Name: _____

Science and Technology 404
Review: Electricity and Energy

1. A balloon rubbed on hair becomes negatively-charged.
   A) Draw a diagram showing the transfer of the charges between the balloon and the hair.
   B) What is the charge of the hair? Explain.

2. What happens when two positive or negatively-charged objects are brought close together?

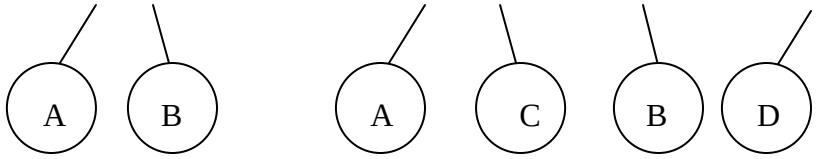
3. What happens when a positively-charged object and a negatively-charged object are brought close together?

4. What happens when a positively charged object or a negatively-charged object is brought near a neutral object? Explain.

5. What happens when a positively- charged object touches a neutral object? Explain.

6. What happens when a negatively- charged object touches a neutral object? Explain.

7. Four charged balls A, B, C and D are suspended from wires. The following diagram shows what happens when these spheres are suspended in pairs close to each other.



   If sphere B is positively-charged, what is the charge of the other spheres?

8. In the laboratory, you are given an ebonite rod, a piece of cotton, a piece of wool and a polyethylene strip and the following electrostatic series.

Capacity to gain electrons ⇧	Ebonite Polyethylene Cotton Wool

1. The ebonite rod is rubbed with the piece of cotton
2. The. polyethylene strip is rubbed with a piece of wool.
3. The ebonite rod is brought close to the polyethylene strip.

a) What is the reaction between the ebonite rod and the polyethylene strip?

b) What is the charge on the ebonite rod?

c) What is the charge on the polyethylene strip?

9. A desktop computer is plugged into a wall outlet. For each electrical function, name an example of a component of this circuit that plays that role.

Electrical Function	Component
Conduction	
Insulation	
Control	
Power Supply	
Protection	
Transformation	

10. Choose the wire with the smaller resistance from the following two choices:

a) A 200 mm long copper wire or a 50 mm long copper wire at the same temperature and diameter.
b) A 1 mm diameter or a 2 mm diameter copper wire of the same length and temperature.
c) A copper wire or a nichrome wire of same diameter, length and temperature
d) A copper wire at 50 °C or a copper wire at 20° C with the same length, and diameter.

11. What is the resistance of a toaster that draws 0.4 A of current when it is plugged into a 120 V outlet?

12. What is voltage of a flashlight bulb that has a resistance of 40 Ω and that draws 0.3 A of current?

13. What is the current intensity drawn by an appliance in a 120 V circuit that has a resistance of 30 Ω?

14. What is the power rating of a hairdryer that draws 10 A of current in a 120 V circuit?

15. What is the electrical energy consumed in Joules by an oven with a power rating of 3500 W used for 45 minutes?

16. What is the electrical energy consumed in Joules by an iron that draws 12 A of current and is plugged into a 120 V circuit if it is used for 15 minutes?

17. Using the following rating plate, calculate the electrical energy consumed by this appliance in kWh when it is used for 2 hours and 20 minutes.

Serial Number 22xzyt5567
120 V AC
1800 W 60 Hz

18. Of the three following hairdryers, which is the cheapest to use? Explain your choice.

Hairdryer A
120 V
10 A

Hairdryer B
120 V
1200 W

Hairdryer C
120 V
0.9 kW

19. What is the efficiency of a machine that performs work equal to 3600 J (useful energy) and consumes14 000 J of energy?

20. A race car has an efficiency of 40%. How much useful energy is used by the car if it consumes 150 000 J of energy?