Name: _____

Chapter 16 Electric Forces and Fields Pre-test

1)   Metal sphere *A* has a charge of -2 units and an identical metal sphere, *B*, has a charge of -4 units. If the spheres are brought into contact with each other and then separated, the charge on sphere *B* will be

2)   The energy required to move one elementary charge through a potential difference of 5.0 volts is

3)   An electrostatic force of 20. newtons is exerted on a charge of 8.0×10^{-2} coulomb at point *P* in an electric field. What is the magnitude of the electric field intensity at *P*?

Questions 4 and 5 refer to the following:

The magnitude of the electric field strength between two oppositely charged parallel metal plates is 2.0×10^3 newtons per coulomb. Point *P* is located midway between the plates as shown in the diagram below.
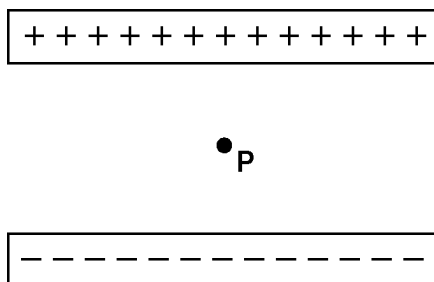

4)   On the diagram provided, sketch *at least* five electric field lines to represent the field between the two oppositely charged plates. [*Draw an arrowhead on each field line to show the proper direction.*]

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

6) The diagram below represents two electrically charged identical-sized metal spheres, *A* and *B*.

A

$+2.0 \times 10^{-7}$ C

B

$+1.0 \times 10^{-7}$ C

If the spheres are brought into contact, which sphere will have a net gain of electrons?

A) neither *A* nor *B*   B) both *A* and *B*   C) *A*, only   D) *B*, only

7) If a small sphere possesses an excess of 5 electrons, the net charge on the sphere is

A) -3.2×10^{20} C   B) -3.2×10^{-20} C   C) -8.0×10^{-19} C   D) -8.0×10^{19} C

8) A balloon is rubbed against a student's hair and then touched to a wall. The balloon "sticks" to the wall due to

A) magnetic forces between the particles of the wall
B) magnetic forces between the particles of the balloon and the particles of the wall
C) electrostatic forces between the particles of the balloon
D) electrostatic forces between the particles of the balloon and the particles of the wall

9) Which graph *best* represents the relationship between the magnitude of the electrostatic force and the distance between two oppositely charged particles?

A)

Force

Distance

C)

Force

Distance

B)

Force

Distance

D)

Force

Distance
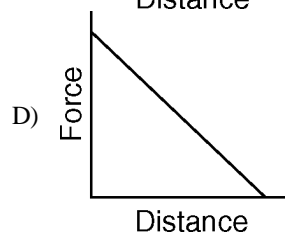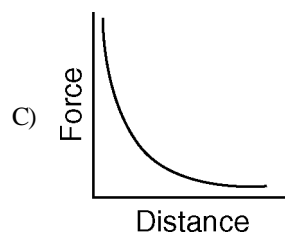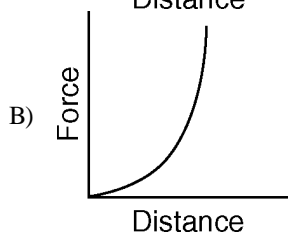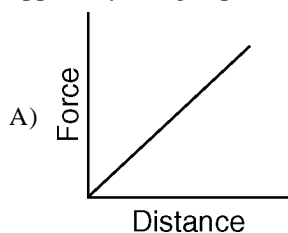
10) A negatively charged plastic comb is brought close to, but does not touch, a small piece of paper. If the comb and the paper are attracted to each other, the charge on the paper

A) must be positive   C) may be negative or neutral
B) must be negative   D) may be positive or neutral

11) Two similar metal spheres, *A* and *B*, have charges of $+2.0 \times 10^{-6}$ coulomb and $+1.0 \times 10^{-6}$ coulomb, respectively, as shown in the diagram below. The magnitude of the electrostatic force on *A* due to *B* is 2.4 newtons.

$+2.0 \times 10^{-6}$ C $\quad$ $+1.0 \times 10^{-6}$ C

A $\qquad$ B
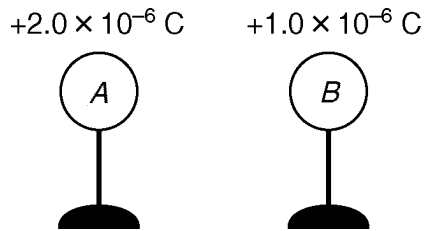
What is the magnitude of the electrostatic force on *B* due to *A*?

A) 9.6 N $\qquad$ B) 4.8 N $\qquad$ C) 1.2 N $\qquad$ D) 2.4 N

12) Which graph *best* represents the relationship between the strength of an electric field and distance from a point charge?

A)

C)

B)

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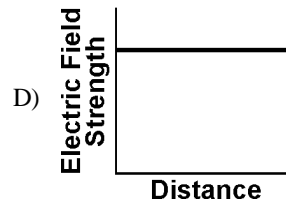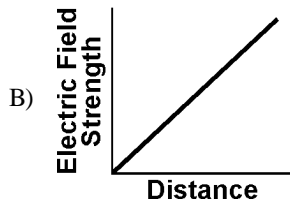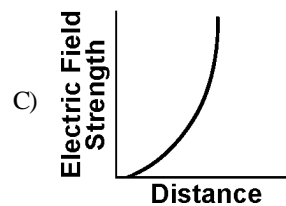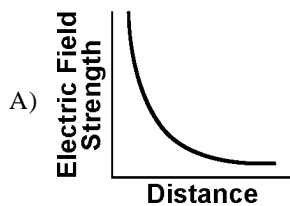
13) An electron placed between oppositely charged parallel plates *A* and *B* moves toward plate *A*, as represented in the diagram below.

A

electron

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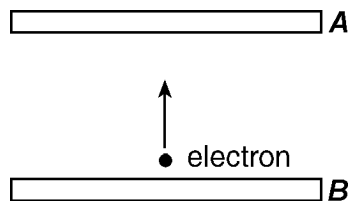
What is the direction of the electric field between the plates?

A) out of the page $\qquad$ B) into the page $\qquad$ C) toward plate *B* $\qquad$ D) toward plate *A*

14) Which diagram *best* represents the electric field around a negatively charged conducting sphere?
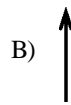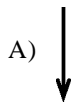
A)

C)

B)

D)
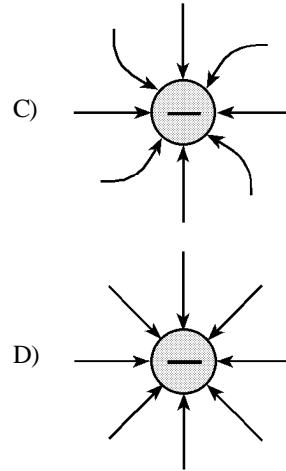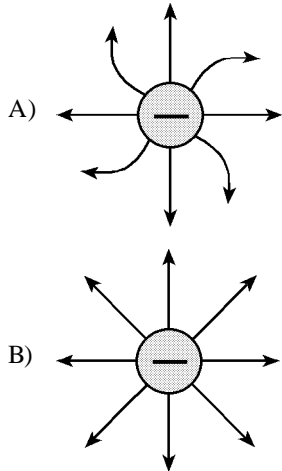
15) What is the magnitude of the electrostatic force acting on an electron located in an electric field having a strength of 5.0×10^3 newtons per coulomb?

16) In the diagram below, *P* is a point near a negatively charged sphere.

Which of the following vectors *best* represents the direction of the electric field at point *P*?

A)   B)   C)   D)

17) Which of the following quantities of excess electric charge could be found on an object?

A) 1.60 elementary charges

C) 4.80×10^{-19} C

B) 6.25×10^{-19} C

D) 6.25 elementary charges