Lab 6. Electrical Measurement and Power Calculations

Name-Surname : **Date :**

Student No. : **Group :**

ATTENTION! – You must bring your Digital Multimeter, 100Ω and 1kΩ resistors, 10kΩ potentiometer, a breadboard and wires with you to the laboratory. Other equipment will be given during the experiment.

Tools

- **DC Voltage Source:** The DC Voltage Source capable to supply 0-30 V DC Voltage. The voltage can be adjusted by using caps on the panel. It has a special module which provides constant 5V to the circuit. (Figure 1).

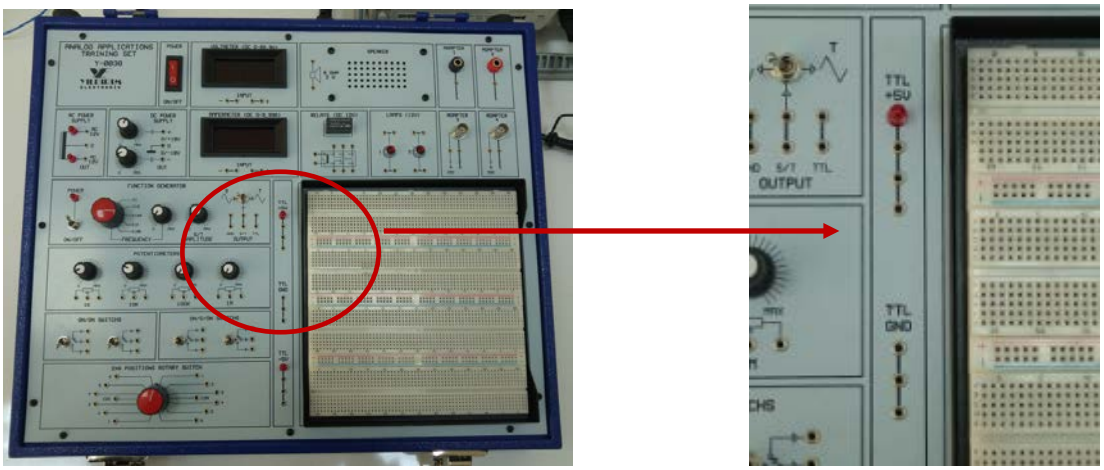

Figure 1. The DC Voltage Source.

- **Breadboard:** Breadboard is an equipment to be utilized for creating temporary and prototyping circuits and experimenting with circuit design. It is also called as solderless breadboard, since it does not require soldering, it is reusable. Figure 2 indicates a breadboard and its connections. The power rails give you lots of easy access to power. Usually they are labeled with a '+' and a '-' and have a red and blue stripe, to indicate the positive and negative side. As seen in Figure 2 power rails are connected vertically while the others are connected horizontally.

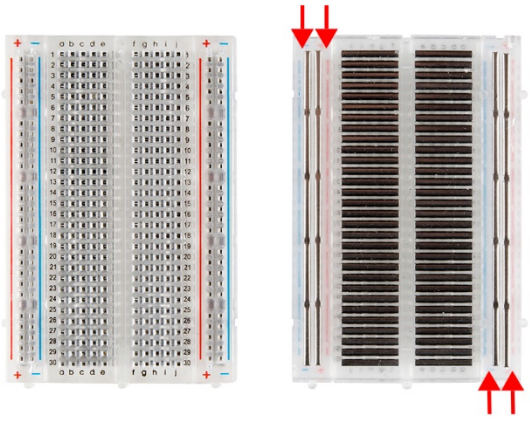

Figure 2. A breadboard and connections on it.

- **Digital Multimeter:** Digital Multimeter is an electronic measuring instrument that can combine several measurement functions in a unit. Ohmmeter function will be used in the scope of this experiment. Red probe is connected to "V/Ω/mA" terminal and black probe is connected to "com" terminal as shown in

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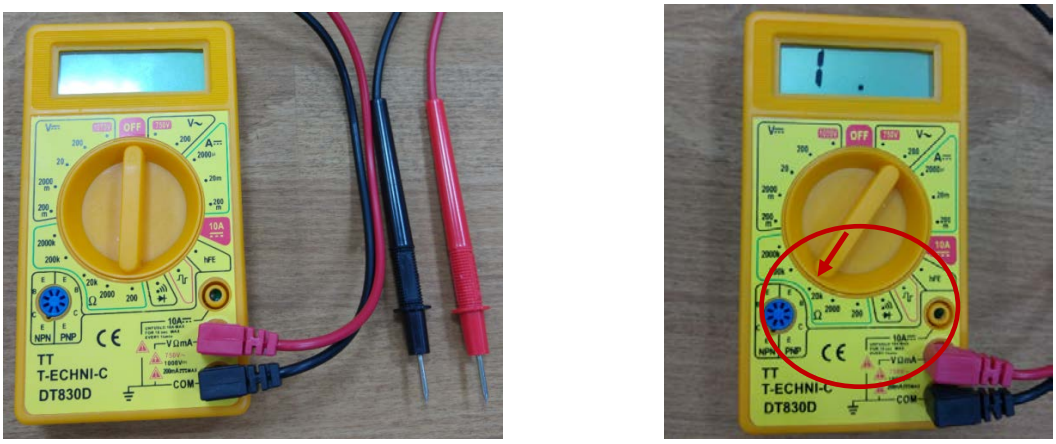
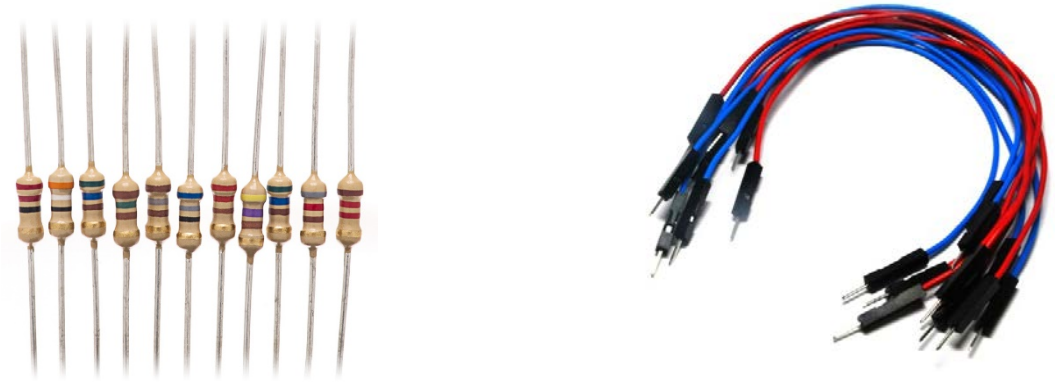
Figure 3a. In order to measure resistance, switch is configured to ohmmeter section (marked with Ω) as shown in Figure 3b. Ohmmeter section includes a resistance value range. Before measurement, suitable resistance value is selected from value range in ohmmeter section.



(a) (b)

Figure 3. a) Connection of probes, b) Configuration of ohmmeter.

- **Resistors and Wires**



(a) (b)

Figure 4. a) Resistors, b) Wires

- **Potentiometer:** A potentiometer is a manually adjustable variable resistor with 3 terminals. Two terminals are connected to both ends of a resistive element, and the third terminal connects to a sliding contact, called a wiper, moving over the resistive element. The position of the wiper determines the output voltage of the potentiometer.

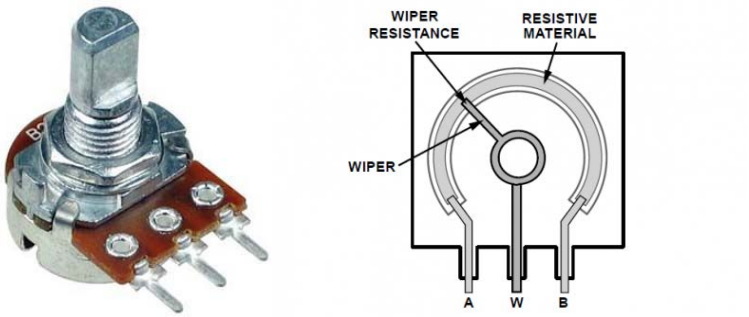


Figure 5. A Potentiometer.

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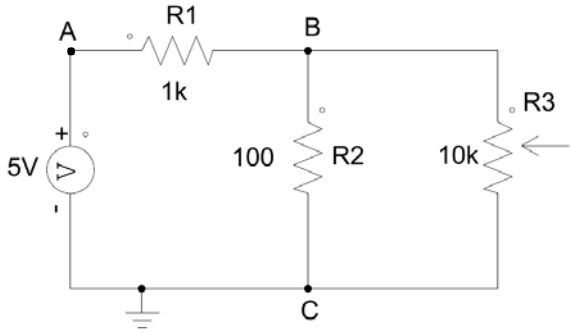
Instructions

1. Build the circuit below on your breadboard. Also, take its photo for the report.



2. Measure the equivalent resistance of the circuit you built.

R_3 (Ω)	R_{eq} (Ω)
10k	
5k	
1k	
100	
0	

3. Measure the voltage and current values.

R_3 (Ω)	A-B Current (mA)	A-B Voltage (V)	B-C Current (mA)	B-C Voltage (V)
10k				
5k				
1k				
100				
0				

Homeworks

1. In introduction section, briefly describe purpose of the experiment.
2. In method section, include the photo of your circuit and briefly describe the used materials and measurement procedures.
3. In results section, calculate the equivalent resistance of the circuit for the values of R_3 given at Instruction 2.
4. In results section, compare the calculated and measured equivalent resistance values.
5. In results section, calculate the current and voltage values across A-B and B-C for the values of R_3 given at Instruction 3.
6. In results section, compare the calculated and measured current and voltage values across A-B and B-C.
7. In results section, calculate the power consumed by R_1 and R_2 for the values of R_3 given at Instruction 3.
8. In conclusion section, comment on the difference between calculated and measured values.
9. In conclusion section, compare the power consumption of R_1 and R_2. Which is greater? Explain the reason.

* *You can access report format from website lcetin.github.io*