

## Resistance and Ohm's Law Worksheet

**Show your work and box your answer.**

1. Voltage: 25 VDC  
Current: 5 A  
Resistance: \_\_\_\_\_

2. Energy: 12 J  
Current: 24 A  
Resistance: \_\_\_\_\_

3. Voltage: 12 VDC  
Current: \_\_\_\_\_  
Resistance: 0.2

4. Energy: \_\_\_\_\_  
Current: 10 A  
Resistance: 120 O

5. **emf:** 3.0 VDC  
Current: \_\_\_\_\_  
Resistance: 1.5 O

6. . Voltage: \_\_\_\_\_  
Current: 0.05 A  
Resistance: 2200 O

7. My amplifier uses a tube filaments requires a maximum of 5 VDC at a current of 15 ampere. Calculate the internal resistance of the tube.

8. The transformer in my amplifier provides 0.7 VDC more than needed to that tube. At 15 amperes of current, calculate the resistance of the wire needed to drop that voltage.

9. A 2 volt .010 ampere LED is connected to a 9 volt battery. What value of limiting resistor must be placed in series with the LED?

10. A 1.7 volt 15 mA LED is connected to a 3 volt battery. What value of limiting resistor must be placed in series with the LED?

11. Your hair dryer consumes 1200 watts of power at 120 VAC. Calculate the current requirements.

12. Calculate the power of the filaments of the tube in my amplifier.

13. The voltage on the plate of the tube in my amplifier is 2700 VDC and the current pull is 0.450 ampere. What is the power of that amplifier?
14. A car stereo system operating off of the 12 VDC car battery produces 60 watts of power. Calculate the current pulled by the stereo system.
15. A QRP transmitter has an input power of 250 milli-watts. If the transmitter is operated off of a 6 VDC battery, how much current is required?

QRP is a radio communications term for “low power operation.”

**Table 1: Resistivity (Temperature - 20°C)**

Material	Resistivity (x 10 <sup>-6</sup> Ω•cm)
aluminum	2.824
copper	1.724
german silver	33
nickel silver	49
iron	10

**Table 2: Properties of Wire (Temperature - 20°C)**

American Wire Gauge (B & S) for any metal		
Gauge Number	Diameter (mm)	Cross Sectional Area (mm <sup>2</sup> )
18	1.024	0.8231
20	0.8118	0.5176
24	0.5106	0.2047
28	0.3211	0.08098
30	0.2546	0.05093

16. What is the resistance of a copper wire 20 m long and 0.81 mm in diameter at 20°C?
17. At 20°C, 100 m of No. 18 gauge copper wire has a resistance of 2.059 Ω. What is the resistance of 500 m of this wire?
18. The diameter of the copper wire in Problem 8 is 1.024 mm. What is the resistance of 100 m of No. 30 gauge copper wire, which has a diameter of 0.2546 mm?
19. What is the resistance of 125 m of No. 20 gauge aluminum wire at 20°C?
20. No. 24 gauge German silver wire has a diameter of 0.511 mm at 20°C. How many centimeters are needed to make a resistance spool of 100 Ω?