

## **Submission Form**

**Fill up the following slots with appropriate content. You must submit the content of this document from this page only.**

- 1. Your Name: Mahfuzur Rahman**
- 2. Your ID: 18321035**
- 3. Your Section: 06**
- 4. Experiment No: 02**
- 5. Experiment Title: To verify Ohm's Law.**
- 6. You must write your ID in each of the graphs you insert here.**

**7. Data Table 1:**

$$R_1 = 307 \, \Omega$$

<b>Sl:</b>	<b>Voltage, V (volt)</b>	<b>Electric Current, I (mA)</b>
1.	1.0	3.3
2.	2.0	6.5
3.	3.0	9.8
4	4.0	13
5	5.0	16.3
6.	6.0	19.5
7.	7.0	22.8
8.	8.0	26.1
9.	9.0	29.3

**8. Data Table 2:**

$$R_2 = 648 \, \Omega$$

<b>Sl:</b>	<b>Voltage, V (volt)</b>	<b>Electric Current, I (mA)</b>
1.	1.0	1.5
2.	2.0	3.1
3.	3.0	4.6
4	4.0	6.2
5	5.0	7.7
6.	6.0	9.3
7.	7.0	10.8
8.	8.0	12.3
9.	9.0	13.9

**9. Data Table 3:**

$$V = 6 \text{ volt}$$

<b>Sl:</b>	<b>Resistance, R (<math>\Omega</math>)</b>	<b>Electric Current, I (mA)</b>
1.	100.0	60
2.	200.0	30
3.	300.0	20
4	400.0	15
5	500.0	12
6.	600.0	10
7.	700.0	8.6
8.	800.0	7.5
9.	900.0	6.7
10.	1000.0	6

10. Draw I vs V graph for Data Table 1 and 2, that is you plot V along the  $x$ -axis and I along the  $y$ -axis. For two tables you will get two straight lines. Draw them as separate graphs. Find the slope of each line. Insert **graph-1** (for  $R_1$ ) and **graph-2** (for  $R_2$ ) as image here:

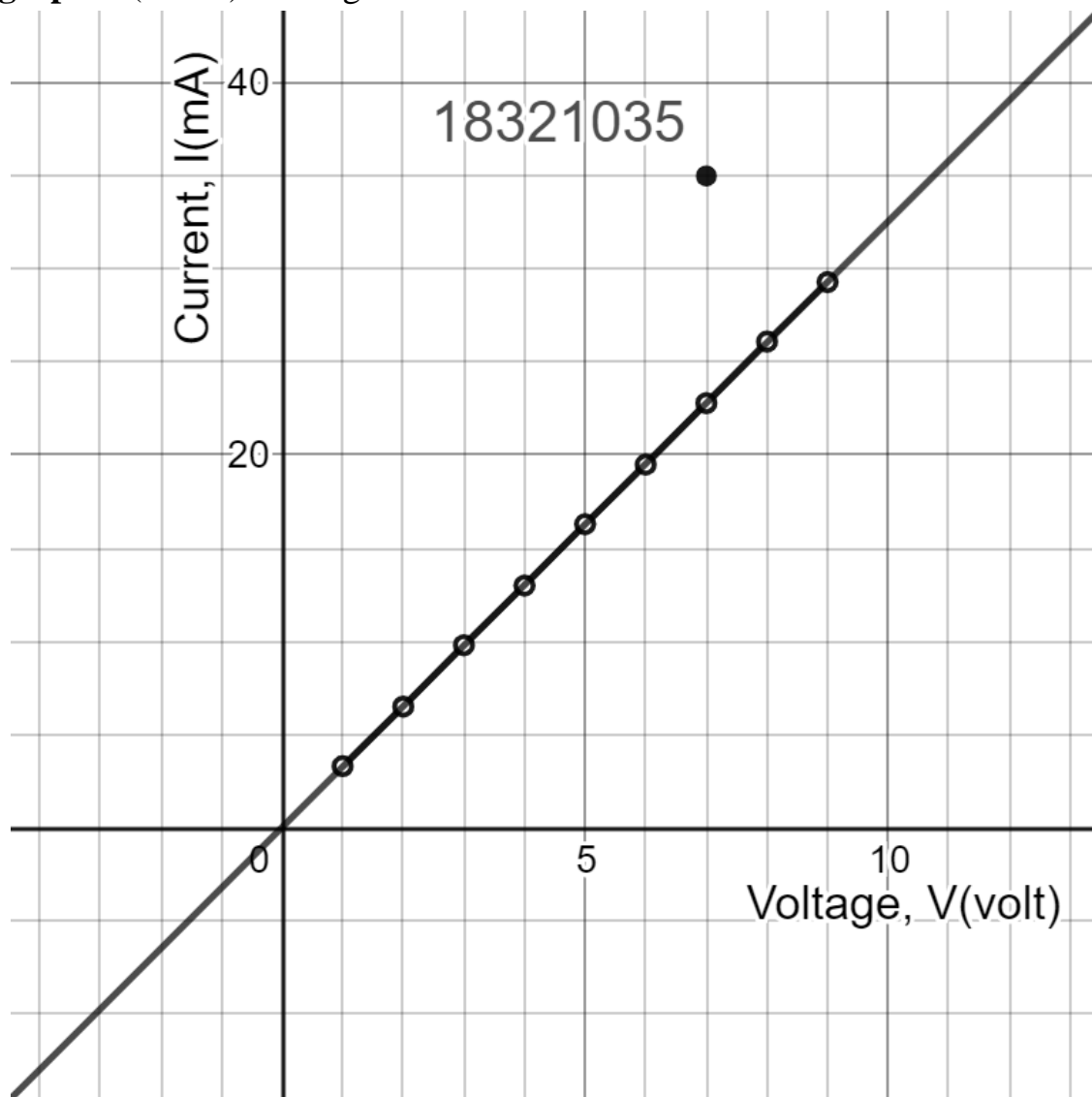


Fig: Graph-1

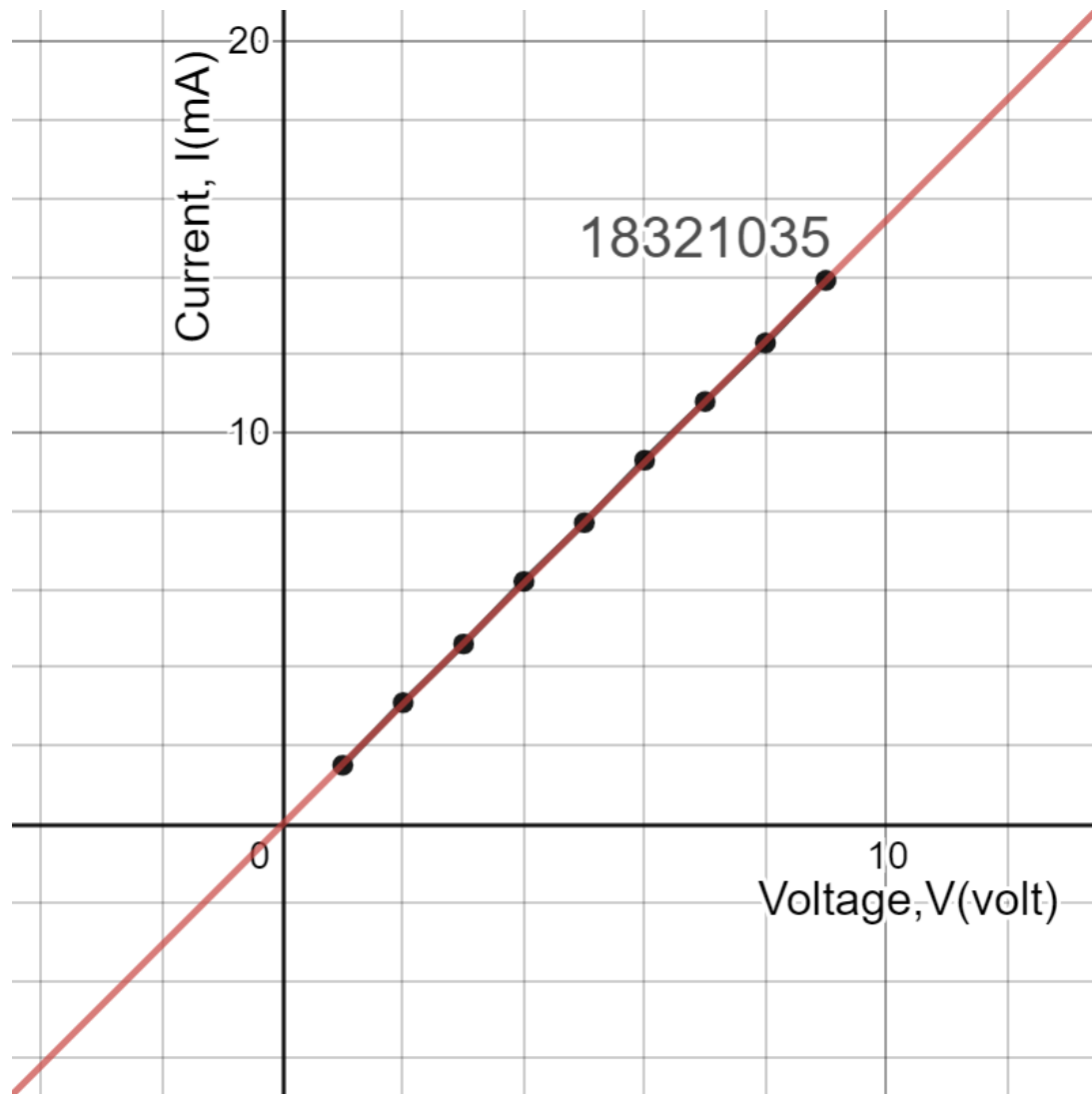


Fig: Graph-2

11. For Data Table 1,

Slope = 3.255

Calculated value of resistance,  $R'_1 = 1/3.255 = 0.30722\Omega$

Percentage of error =  $\frac{|\text{Calculated resistance} - \text{Given resistance}|}{100} = \frac{|0.30722 - 307|}{100} = 3.067\%$

For Data Table 2,

Slope = 1.545

Calculated value of resistance,  $R'_2 = 1/1.545 = 0.647\Omega$

$$\text{Percentage of error} = \frac{|\text{Calculated resistance} - \text{Given resistance}|}{100} = \frac{|0.647 - 648|}{100} = 6.47\%$$

12. Draw I vs R graph for Data Table 3, that is you plot R along x-axis and I along y-axis. You will get a hyperbolic curve. Insert **graph-3** as image here:

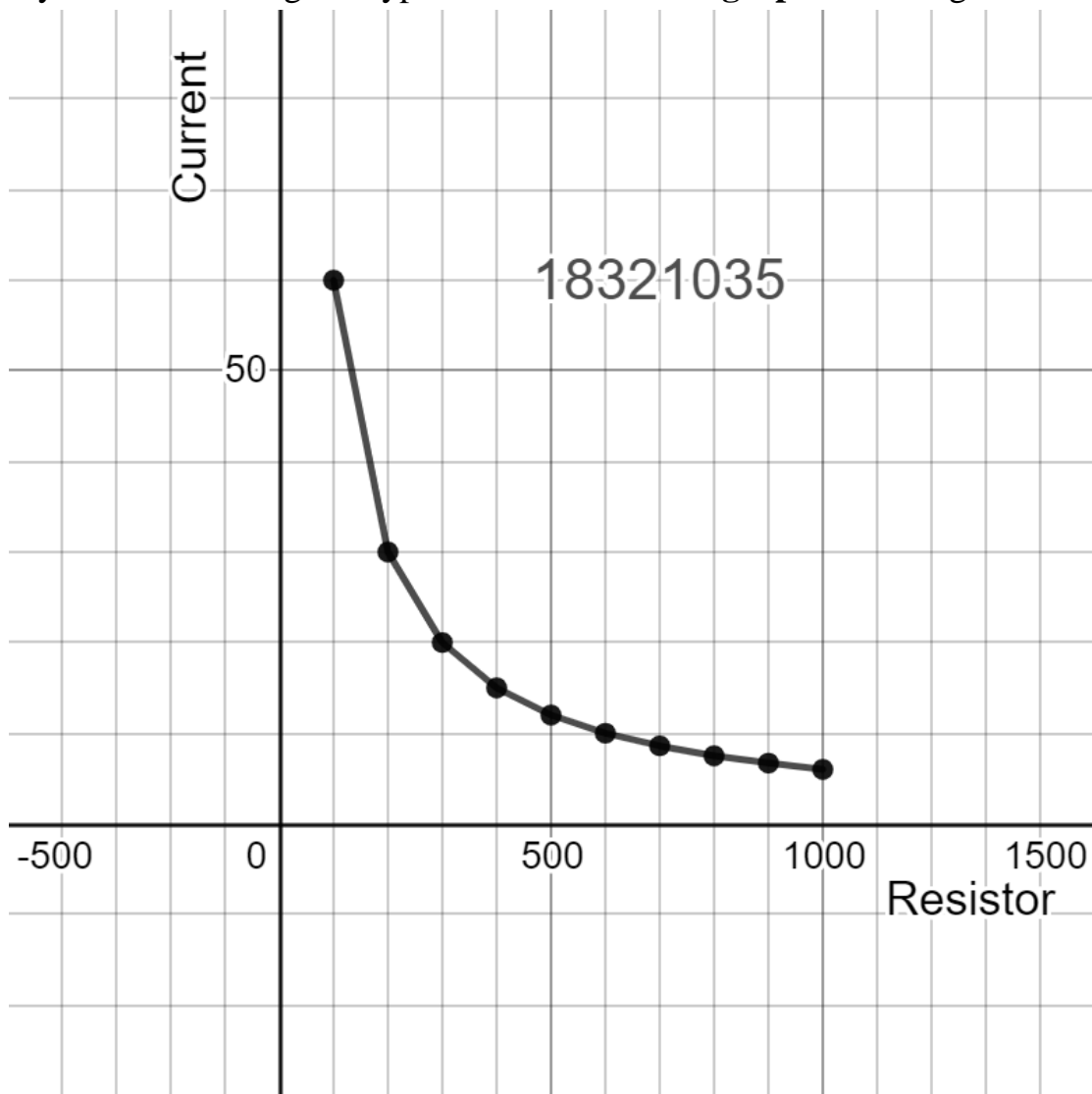


Fig: Graph 3

You are ***strongly*** encouraged to use your **own words** to describe your thoughts. **However, any kind of plagiarism (such as copying and pasting from other students' lab-reports) will not be tolerated and will be subject to disciplinary action according to BracU policy.**

Please briefly answer the following questions: *Using slope to find calculated resistance value was interesting.*

13. Explain why you see a hyperbolic graph in step 12. Ans. *As long as the value of  $R$  was increasing the value of Current were getting closer. For example, at low  $R$  there were more current. As we increase the  $R$  the current were getting lower with low decreasing tendency.*

14. What assumption do you have to make about the temperature for Ohm's law to hold true? Ans. *We need to constant the value of temperature because of the resistance*

15. Sketch I-V curves for materials for which:

- a. Resistance increases with temperature
- b. Resistance decreases with temperature

Explain your reasoning in both cases. We are only interested in an explanation for the shape of the graph.

Discuss Here: *We can find the resistance from I-V graph using slope.*

a. *If we increase the resistance, the slope decreases because resistor and slope are inversely proportional. The shape of the graph will be downward from the previous graph.*

b. *Also if we decreases the resistance, the slope increases. So, the shape of the graph will be upward from the previous.*



