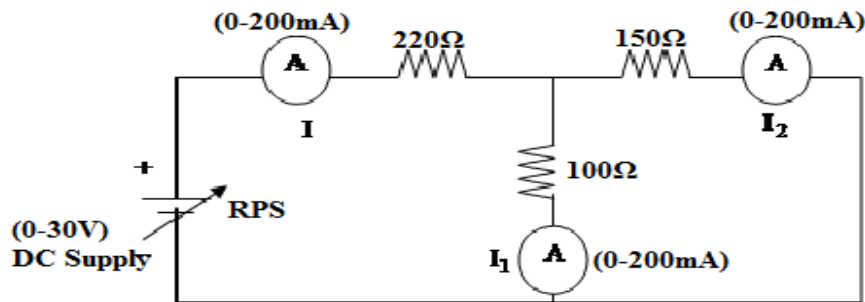


Figure - 2

4. PROCEDURE:

To Verify KVL

1. Connect the circuit diagram as shown in Figure 1.
2. Switch ON the supply to RPS.
3. Apply the voltage (say 5v) and note the voltmeter readings.
4. Sum up the voltmeter readings (voltage drops), that should be equal to applied voltage.
5. Thus KVL is verified practically.

To Verify KCL

1. Connect the circuit diagram as shown in Figure 2.
2. Switch ON the supply to RPS.
3. Apply the voltage (say 5v) and note the ammeter readings.
4. Sum up the Ammeter readings (I_1 and I_2), that should be equal to total current (I).
5. Thus KCL is verified practically.

5. OBSERVATIONS:

For KVL

| Applied Voltage V (volts) | V ₁ (volts) | | V ₂ (volts) | | V ₃ (volts) | | V ₁ +V ₂ +V ₃ (volts) | |
|---------------------------------|------------------------|-----------|------------------------|-----------|------------------------|-----------|--|-----------|
| | Theoretical | Practical | Theoretical | practical | Theoretical | practical | Theoretical | practical |
| | | | | | | | | |

For KCL

| Applied Voltage V (volts) | I (A) | | I ₁ (A) | | I ₂ (A) | | I ₁ +I ₂ (A) | |
|------------------------------|-------------|-----------|--------------------|-----------|--------------------|-----------|------------------------------------|-----------|
| | Theoretical | Practical | Theoretical | practical | Theoretical | practical | Theoretical | practical |
| | | | | | | | | |

6. PRECAUTIONS:

1. Check for proper connections before switching ON the supply.
2. Make sure of proper color coding of resistors.
3. The terminal of the resistance should be properly connected.

7. RESULT:

8. PRE LAB VIVA QUESTIONS:

1. What is current?
2. What is voltage?

3. What is resistance?
4. What is ohm's law?
5. What is KCL and KVL?

1.9 POST LAB VIVA QUESTIONS:

1. What do you mean by junction?
2. What directions should be assumed for KCL?
3. What are the positive and negative signs in KVL?
4. What is the colour coding of resistors?
5. What are the precautions to be taken while doing the experiment?
6. What is the range of ammeters and voltmeters you used in this experiment?

EXPERIMENT-2

VERIFICATION OF MESH ANALYSIS

1. AIM:

To verify Mesh analysis for a given passive resistive network

2. APPARATUS REQUIRED:

| S. No | Apparatus Name | Range | Type | Quantity |
|-------|------------------|-------|------|----------|
| 1 | RPS | | | |
| 2 | Ammeter | | | |
| 3 | Voltmeter | | | |
| 4 | Resistors | | | |
| 5 | Bread Board | | | |
| 6 | Connecting Wires | | | |

3. CIRCUIT DIAGRAMS:

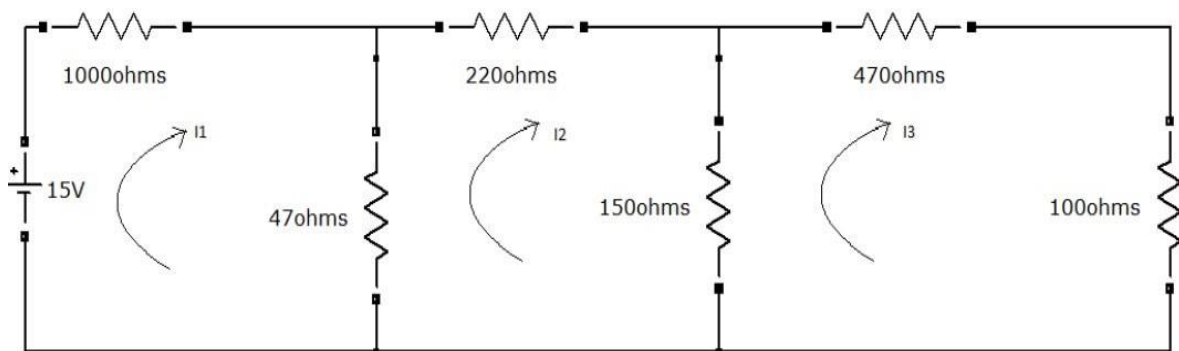


Figure – 1

4. PROCEDURE

1. Connect the circuit diagram as shown in Figure-1.
2. Switch ON the supply of RPS.
3. Apply the voltage (say 15v) gradually in steps.
4. With the help of ammeters, find the mesh currents I_1 , I_2 and I_3 .
5. Verify the practical results obtained with theoretical results

5. CALCULATION:

6. OBSERVATIONS:

| Applied Voltage V (volts) | Loop current(I ₁) | | Loop current (I ₂) | | Loop current(I ₃) | |
|------------------------------|-------------------------------|-----------|--------------------------------|-----------|-------------------------------|-----------|
| | Theoretical | Practical | Theoretical | Practical | Theoretical | Practical |
| | | | | | | |

7. PRECAUTIONS:

1. Check for proper connections before switching ON the supply
2. Make sure of proper color coding of resistors
3. The terminal of the resistance should be properly connected.

8. RESULT:

9. PRE LAB VIVA QUESTIONS:

1. On which law is the mesh analysis based?
2. What is mesh analysis?
3. When do we go for super mesh analysis?
4. What is the equation for determining the number of independent loop equations in mesh current method?

10. POST LAB VIVA QUESTIONS:

1. How do we calculate branch currents from loop currents?
2. How do we calculate branch voltages from loop currents?