Title: **Parallel Circuits Characteristics** Lab: 11

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

Name ANSWER KEY Grade 80pts Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall calculate parallel circuit quantities using the characteristics of a parallel circuit.
2. Student shall apply the conductance method of determining total resistance.
3. Student shall evaluate how changing branch resistance will affect total circuit resistance.

**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 |  |

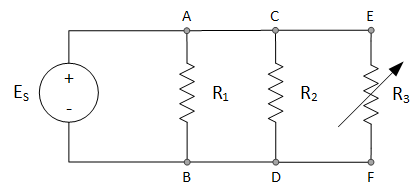
**Theory**

Resistance is the degree to which a component opposes the electrical current. Conductance is the degree to which a component conducts electricity. Conductance is the inverse of resistance and is represented by the letter “G”. The unit for electrical conductance is siemens (S).  
The formula is as follows;

The conductance method is used to calculate a parallel circuit’s total current. The conductance method is derived as follows;

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

**Circuit**



Where;

**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 | 53.333mW | 6.667mA | 1.2kΩ | 8V |
| R2 | 94.118mW | 11.765mA | 680Ω | 8V |
| R3 | 12.8mW | 1.6mA | 5kΩ | 8V |
| Total | 160.251mW | 20.031mA | 399.374Ω | 8V |

Measurements

1. Construct the circuit on the previous page. Complete the table below.

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

Calculations

1. Changing the value of R3 to that shown in the table, compute the following values based on the Ohm’s Wheel and the information given on the pervious page.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 | 53.333mW | 6.667mA | 1.2kΩ | 8V |
| R2 | 94.118mW | 11.765mA | 680Ω | 8V |
| R3 | 7.111mW | 888.889μA | 9kΩ | 8V |
| Total | 154.562mW | 19.32mA | 414.073Ω | 8V |

Measurements

1. Adjust the value of R3 and complete the table below.

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

Calculations

1. Changing the value of R3 to that shown in the table, compute the following values based on the Ohm’s Wheel and the information given on the pervious page.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 | 53.333mW | 6.667mA | 1.2kΩ | 8V |
| R2 | 94.118mW | 11.765mA | 680Ω | 8V |
| R3 | 21.333mW | 2.667mA | 3kΩ | 8V |
| Total | 168.784mW | 21.098mA | 379.182Ω | 8V |

Measurements

1. Adjust the value of R3 and complete the table below.

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

Evaluations

1. What was the effect of changing the value of R3 on IAB and ICD?
   1. Went Up
   2. Went Down
   3. Stayed the same
2. What was the effect of changing the value of R3 on EAB and ECD?
   1. Went Up
   2. Went Down
   3. Stayed the same
3. What was the effect of changing the value of R3 on PAB and PCD?
   1. Went Up
   2. Went Down
   3. Stayed the same
4. What was the effect of increasing the value of R3 on the IT?
   1. Went Up
   2. Went Down
   3. Stayed the same
5. What was the effect of decreasing the value of R3 on the PT?
   1. Went Up
   2. Went Down
   3. Stayed the same
6. Which branch current will have the highest power dissipation?
   1. Lowest resistance
   2. Highest resistance
   3. They are all the same

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