Quiz 1A

PHYSICS 208, WINTER 2016

SECTION: NAME:

Directions: Consider the following scenarios and *carefully* read each question. You are encouraged to write legible and organized solutions on a clean sheet of paper. Note that *vectors must have a direction and all answers must have appropriate units* and $\frac{1}{4\pi\epsilon_0} \approx 9 \times 10^9\ Nm^2/C^2$.

Consider three point charges arranged in a line. Charge $q_1 = .125\,C$ is located at the origin. Charge q_3 is equal in magnitude, but opposite in sign to q_1 and is located four centimeters away from q_1. Charge $q_2 = 2\,C$ lies halfway between q_1 and q_3.

(3 points) What is the net force on q_3? What is the electric field due to q_1 and q_2 at the location of q_3? (Suppose q_3 no longer exists)

(3 points) What is the net force on q_2? What is the electric field due to q_1 and q_3 at the location of q_2? (Suppose q_2 no longer exists)

(2 points) What is the minimum potential energy of the dipole created by q_1 and q_3 if it is placed in a uniform and parallel electric field of magnitude $E = 5.0 \times 10^5\ N/C$?

Conceptual Question (2 points) Why does charge tend to build up on the surface of an insulator and not a conductor? Explain.