Name: _____ Practice Ph12 4-2

1. A "point" charge of 2.3×10^{-12} C exerts a force on a "point" charge of 1.5×10^{-12} C situated 2.0 m away. What is the force exerted by the first charge on the second?
   A. 1.0×10^{-2} N
   B. 7.8×10^{-15} N
   C. 1.6×10^{-14} N
   D. 5.2×10^{-3} N

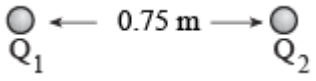
2. Keeping all other variables constant, the size of the electric force between two charges is
   A. inversely proportional to the product of the charges.
   B. inversely proportional to the square of the distance separating the charges.
   C. inversely proportional to the distance separating the charges.
   D. directly proportional to the square of the distance separating the charges.

3. The force between two equal charges at a separation of 2.0×10^{-2} m is 3.6×10^{1} N. How big is each charge?
   A. 1.27×10^{-6} C
   B. 2.8×10^{-8} C
   C. 4.0×10^{-9} C
   D. 1.6×10^{-19} C

4. What is the point charge which experiences a 4.0×10^{4} N force when it is 1.5×10^{-3} m from a 2.0 μC point charge?
   A. 4.5×10^{4} C
   B. 5.0×10^{-6} C
   C. 6.7×10^{-9} C
   D. 3.3×10^{-3} C

5. What is the distance between two electrons if the electrostatic force between them is 1.0×10^{-12} N?
   A. 2.3×10^{-16} m
   B. 6×10^{-8} m
   C. 3×10^{-8} m
   D. 1.5×10^{-8} m

6. If $Q_1 = 1.2 \times 10^{-9}$ C and $Q_2 = -2.7 \times 10^{-9}$ C, what is the electric force exerted on Q_2 by Q_1?



   A. 5.2×10^{-8} N to the right
   B. 5.2×10^{-8} N to the left
   C. 3.9×10^{-8} N to the right
   D. 3.9×10^{-8} N to the left

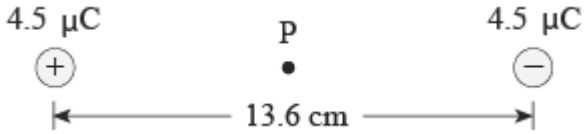
7. An electron orbits the nucleus of an atom with velocity *v*. If this electron were to orbit the same nucleus with twice the previous orbital radius, its orbital velocity would now be
   A. $2v$
   B. v
   C. $\frac{v}{\sqrt{2}}$
   D. $\frac{v}{2}$

8. Find the elecric field strength 40.0 cm from a charge of 7.0×10^{-5} C.

9. An electric field exists only around
   A. neutral objects
   B. negative charges
   C. positive charges
   D. electric charges

10. An electron experiences an electric force of 8.0×10^{-15} N when in an electric field. What is the strength of the electric field?
   A. 2.0×10^{-5} N/C
   B. 1.4×10^{-9} N/C
   C. 3.1×10^{23} N/C
   D. 5.0×10^{4} N/C

11. What is the magnitude of the electric field strength at point 'P', midway between the positive and negative 4.5 µC, 13.6 cm apart as shown below?



   A. 1.8×10^{7} N/C
   B. 4.4×10^{6} N/C
   C. 2.2×10^{6} N/C
   D. 0 N/C

12. Which diagram shows the electric field near a negative point charge?

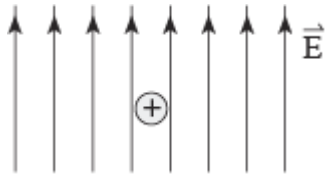
A. 

B. 

C. 

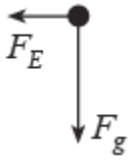
D. 

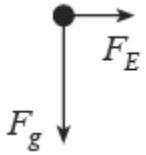
13. A positively charged oil droplet is in a vertical electric field.

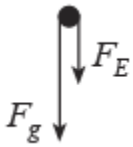


Which of the following is a correctly labelled free-body diagram showing the forces acting on the oil droplet?

A. 

B. 

C. 

D. 

14. What is the force of gravity on a plastic sphere which has a positive charge of 4.8×10^{-19} C and is held stationary in a gravitational field of 9.8 N/kg by an electric field of 1.2×10^{5} V/m with a plate separation of 1.0 m?

A. 5.8×10^{-18} N

B. 4×10^{-24} N

C. 2.1×10^{23} N

D. 5.8×10^{-14} N

15. Two large parallel metal plates have a potential difference of 350 V between them. If the magnitude of the electric field between the plates is 2.9×10^{4} N/C, what is the magnitude of the electric force experienced by an electron between the plates?

A. 4.6×10^{-15} N

B. 5.5×10^{-24} N

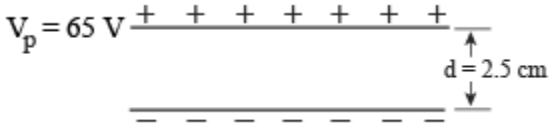
C. 4.6×10^{-22} N

D. 5.6×10^{-17} N

16. Which one of the following is equivalent to one volt?

A. One newton per ampere
B. One joule per coulomb
C. One joule per ampere
D. One newton per coulomb

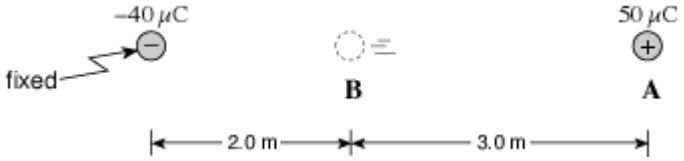
17. Calculate the magnitude of the electric field strength between the parallel plates shown below.



A. 1.6×10^{20} N/C
B. 4.2×10^{-18} N/C
C. 2600 N/C
D. 26 N/C

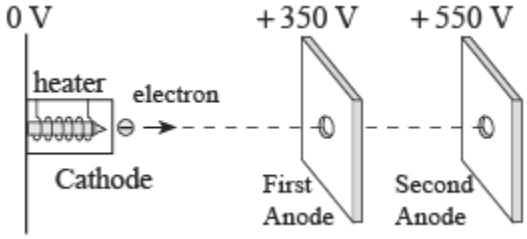
Use the following information to answer the next 1 question(s).

A 1.0×10^{-3} kg styrofoam ball carrying 50 µC of charge is released from rest from position A as shown in the diagram below. (1 µC = 1.0×10^{-6} C).



18. What is the speed of the ball as it reaches position B? ($v_i = 0$ at A).

19. An electron is emitted with negligible kinetic energy from the cathode of a cathode ray tube as shown. What is the kinetic energy of the electron (in joules) when it reaches the second anode?



A. 1.4×10^{-16} J
B. 3.2×10^{-17} J
C. 5.6×10^{-17} J
D. 8.8×10^{-17} J

20. What is the electrical potential energy, relative to infinity, of the electron in a ^4_2He ion if the electron is 5.5×10^{-11} m away from the nucleus?

A. -8.4×10^{-18} J
B. -4.2×10^{-18} J
C. -7.6×10^{-8} J
D. -1.5×10^{-7} J

21. How long will it take an electron, accelerated from rest through a potential difference of 350V, to travel 25.0 cm from the accelerating plate to the front of a vacuum tube?
    A. 2.25×10^{-6} s
    B. 3.18×10^{-8} s
    C. 2.25×10^{-8} s
    D. 2.03×10^{-15} s

22. If a point P near a positive charge at Q has a voltage of +2 V relative to infinity, then
    A. the electrical potential energy lost by a charge of +1 C in moving from P to Q is 2 J
    B. the work that must be done to move a charge of +1 C from infinity to P is 2 J
    C. the work that must be done to move a charge of +1 C from P to Q is 2 J
    D. the electrical potential energy lost by a charge of +1 C in moving from infinity to P is 2 J