LAB # 2 & 3

**Objective:**

1. **To measure current, voltage, and resistance using a digital multimeter (DMM). 🡪 02**
2. **To verify Ohm's Law by: 🡪 03**
   1. **Keeping the voltage constant.**
   2. **Keeping the resistance constant.**

**Equipment:**

* Digital Multimeter (DMM)
* DC Power Supply
* Resistors of known values (e.g.,1KΩ, 4.7KΩ,10KΩ)
* Connecting wires
* Breadboard
* Switch

**Theory:**

**Ohm's Law:**

Ohm's Law states that the current (I) through a conductor between two points is directly proportional to the voltage (V) across the two points and inversely proportional to the resistance (R) of the conductor. Mathematically, it is represented as:

**V=I×R**

**Part 1: Measurement of Current, Voltage, and Resistance Procedure:**

1. **Voltage Measurement:**
   * Connect the power supply to the breadboard.
   * Connect the DMM probes across the power supply terminals.
   * Set the DMM to measure DC voltage.
   * Turn on the power supply and record the voltage reading.
2. **Current Measurement:**
   * Connect a resistor in series with the power supply.
   * Break the circuit at one point and connect the DMM probes in series to measure the current.
   * Set the DMM to measure DC current.
   * Turn on the power supply and record the current reading.
3. **Resistance Measurement:**
   * Ensure the resistor is disconnected from the circuit.
   * Connect the DMM probes across the resistor terminals.
   * Set the DMM to measure resistance.
   * Record the resistance reading.

**Part 2: Verification of Ohm's Law:**

1. **Keeping Voltage Constant. Procedure:**
   1. **Setup:**
      * Connect the power supply, resistor, and DMM as described in Part 1 for voltage measurement.
      * Use a resistor of known value (e.g., 1KΩ).
   2. **Measurement:**
      * Set the power supply to a constant voltage (e.g., 10V).
      * Measure and record the current flowing through the resistor using the DMM.
      * Repeat the measurement for different resistors (e.g., 4.7KΩ, 10KΩ).

**Data Analysis:**

* + - Calculate the expected current using Ohm's Law: **I=V/R**
    - Compare the measured current with the calculated current.

1. **Keeping Resistance Constant Procedure:**
   1. **Setup:**
      * Connect the power supply, variable resistor (potentiometer), and DMM as described in Part 1 for voltage measurement.
      * Set the fixed resistance value (e.g., 10KΩ).
   2. **Measurement:**
      * Vary the power supply voltage (e.g.,5V, 10V, 15V).
      * Measure and record the current for each voltage setting.

**Data Analysis:**

* + - Calculate the expected current for each voltage setting using Ohm's Law: **I=V/R**
    - Compare the measured current with the calculated current.

**Observations:**

1. ***By keeping voltage constant***

|  |  |  |  |
| --- | --- | --- | --- |
| **S.NO** | **SUPPLY VOLTAGE** | **RESISTANCE** | **MEASURED CURRENT** |
| **1** | 10V | 1K Ω |  |
| **2** | 10V | 4.7KΩ |  |
| **3** | 10V | 10KΩ |  |

1. ***By keeping resistance constant***

|  |  |  |  |
| --- | --- | --- | --- |
| **S.NO** | **SUPPLY VOLTAGE** | **RESISTANCE** | **MEASURED CURRENT** |
| **1** | 5V | 10K |  |
| **2** | 10V | 10K |  |
| **3** | 15V | 10K |  |

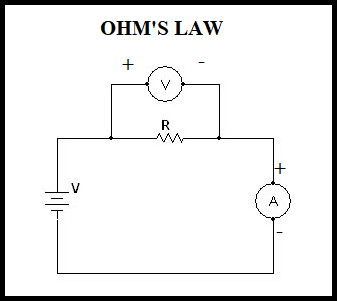
**Conclusion:**

* + - Summarize the findings of the experiment.
    - Confirm whether Ohm's Law holds under the conditions tested.
    - Reflect on the accuracy and precision of the measurements.

**Safety Precautions:**

* + - Ensure all connections are secure to avoid short circuits.
    - Handle the DMM and power supply according to the manufacturer's instructions.
    - Do not exceed the voltage and current ratings of the components used.

**Circuit Diagram:**



Course Code: CIT-134 Course Title: Electronics-I

**POST LAB:**

1. State Ohm's Law?
2. How can Ohm's Law be represented mathematically? Provide the formula.
3. If a resistor has a resistance of 10 ohms and a current of 2 amperes flows through it, what will be the voltage drop across the resistor according to Ohm's Law?

**RESULT:**