**Worksheet 6.4 – Electric Potential**

1. What is the potential at a distance of 6.0 cm from a 2.5 uC charge?
2. What is the potential at a distance of 25 cm from a -2.5 uC charge?
3. Three charges are located in a line as shown.

Find the potential at point P.

**q2 = -3.0 uC**

**q1 = 1.0 uC**

**q3 = -5.0 uC**

**P**

**10.0 cm**

**10.0 cm**

**7.5 cm**

1. How much work is done against the electric field produced by a 5.0 uC charged object when a 0.030 uC charge is moved from a distance of 45 cm to 15 cm.
2. A proton is released 2.0x10-11 m from the centre of a 6.4x10-18 C fixed charge. What is the speed of the proton when it is 0.50 m from the charge
3. The centers of two alpha particles are held 2.5x10-12 m apart, when they are released. Calculate the speed of each alpha particle when they are 0.75 m apart.
4. 4.4x10-5 J of work is done moving a 3.00 uC charge at a constant speed from point A to point B. If A and B are 2.4 cm apart, what is the potential difference between A and B?
5. Two parallel plates are connected to a 12.0 V battery. If the plates are 9.00x10-2 m apart, what is the electric field strength between them?
6. The electric field between two parallel plates is 5.0x103 N/C. If the potential difference between the plates is 2.0x102 V, how far apart are the plates?
7. Two parallel plates are 7.3 cm apart. If the electric field strength between the plates is 2.0x103 V/m, what is the potential difference between the plates?
8. An alpha particle gains 1.5x10-15 J of kinetic energy. Through what potential difference was it accelerated? =
9. A proton is accelerated by a potential difference of 7.20x102 V. What is the change in its kinetic energy?
10. What maximum speed will an alpha particle reach if it moves from rest through a potential difference of -7.50x103 V?

Answers:

1. (3.8x105 V)
2. (-9.0x104 V)
3. (-2.0x105 V)
4. (6.0x10-3 J)
5. (7.4x105 m/s)
6. (2.4x105 m/s)
7. (14.7 V)
8. (1.33x102 N/C)
9. (4.0x10-2 m)
10. (1.5x102 V)
11. (4.69x103 V)
12. (1.15x10-16 J)
13. (8.50x105 m/s)