Title: **RC Parallel Circuit** Worksheet: 33

Course: Electrical Applications Unit: Electrical Theory CLO: 3

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

**Objectives**

1. Student shall determine the missing component(s) in a RC parallel circuit given other known quantities.
2. Student shall apply trigonometric functions to produce appropriate RC parallel circuit quantities.

**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**

A resistive-capacitive (RC) parallel circuit is one that shares the same voltage across all the resistive and capacitive components within the circuit. Since there is the existence of the impedance triangle, there shall also be a current and a power triangle.

|  |  |
| --- | --- |
| Impedance Opposition to current flow | Power Triangle Presence of Reactive Power |
|  |  |
|  |  |
| Current Response Total current is the vector sum | Voltage Response Same voltage across each component |
|  |  |
|  |  |

**Circuit**



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P/Q/S | I | R/XC/Z | E |
| R1 | 520.833mW | 20.833mA | 1.2kΩ | 25V |
| C1 | 431.969mVAR | 17.279mA | 1.447kΩ | 25V |
| Total | 676.657mVA | 27.066mA | 923.659Ω | 25V |
| θ | 39.672˚ | 39.672˚ |  | 0˚ |
| PF | 0.770 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P/Q/S | I | R/XC/Z | E |
| R1 | 520.833mW | 20.833mA | 1.2kΩ | 25V |
| C1 | 647.953mVAR | 25.918mA | 964.575Ω | 25V |
| Total | 831.331mVA | 33.253mA | 751.807Ω | 25V |
| θ | 51.207˚ | 51.207˚ |  | 0˚ |
| PF | 0.627 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P/Q/S | I | R/XC/Z | E |
| R1 | 260.417mW | 10.417mA | 2.4kΩ | 25V |
| C1 | 647.953mVAR | 25.918mA | 964.575Ω | 25V |
| Total | 698.327mVA | 27.933mA | 894.996Ω | 25V |
| θ | 68.104˚ | 68.104˚ |  | 0˚ |
| PF | 0.373 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P/Q/S | I | R/XC/Z | E |
| R1 | 260.417mW | 10.417mA | 2.4kΩ | 25V |
| C1 | 1.296VAR | 51.836mA | 482.288Ω | 25V |
| Total | 1.322VA | 52.873mA | 472.835Ω | 25V |
| θ | 78.638˚ | 78.638˚ |  | 0˚ |
| PF | 0.197 |

**Circuit**



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | P/Q/S | I | R/XC/Z | E |
| R1 | 1.042W | 20.833mA | 2.4kΩ | 50V |
| C1 | 5.184VAR | 103.673mA | 482.288Ω | 50V |
| Total | 5.287VA | 105.745mA | 472.835Ω | 50V |
| θ | 78.638˚ | 78.638˚ |  | 0˚ |
| PF | 0.197 |

Evaluations

1. If the frequency is increased, the power phase angle?
   1. Increases
   2. Decreases
   3. Stays the same
2. If the voltage is decreased, the power factor will?
   1. Increase
   2. Decrease
   3. Stay the same
3. If the capacitance is increased, the total impedance will?
   1. Increase
   2. Decrease
   3. Stay the same
4. If the resistance is increased, the total current will?
   1. Increase
   2. Decrease
   3. Stay the same
5. If the capacitance is decreased, the capacitive reactance will?
   1. Increase
   2. Decrease
   3. Stay the same
6. If the frequency is decreased, the active power will?
   1. Increase
   2. Decrease
   3. Stay the same