Electricity Practice Name:_____

1. A battery has two terminals, a negative and a positive, they are connected with a wire. What type of particles will flow through the wire and which direction will they go?

Electrons, negative to positive

$2 \times 60 = 120\ sec$

2. A charge of 1800 coulombs was passed through a wire in 2.0 minutes. What was the average current in that interval?

$$I = \frac{Q}{t} = \frac{1800}{120} = 15\ amps$$

3. A steady current of 0.50 A flows through a wire. How many electrons pass through a point in the wire each second?

$$\frac{0.50\ coulombs}{sec} \times \frac{2.5 \times 10^{19}\ electrons}{1\ C} = \frac{1.3 \times 10^{19}\ electrons}{sec}$$

Electricity Practice Name:_____

4. 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.

$$3.60\,A = \frac{3.60\,C}{sec} \times \frac{15.3\,sec}{} \times \frac{2.5\times10^{19}\,electrons}{1\,C}$$

$$= 1.4\times10^{21}\,electrons$$

5. 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?

$$2.0\times10^{20}\,electrons \times \frac{1\,coulomb}{2.5\times10^{19}\,electrons} \times \frac{1\,sec}{10\,coulombs}$$

$$= 0.80\,seconds$$

6. A current of 2.0 A flows through a 28 Ω load. What is the potential difference (voltage) across the load?

$$R = \frac{V}{I} \rightarrow V = RI$$

$$= 28\Omega \times 2\,A$$

$$= 56\,V$$

Electricity Practice Name:_____

7. The potential difference across a load is 4.9 V and the current passing through the load is 0.25 A. What is the resistance of the load?

$$R = \frac{V}{I} = \frac{4.9\,V}{0.25\,A} = 19.6\,\Omega$$

$$\approx 2.0 \times 10^{1}\,\Omega$$

8. What current will flow through a 250 Ω load if it has a potential difference of 120 V across it?

$$I = \frac{V}{R} = \frac{120\,V}{250\,\Omega} = 0.48\,A$$

9. A 9.0 volt battery is connected to a load. What will the current be through the load if
   a. The resistance of the load is 50.0 Ω

$$I = \frac{V}{R} = \frac{9.0\,V}{50\,\Omega} = 0.18\,A$$

   b. The resistance of the load is 100.0 Ω

$$\frac{9.0\,V}{100\,\Omega} = 0.090\,A$$

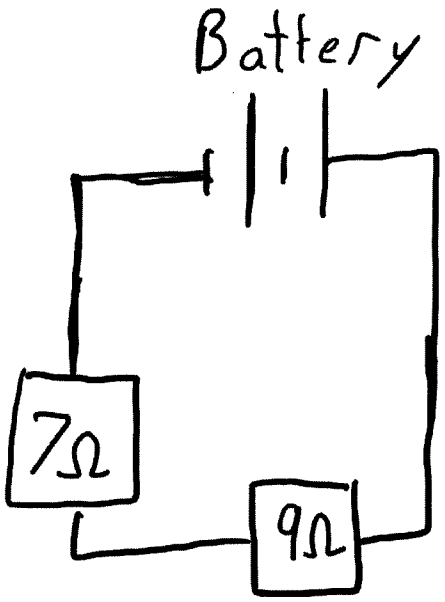
Electricity Practice Name:_____

10. A battery is connected to a 7.0 Ω and 9.0 Ω load in series. The current through the whole circuit is 1.3 amps.
    a. What is the potential difference across the 9 Ω load?

$V = IR = 11.7\,V = 12\,V$

    b. What is the potential difference across the 7 Ω load?

$1.3A \times 7.0\Omega = 9.1\,V$

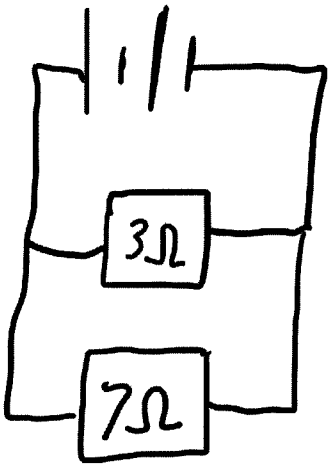


11. A battery is connected to a 3.0 ohm, and a 7.0 ohm load in parallel. The voltage across each load is 5.9 volts.
    a. What is the current passing through the 3 ohm load?

$I = \frac{V}{R} = 2.0A$

    b. What is the current passing through the 7 ohm load?

$\frac{5.9\,V}{7.0A} = 0.84A$



Electricity Practice Name:_____

12. A 25 watt lightbulb is connected to a 120 volt power source. What current passes through the lightbulb?

$$P = VI \rightarrow \frac{P}{V} = I$$

$$\frac{25W}{120V} = 0.21A$$

13. A current of 5.0 A passes through a load which is drawing 150 watts of power. What is the potential difference across the load?

$$P = VI \rightarrow \frac{P}{I} = V$$

$$\frac{150W}{5.0A} = 3.0 \times 10^{1} V$$

14. A 1600 watt appliance is connected to a 120 volt power source, how much current is it drawing?

$$I = \frac{P}{V} = 13.33$$

$$\approx 13 A$$

Electricity Practice Name:_____

15. A microwave connected to 120 V power source draws 9.2 amps of power.
    a. How much power does it draw?

$P = VI = 120V \times 9.2A$

$= 1104 \approx 1100 \text{ watts}$

    b. How much energy in joules does it use in 15 seconds?

$P = \frac{W}{t} \rightarrow W = Pt$

$= 1104W \times 15 \text{ sec}$

$= 17000 J$

16. An electric motor is connected to 240 volt power source, it draws 4.5 amps of current. How fast will the motor be able to lift a 500.0 kg object if it is 100% efficient?

$P = VI = 240V \times 4.5A = 1080 \text{ watts}$

$P = F\bar{v} \rightarrow \frac{P}{F} = \bar{v}$

$F_g = mg$

$= 500 \times 9.8$

$= 4900 N$

$\frac{1080 \text{ watts}}{4900 N} = 0.22 m/s$

Electricity Practice Name:_____

17. An electric heating element has a resistance of 85Ω, it is connected to a 6.0V battery.
    a. What current passes through the heating element?

$I = \frac{V}{R} = \frac{6.0V}{85\Omega}$

$= 0.071 amps$

    b. What is the power the heating element is drawing?

Option 1

$P = VI$

$= 6.0 \times 0.071$

$= 0.42 watts$

Option 2

$P = \frac{V^2}{R} = \frac{6^2}{85} = 0.42 watts$

    c. How much energy does the element use in 25 seconds?

$Pt = V$

$0.42 \times 25 = 11 J$