4. As the temperature of a metal conductor is reduced, what will happen to the resistance of the conductor?

↓

5. If the diameter of a conductor is increased, what will happen to the resistance of the conductor?

$R = \frac{\rho L}{A\uparrow} =$ ↓

6. A 0.500 m length of wire with a cross-sectional area of 3.14×10^{-6} meters squared is found to have a resistance of 2.53×10^{-3} ohms. What is this wire made out of? (calculate resistivity and identify it using the reference tables)

$$R = \frac{\rho L}{A} \rightarrow \rho = \frac{RA}{L} = \frac{(2.53\times10^{-3}\,\Omega)(3.14\times10^{-6}\,m^2)}{0.500\,m}$$

$$\rho = 1.59\times10^{-8}\,\Omega\cdot m$$

↳ silver

Electric Power and Energy:

1. An electrical appliance draws 9 amps of current when connected to a 120 V source. What is the total amount of power dissipated by this appliance?

$I = 9A$, $V = 120V$, $P = ?$

$P = IV = (9A)(120V) = 1080W$

2. Based on your answer to the question above, how much energy is used in 120 s?

$t = 120s$ $\quad W = Pt = (1080W)(120s) = 1.30\times10^5\,J$

3. Calculate the resistance of a 75 watt light bulb operated at 120 Volts?

$P = 75W$, $V = 120V$, $R = ?$

$P = \frac{V^2}{R} \rightarrow R = \frac{V^2}{P} = \frac{(120V)^2}{75W} = 192\,\Omega$

4. A device operating at a potential difference of 1.5 volts draws a current of 0.2 amps. How much energy is used by the device in 60 s?

$V = 1.5V$, $I = 0.2A$, $t = 60s$, $W = ?$

$W = VIt = (1.5V)(0.2A)(60s)$

$W = 18J$

5. A 100 ohm resistor has a 20 amp current moving through it. Calculate the amount of energy used in 30 seconds.

$R = 100\,\Omega$, $I = 20A$, $t = 30s$, $W = ?$

$W = I^2Rt = (20A)^2(100\,\Omega)(30s)$

$W = 1.20\times10^6\,J$

6. An electric drill operating at 120 volts draws a current of 3 amps. What is the total amount of energy used by the drill during 1 minute of operation?

$V = 120V$, $I = 3A$, $t = 1\,min = 60s$, $W = ?$

$W = IVt = (3A)(120V)(60s)$

$W = 2.16\times10^4\,J$