Chapter 17.1 Physics

Worksheet Potential Difference

1. It takes 8 mJ of energy to move a charge of 4 μC from point A to point C in an electric field. What is the potential difference between the points?
2. How much work is required to move a positive charge of 2.5 C between two points that have a potential difference of 60 V, Recall that W = ∆PE.
3. A cloud has a potential difference relative to a tree of 900 MV. During a lightning storm, a charge of 100 C travels through this potential difference. How much energy is released during this lightning strike?
4. What charge is moved between two points having a potential difference of 6 V if 3 x 10-5 Joules of energy is required?
5. A charge moves a distance of 0.02 meters in the direction of a uniform electric field whose magnitude is 215 N/C. As the charge moves between two points, its electric potential energy decreases by 6.9 x 10-19 J.
6. What is the particle charge?
7. What is the potential difference between the two points?
8. A particle moves 10 meters along an electric field whose strength is 75 N/C. As it moves from point A to point B in this electric field, its electrical potential energy decreases by 4.8 x 10-16 J.
9. What is the particle charge?
10. What is the potential difference between the two points?
11. An electron moves 4.5 meters in the direction of an electric field whose strength is 325 N/C. Determine the charge in electrical potential energy (Recall the charge of an electron is -1.6 x 10-19 C.)
12. What is the charge in the electrical potential energy in a lightning bolt if 35 C of charge travels to the ground from a cloud 2000 meters above the ground in the direction of the field? Assume the electric field is uniform and has a magnitude of 1x 106 N/C.
13. A proton has a charge of 1.6 x 10-19 C and moves a distance of 2 x 10-6 m in the direction of an electric field that has a magnitude of 2 N/C.
14. What is the change in the electrical potential energy associated with the protons movement in the field?
15. What is the potential difference between the proton’s starting point and ending point?
16. Potential difference in a uniform electric field is also given as V = -Ed (E = N/C = V/m)

A spark will jump between two people if the electric field exceeds 4 MV/m. You shuffle across a rug and a spark jumps when you put your finger 0.0015 m from another person’s ear. Calculate the potential difference between your body and the ear.

1. A potential difference of 0.9V exists from one side to other side of a cell membrane that is 5.x 10-9 m thick. What is the electric field across the membrane?