**Electricity Review Assignment**

1. In your own words, describe what static electricity is and what causes it.

1. List the three main types of particles found in the atom, where they are found within the atom, and their respective charges.

*(i)*

*(ii)*

*(iii)*

1. When you charge an object, what is happening to the protons and electrons?

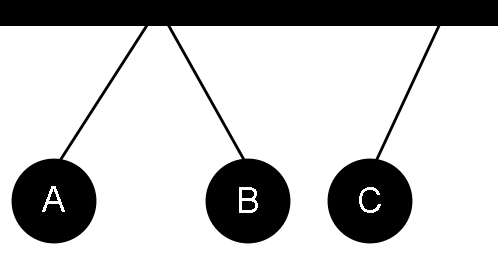
1. If an object is neutral, then it has:

1. An object becomes negatively charged by …

1. An object becomes positively charged by …

1. Two spheres are placed next to one another. Sphere 1 has a positive charge, sphere 2 has a negative charge. What will happen?

1. Two spheres are placed next to one another. Sphere 1 has a negative charge, sphere 2 also has a negative charge. What will happen?

1. Examine the image to the right. Spheres A, B, and C were each given charge. Spheres A and B were then suspended close to each other, resulting in repulsion. Sphere C was suspended further away from the other two. As sphere B moved away from sphere A, sphere C moved towards sphere B. What would happen if sphere A and C were brought close together?

1. Three spheres are each given a static charge. Spheres 1 and 2 repel each other. Spheres 2 and 3 attract each other. What will happen to spheres 1 and 3?

1. Four spheres are each given a static charge. Spheres 1 and 2 attract, spheres 2 and 3 repel, and spheres 1 and 4 attract.
   1. Spheres 1 and 3 will:
   2. Spheres 2 and 4 will:
   3. Spheres 3 and 4 will:
2. You are given a series of objects. You know that object A is negatively charged, and object B is neutral. You conduct a series of tests to see which objects attract and which objects repel each other. You discover the following:

|  |  |  |  |
| --- | --- | --- | --- |
| Object C:  Attracts B | Object D:  Repels C | Object E:  Attracts D  Repels F | Object F:  Attracts A |

What are the charges of objects C, D, E, and F?  
Object C:

Object D:

Object E:

Object F:

1. Sometimes when you put on clothes, they start to stick to you because of static. This is an example of charging by:
2. If you bring a charged object close to running tap water, the tap water is sometimes attracted to it. This is an example of charging by:
3. If you shuffle your feet across a carpet, and then shock someone by touching them, what two types of charging are involved?
4. If you have a negatively charged object, and you charge a neutral object by conduction, what charge will the neutral object gain?
5. If you have a positively charged object, and you charge a neutral object by induction, what charge will the neutral object gain?
6. If you have two neutral materials, and you charge them using friction, what will happen to their charges?
7. If a glass rod is rubbed against your skin, what charge will each object have afterwards?  
   Glass:

Skin:

1. If rubber is rubbed with vinyl, what charge will each object have afterwards?  
   Rubber:

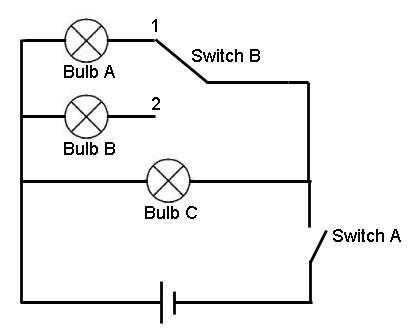
Vinyl:

1. Where are electrons moving to and from when you rub a piece of amber and fur together?
2. Where are electrons moving to and from when you rub a piece of wool and ebonite together?
3. If plastic and vinyl are rubbed together, and then the plastic is brought close to a negatively charged object, what will happen?
4. If nylon and silk are rubbed together, and then paper and acetate are rubbed together, what will happen when you bring silk and paper close to each other?
5. If you want to give wool a positive charge, why would it be better to rub it with plastic rather than silk?
6. In your own words, explain how an object can become positively charged. You must correctly use and describe the following terms: protons, electrons, valence shell. Be clear about which particles can be transferred and which cannot.
7. An electrical appliance has a broken resistor with a resistance of 15 Ω. Which of the following resistors could be used to replace the broken one?
   1. Potential difference = 2 V, Current intensity = 0.5 A
   2. Potential difference = 30 V, Current intensity = 2 A
   3. Potential difference = 10 V, Current intensity = 5 A
   4. Potential difference = 5 V, Current intensity = 3 A

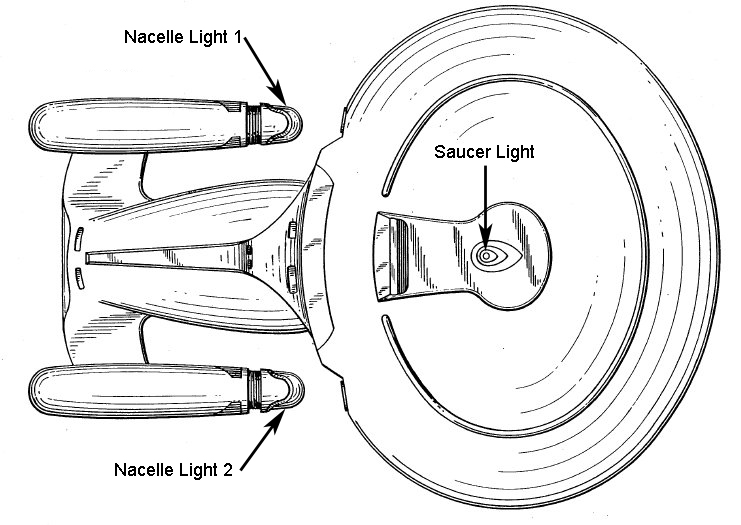
Answer: \_\_\_\_\_\_\_

1. A toy ambulance has lights and sound that are on the same electrical circuit. The headlights turn on when you turn on the main power switch. The siren is controlled by a second switch. Draw a circuit diagram that represents this situation. You can use the symbol for a resistor to represent the siren.
2. A circuit has a current intensity of 0.05 A and a 5 Ω resistor. What is the potential difference?
3. A circuit has a potential difference of 25 V and a current intensity of 5 A. What is the resistance?
4. A circuit has a potential difference of 30 V and a resistance of 25 Ω. What is the current intensity?
5. There are 0.05 A of current running through an electrical circuit. The circuit has a resistance of 200 Ω. What is the potential difference of this circuit?
6. There are 4 mA of current running through an electrical circuit. The circuit has a resistance of 500 Ω. What is the potential difference of this circuit?
7. If a circuit has a potential difference of 3 V and a current intensity of 0.4 A, what is the resistance?
8. If a circuit has a current intensity of 0.6 A and a potential difference of 20 V, what is the resistance?
9. If a circuit has a resistance of 5000 Ω and a potential difference of 150 V, what is the current intensity?
10. If a circuit has a potential difference of 200 V and a resistance of 100 Ω, what is the current intensity?
11. An electrical appliance has a defective resistor with a resistance of 10 Ω. Based on the information in the table below, which resistor should you select to replace the defective one?

|  |  |  |
| --- | --- | --- |
| **Resistor** | **Current Intensity (A)** | **Potential Difference (V)** |
| 1 | 0.8 | 4 |
| 2 | 5 | 30 |
| 3 | 1 | 12 |
| 4 | 3 | 30 |



1. In the diagram to the right, which light bulbs would be on if switch A was open and switch B was in position 1?
2. In the diagram to the right, which light bulbs would be on if switch A was closed and switch B was in position 2?
3. In the diagram to the right, which light bulbs would be on if switch A was closed and switch B was in position1?
4. In the diagram above, if light bulb C is burnt out, would the other bulbs still work? Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Draw a circuit diagram with a power source, a switch, and two light bulbs in series. Add a voltmeter measuring the potential difference across one of the bulbs.
6. Draw a circuit diagram with a power source, a switch, and two light bulbs in parallel. Add an ammeter measuring current intensity through one of the bulbs.
7. Tom is an avid Star Trek fan, and decides to build a model of the USS Enterprise NCC-1701 shown below.



* 1. There are three lights on this model, all in the same circuit.
  2. The saucer light comes on when you turn on the main power switch.
  3. The two nacelle lights come on at the same time as each other, but independently of the saucer light *(using a second switch)*, when you want to simulate warp flight.

Draw a circuit diagram that meets these requirements.