**Electric Forces**

AP Physics 1

1. What causes an electric force?

2. What factors determine how large an electric force on a specific object is?

3. Why can the electric force be both attractive and repulsive while gravity is always attractive?

4. What is the minimum value of charge that is possible? Why is this the smallest possible value of charge?

5. Are each of the following values for charge possible? Explain why or why not:

a) q1 = 1.0 x 10-19 C

b) q2 = 8.0 x 10-19 C

c) q3 = 1.0 x 10-18 C

6. What evidence, from labs we performed in class, shows that there are two kinds of charges?

7. Which is stronger, the electric force or the gravitational force? Give an example that demonstrates the relative strength of the two forces.

8. What property do conductors have that insulators do not.

9. A negatively charged PVC pipe is brought near but not touching a neutral aluminum coke can.

a) Draw a diagram showing the distribution of charge in both objects.

b) Assuming the can is free to move, which way would it move (towards the rod or away from the rod)? Explain your reasoning.

c) Suppose the can were replaced by a rubber tube. Draw how the charges would be distributed in the rubber when the charged rod is brought nearby.

10. A positively charged rod is brought near a neutral electroscope. Describes what happens to the electroscope leaves. Draw a diagram showing the charges in the electroscope and explain your reasoning.

11. A positively charged rod is brought near a negatively charged electroscope. Describes what happens to the electroscope leaves. Draw a diagram showing the charges in the electroscope and explain your reasoning.

12. Two charges, one +4 x 10-6 C and the other +8 x 10-6 C are separated by a distance of .5 m. Calculate the electric force between the two charges and indicate if it is attractive or repulsive.

13. Two +8 x 10-6 C charges repel each other with an electric force of 100 N. How far apart are the two charges?

14. Consider two positive charges, *Q* and *q*. Charge *q* is initially placed at rest at point A, as shown in the diagram. *Q* is much larger than *q* and is fixed in placed. Because *q* is in a system which contains *Q*, it has electric potential energy. The charge *q* is released from rest and moves to the right. At each indicated position, draw an LOL chart showing the distribution of energy for the two charge system.

*Q*

***A***

Ue

K

Ue

K

***B***

***C***

Ue

K

*Infinitely far apart*

Ue

K