6.1 Ohm's Law & Power

1) A current of 3.60 A flows for 15.3 s through a conductor. Calculate the number of electrons that pass through a point in the conductor in this time. (3.44×10^{20})

2) How long would it take 2.0×10^{20} electrons to pass through a point in a conductor if the current was 10.0 A? (3.2 s)

3) Calculate the current if a charge of 5.60 C passes through a point in a conductor in 15.4 s. (0.364 A)

4) What is the potential difference across a conductor to produce a current of 8.00 A if there is a resistance in the conductor of 12.0 Ω? (96 V)

5) What is the heat produced in a conductor in 25.0 s if there is a current of 11.0 A and a resistance of 7.20 Ω ? (21 800 J)

6) 150 J of heat are produced in a conductor in 5.50 s. If the current through the conductor is 10.0 A, what is the resistance of the conductor? (0.273 Ω)

7) What is the current through a 400 W electric appliance when it is connected to a 120 V power line? (3.33 A)

8) When an electric appliance is connected to a 120 V power line, there is a current through the appliance of18.3 A.

a) What is its resistance? (6.56 Ω)

b) What is the average amount of energy given to each electron by the power line? (1.92×10^{-17} J)

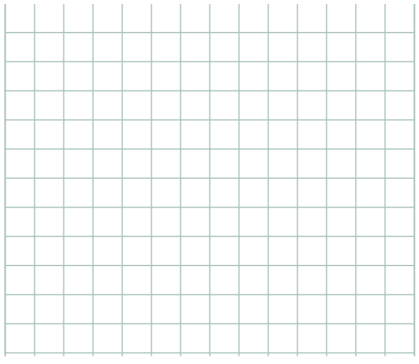
9) What potential difference is required across an electrical appliance to produce a current of 20.0 A when there is a resistance of 6.00 Ω? (120 V)

a) How many electrons pass through the appliance every minute? (7.5×10^{21})

10) A student designed an experiment in order to measure the current through a resistor at different voltages. Given the following data:

Voltage (V)	Current (I)
3.0	0.151
6.0	0.310
9.0	0.448
12.0	0.511
15.0	0.750

a. Draw a graph showing the relationship between current and voltage (V vs. I)



b. Using the graph, what is the resistance of the resistor? (20.0 +/- 0.5 _)