Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_/\_\_\_/\_\_\_\_

**Answer Key: Electrical Power**

**Lab #2 – Determine Power Used in a Resistive Circuit**

**Equipment and materials**

* Adjustable DC power supply (0-30 volts)
* DC wattmeter (0-20 watts)
* 330-ohm, 2-watt resistor
* Ammeter or multimeter
* DC voltmeter and ohmmeter (multimeter)

**Procedure Steps**

1. Leaving the power off, connect the following circuit (Figure 1.) b. FIGURE 1



1. Double check your circuit for correct wiring.
2. Turn on power.
3. Apply 10 volts across the resistor.
4. Measure the voltage to set it to the indicated value, then measure the current and power and record the values.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **OBSERVED** |  | **COMPUTED** |  |  |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| **Data Table** | V | I | P | V | I | P |  |
| (Record step 5.) | 10 V | meas | meas | 10 V | 30 mA | 300 mW |  |
| \_\_\_\_ | \_\_\_\_ | \_\_\_\_ | \_\_\_\_ | \_\_\_\_ |  |
| (Record step 7.) | 15 V | meas | meas | 15 V | 45 mA | 682 mW |  |
| \_\_\_\_ | \_\_\_\_ | \_\_\_\_ | \_\_\_\_ |  |
| (Record step 9.) | 20 V | meas | meas | 20 V | 60 mA | 1.21 A |  |
| \_\_\_\_ | \_\_\_\_ | \_\_\_\_ | \_\_\_\_ | \_\_\_\_ |  |
| (Record step 12.) | \_\_\_\_\_Ω Measured value 330 Ω +/- 5% |  |  |

1. Increase the power supply to 15 volts.
2. Read and record V, I, and P.
3. Increase the power supply to 20 volts.
4. Read and record V, I, and P.
5. Turn off the power supply.
6. Disconnect the circuit.
7. Read its value with the ohmmeter.
8. Using the three forms of power formula, compute the power for the V, I, and R values at 10 volts, 15 volts, and 20 volts.
9. Compare the computed values with the wattmeter readings.

**NOTE:** The following questions may be used for discussion:

A. What causes the difference between computed values and wattmeter indications? Differences in actual resistor values and power supply voltage

B. Did the resistance remain constant during this experiment? Did the current remain constant? Compare the changing voltage with the power consumed by the resistor. Is the relationship a direct proportion or inverse proportion?

It should remain nearly constant, although resistance value does change with temperature.

Direct.

C. Would the same power be consumed if the load were reversed? Why? Yes, a resistor has no polarity.

D. When the voltage was doubled (10 V to 20 V), how much did power increase? By a factor of 4, a function of V squared.

15.Return the equipment and materials to the proper storage area.