

Practice - Electric Fields

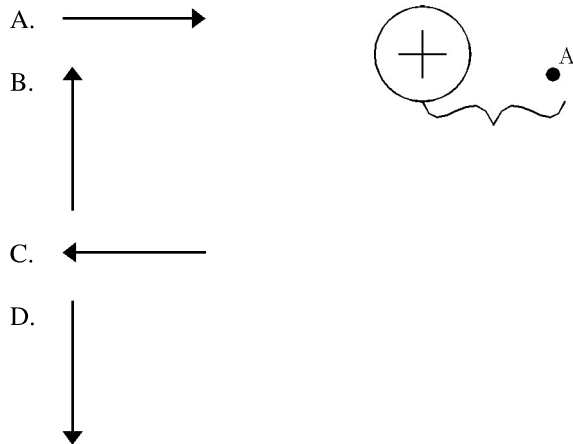
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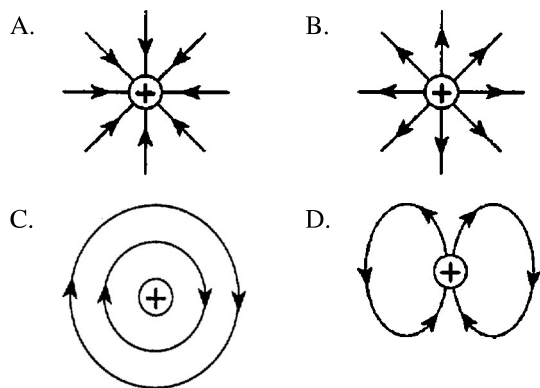
1. Which is a vector quantity?

- A. electric charge
- B. electrical resistance
- C. electrical potential difference
- D. electric field intensity

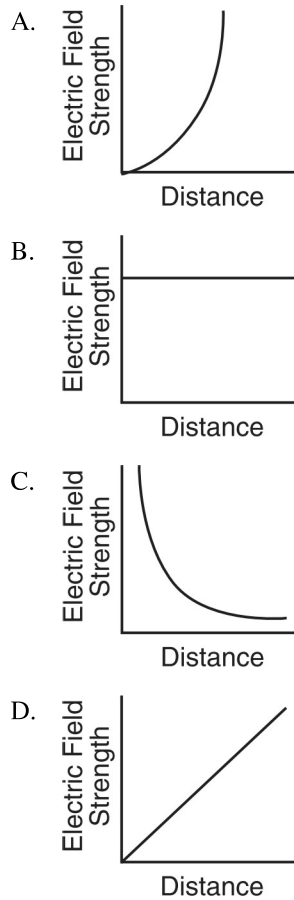
2. In the diagram, *A* is a point near a positively charged sphere. Which vector best represents the direction of the electric field at point *A*?



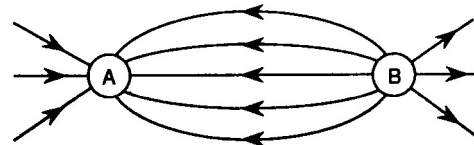
3. Which diagram best represents the electric field near a positively charged conducting sphere?



4. Which graph best represents the relationship between the strength of an electric field and distance from a point charge?

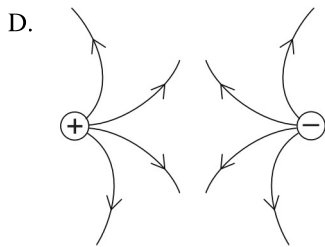
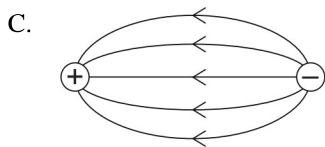
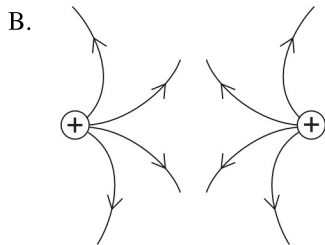
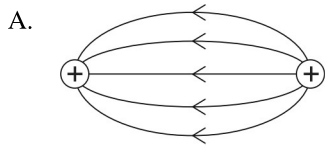


5. The diagram shown represents the electric field lines in the vicinity of two isolated electrical charges, *A* and *B*. Which statement identifies the charges of *A* and *B*?

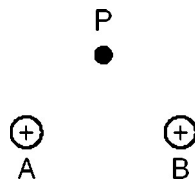


- A. *A* is negative and *B* is positive.
- B. *A* is positive and *B* is negative.
- C. *A* and *B* are both positive.
- D. *A* and *B* are both negative.

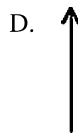
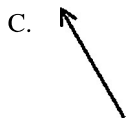
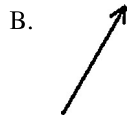
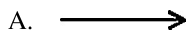
6. Which diagram represents the electric field lines between two small electrically charged spheres?



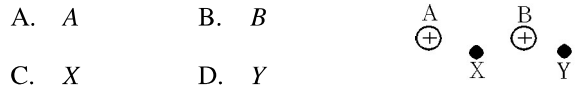
7. In the accompanying diagram, two identical spheres, *A* and *B*, have equal net positive charges.



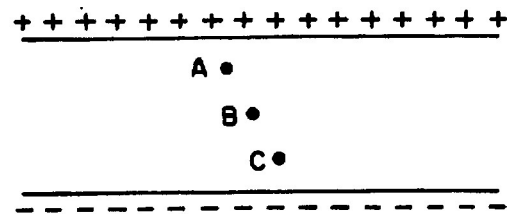
Which arrow best represents the direction of their resultant electric field at point *P*?



8. Two equal positive point charges, *A* and *B*, are positioned as shown. At which location is the electric field intensity due to these two charges equal to zero?

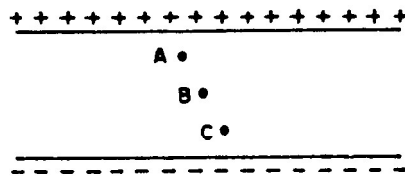


9. The diagram represents two charged parallel plates. How does the intensity of the electric field compare at locations *A*, *B*, and *C*?



- A. The intensity is greater at *A* than at *B*.
- B. The intensity is greater at *C* than at *A*.
- C. The intensity is greater at *B* than at *C*.
- D. The intensity is the same at *A*, *B*, and *C*.

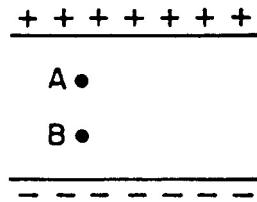
10. The diagram shown represents two charged parallel plates. What is the force acting on an electron placed in the electric field relative to locations *A*, *B* and *C*?



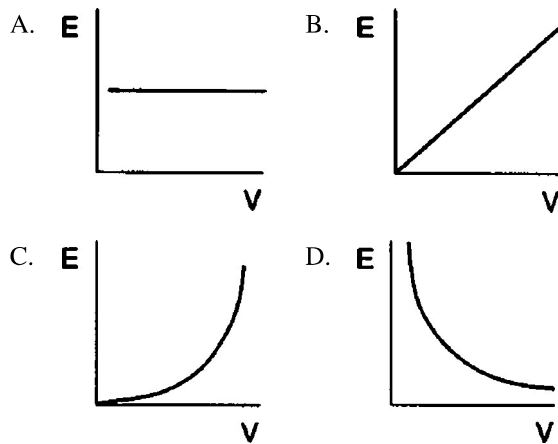
- A. greater at *A* than at *B*
- B. greater at *C* than at *A*
- C. greater at *A* than at *C*
- D. the same at *A*, *B*, and *C*

11. As an electron moves between two charged parallel plates from point *B* to point *A*, as shown in the diagram, the force of the electric field on the electron

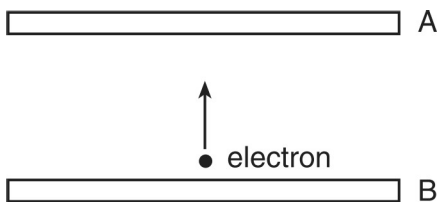
- A. decreases
- B. increases
- C. remains the same



12. Two oppositely charged parallel plates are a fixed distance apart. Which graph best represents the relationship between the electric field intensity (E) between the plates and the potential difference (V) across the plates?



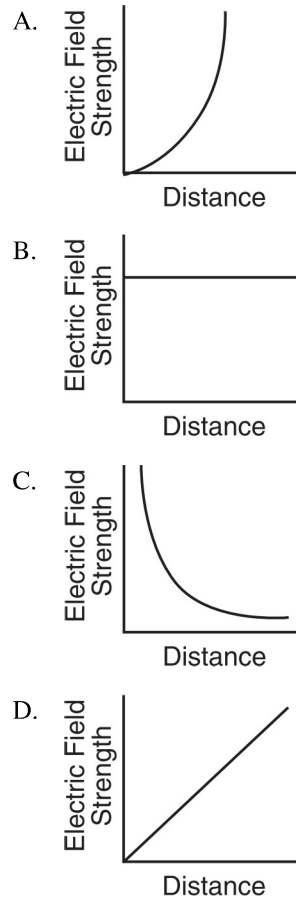
13. An electron placed between oppositely charged parallel plates *A* and *B* moves toward plate *A*, as represented in the diagram below.



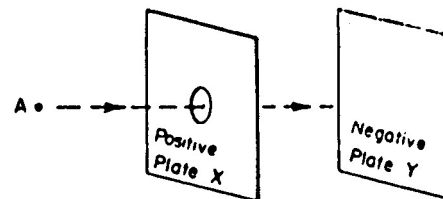
What is the direction of the electric field between the plates?

- A. toward plate *A*
- B. toward plate *B*
- C. into the page
- D. out of the page

14. Which graph best represents the relationship between electric field intensity and distance between two oppositely charged parallel plates?

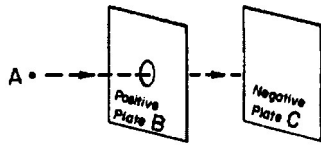


15. An electron is fired from *A* toward *X*. After the electron passes through a hole in positively charged plate *X*, as shown in the diagram, where will the electrical force on the electron be directed?



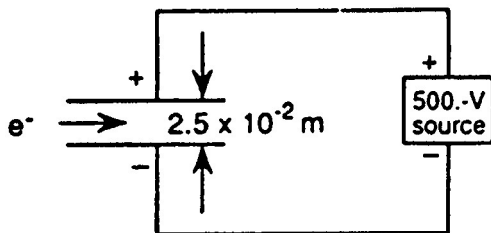
- A. toward plate *X*
- B. toward plate *Y*
- C. up
- D. down

16. A beam of electrons is fired from point A toward plate B as shown in the diagram. After the beam passes through a hole in positively charged plate B, the electrons will



- A. speed up
 B. slow down
 C. be pushed up
 D. be pushed toward the right
17. Which could *not* be accelerated using an electric field?
- A. electron B. positron
 C. alpha particle D. photon

18. The diagram shown represents an electron with a velocity of 2.0×10^6 meters per second directed into a region between two large, flat charged parallel plates.



The direction of the acceleration of the electron in the region between the plates is

- A. into the page
 B. out of the page
 C. toward the bottom of the page
 D. toward the top of the page

19. What is the magnitude of the electric field intensity at a point in the field where an electron experiences a 1.0-newton force?

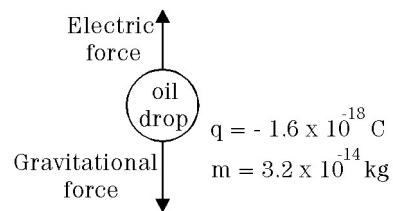
- A. 1.0 N/C B. 1.6×10^{-19} N/C
 C. 6.3×10^{18} N/C D. 9.1×10^{-31} N/C

20. What force will a proton experience in a uniform electric field whose strength is 2.00×10^5 newtons per coulomb?

- A. 8.35×10^{24} N B. 1.67×10^5 N
 C. 3.20×10^{-14} N D. 1.67×10^{-14} N

21. The diagram which illustrates the Millikan oil drop experiment, shows a 3.2×10^{-14} -kilogram oil drop with a charge of -1.6×10^{-18} coulomb. The oil drop was in equilibrium when the upward electric force on the drop was equal in magnitude to the gravitational force on the drop.

What was the magnitude of the electric field intensity when this oil drop was in equilibrium?



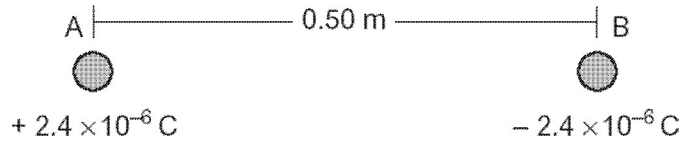
- A. 2.0×10^{-5} N/C B. 2.0×10^5 N/C
 C. 5.0×10^{-5} N/C D. 5.0×10^5 N/C

22. What is the magnitude of the electric field intensity at a point where a proton experiences an electrostatic force of magnitude 2.30×10^{-25} newton?

- A. 3.68×10^{-44} N/C B. 1.44×10^{-6} N/C
 C. 3.68×10^6 N/C D. 1.44×10^{44} N/C

23. Base your answer(s) to the following question(s) on the information and diagram below.

Two small charged spheres, *A* and *B*, are separated by a distance of 0.50 meter. The charge on sphere *A* is $+2.4 \times 10^{-6}$ coulomb and the charge on sphere *B* is -2.4×10^{-6} coulomb.



a. On the diagram below, sketch three electric field lines to represent the electric field in the region between sphere *A* and sphere *B*. [Draw an arrowhead on each field line to show the proper direction.]



b. Calculate the magnitude of the electrostatic force that sphere *A* exerts on sphere *B*. [Show all calculations, including the equation and substitution with units.]

c. Using the axes below, sketch the general shape of the graph that shows the relationship between the magnitude of the electrostatic force between the two charged spheres and the distance separating them. The charge on each sphere remains constant as the distance separating them is varied.

