**Class\_\_\_\_\_\_ Student ID\_\_\_\_\_\_\_\_\_\_\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Instructor\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Pre-class Assignment Grade\_\_\_\_\_\_\_\_\_\_\_ Final Grade\_\_\_\_\_\_\_\_\_\_**

**Experiment Name: The Wheatstone Bridge**

**Ⅰ. Pre-Lab**

1. List the goals of the experiment
2. Draw the electrical circuit of the Wheatstone bridge and describe the conditions needed to balance the bridge.

**II. Recording of Observables and Data**

1. **Resistance measurement using the Wheatstone bridge**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Resistor** | ***N*** | ***Rs*（Ω）** | ***Rx*（Ω）** | ***△Rs*（Ω）** | ***△n*（click）** | ***S*（click）** |
| 1 kΩ | 1 |  |  |  |  |  |
| 10 kΩ | 1 |  |  |  |  |  |

1. **Determining the sensitivity of the Wheatstone bridge**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***N*** | ***Rs*（Ω）** | ***Rx*（Ω）** | ***△Rs*（Ω）** | ***△n*（click）** | ***S*（click）** |
| 0.01 |  |  |  |  |  |
| 0.1 |  |  |  |  |  |
| 1 |  |  |  |  |  |
| 10 |  |  |  |  |  |
| 100 |  |  |  |  |  |

|  |  |
| --- | --- |
| **Instructor**  **Signature** |  |

**III. Data Processing**

**Analysis and conclusion of results**

Compare and contrast the sensitivity of the Wheatstone bridge under different *N*-values. What are some other parameters/factors that may contribute to the sensitivity of the bridge?

**Ⅳ. Questions**

a. Why can’t the bridge measure the resistance of resistors smaller than 1 ？

b. What measures can be employed to protect the ammeter from damage due to excess current?

c. After the bridge is balanced, if the positions of the current supply and the ammeter were to be exchanged, will the bridge still be balanced? Show this mathematically.