Physics 513 Name _____
Vaughan Worksheet

1. At a given location in space, a 4×10^{-6} C charge experiences a force of 0.008 N eastward. What is the magnitude and direction of the electric field at that location in space?

2. An electric field of 3000 N/C northward exists at a certain location in space. If an electron is placed at that location, what will be the magnitude and direction of the electric force on the electron?

3. A charge experiences a 2500 N force towards the left when it is placed at a location in space where the electric field is 5×10^{5} N/C towards the right. What is the charge?

4. A 7 μC charge is placed 50 cm to the right of a -5 μC charge.
a) What is the direction and magnitude of the force on the 7 μC charge?
b) What is the direction and magnitude of the electric field at the location of the 7 μC charge?
c) What is the direction and magnitude of the force on the -5 μC charge?
d) What is the direction and magnitude of the electric field at the location of the -5 μC charge?

5. Between the plates of a parallel plate capacitor which are oriented horizontally, an electric field that is 35000 N/C upward exists. A 3 gram pith ball (without its string) has been charged and placed in this field. The pith ball is suspended in static equilibrium.
a) What is the magnitude and direction of the force of gravity on the pith ball?
b) What must be the magnitude and direction of the electric force on the pith ball?
c) What is the sign and magnitude of the charge on the pith ball?

6. Between two points in space, there exists a 15 V potential difference. How much work does it take to move
a) a 4 C charge through this potential difference?
b) an electron through this potential difference in Joules? In electronvolts?

7. It requires 100 eV to move a charged object through a potential difference of 25 V. What is the charge on the object in Coulombs?

8. When moving a 3 μC charge between two points in space, 6 Joules of work is done. What is the potential difference between these two points?

9. How much energy is stored at a location in space that has a potential of 300 V when a 5 μC is placed there?

10. Between the plates of a parallel plate capacitor that are oriented horizontally, there is a 500 V potential difference established by a battery whose positive terminal is connected to the top plate. The plates are separated by 20 cm.
a) What is the magnitude and direction of the electric field between the plates?
b) What would be the magnitude and direction of electric force on a -10 μC in that space?
c) How much work would be required to move the -10 μC from the top to the bottom plate?
d) If released from rest at the bottom plate, how fast would this charge be going when it reached the top plate if the mass of the charge is 4×10^{-5} kg?