OHM’s Law Experiment

I. INTRODUCTION

1.1. OHM”s Law

If a conductor is connected to a power supply, the voltage difference gives a flow of electric current through the conductor. In a current carrying wire, the current is always along the length of the wire (conductor), regardless of whether the wire is straight or curved. The unit of current is the ampere and defined one coulomb per second (1A=1C/s). The magnitude of the current flowing through a conductor by a voltage difference is determined by the electrical properties of the conductor. One of the most important properties of a conductor is its resistance (R) . The relationship between the applied voltage (V) and current (I) is given by:

$$V = IR$$

This relationship is called **Ohm’s Law.** The voltage V is measured in volts, current I in amperes and resistance R in the unit of ohm (1Ω=1V / A) .

For the materials obeying Ohm’s law, the potential difference V across the material is proportional to the current I through the material. For the resistance does not obey Ohm’s law the line will not be linear.

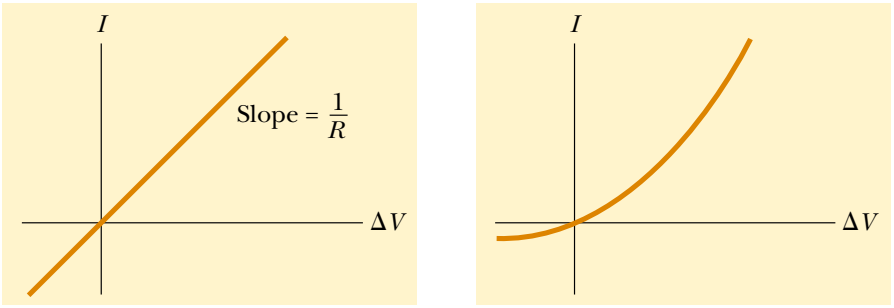


Figure 1. The current – potential difference curve for an ohmic material. The curve is linear, and the slope is equal to the inverse of the resistance of the conductor. A nonlinear current–potential difference curve for a semiconducting diode. This device does not obey Ohm's law.

1.2 Resistance

Most electric circuits use devices called **resistors** to control the current level in the various parts of the circuit. Two common types of resistors are the *composi- tion resistor,* which contains carbon, and the *wire-wound resistor,* which consists of a coil of wire. Resistors' values in ohms are normally indicated by color-coding, as shown in Figure 2.

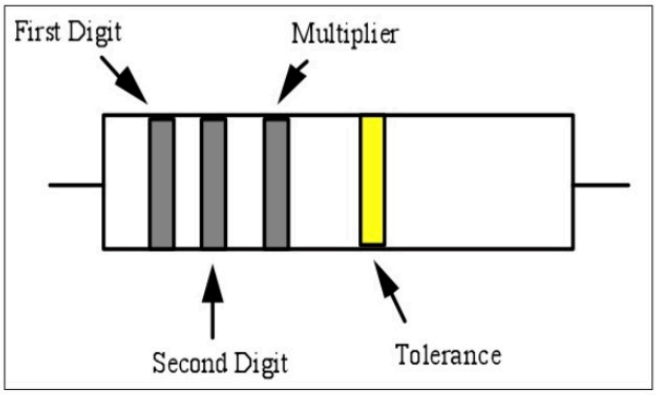


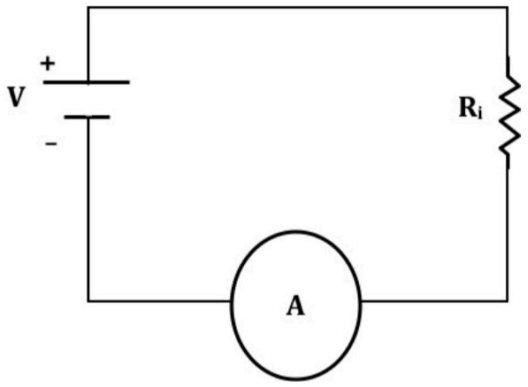
Figure 2. Resistor and colour codes

Color	Number	Multiplier
Black	0	10^0
Brown	1	10^1
Red	2	10^2
Orange	3	10^3
Yellow	4	10^4
Green	5	10^5
Blue	6	10^6
Violet	7	10^7
Grey	8	10^8
White	9	10^9
Tolerance		
Gold	5%	
Silver	10%	
(No Band)	20%	

II.APPARATUS

Resistance, cables, avometer, basic electrical set.

III. EXPERIMENTAL PROCEDURE



1) Set up the circuit provided on the right side.

2) If you have one avometer, prepare it for 2 situations. You can use your avometer for measuring current and voltage.

3) Please make the connection of power supply.

4) Do not forget that Ammeters are connected in series so that the current flows through them. The ideal ammeter has a resistance of zero. Real ammeters have some internal resistance. Voltmeters are connected in parallel to resistive elements in the circuit so that they measure the potential dfference across (on each side of) the element.

5) In this experiment, the current flowing through a resis- tor will be measured as the voltage across the resistor is varied. So please fill the Tabe 1 for this circuit.

6) Pleaese plot I vs. V graph, what value is obtained from the slope? Is your resistence ohmic or not?

Table1	
Voltage (V)	**Current (A)**
2	
4	
6	
8	
10	
12	
14	
16	
18	
20	

Ref.

1) Serway, R, Beichner,R. Physics for Scientists ans engineers with modern physics, Fifth edition. 2000.
2) Rentech.Experiments in electricity, student guide. 2013.

3) https://www.phy.olemiss.edu/lab/genlab/labmanual/2014Manual/OhmsLaw.pdf

Table2		
Observation	**Ruler**	
	d_i(mm)	$a_i = d_i - d_{avg}$(mm)
1		
2		
3		
4		
5		
.		
.		
20		