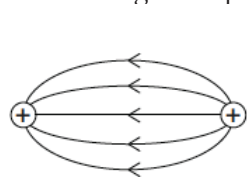
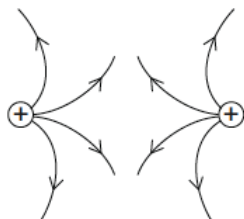


# Electrostatics-E Field

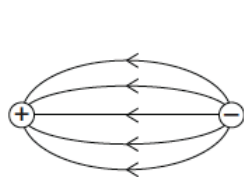
1. Which diagram represents the electric field lines between two small electrically charged spheres?



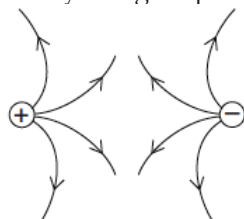
(1)



(2)

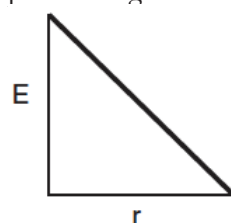


(3)

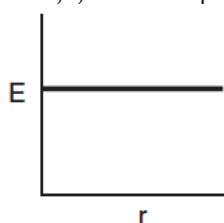


(4)

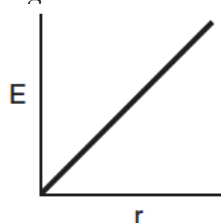
2. Which graph best represents the relationship between the magnitude of the electric field strength,  $E$ , around a point charge and the distance,  $r$ , from the point charge?



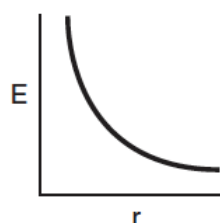
(1)



(2)

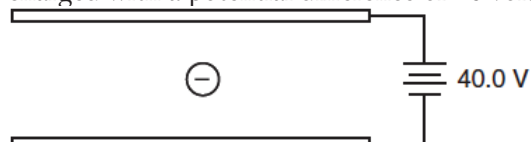


(3)



(4)

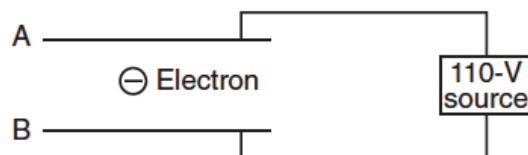
3. The diagram below represents an electron within an electric field between two parallel plates that are charged with a potential difference of 40 volts.



If the magnitude of the electric force on the electron is  $2.00 \times 10^{-15}$  newton, the magnitude of the electric field strength between the charged plates is

1.  $3.20 \times 10^{-34}$  N/C
  2.  $2.00 \times 10^{-14}$  N/C
  3.  $1.25 \times 10^4$  N/C
  4.  $2.00 \times 10^{16}$  N/C
4. Two oppositely charged parallel metal plates, 1.00 centimeter apart, exert a force with a magnitude of  $3.60 \times 10^{-15}$  newton on an electron placed between the plates. Calculate the magnitude of the electric field strength between the plates. [Show all work, including the equation and substitution with units.]

5. An electron is located in the electric field between two parallel metal plates as shown in the diagram below.

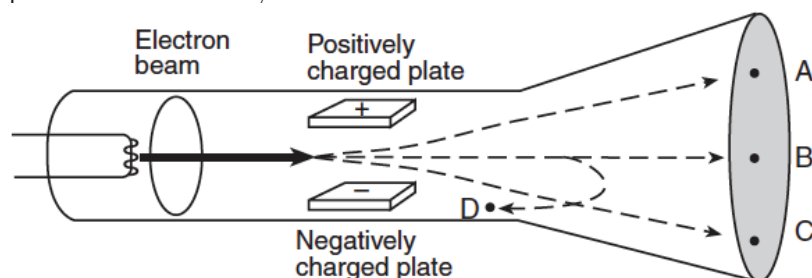


If the electron is attracted to plate A, then plate A is charged

1. positively, and the electric field is directed from plate A toward plate B
2. positively, and the electric field is directed from plate B toward plate A
3. negatively, and the electric field is directed from plate A toward plate B
4. negatively, and the electric field is directed from plate B toward plate A

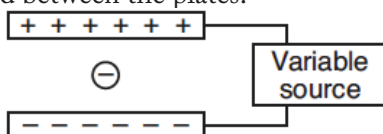
# Electrostatics-E Field

6. The diagram below shows a beam of electrons fired through the region between two oppositely charged parallel plates in a cathode ray tube.



After passing between the charged plates, the electrons will most likely travel path

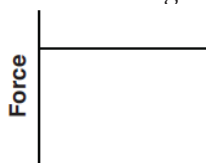
1. A
  2. B
  3. C
  4. D
7. Two parallel metal plates are connected to a variable source of potential difference. When the potential difference of the source is increased, the magnitude of the electric field strength between the plates increases. The diagram below shows an electron located between the plates.



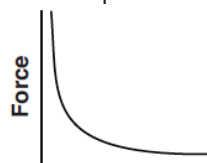
Which graph represents the relationship between the magnitude of the electrostatic force on the electron and the magnitude of the electric field strength between the plates?



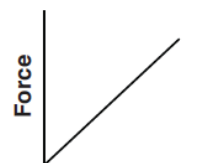
(1)



(2)



(3)

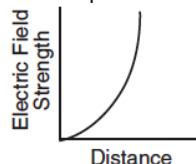


(4)

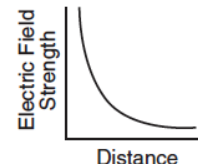
8. On the diagram below, sketch at least four electric field lines with arrowheads that represent the electric field around a negatively charged conducting sphere.



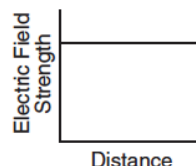
9. Which graph best represents the relationship between the strength of an electric field and distance from a point charge?



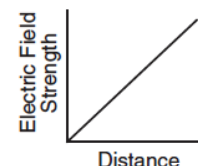
(1)



(3)



(2)



(4)

# Electrostatics-E Field

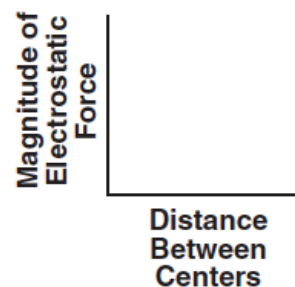
Base your answers to questions 11 through 13 on the information below.

The centers of two small charged particles are separated by a distance of  $1.2 \times 10^{-4}$  meter. The charges on the particles are  $+8.0 \times 10^{-19}$  coulomb and  $+4.8 \times 10^{-19}$  coulomb, respectively.

10. Calculate the magnitude of the electrostatic force between these two particles. [Show all work, including the equation and substitution with units.]

11. On the axes at right, sketch a graph showing the relationship between the magnitude of the electrostatic force between the two charged particles and the distance between the centers of the particles.

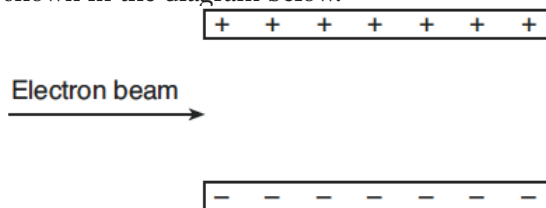
12. On the diagram below, draw at least four electric field lines in the region between the two positively charged particles.



$$8.0 \times 10^{-19} \text{ C } (+)$$

$$(+ ) 4.8 \times 10^{-19} \text{ C}$$

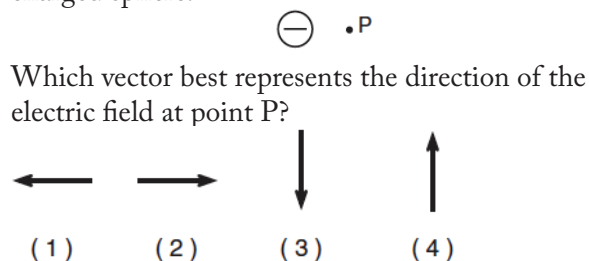
13. A beam of electrons is directed into the electric field between two oppositely charged parallel plates, as shown in the diagram below.



The electrostatic force exerted on the electrons by the electric field is directed

1. into the page
  2. out of the page
  3. toward the bottom of the page
  4. toward the top of the page
14. What is the magnitude of the electric field intensity at a point where a proton experiences an electrostatic force of magnitude  $2.30 \times 10^{-25}$  newton?
1.  $3.68 \times 10^{-44}$  N/C
  2.  $1.44 \times 10^{-6}$  N/C
  3.  $3.68 \times 10^6$  N/C
  4.  $1.44 \times 10^{44}$  N/C

15. In the diagram below, P is a point near a negatively charged sphere.



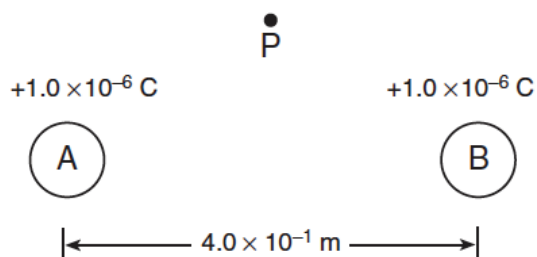
Which vector best represents the direction of the electric field at point P?

16. An object with a net charge of  $4.80 \times 10^{-6}$  coulomb experiences an electrostatic force having a magnitude of  $6.00 \times 10^{-2}$  newton when placed near a negatively charged metal sphere. What is the electric field strength at this location?
1.  $1.25 \times 10^4$  N/C directed away from the sphere
  2.  $1.25 \times 10^4$  N/C directed toward the sphere
  3.  $2.88 \times 10^{-8}$  N/C directed away from the sphere
  4.  $2.88 \times 10^{-8}$  N/C directed toward the sphere

# Electrostatics-E Field

Base your answers to questions 17 and 18 on the information and diagram below.

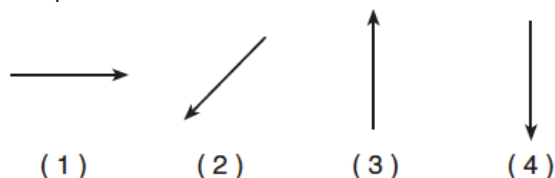
Two small metallic spheres, A and B, are separated by a distance of  $4.0 \times 10^{-1}$  meter, as shown. The charge on each sphere is  $+1.0 \times 10^{-6}$  coulomb. Point P is located near the spheres.



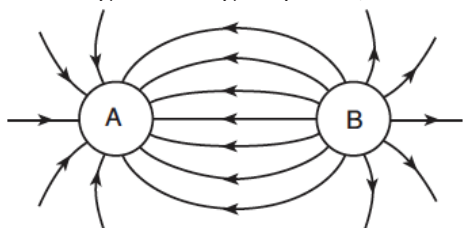
17. What is the magnitude of the electrostatic force between the two charged spheres?

1.  $2.2 \times 10^{-2}$  N
2.  $5.6 \times 10^{-2}$  N
3.  $2.2 \times 10^4$  N
4.  $5.6 \times 10^4$  N

18. Which arrow best represents the direction of the resultant electric field at point P due to the charges on spheres A and B?



19. The diagram below represents the electric field surrounding two charged spheres, A and B.



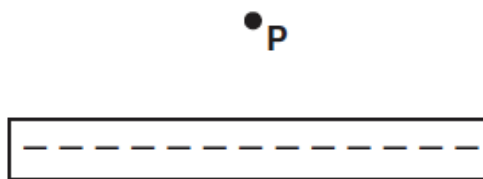
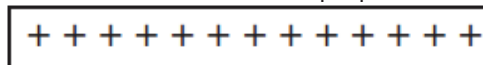
What is the sign of the charge of each sphere?

1. Sphere A is positive and sphere B is negative
2. Sphere A is negative and sphere B is positive
3. Both spheres are positive
4. Both spheres are negative

Base your answers to questions 20 and 21 on the information below.

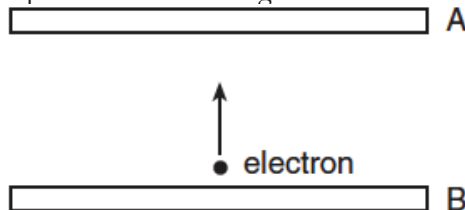
The magnitude of the electric field strength between two oppositely charged parallel metal plates is  $2.0 \times 10^3$  newtons per coulomb. Point P is located midway between the plates.

20. On the diagram below, sketch at least five electric field lines to represent the field between the two oppositely charged plates. [Draw an arrowhead on each field line to show the proper direction.]



21. An electron is located at point P between the plates. Calculate the magnitude of the force exerted on the electron by the electric field. [Show all work, including the equation and substitution with units.]

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

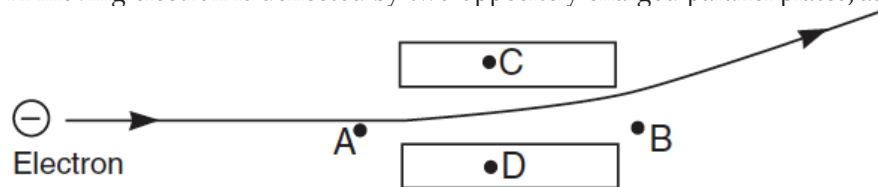


What is the direction of the electric field between the plates?

1. toward plate A
2. toward plate B
3. into the page
4. out of the page

## Electrostatics-E Field

23. A moving electron is deflected by two oppositely charged parallel plates, as shown in the diagram below.



The electric field between the plates is directed from

1. A to B
  2. B to A
  3. C to D
  4. D to C
- 
24. A  $3.00 \times 10^{-9}$ -coulomb test charge is placed near a negatively charged metal sphere. The sphere exerts an electrostatic force of magnitude  $6.00 \times 10^{-5}$  newton on the test charge. What is the magnitude and direction of the electric field strength at this location?
1.  $2.00 \times 10^4$  N/C directed away from the sphere
  2.  $2.00 \times 10^4$  N/C directed toward the sphere
  3.  $5.00 \times 10^{-5}$  N/C directed away from the sphere
  4.  $5.00 \times 10^{-5}$  N/C directed toward the sphere