Series Circuit with Faults – In-class exercise

Consider these problems as if you were making the measurements with a DMM. You will not be able to measure power so calculate it based on your theoretical measurements.

1. In the space to the right, ***neatly***draw the

schematic for a *series* circuit containing

the following components:

* 9V battery
* R1 = 3Ω
* R2 = 10Ω
* R3 = 15Ω

2. Enter the values of voltage, current and resistance you would theoretically measure using a DMM. Calculate the power based on these values.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CALCULATED VALUES (No circuit faults)** | | | | |
|  | Voltage | Current | Resistance | Power |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| Total |  |  |  |  |

1. Suppose R2 has burned up, i.e., it has opened. Enter the values you would expect to measure using a DMM. Calculate the power based on these values.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CALCULATED VALUES (R2 open)** | | | | |
|  | Voltage | Current | Resistance | Power |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| Total |  |  |  |  |

1. Now suppose R2 has been short circuited (bypassed). Enter the values you would expect to measure using a DMM. Calculate the power based on these values.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CALCULATED VALUES (R2 shorted)** | | | | |
|  | Voltage | Current | Resistance | Power |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| Total |  |  |  |  |

Parallel Circuit with Faults – In-class exercise

Consider these problems as if you were making the measurements with a DMM. You will not be able to measure power so calculate it based on your theoretical measurements.

1. In the space to the right, ***neatly***draw the

schematic for a parallel circuit containing

the following parallel components:

* 9V battery
* R1 = 3Ω
* R2 = 10Ω
* R3 = 15Ω
  1. Enter the values of voltage, current and resistance you would theoretically measure using a DMM. Calculate the power based on these values.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CALCULATED VALUES (No circuit faults)** | | | | |
|  | Voltage | Current | Resistance | Power |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| Total |  |  |  |  |

* 1. Suppose R2 has burned up, i.e., it has opened. Enter the values of voltage, current and resistance you would expect to measure using a DMM. Calculate the power based on these values.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CALCULATED VALUES (R2 open)** | | | | |
|  | Voltage | Current | Resistance | Power |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| Total |  |  |  |  |

* 1. Now suppose R2 has been short circuited (bypassed). Enter the values of voltage, current, and resistance you would expect to measure using a DMM. Calculate the power based on these values.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CALCULATED VALUES (R2 shorted)** | | | | |
|  | Voltage | Current | Resistance | Power |
| R1 |  |  |  |  |
| R2 |  |  |  |  |
| R3 |  |  |  |  |
| Total |  |  |  |  |