Electrostatics Worksheet

1. What is the electrostatic force between two metal spheres, each having 5 C of charge. The balloons are 0.30 m apart. ***2.5×10^{12} N***

2. Suppose that two point charges, each with a charge of +1 Coulomb are separated by a distance of one meter. (a) Will they attract or repel? (b) Determine the magnitude of the electrical force between them. ***9×10^{9} N***

3. Two balloons are charged with an identical quantity and type of charge: -0.0025 C. They are held apart at a separation distance of 8 m. Determine the magnitude of the electrical force of repulsion between them. ***878.9 N***

4. Two charged boxes are 4 meters apart from each other. The blue box has a charge of +0.000337 C and is attracting the red box with a force of 626 Newtons. Determine charge of the red box. Remember to indicate if it is positive or negative. ***0.0033 C***

5. A piece of styrofoam has a charge of -0.004 C and is placed 3 m from a piece of salt with a charge of -0.003 C. How much electrostatic force is produced? ***12,000 N***

6. If you put in 10 joules of work to push 1 coulomb of charge against an electric field, what will be its voltage with respect to its starting position? ***10 V***

7. What is the voltage at the location of a 0.0001 C charge that has an electric potential energy of 0.5 J? ***5000 V***

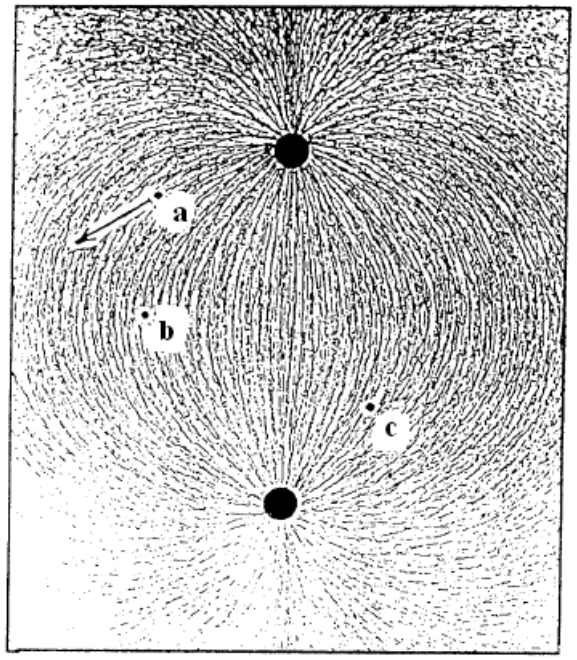
8. How much electrical potential energy is given to each coulomb of charge that flows through a 1.5 volt battery? ***1.5 J***

9. What voltage is produced by a balloon with 35 J of electric potential energy and containing 0.0005 C of charge? ***70,000 V***

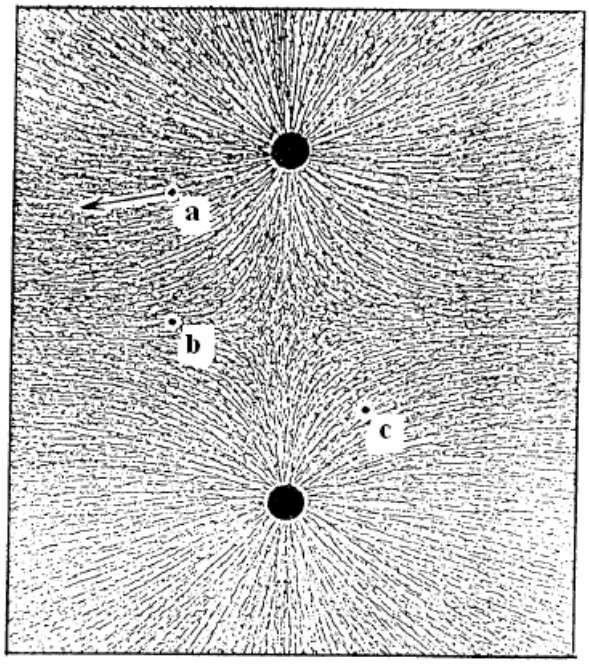
10. A balloon may be charged to several thousand volts. Does this mean it has several thousand joules of energy? Explain your answer.

11. How much charge is carried by a 120,000,000 volt lightning bolt? The electric potential energy of the built up charge before it discharged as lightning was 3,000,000,000 J. ***25 C***

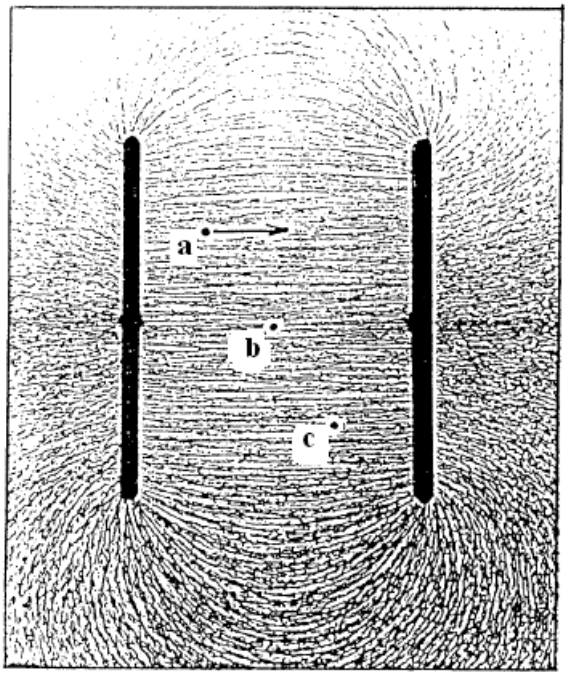
19 Three points, (*a, b, c*) are indicated on each electric field pattern. Point *a* in each pattern shows the electric field vector at that point. The vector indicates the magnitude and direction of the force that a positive test charge would experience at that point (a curved field indicates that the force on a nearby test charge would be different in magnitude and direction). Use the vector at points *a* as a reference and sketch in the electric field vectors for points *b* and *c* in each pattern, using colored ink



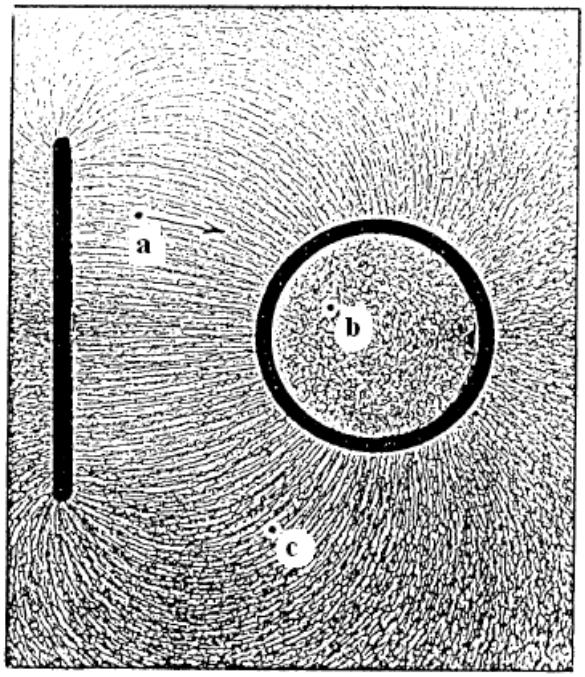
a.



b.



c.



d.

Conceptual PHYSICS