Title: **More Parallel Circuits** Worksheet: 10

Course: Electrical Applications Unit: Electrical Theory CLO: 3

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

**Objectives**

1. Student shall calculate power, current, resistance and voltage for each resistor in a parallel circuit.
2. Student shall distinguish the principle that a parallel circuit only contains one voltage.
3. Student shall formulate that a parallel circuit is a current divider.

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Worksheet. Grading shall be based on an answer key.

**Theory**

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

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

**Circuit**

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

**Instructions**

Using the Ohms Wheel, solve for branch currents, total current, and power dissipated by each resistor.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 |  |  | 880Ω |  |
| R2 |  | 125mA |  | 1.5V |
| Total |  |  |  |  |

**Circuit**

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

Complete the table below for the parameters listed within the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 | 73.143mW |  | 875Ω |  |
| R2 |  |  | 930Ω |  |
| R3 |  | 6.667mA |  |  |
| Total |  |  |  |  |

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

Complete the table below for the parameters listed within the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 |  | 18mA |  |  |
| R2 |  |  | 1k |  |
| R3 |  |  |  |  |
| R4 | 4.32W | 120mA |  |  |
| Total |  | 227mA |  |  |

Complete the table below for the parameters listed within the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P | I | R | E |
| R1 | 11.52W |  | 450Ω |  |
| R2 |  | 80mA |  |  |
| R3 |  |  | 1.8kΩ |  |
| R4 |  | 20mA |  |  |
| Total | 21.6W |  |  |  |

A toaster contains three heating elements connected in parallel. Each heating element has a conductance of 6.944mS (S = siemens). The toaster is supplied by a line voltage of 120volts. Draw out the circuit and calculate the values below.

1. Total Resistance \_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Current through each Heating element \_\_\_\_\_\_\_\_\_\_\_\_
3. Total current to toaster \_\_\_\_\_\_\_\_\_\_\_\_\_
4. Power dissipated by each heating element \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Total power of toaster \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A parallel circuit has a total power consumption of 28.8 watts. Branch 1 consumes 4.8 watts, branch 2 has 40 milliamps of current flowing through it and branch 3 consumes 14.4 watts. Draw out the circuit and calculate the values below.

1. Total Resistance \_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Current through branch 1 \_\_\_\_\_\_\_\_\_\_\_\_
3. Current through branch 3 \_\_\_\_\_\_\_\_\_\_\_\_
4. R1 \_\_\_\_\_\_\_\_\_\_\_\_ R2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ R3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_

A parallel circuit consists of a power source and three branches, each branch consists of one resistor.

Branch 1 has a current of 37mA.

Branch 2 has a power of 150mW.

Twenty-four volts is present across branch 3.

The total circuit power is 1.372W

Draw the described parallel circuit and solve for the following:

1. RT \_\_\_\_\_\_\_\_\_\_
2. IT \_\_\_\_\_\_\_\_\_\_
3. ET \_\_\_\_\_\_\_\_\_\_
4. R1 \_\_\_\_\_\_\_\_\_\_
5. R2 \_\_\_\_\_\_\_\_\_\_
6. R3 \_\_\_\_\_\_\_\_\_\_
7. IR1 \_\_\_\_\_\_\_\_\_\_
8. IR2 \_\_\_\_\_\_\_\_\_\_
9. IR3 \_\_\_\_\_\_\_\_\_\_
10. PR1 \_\_\_\_\_\_\_\_\_\_
11. PR2 \_\_\_\_\_\_\_\_\_\_
12. PR3 \_\_\_\_\_\_\_\_\_\_
13. PT \_\_\_\_\_\_\_\_\_\_