

$\text{ave.} = 6.9$
 $\sigma = 2.4$

Name Answer Key

Lab: TTh Tues (circle one)

Quiz #10: Electrostatics

Problem 1 (2 points)

Complete the following statement: When a plastic rod is rubbed with animal fur, the rod becomes negatively charged as

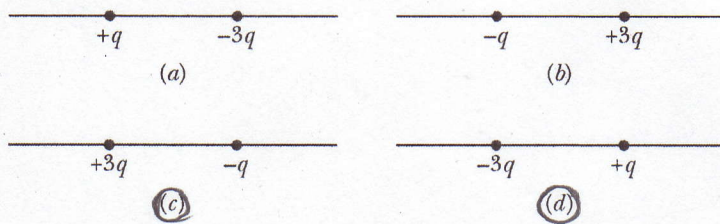
C

- a) protons are transferred from the fur to the rod
- b) protons are transferred from the rod to the fur
- c) electrons are transferred from the fur to the rod
- d) electrons are transferred from the rod to the fur
- e) electrons are created on the surface of the rod

Problem 2 (3 points)

The figure below shows four situations in which charged particles are fixed in place on an axis. In which situation(s) is there a point to the **right** of the particles where an electron can be in equilibrium?

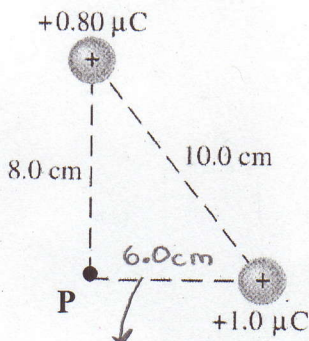
C + D



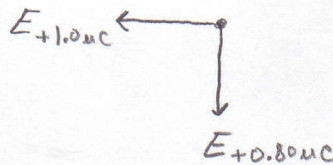
\Rightarrow the electron must be farther away from the bigger charge

Problem 3 (5 points)

Two point charges are fixed in place in a right triangle as shown in the figure below. What is the magnitude and direction of the electric field at point P?



$$E = \frac{k|q|}{r^2}$$



$$E_{+0.80\mu C} = \frac{(9.0 \times 10^9 \text{ Nm}^2/\text{C}^2)(0.80 \times 10^{-6} \text{ C})}{(0.080 \text{ m})^2} = \underline{1.13 \times 10^6 \text{ N/C}}$$

$$E_{+1.0\mu C} = \frac{(9.0 \times 10^9 \text{ Nm}^2/\text{C}^2)(1.0 \times 10^{-6} \text{ C})}{(0.060 \text{ m})^2} = \underline{2.50 \times 10^6 \text{ N/C}}$$

$$E_x = \underline{-2.50 \times 10^6 \text{ N/C}}$$

$$E_y = \underline{-1.13 \times 10^6 \text{ N/C}}$$

$$|\vec{E}| = \sqrt{E_x^2 + E_y^2} = \sqrt{(-2.50 \times 10^6 \text{ N/C})^2 + (-1.13 \times 10^6 \text{ N/C})^2}$$

$|\vec{E}| = 2.7 \times 10^6 \text{ N/C}$

$$\theta = \tan^{-1}\left(\frac{E_y}{E_x}\right) = \tan^{-1}\left(\frac{-1.13 \times 10^6 \text{ N/C}}{-2.50 \times 10^6 \text{ N/C}}\right) = \underline{24.3^\circ} \rightarrow \text{wrong quadrant}$$

$\theta = 204^\circ$