Title: **Voltage Divider** Lab: 7

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

Name ANSWER KEY Grade 61pts Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall evaluate the effects of a series circuit as a voltage divider.
2. Student explain the effects of a voltage divider.

**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.

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

Where;

Calculations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 |  | 415.225μA | 4.7kΩ | 1.952V |
| R2 |  | 415.225μA | 1.8kΩ | 0.747V |
| R3 |  | 415.225μA | 6.8kΩ | 2.824V |
| R4 |  | 415.225μA | 10kΩ | 4.152V |
| R5 |  | 415.225μA | 5.6kΩ | 2.325V |
| Total |  | 415.225μA | 28.9kΩ | 12V |

**Instructions**

Measurements

Build the circuit shown on the previous page and record the measured values below. When taking these readings, the first letter indicates the red lead and the second letter indicates the black lead, therefore to read EAB place the red lead on “A” and the black lead on “B”.

|  |  |  |
| --- | --- | --- |
|  | Calculated Value | Measured Value |
| EAB | 1.952V |  |
| EBC | 0.747V |  |
| ECD | 2.824V |  |
| EDE | 4.152V |  |
| EEF | 2.325V |  |
| EAF | 12V |  |
| EBF | 10.048V |  |
| ECF | 9.301V |  |
| EDF | 6.477V |  |
| EEF | 2.325V |  |
| EFA | -12V |  |
| ECB | -0.747V |  |
| EBA | -1.952V |  |
| EDB | -3.571V |  |
| EFB | -10.048V |  |

When taking the readings below, references with only one *subscript* letter indicate a measurement from that point to *ground*. To take this reading, place the red lead on the reference point indicated and the black lead is placed on *ground*. So, to read EA, place the red lead on “A” and the black lead on *ground*.

|  |  |  |
| --- | --- | --- |
|  | Calculated Value | Measured Value |
| EA | 9.675V |  |
| EB | 7.723V |  |
| EC | 6.976V |  |
| ED | 4.152V |  |
| EE | 0V |  |
| EF | -2.325V |  |

Evaluations

1. Voltage reading are always from one “point” to another “point”. Does the order in which the leads are placed make a difference on a voltage reading? Yes / No
2. Is there a situation that you can imagine where negative voltage would be useful? Explain.

*Yes, running a DC motor in reverse.*

1. What value would be establishing a certain “reference point” have on taking voltage readings? *It is useful in troubleshooting, finding “opens” and “shorts”.*