**PHYS 202 … Practice Problems … Electric Potential Part A**

**Electric Potential and Potential Energy … “Plug and Chug” problems**

**Part 1** … Electric potential energy between two point charges (taking the potential energy to be zero when infinitely far apart)

1. A 4.50 nC point charge and a 3.20 nC point charge are separated by a distance of 8.40 mm. What is the electric potential energy of this arrangement?
2. A 7.50 nC point charge and a – 5.30 nC point charge are separated by a distance of 3.25 mm. What is the electric potential energy of this arrangement?
3. A – 5.30 nC point charge and a – 2.10 nC point charge are separated by a distance of 0.00475 m. What is the electric potential energy of this arrangement?
4. Two identical 8.80 x 10 – 7 C point charges are separated by 0.00388 m. What is the electric potential energy of this arrangement?
5. An arrangement of two protons has a potential energy of 4.29 x 10 – 27 J. How far apart of the protons?

**Part 2** … Electric potential energy between a collection of charges (taking the potential energy to be zero when infinitely far apart)

1. An electron is located on the x-axis at x = 0.525 mm. A proton is located on the x-axis at x = 0.948 mm. A second electron is located on the y-axis at y = 0.492 mm. What is the total electric potential energy of this arrangement?
2. An electron is located on the x-axis at x = 0.525 mm. A proton is located on the x-axis at x = 0.948 mm. A second proton is located on the y-axis at y = 0.492 mm. What is the total electric potential energy of this arrangement?
3. A proton is located on the x-axis at x = 0.525 mm. An electron is located on the x-axis at x = 0.948 mm. A second electron is located on the y-axis at y = 0.492 mm. What is the total electric potential energy of this arrangement?
4. A proton is located on the x-axis at x = 0.525 mm. An electron is located on the x-axis at x = 0.948 mm. A second proton is located on the y-axis at y = 0.492 mm. What is the total electric potential energy of this arrangement?

**Part 3** … Electric potential due to a single point charge (taking the potential to be zero at infinity)

1. What is the electric potential at a distance of 5.39 mm from a 4.29 nC point charge?
2. What is the electric potential at a distance of 3.29 mm from a – 6.92 nC point charge?
3. At a distance of 0.303 mm from a point charge the electric potential is – 5.292 x 10 3 V. What is the value of this point charge?
4. At what distance from an electron is the electric potential 325 V lower than it is infinitely far from the electron?

**Part 4** … Electric potential due to a collection of point charges (taking the potential to be zero at infinity)

1. An electron is located on the x-axis at x = 0.525 mm. A proton is located on the x-axis at x = 0.948 mm. A second electron is located on the y-axis at y = 0.492 mm. What is the total electric potential at the origin?
2. An electron is located on the x-axis at x = 0.525 mm. A proton is located on the x-axis at x = 0.948 mm. A second proton is located on the y-axis at y = 0.492 mm. What is the total electric potential at the origin?
3. A proton is located on the x-axis at x = 0.525 mm. An electron is located on the x-axis at x = 0.948 mm. A second electron is located on the y-axis at y = 0.492 mm. What is the total electric potential at the origin?
4. A proton is located on the x-axis at x = 0.525 mm. An electron is located on the x-axis at x = 0.948 mm. A second proton is located on the y-axis at y = 0.492 mm. What is the total electric potential at the origin?
5. An electron is located on the x-axis at x = 0.525 mm. A proton is located on the x-axis at x = 0.948 mm. A second electron is located on the y-axis at y = 0.492 mm. What is the total electric potential on the y-axis at y = 0.655 mm?
6. An electron is located on the x-axis at x = 0.525 mm. A proton is located on the x-axis at x = 0.948 mm. A second proton is located on the y-axis at y = 0.492 mm. What is the total electric potential on the y-axis at y = 0.655 mm?
7. A proton is located on the x-axis at x = 0.525 mm. An electron is located on the x-axis at x = 0.948 mm. A second electron is located on the y-axis at y = 0.492 mm. What is the total electric potential on the y-axis at y = 0.655 mm?
8. A proton is located on the x-axis at x = 0.525 mm. An electron is located on the x-axis at x = 0.948 mm. A second proton is located on the y-axis at y = 0.492 mm. What is the total electric potential on the y-axis at y = 0.655 mm?