Electrostatics Review

1. a. Describe the process to charge an object to +2q through friction. Draw diagrams and indicate what happens to the charges.

b. Describe the process to charge an object to +2q through conduction. Draw diagrams and indicate what happens to the charges.

2. A +3.0 μ C is held close to a +6.0 μ C charge. Draw the electric field lines in this region.

3. A -9.0 μ C charge is held a distance of 20.0 cm from a -1.0 μ C charge.

a. What is the net electric field (include direction) directly between the charges, 10.0 cm from each charge?

b. What is the force on a +2.0 μ C charge when it is placed directly between the charges, 10.0 cm from each charge? (Include direction)

c. Which direction would you have to move the $+2.0 \,\mu\text{C}$ charge in order to get a net force of zero on it? (Hint: Where is the equilibrium point?)

4. Three charges are placed along a straight line as shown below. The distance from A to B is 5 cm. The distance from B to C is 15 cm.



a. Find the magnitude of each of the six forces on the diagram.

b. Find the net force on each of the charges. Include directions.

- c. Find the electric potential 5.0 cm from charge A on the line between the charges.
- d. Find the electric potential 15.0 cm to the right of C on the line.

e. How much potential energy does charge B have due to charges A and C?

5. A constant electric field points to the right and has a magnitude of 5000 N/C. The distance between points A and B is 5 cm.



a. What direction would a proton travel if placed in the field?

b. What direction would an electron travel if placed in the field?

c. What is the force on a +4 μ C charge that is placed in the field?

d. What is the electric potential difference between points A and B?

e. What would the magnitude of the change in potential energy be for a +4 μC charge that moves from point A to point B?