Physics 1 - Self Test Ch 32 & 33

Name_____ MOD___

Acceleration of gravity: g = 10 m/s² **(43 total points)**

$F = \frac{k q_1 q_2}{r^2}$ **k = 9 x 10⁹ N·m²/C²** **electron charge = 1.6 x 10⁻¹⁹ C** **electron mass = 9.1 x 10⁻³¹ kg**

Voltage = Work/charge

Multiple Choice

___ 1. Subatomic particles with a negative charge are called
a. protons b. neutrons c. quarks d. electrons

___ 2. A neutral object has an equal number of _____ and _____
a. protons and neutrons
b. electrons and neutrons
c. protons and quarks
d. protons and electrons

___ 3. Objects become electrically charged by gaining or losing
a. protons b. neutrons c. quarks d. electrons

___ 4. Charged atoms are called
a. isotopes b. ions c. cations d. anions

___ 5. Gravitational forces are
a. attractive only b. repulsive only c. both attractive and repulsive

___ 6. Electrical forces are
a. attractive only b. repulsive only c. both attractive and repulsive

___ 7. A repelling force occurs between two charged objects when the charges are
a. of like sign b. of unlike sign c. of equal magnitude d. of unequal magnitude

___ 8. An object becomes positively charged by:
a. gaining electrons b. losing electrons c. gaining protons d. losing protons e. both a & b f. all of these

___ 9. The subatomic particles which can move freely within some materials are:
a. electrons b. protons c. neutrons d. both a and c

___ 10. The conservation of charge means that
a. the total amount of charge in the universe is constant
b. charge cannot be created or destroyed
c. both a and b
d. none of these choices

___ 11. In a material that is an electric insulator
a. there are more protons than electrons
b. electrons can move about freely
c. there are no electrons
d. electrons are tightly bound to their atoms

___ 12. If you comb your hair and the comb becomes negatively charged, your hair becomes
a. negatively charged b. positively charged c. uncharged

___ 13. To charge an object, charges must be
a. created b. destroyed c. moved from one place to another d. neutralized

___ 14. A rubber balloon is rubbed against a wall and then sticks to the wall. This is because:
a. charges are somewhat sticky and behave like glue
b. electrons hop back and forth between the balloon and the wall
c. the balloon induces an opposite charge on the wall surface
d. the balloon causes the formation of ions on the wall

___15. When an object is charged by conduction, the charge on it is the _____ the charging agent. When an object is charged by induction, the charge on it is the _____ the charging agent
a. same as, same as b. same as, opposite of c. opposite of, opposite of d. opposite of, same as

___ 16. Coulomb's Law says that the force between any two charges depends
a. directly on the size of the charge
b. inversely on the square of the distance between the charges
c. both of these
d. neither of these

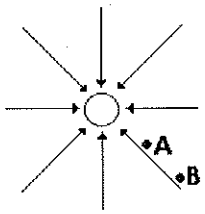
___ 17. A 2 coulomb charge and a 4 coulomb charge attract each other with a force of 10 N. How much is the new force if the 4 coulomb charge is doubled to 8 coulombs?
a. 5 N b. 10 N c. 20 N d. 50 N

___ 18. Two charges exert a force of 1.0 N on each other. If the magnitude (amount) of each charge is doubled, the force on each charge is
a. 1.0 N b. 2.0 N c. 3.0 N d. 4.0 N

___ 19. Two charges exert a force of 1.0 N on each other. If the magnitude (amount) of each charge is doubled, and the distance between them is also doubled, the force on each charge is:
a. 1.0 N b. 2.0 N c. 3.0 N d. 4.0 N

___ 20. The charge on the large object is:
a. positive b. negative c. can't tell

___ 21. At which position is the field stronger:
a. position A b. position B c. same both places



___ 22. Electric lines of force tell us about:
a. the size of the electric field
b. the direction of the electric field
c. both a and b
d. neither a or b

___ 23. The leaves of a neutral electroscope diverge when a negatively charged object touches the scope's rod. The term "diverge" means to:
a. dive
b. move toward each other
c. move away from each other
d. explode

___ 24. A volt is a unit of
a. energy b. electric charge c. energy per charge d. electric current

___ 25. What is another name for potential difference?
a. charge b. potential energy c. voltage d. coulomb

Questions 26 and 27. When an electron is brought near a negatively charged sphere

___ 26. its potential energy
a. increases b. decreases c. remains the same d. cannot determine

___ 27. this is because
a. work had to be done to move the charge
b. electrons and negative charges attract each other
c. both reasons
d. neither reason

___ 28. If you do 10 joules of work to move a 1.0 coulomb charge in an electric field, the voltage of the charge with respect to its starting point is:
a. 0.1 volt b. 10 volts c. 11 volts d. 100 volts

Questions 29 and 30 It takes 20 joules of work to move a 2.0 coulomb charge in a certain electric field, and it takes 10 joules of work to move a 1.0 coulomb charge in the same field

___ 29. Which charge gained more potential energy?
a. 1.0 coulomb charge b. 2.0 coulomb charge c. work is the same in both cases

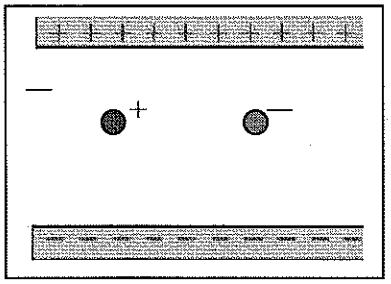
___ 30. Which charge has more voltage with respect to its starting point?
a. 1.0 coulomb charge b. 2.0 coulomb charge c. voltage is the same in both cases

FREE RESPONSE

31. ***How much work is done*** when moving a 1.0 coulomb charge from one plate of a battery to the other plate if the voltage of the battery is 3.0 volts?

32. Imagine a free electron and a free proton midway between the two charged plates shown. When released:
a. In what direction do the charges move?

b. Which charge arrives at what plate first?



33. Compare an electric field to a gravitational field (give at least 3 comparisons). (3 pts.)

ELECTRIC FIELD	GRAVITATIONAL FIELD

34. When objects become charged due to the transfer of charge it's the electrons that do the transferring. Why not the ***protons***?

35. Calculate the ***force*** that exists between a charge of 1.8×10^{-6} C and -2.5×10^{-6} C when they are placed 15 cm apart.

36. During the '90's a French team flew a kite that was 1034 m long. Imagine two charges of opposite sign at the opposite ends of the kite and of a charge of 1.0 coulomb. Calculate the force between the two charges. It is an attractive or repulsive force? (2)

37. What is an **electroscope**? How would you use an electroscope to show *conduction* and *induction*? (3 pts.)