ELECTROSTATICS

1. Two charged objects are 3.0 cm apart and repel each other with a force of 1×10^{-19} N. Assuming that the charges are the same magnitude (size), find the charge on each.

2. Two charges of +2 μC and -5 μC are separated by a distance of 25 cm. Find the force of attraction that exists between them.

3. Two charges of +5 μC and -25 μC exert a force of 0.05 N on each other. Find the distance that separates them.

4. Two similarly charged objects are separated by a distance of 20 cm. If the force of repulsion on each is 1.0 N, find the number of electrons each has lost (or gained).

5. Two charged objects repel one another with a force of 0.072 N when separated by a distance of 10 cm. If the sum of the two charges is 6 μC, find the charge on each.

6. Three charges: A = -35 μC, B = +45 μC, and C = -55 μC, are positioned on a meter stick at the following positions respectively; 0.0 cm, 40.0 cm, and 100.0 cm. Find the total force acting on charge B.

7. Three charges: A = +20 μC, B = +10 μC, and C = +15 μC, are positioned on a meter stick at the following positions respectively; 0.0 cm, 10.0 cm, and 35.0 cm. Find the total force acting on charge B.

8. Three charges: A = -20 μC, B = +20 μC, and C = -30 μC, are positioned on a meter stick at the following positions respectively; 0.0 cm, 10.0 cm, and 35.0 cm. Find the total force acting on charge A.

9. Three charges: A = -20 μC, B = +40 μC, and C = +30 μC, are positioned on a meter stick at the following positions respectively; 0.0 cm, 40.0 cm, and 100.0 cm. Find the total force acting on charge C.

10. Three charges: A = -35 μC, B = +45 μC, and C = -55 μC, are positioned on a meter stick at the following positions respectively; 0.0 cm, 40.0 cm, and 80.0 cm. Find the total force acting on charge B.

11. Two charges: A = +30 μC and B = +50 μC are placed at opposite ends of a meter stick. Where should a charge of -25 μC be placed such that the force on it due to A and B are zero?

13. Three charges: A = +8 μC, B = -10 μC, C = -15 μC, and D are positioned on a meter stick at the following positions respectively; 0.0 cm, 10.0 cm, 25 cm, and 100.0 cm. Find the magnitude of charge D if the total force acting on charge C is zero.

14. A charge of -5 μC experiences a force of 0.15 N. Find the electric field intensity at this point.

15. An electron is located in an electric field where the electric field intensity is 250 N/C distance. Find the force acting on the electron.

16. If the force acting on a charged object is 5 mN when it is located in an electric field where the field strength is 100 N/C, find the charge on the object.

17. A +10 μC charge is placed in an electric field where the strength is 85,000 N/C. If the charge is allowed to move a distance of 25 cm in the direction of the electric field lines, find the force on the charged object and the potential difference.

18. The potential difference between two points in an electric field is 125 V. Find the work done in moving one electron between these points.

19. Find the work done in moving 250 electrons through a potential difference of 240 V.

20. Find the work done in moving a charge of 5 μC through a potential difference of 50 V.

21. Find the work done moving a proton through a potential difference of 120 V.

22. Find the force exerted on an electron in an electric field having a strength of 1200 N/C.

23. Find the electric field strength between two metal plates that are separated by a distance of 8.0 cm if the potential difference between them is 240 V.

24. If an electron were allowed to pass through a potential difference of 120 V, find the velocity it would attain. The mass of an electron is 9×10^{-31} kg. The work done on an electron will cause it to gain speed i.e. its energy will be a function of its velocity. Kinetic Energy = $\frac{1}{2}mv^2$