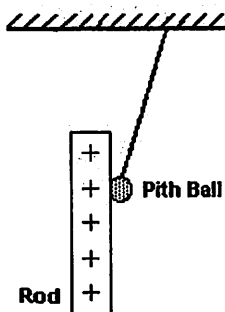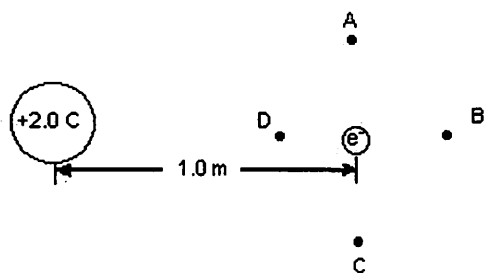22. As shown in the diagram, a neutral pith ball suspended on a string is attracted to a positively charged rod.

During contact with the rod, the pith ball

A. loses electrons
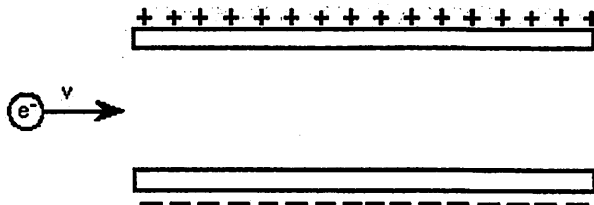B. gains electrons
C. loses protons
D. gains protons

23. An electron is located 1.0 meter from a +2.0-coulomb charge, as shown in the diagram.

The electrostatic force acting on the electron is directed toward point

A. A
B. B
C. C
D. D

24. In the diagram below, an electron moving with speed v enters the space between two oppositely charged parallel plates.


Which diagram below best represents the path the electron follows as it passes between the plates?

A.   C.

B.   D.

25. An inflated balloon which has been rubbed against a person's hair is touched to a neutral wall and remains attracted to it. Which diagram best represents the charge distribution on the balloon and the wall?

A.   C.

B.   D.

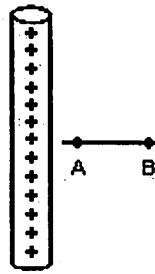18. The diagram shows the electric field in the vicinity of two charged conducting spheres, *A* and *B*.
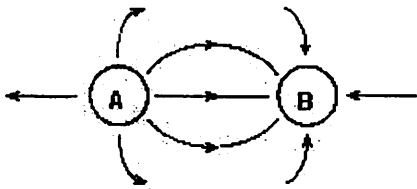
What is the static electric charge on each of the conducting spheres?

   A. *A* is negative and *B* is positive.
   B. *A* is positive and *B* is negative.
   C. Both *A* and *B* are positive.
   D. Both *A* and *B* are negative.

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
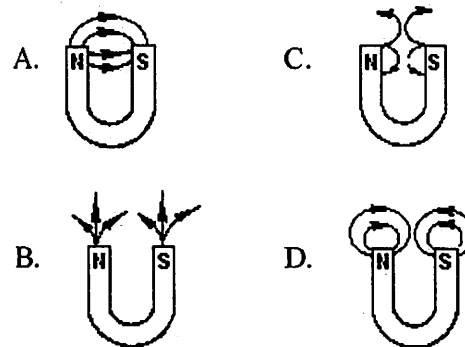   C. 6.3×10^{18} N/C
   D. 9.1×10^{-31} N/C

20. The diagram below represents a uniformly charged rod.

Which graph best represents the relationship between the magnitude of the electric field intensity (*E*) and the distance from the rod as measured along line *AB*?
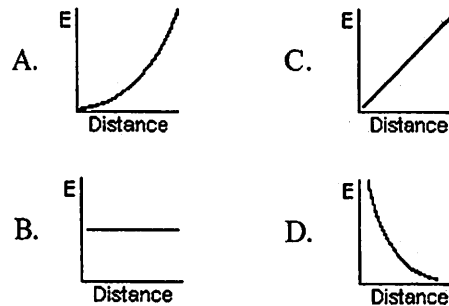
21. Which diagram best represents the magnetic field near the poles of a horseshoe magnet?

14. A metallic sphere is positively charged. The field at the center of the sphere due to this positive charge is
   A. positive
   B. negative
   C. zero
   D. dependent on the magnitude of the charge

15. How much energy is needed to move one electron through a potential difference of 1.0×10^2 volts?
   A. 1.0 J
   B. 1.0×10^2 J
   C. 1.6×10^{-19} J
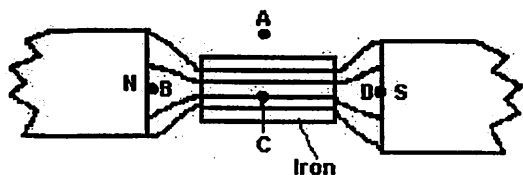   D. 1.6×10^{-17} J

16. Which diagram best represents the magnetic field between two magnetic north poles?

A.

C.

B.

D.
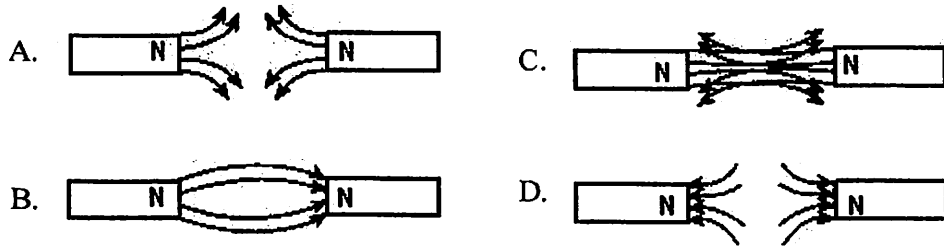
17. Which diagram best represents the charge distribution on a neutral electroscope when a negatively charged rod is held near it?

A.

C.

B.

D.
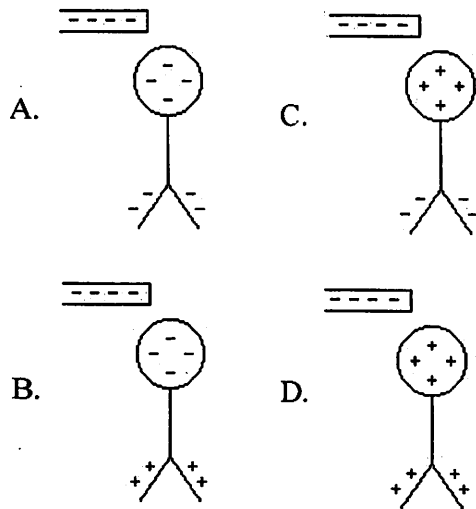
6. The diagram shows the magnetic field that results when a piece of iron is placed between unlike magnetic poles.

Iron

At which point is the magnetic field strength greatest?

A. A
B. B
C. C
D. D

7. An electron moves at 3.0×10^7 meters per second perpendicularly to a magnetic field that has a flux density of 2.0 teslas. What is the magnitude of the force on the electron?

A. 9.6×10^{-19} N
B. 3.2×10^{-19} N
C. 9.6×10^{-12} N
D. 4.8×10^{-12} N

8. An object with +10 elementary charges is grounded and becomes neutral. What is the best explanation for this occurrence?

A. The object gained 10 electrons from the ground.
B. The object lost 10 electrons to the ground.
C. The object gained 10 protons from the ground.
D. The object lost 10 protons to the ground.

9. Two identical spheres carry charges of +0.6 coulomb and -0.2 coulomb, respectively. If these spheres touch, the resulting charge on the first sphere will be

A. +0.8 C
B. +0.2 C
C. -0.3 C
D. +0.4 C

10. The diagram shows the positions of two positive point charges, A and B.
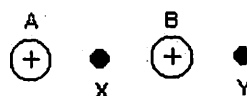
At which location is the electric field intensity due to these two charges equal to zero?

A. A
B. B
C. X
D. Y

11. As two nuclei are moved closer together, the electrostatic force of repulsion between them
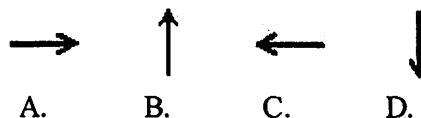
A. decreases
B. increases
C. remains the same

12. Which part of an atom is most likely to be transferred as a body acquires a static electric charge?

A. proton
B. neutron
C. electron
D. positron

13. In the diagram below, A is a point near a positively charged sphere.

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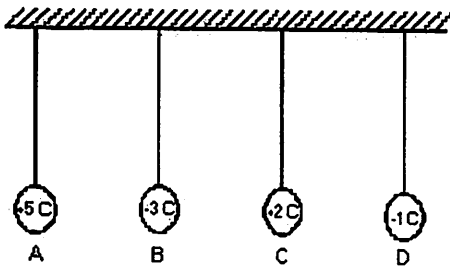

A.   B.   C.   D.

1. If a positively charged rod is brought near the knob of a positively charged electroscope, the leaves of the electroscope will
   A. converge, only
   B. diverge, only
   C. first diverge, then converge
   D. first converge, then diverge

2. The diagram shows four charged metal spheres suspended by strings. The charge of each sphere is indicated.

If spheres A, B, C, and D simultaneously come into contact, the net charge on the four spheres will be

   A. +1 C
   B. +2 C
   C. +3 C
   D. +4 C

3. If the potential difference between two oppositely charged metal plates is doubled, the electric field intensity at a point between them is
   A. halved
   B. unchanged
   C. doubled
   D. quadrupled

4. Moving a point charge of 3.2×10^{-19} C between points A and B in an electric field requires 4.8×10^{-19} J of energy. What is the potential difference between these two points?
   A. 0.67 V
   B. 2.0 V
   C. 3.0 V
   D. 1.5 V

5. In the diagram, a steel paper clip is attached to a string, which is attached to a table. The clip remains suspended beneath a magnet.

Table
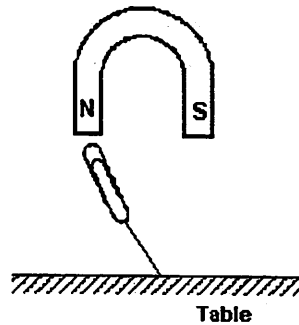
As the magnet is lifted the paper clip begins to fall as a result of

   A. an increase in the potential energy of the clip
   B. an increase in the gravitational field strength near the magnet
   C. a decrease in the magnetic properties of the clip
   D. a decrease in the magnetic field strength near the clip