Electrical Potential and Energy **Name** _____

Physics II **Date** _____ **Period** _____

1. An electron in a vacuum is initially at rest at a position having a potential of 0 V. This electron travels and passes through a location that has a potential of 1000 V.

   (a) What is the initial potential energy associated with this electron?

   _____

   (b) What is the initial kinetic energy of the electron?

   _____

   (c) What is the potential energy associated with this electron as it passes through the location having a 1000 V potential?

   _____

   (d) What is the kinetic energy of the electron as it passes through the 1000 V location?

   _____

2. A proton at rest in a vacuum is accelerated from an initial location having a potential of 5000 V. It travels along and passes through a location having a potential of 4000 V.

   (a) What is the initial potential energy associated with this proton?

   _____

   (b) What is the potential energy associated with the proton as it passes through the 4000 V location?

   _____

   (c) How much kinetic energy in Joules does the proton have as it passes through the 4000 V location?

   _____

   (d) How much kinetic energy in eV does the proton have as it passes through the 4000 V location?

   _____

3. A proton is moving through a vacuum with a speed of 1,000,000 m/s in a region of space that has a potential of 0 V. It enters an electric field that slows it down to a halt.

   (a) How much kinetic energy does the proton lose as it comes to rest?

   _____

   (b) How much potential energy does the electric field gain during the halting of the proton?

   _____

   (c) What is the potential at the location at which the proton comes to rest?

   _____

   (d) As the proton slows down, does it move toward higher and higher potential or lower and lower potential?

   _____

4. How big a potential difference must be used to accelerate a He^+ ion from rest to a speed of 2,000,000 m/s?

   _____