Electrostatics Worksheet (p.1)
All questions should be answered on your own paper.

1. In terms of attraction and repulsion, how do negative particles affect negative particles? How do negatives affect positives?
2. What happens to electrons in any charging process? What happens to protons in the same processes?
3. Give an example of something charged by friction.
4. Give an example of something charged by simple contact.
5. Give an example of temporarily charging an object by induction.
6. What is an electrostatic discharge?
7. How does an electrically polarized object differ from an electrically charged object?
8. Rub an inflated balloon against your hair and place it against a door. What does the balloon do? Explain how it does this.
9. How does the magnitude of electrical force between a pair of charged objects change when the objects are moved twice as far apart? Three times as far apart?
10. 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
11. 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*
12. 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*
13. 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*
14. 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*

Electrostatics Worksheet (p.2)

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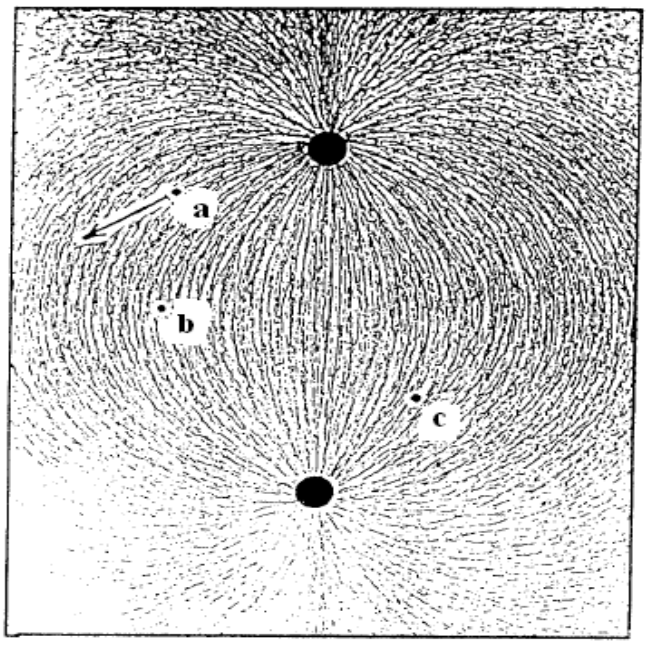
15. What occurs when we “ground” an object?
16. What are two purposes of a lightning rod? Which is primary?
17. How can you charge an object negatively by using a positively charged object?
18. Why is it safe to be in a car when it is struck by lightning? No, it’s not “grounding”.
19. Sketch the electric field surrounding two electrons that are 2 cm apart.
20. Where is the magnitude of an electric field the strongest?
21. Describe how a charged particle would gain electrical potential energy.
22. Compare and contrast electrical potential energy and electric potential.
23. 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*
24. 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*
25. How much electrical potential energy is given to each coulomb of charge that flows through a 1.5 volt battery? *1.5 J*
26. What voltage is produced by a balloon with 35 J of electric potential energy and containing 0.0005 C of charge? *7,000 V*
27. A balloon may be charged to several thousand volts. Does this mean it has several thousand joules of energy? Explain your answer.
28. 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*

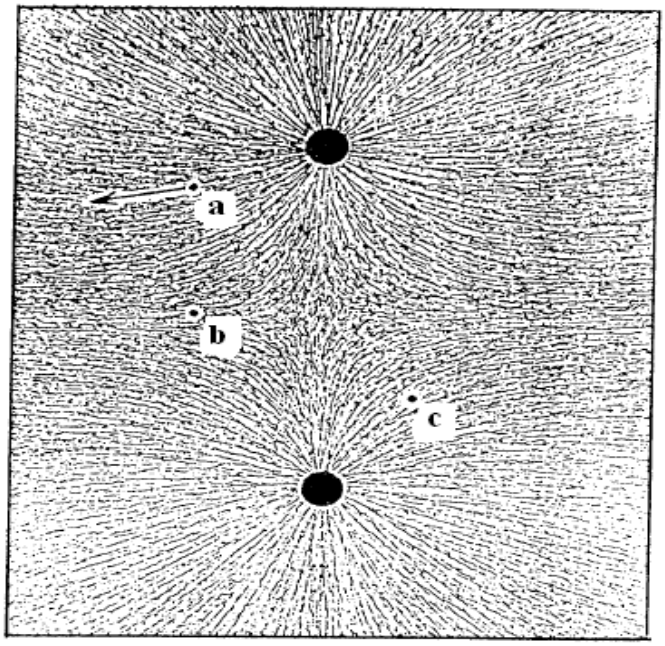
Electrostatics Worksheet (p.3)

All questions should be answered on your own paper.

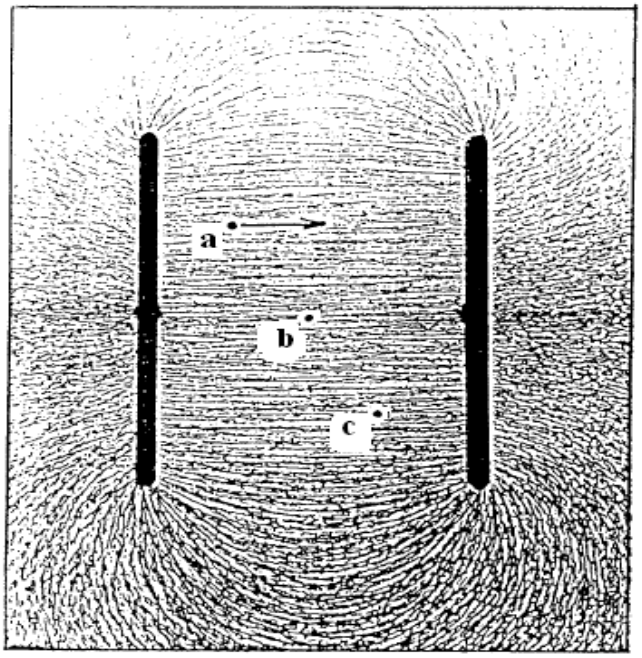
29 Three points, (*a, b, c*) are indicated on each electric field pattern. Point *a* in each pattern shows the electric field vector at that point. The vector indicates the magnitude and direction of the force that a positive test charge would experience at that point (a curved field indicates that the 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



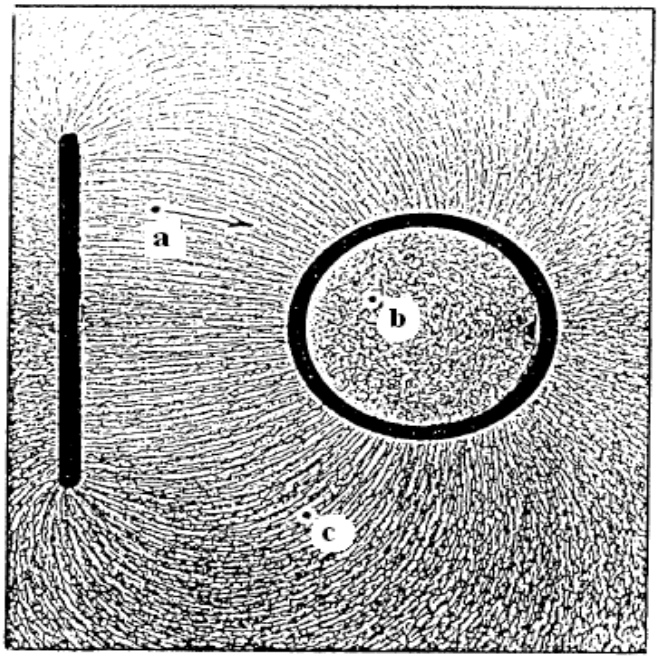
a.



b.



c.



d.

Conceptual PHYSICS