Title: **Complex Combination Circuits** Lab: 15

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

Name ANSWER KEY Grade 82pts Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall calculate complex combination circuit quantities using the characteristics of a series and a parallel circuit.
2. Student shall construct the circuit and analyze the results.

**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**

A combination circuit is a configuration that mixes components connected in series as well as components connected in parallel. A combination circuit has two major schemes, series-parallel and parallel-series. This lab will focus on a combination of both type of circuits combined to make a *complex combination circuit*.

**Circuit**



Where;

RAB = 60Ω RCD = 547.97Ω REF = 5.17kΩ RBD = 495.457Ω RT = 797.457Ω

IT = 11.286mA

**Instructions**

Calculations

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 | 2.802mW | 11.286mA | 22Ω | 248.289mV |
| R2 | 4.585mW | 6.772mA | 100Ω | 677.153mV |
| R3 | 3.057mW | 4.514mA | 150Ω |
| R4 | 31.267mW | 5.592mA | 1kΩ | 5.592V |
| R5 | 14.212mW | 2.542mA | 2.2kΩ |
| R6 | 11.58mW | 2.071mA | 2.7kΩ |
| R7 | 550.511μW | 1.082mA | 470Ω | 508.333mV |
| R8 | 5.498mW | 4.7kΩ | 5.083V |
| R9 | 28.022mW | 11.286mA | 220Ω | 2.483V |
| Total | 101.573mW | 11.286mA | 797.457Ω | 9V |

Measurements

1. Construct the circuit on the previous page. Take measurements and complete the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| R4 |  |  |  |  |
| R5 |  |  |  |  |
| R6 |  |  |  |  |
| R7 |  |  |  |  |
| R8 |  |  |  |  |
| R9 |  |  |  |  |
| Total |  |  |  |  |

Evaluations

1. What would be the effect of increasing the value of R2 on total circuit resistance?
   1. Go Up
   2. Go Down
   3. Stayed the same
2. What would be the effect of increasing ES on ECD?
   1. Go Up
   2. Go Down
   3. Stayed the same
   4. Stayed the same