Title: **Open Circuit** Lab: 5

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

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade \_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall evaluate the effects of an open circuit.
2. Student explain the effects of an open within a series circuit.

**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/Wire kit |  |
| Calculator |  |

**Instructions**

Using the figure below, answer the following problems.

|  |  |
| --- | --- |
|  |  |
|  |

Calculations

Whenever a measurement has a single letter *subscript*, that measurement refers from that *point* to some reference point. In this case EA refers to a voltage measurement from point “A” to ground. The ground symbol is denoted on the drawing above.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 |  | 29.787mA | 100Ω | 2.979V |
| R2 |  | 29.787mA | 150Ω | 4.468V |
| R3 |  | 29.787mA | 220Ω | 6.553V |
| Total |  | 29.787mA | 470Ω | 14V |

EA 14V EB 11.021V EC 6.553V ED 6.553V

**Instructions**

Using the figure below, answer the following problems.

|  |  |
| --- | --- |
|  |  |
|  |

Measurements

Build the circuit shown above and record the measured values below. To measure the voltage for EA, set your multimeter to read DC voltage and place the black lead on *ground* and the red lead at point “A”.

1. EA \_\_\_\_\_\_\_\_\_\_ EB \_\_\_\_\_\_\_\_\_\_ EC \_\_\_\_\_\_\_\_\_\_ ED \_\_\_\_\_\_\_\_\_\_

Remove the jumper between points “C” and “D”. Set your multimeter and change leads to measure DC current. Have the instructor look at your meter setup **before** connecting to the circuit. After getting instructor approval, measure and record total current.

1. IT 0V

Leave the jumper removed. Set your multimeter and change leads to measure DC voltage. If you leave the multimeter setup up the read current and try to measure voltage, you will blow the meter’s fuse.

1. EAB 0V EBC 0V ECD 14V ED 0V

Set your multimeter and change leads to measure DC current again. With the jumper still removed measure and record total current from between R1 and R2 (not at points “C” and “D” like before).

1. IT 0A

Evaluations

1. When the jumper was removed, did any of the resistors drop any voltage? Yes / No
2. What was the effect on the circuit current?

*Circuit current went to 0A*

1. With the jumper removed, did you measure any voltage greater than zero in Step 3? Why?

*Measuring across the “broken” showed the source voltage.*