Name_____ Date_____ Period_____

Unit 12

Electric Fields Practice Test

Form P

Some useful constants

$k = 9.0 \times 10^{9}\ N \cdot m^2/C^2$ $1\ \text{elementary charge} = 1.69 \times 10^{-19}\ C$

$m_e = 9.11 \times 10^{-31}\ kg$ $m_p = 1.67 \times 10^{-27}\ kg$

1. Suppose you have found an isolated single charge of -3.00 C.
   a. Sketch the electric field around this charge.

   b. What is the magnitude and direction of the electric field 4.00 cm from this charge?

   c. What is the magnitude and direction of the electric field 2.00 m from this charge?

2. Now suppose that a second charge of +6.00 C is placed at a distance of 2.00 m to the right of the first charge.
   a. Sketch the electric field around both of these charges.

   b. What is the magnitude and direction of the electric field 60.0 cm from the first charge along the line towards the second charge?

   c. What is the magnitude and direction of the electric field 60.0 cm from the first charge along the line directly away from the second charge?

   d. What would be the force on an electron at the location given in part C?

3. Now suppose we add a third charge to this line 1.00 m to the right of the second charge.
    a. Find the magnitude and direction of the electric field 60.0 cm from the first charge along the line towards the second charge.

    b. Find the magnitude and direction of the electric field 60.0 cm from the second charge along the line perpendicular to the three charges.

4. But wait! there's more! Let us move the third charge to make a right triangle with the first charge of -3.00 C at the corner of the right angle (let that be the origin); the second charge of +6.00 C 2.00 m to the right along the positive x-axis; and the third charge of +2.50 C at a distance of 1.00 m from the first charge along the positive y-axis.
    a. Sketch the electric field around these three charges.

    b. What is the magnitude and direction of the electric field at a location of 2.00 m to the right and 1.00 m up from the first charge (2m, 1m)?

    c. What is the magnitude and direction of the force on an oxygen nucleus placed at this location?