Title: **Kirchhoff's Current Law** Lab: 10

Course: Electrical Applications Unit: Electrical Lab CLO: 2, 3, 4

Name ANSWER KEY Grade 27pts Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall calculate current values within a parallel circuit.
2. Student shall prove Kirchhoff’s Current Law (KCL).

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Lab. Grading shall be based on instructor evaluation.

**Materials**

|  |  |
| --- | --- |
| Student Provided Materials | Department Provided |
| Proto-Board | Power Supply |
| Multimeter |  |
| Resistor Kit |  |
| Calculator |  |

**Theory**

Kirchhoff’s Current Law (KCL) states that the sum of the currents entering a node (point) equals the sum of the currents leaving a node (point). Kirchhoff’s Current Law can be stated in the following equation.

Therefore, in the circuit below, the sum of the currents going into node “A” must equal the sum of the currents coming out of that same node. Below is the formula for node “A”.

**Circuit**



Where;

**Instructions**

Calculations

1. Compute the following values based on Ohm’s law and the information given on the pervious page.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 |  | 21.277mA | 470Ω | 10V |
| R2 |  | 17.857mA | 560Ω | 10V |
| R3 |  | 10mA | 1kΩ | 10V |
| Total |  | 49.134mA | 203.526Ω | 10V |

1. Using the computations above, apply Kirchhoff’s current law to calculate the following.

IA = 49.134mA IC = 27.857mA IE = 10mA

Measurements

1. Construct the circuit on the previous page. Ensure to install jumpers at every current reading for ease of measurement.
2. Set your meter and leads to read direct current. Measure and record the following values.

IR1 = \_\_\_\_\_\_\_\_\_\_\_ IR2 = \_\_\_\_\_\_\_\_\_\_\_ IR3 = \_\_\_\_\_\_\_\_\_\_\_

IA = \_\_\_\_\_\_\_\_\_\_\_ IC = \_\_\_\_\_\_\_\_\_\_\_ IE = \_\_\_\_\_\_\_\_\_\_\_

1. Do the recorded values above match those that were calculated previously? Yes / No

**NOTE**: If you answered “No” above, get instructor assistance.

Evaluations

1. Which of the following current readings equals the current supplied by the power supply?
   1. IA
   2. IC
   3. IE
2. Which of the following current readings equals two-thirds of the current supplied by the power supply?
   1. IA
   2. IC
   3. IE
3. Which of the following current readings equals the current through one resistor?
   1. IA
   2. IC
   3. IE
4. If resistor R2 was removed, what would happen to the current reading IC? *Go down*
5. Applying Kirchhoff’s current law, write the equation for node “B”.