

## EXPERIMENT NO. 3

### DEMONSTRATION OF OHM'S LAW

#### OBJECTIVE:

To verify the following two equivalent forms of Ohm's Law:

- a) Express I as a function of V and R.
- b) Express V as a function of I and R.
- c) Demonstration of KVL
- d) Demonstration of KCL

#### EQUIPMENTS REQUIRED:

- Variable DC power supply
- DMM (Digital Multi Meter)
- Resistors with different Resistances
- Breadboard

#### THEORY:

##### OHM'S LAW

Ohm's law describes mathematically, how voltage „V“, current „I“, and resistance „R“ in a circuit are related, According to this law :

*“The current in a circuit is directly proportional to the applied voltage and inversely proportional to the circuit resistance”.*

##### FORMULA FOR VOLTAGE AND CURRENT

$$V=IR$$

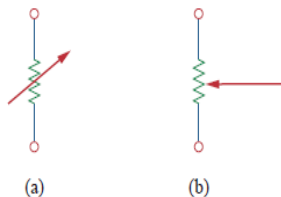
$$I=V/R$$

where the constant of proportionality R is called the Resistance. The unit of resistance is ohm ( $\Omega$ ).

The resistance R of an element denotes its ability to resist the flow of electric current; it is measured in ohms ( $\Omega$ ).

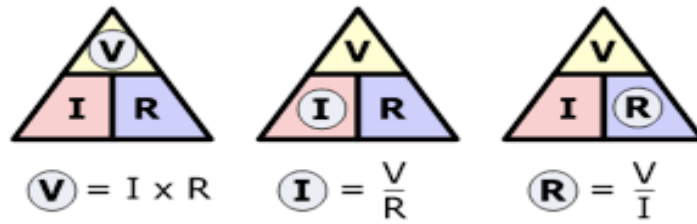
$$R=V/I$$

A resistor is either fixed or variable. Most resistors are of the fixed type, meaning their resistance remains constant. Variable resistors have adjustable resistance.



Circuit symbol for: (a) a variable resistor in general, (b) a potentiometer.

Resistor that obeys Ohm's law is known as a linear resistor. A nonlinear resistor does not obey Ohm's law. formula variation in ohm's law is as under



### CIRCUIT DIAGRAM FOR ohm's Law

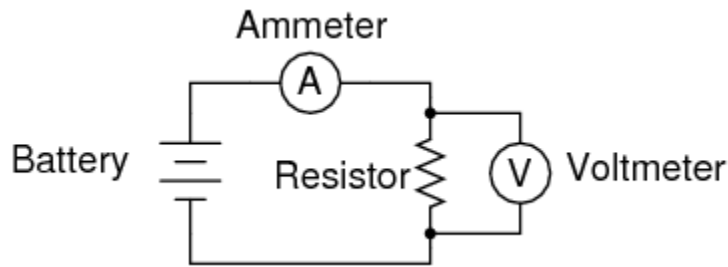


Figure 3.2 Circuit for OHM's Law

Table 3.1 : Observations using Figure 3.1

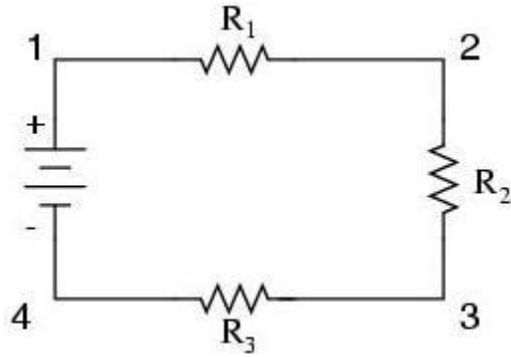
Voltage [V]	Resistance [R]	Current [I]

### POWER ABSORPTION

The power absorbed by the resistance in a given circuit is equal to the product of voltage (V) across it and current (I) flowing through it. Mathematically,

$$P = VI = I^2 R = V^2/R \text{ Watts}$$

**Circuit Diagram** for Connecting more resistance and finding current and voltage drop across each resistance.



**Figure 3.2 Circuit for OHM's Law**

**PROCEDURE**

Select R1= , R2= , R3=

1. Construct the Circuit as shown in Figure above.
2. Calculate the values of currents for given resistances and write them in column of table 3.2
3. Measured the values of currents through DMM for given resistances and write them in column "Measured Current" of the table 3.2.
4. Calculate the values of Voltages for given resistances and write them below

**Table 3.2 : Observations**

*"The current in a circuit is and inversely proportional to the circuit resistance".*

Select Vs=5V OR 10V OR 15V

R1 Resistance	R2 Resistance	R3 Resistance	Total Resistance	IT OR IS [A] Measured	IR1 [A] Measured	IR2 [A] Measured	IR3 [A] Measured

**PROVE THAT IN A SERIES CIRCUIT**

$V_1 = I_1 R_1 =$

$V_2 = I_2 R_2 =$

$V_3 = I_3 R_3 =$

$I_1 = V_1 / R_1 =$

$I_2 = V_2 / R_2 =$

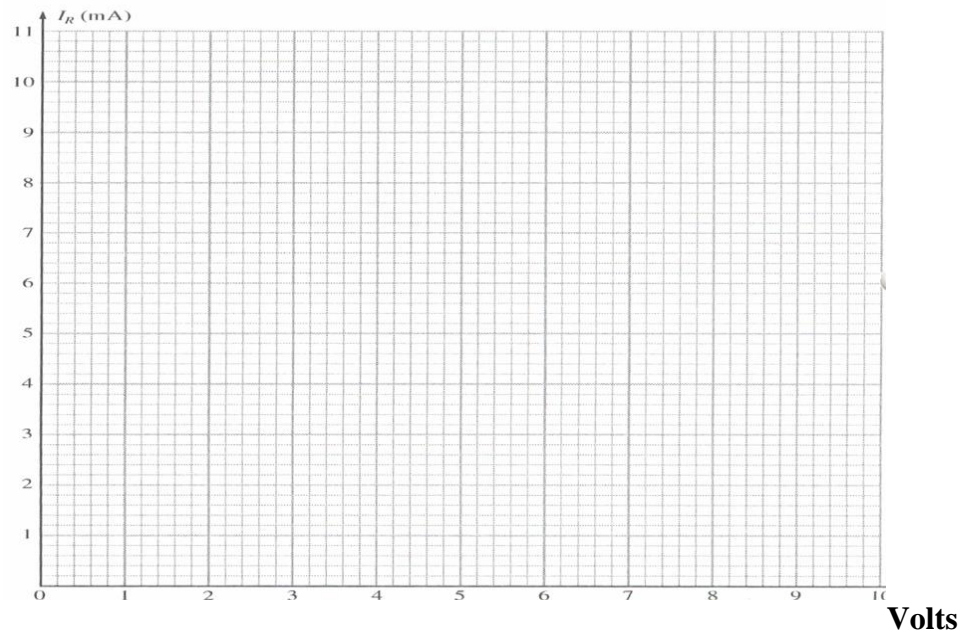
$I_3 = V_3 / R_3 =$

$R_1 = V_1 / I_1 =$

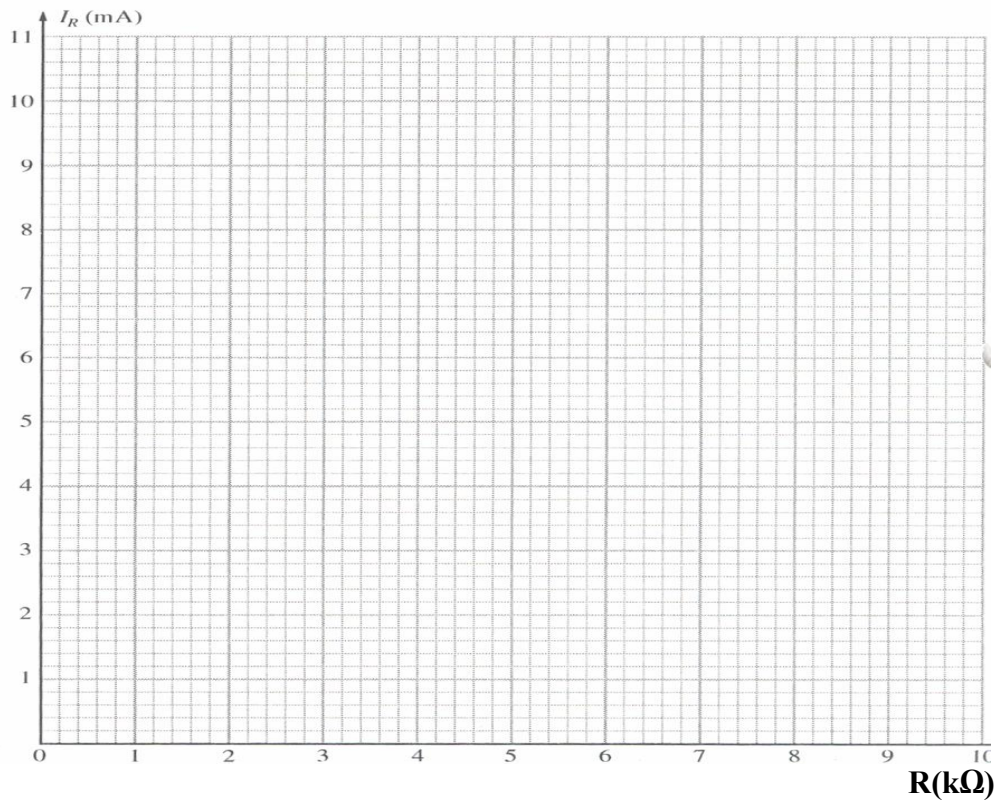
$R_2 = V_2 / I_2 =$

$R_3 = V_3 / I_3 =$

The i-v graph as per circuit.



**Figure 3.2 Current versus voltage**



**Figure 3.3 Current versus resistance**



# Evaluation Chart

	Total Marks	Obtained Marks
Participation in the Lab	3	
Accuracy of Results Obtained	4	
Viva	3	
<b>Total</b>	10	

**Comments from Lab Instructor:**

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Date

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Instructor's Signature