Name: ______________________________ Period: ____________

Electrostatics-Charge

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

If the spheres are brought into contact, which sphere will have a net gain of electrons?
   1. A, only
   2. B, only
   3. both A and B
   4. neither A nor B

2. 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
   1. 0 units
   2. -2 units
   3. -3 units
   4. +4 units

3. If an object has a net negative charge of 4.0 coulombs, the object possesses
   1. 6.3×10^{18} more electrons than protons
   2. 2.5×10^{19} more electrons than protons
   3. 6.3×10^{18} more protons than electrons
   4. 2.5×10^{19} more protons than electrons

Base your answers to questions 4 and 5 on the information below

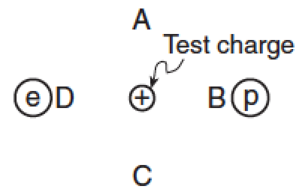
A lightweight sphere hangs by an insulating thread. A student wishes to determine if the sphere is neutral or electrostatically charged. She has a negatively charged hard rubber rod and a positively charged glass rod. She does not touch the sphere with the rods, but runs tests by bringing them near the sphere one at a time.

4. Describe the test result that would prove that the sphere is neutral

5. Describe the test result that would prove that the sphere is positively charged.

6. Oil droplets may gain electrical charges as they are projected through a nozzle. Which quantity of charge is *not* possible on an oil droplet?
   1. 8.0×10^{-19} C
   2. 4.8×10^{-19} C
   3. 3.2×10^{-19} C
   4. 2.6×10^{-19} C

7. A positive test charge is placed between an electron, *e*, and a proton, *p*, as shown in the diagram below.



When the test charge is released, it will move toward
   1. A
   2. B
   3. C
   4. D

8. A metal sphere has a net negative charge of 1.1×10^{-6} coulomb. Approximately how many more electrons than protons are on the sphere?
   1. 1.8×10^{12}
   2. 5.7×10^{12}
   3. 6.9×10^{12}
   4. 9.9×10^{12}

9. A positively charged glass rod attracts object X. The net charge of object X
   1. may be zero or negative
   2. may be zero or positive
   3. must be negative
   4. must be positive

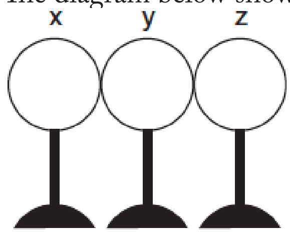
10. The charge-to-mass ratio of an electron is
   1. 5.69×10^{-12} C/kg
   2. 1.76×10^{-11} C/kg
   3. 1.76×10^{11} C/kg
   4. 5.69×10^{12} C/kg

11. What is the magnitude of the charge, in coulombs, of a lithium nucleus containing three protons and four neutrons?

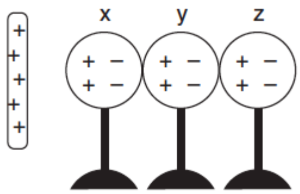
Name: ______________________________ Period: __________

Electrostatics-Charge

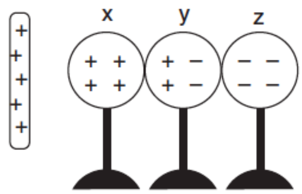
12. The diagram below shows three neutral metal spheres, x, y, and z, in contact and on insulating stands.



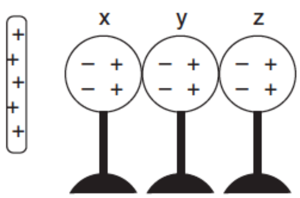
Which diagram best represents the charge distribution on the spheres when a positively charged rod is brought near sphere x, but does not touch it.



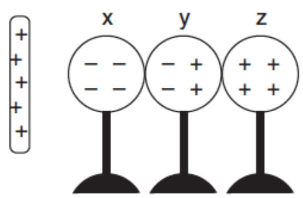
(1)



(3)



(2)



(4)

13. What is the net electrical charge on a magnesium ion that is formed when a neutral magnesium atom loses two electrons?
    1. -3.2×10^{-19} C
    2. -1.6×10^{-19} C
    3. $+1.6 \times 10^{-19}$ C
    4. $+3.2 \times 10^{-19}$ C

14. 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
    1. may be negative or neutral
    2. may be positive or neutral
    3. must be negative
    4. must be positive

15. An object possessing an excess of 6.0×10^{6} electrons has a net charge of
    1. 2.7×10^{-26} C
    2. 5.5×10^{-24} C
    3. 3.8×10^{-13} C
    4. 9.6×10^{-13} C

16. When a neutral metal sphere is charged by contact with a positively charged glass rod, the sphere
    1. loses electrons
    2. gains electrons
    3. loses protons
    4. gains protons

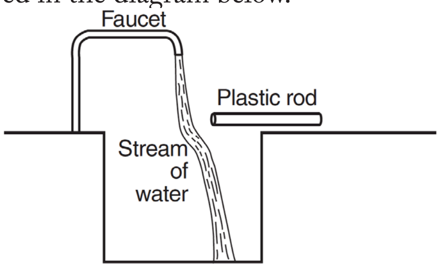
17. Which quantity of excess electric charge could be found on an object?
    1. 6.25×10^{-19} C
    2. 4.8×10^{-19} C
    3. 6.25 elementary charges
    4. 1.60 elementary charges

18. A particle could have a charge of
    1. 0.8×10^{-19} C
    2. 1.2×10^{-19} C
    3. 3.2×10^{-19} C
    4. 4.1×10^{-19} C

Name: ______________________ Period: __________

Electrostatics-Charge

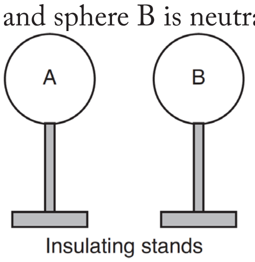
19. A dry plastic rod is rubbed with wool cloth and then held near a thin stream of water from a faucet. The path of the stream of water is changed, as represented in the diagram below.



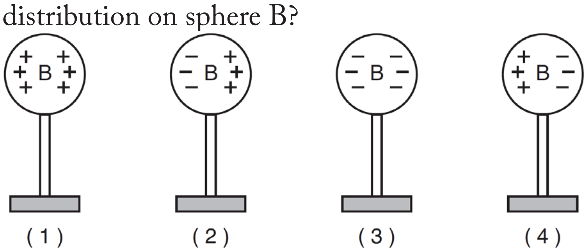
Which force causes the path of the stream of water to change due to the plastic rod?
1. nuclear
2. magnetic
3. electrostatic
4. gravitational

20. Which net charge could be found on an object?
1. $+4.80 \times 10^{-19}$ C
2. $+2.40 \times 10^{-19}$ C
3. -2.40×10^{-19} C
4. -5.60×10^{-19} C

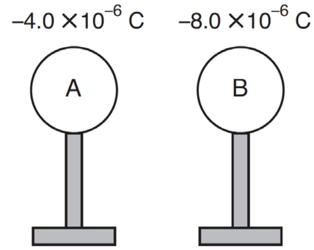
21. Two identically-sized metal spheres, A and B, are on insulating stands, as shown in the diagram below. Sphere A possesses an excess of 6.3×10^{10} electrons and sphere B is neutral.



Which diagram best represents the charge distribution on sphere B?



22. Two identically-sized metal spheres on insulating stands are positioned as shown below. The charge on sphere A is -4.0×10^{-6} coulomb and the charge on sphere B is -8.0×10^{-6} coulomb.



The two spheres are touched together and then separated. The total number of excess electrons on sphere A after the separation is
1. 2.5×10^{13}
2. 3.8×10^{13}
3. 5.0×10^{13}
4. 7.5×10^{13}