Title: **Parallel-Series Circuits** Worksheet: 12

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-series circuit.
2. Student shall distinguish the characteristics that a parallel-series circuit exhibits.

**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**

As the name suggests, a parallel-series circuit contains both a parallel circuit and a series circuit. In the case of a parallel-series circuit, the major circuit is a parallel circuit, hence the name parallel coming first in the name. Within the parallel branch circuits there exists a series circuit. To solve a parallel-series circuit you must first solve the individual branch circuit resistances, then use those values to solve the larger parallel circuit.

**Circuit**

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

Where;

**Instructions**

1. To solve the circuit above, first solve the branch resistance “totals”.

RAB = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ RCD = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Once you have obtained these resistance values, calculating each branch current is possible.

IAB = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ICD = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Next use RAB and RCD and the conductance method, compute total circuit resistance.

RT = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Now that we know total circuit resistance, we can calculate the total circuit current.

IT = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Using the calculated branch currents along with RAB and RCD, you can calculate the voltage drop across each resistor.

ER1 = \_\_\_\_\_\_\_\_\_\_\_\_ ER2 = \_\_\_\_\_\_\_\_\_\_\_\_ ER3 = \_\_\_\_\_\_\_\_\_\_\_\_ ER4 = \_\_\_\_\_\_\_\_\_\_\_\_

1. Now you have all the information necessary to complete the table below.

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

**Circuit**



Where;

Compute the inner parallel circuit values.

RAB = \_\_\_\_\_\_\_\_\_\_\_ RCD = \_\_\_\_\_\_\_\_\_\_\_ IAB = \_\_\_\_\_\_\_\_\_\_\_ ICD = \_\_\_\_\_\_\_\_\_\_\_

Complete the table below for the parameters and calculated values listed above.

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