# *Physics 4B*

## PLC Activity #5: Electric Potential

*To get credit for this activity, you must show your answers to a PLC tutor and have them initial the sign-out sheet* ***before 4:00 pm on Wednesday****.*

**Show all of your work for each question.**

**Part 1: Electric Potential Physlets**

Go to **Chapter 25: Electric Potential**. Do the following Physlet Physics exercises and answer the questions listed.

**1) Physlet Problem 25.1**

a. For each of the animations, does the potential energy of the particle increase or decrease as it moves?

b. Is the beginning point or ending point at a higher electric potential (higher voltage)?

c. Is an external force required or is the movement the result of the force due to the electric field? If an external force is required, describe it.

**2) Physlet Problem 25.3**

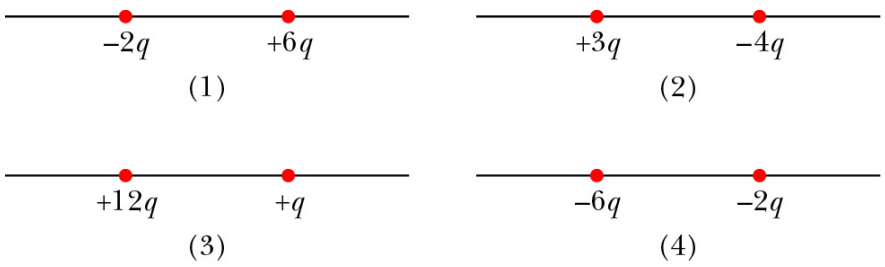
An **electron** is moved through a region with an electric potential defined by the equipotential lines shown (position is given in meters, time is given in seconds, and electric potential is given in volts). Rank the work done by the external force (smallest to greatest) for Animations 1--5. Explain the basis for your ranking.

**3) Physlet Problem 25.5**

In the animation the electric potential changes from 0 V to 1 V as shown by the equipotential lines (position is given in meters, time is given in seconds, velocity is given in meters/second, and electric potential is given in volts). Click-drag to place the 1-mC test charge anywhere in the animation before you press "play." What is the mass of the particle?

## Part 2: Ranking Task Exercises and Conceptual Questions

**4)** The figure below shows four pairs of charged particles with identical separations. (a) Rank the pairs according to their electric potential energy, greatest (most positive) first. (b) For each pair, if the separation between the particles is increased, does the potential energy of the pair increase or decrease?




**5)** Three isolated, empty, spherical shells of the same radius have the following uniform charges: shell A, $+q$; shell B, $+2q$; shell C, $+3q$. Set the electric potential to be zero at an infinite distance from the shells. Then rank the shells, greatest, first, according to (a) the electric potential at the surface of the shell, (b) the electric potential at the center of the shell, (c) the electric field magnitude at the surface of the shell, and (d) the electric field magnitude at the center of the shell.