Title: **Combination Circuit** Hands On: 3

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

Name ANSWER KEY Grade 53pts. Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall calculate power, voltage and current values based on the specified resistors in a combination circuit using Ohm’s and Watt’s laws.
2. Student shall construct the designed combination circuit and measure voltage and current readings and calculate power based on the actual readings.
3. Student shall evaluate if the circuit is performing to design standards.

**Assessment**

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

**Materials**

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

**Instructions**

Using the table below first calculate the *design* quantities for each component in the combination circuit. Record the results in the Calculation section table below. After computations are complete and recorded, gather the necessary components and construct the circuit on your proto-board. Take all appropriate measurements and record the measurement quantities in the Measurement section below. Use measured readings to calculate the power.

**Circuit**



Where;

RBC = 519.444Ω, RAC = 1.079kΩ, RDE = 4.92kΩ, RT = 885.226Ω, IAC = 11.117Ma, IDE = 2.439mA

**Instructions**

Calculations

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 | 69.207mW | 11.117mA | 560Ω | 6.225V |
| R2 | 15.157mW | 2.625mA | 2.2kΩ | 5.775V |
| R3 | 49.038mW | 8.492mA | 680Ω |
| R4 | 27.960mW | 2.439mA | 4.7kΩ | 11.463V |
| R5 | 1.309mW | 220Ω | 536.585mV |
| Total | 162.672mW | 13.556mA | 885.226Ω | 12V |

Measurements

1. Gather components and construct the circuit found on the previous page.
2. Measure the resistance, voltage and current for each component in the circuit and record the values in the table below. **Have your instructor witness you taking voltage and current readings**. Use the measured values to calculate the actual powers in the circuit.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| R4 |  |  |  |  |
| R5 |  |  |  |  |
| Total |  |  |  |  |

Evaluations

1. What is the common measurement in this circuit? There is no common measurement
2. If R2 burns up and becomes “open”, how will the current through R3 be affected?
   1. Increase
   2. Decrease
   3. Remain the same
3. A parallel circuit can be termed a \_\_\_\_\_\_\_\_\_\_\_\_ and a series circuit a \_\_\_\_\_\_\_\_\_\_\_\_.
   1. Voltage divider, Current divider
   2. Current divider, Voltage divider
   3. Power multiplier, Power divider
   4. None of the Above
4. The total voltage or this circuit can be computed by adding the individual resistor voltages.
   1. True
   2. False
5. If node “B” is shorted to node “C”, how will total circuit power be affected?
   1. Increase
   2. Decrease
   3. Remain the same