

HONORS CHEMISTRY -- CHAPTER 8-9 TEST – MULTIPLE CHOICE

NAME: \_\_\_\_\_

- Which of the following has bonds which are the least ionic?  
a)  $\text{CCl}_4$       b)  $\text{SiO}_2$       c)  $\text{KCl}$       d)  $\text{NH}_3$       e)  $\text{H}_2$
- What type of bonding occurs between phosphorus and hydrogen within a molecule of  $\text{PH}_3$ ?  
a) ionic      b) covalent      c) hydrogen bonding      d) LDF's
- Which of the following are non-polar molecules?  
a)  $\text{F}_2$       b)  $\text{O}_2$       c)  $\text{CH}_4$       d)  $\text{CO}_2$       e) all of these
- The lattice energy of  $\text{CaS}$  is higher than the lattice energy of  $\text{NaCl}$ . Why is this the case?  
a)  $\text{NaCl}$  possesses greater charges  
b)  $\text{CaS}$  possesses greater charges  
c) in the crystalline lattice, there is less distance between Ca and S atoms  
d) in the crystalline lattice, there is less distance between Na and Cl atoms
- The pi bond in the carbonate ion ( $\text{CO}_3^{2-}$ ) is...  
a) localized      b) delocalized      c) there is no pi bond in this ion
- Resonance structures for individual molecules are useful because they indicate...  
a) that there are many different types of the same molecule  
b) that often times, pi bonds are delocalized  
c) that a double bond can be in one location on one molecule and in another location on another molecule  
d) that Lewis structures can never violate the octet rule
- In which pair do both compounds exhibit ionic bonding?  
a)  $\text{SO}_2$ ,  $\text{HCl}$       b)  $\text{KNO}_3$ ,  $\text{CH}_4$       c)  $\text{NaF}$ ,  $\text{K}_2\text{SO}_4$       d)  $\text{KCl}$ ,  $\text{CO}_2$       e)  $\text{NaCl}$ ,  $\text{H}_2\text{O}$
- Which of the following best explains why the boiling point of  $\text{H}_2\text{O}$  is higher than the boiling point of  $\text{H}_2\text{S}$ ?  
a)  $\text{H}_2\text{O}$  is less polar than  $\text{H}_2\text{S}$   
b)  $\text{H}_2\text{S}$  is a larger molecule, leading to stronger LDF's than for  $\text{H}_2\text{O}$   
c) hydrogen bonds exist among molecules of  $\text{H}_2\text{O}$   
d) water has a low mass  
e)  $\text{H}_2\text{O}$  is a larger molecule, leading to stronger LDF's than for  $\text{H}_2\text{S}$
- Which of the following compounds would be expected to have the highest melting point?  
a)  $\text{LiF}$       b)  $\text{BF}_3$       c)  $\text{CF}_4$       d)  $\text{NF}_3$       e)  $\text{OF}_2$
- Dry ice is frozen  $\text{CO}_2$ . What types of forces can exist between molecules of  $\text{CO}_2$ ?  
a) hydrogen bonds      b) LDF's      c) dipole-dipole forces      d) a & c
- What is the molecular geometry of  $\text{CO}_2$ ?  
a) T-shaped      b) trigonal planar      c) seesaw      d) linear      e) tetrahedral
- A central atom which has 5 electron domains associated with it results in bond angles of \_\_\_\_\_ degrees.  
a) 90      b) 120      c) 90 & 120      d) 109.5      e) 90 & 109.5
- $\text{CO}$  contains \_\_\_\_\_ pi bonds.  
a) 0      b) 1      c) 2      d) 3      e) cannot be determined
- In sigma bonding electrons are...  
a) delocalized      b) localized on the internuclear axis      c) either of these

15. Which of the following has the strongest bond?  
a)  $H_2$             b)  $N_2$             c)  $F_2$             d)  $O_2$             e)  $Cl_2$
16. Delocalized pi bonding in benzene ( $C_6H_6$ ) \_\_\_\_\_ the bonding in benzene.  
a) weakens            b) strengthens            c) has no effect on
17. Electrons are **transferred** from one element to another in a...  
a) polar covalent bond            b) non-polar covalent bond            c) ionic bond            d) all of these
18. Which of the following molecules possesses a dipole moment?  
a)  $BI_3$             b)  $BrF_3$             c)  $PCl_3$             d) a & b            e) b & c
19. What is the hybridization in a molecule with 120 degree bond angles exclusively?  
a)  $sp$             b)  $sp^2$             c)  $sp^3$             d)  $sp^3d$             e)  $sp^3d^2$
20. Which hybridization scheme results in a planar molecule (i.e. all atoms lying in the same plane) if there are no unshared electron pairs around the central atom?  
a)  $sp^4$             b)  $sp^2$             c)  $sp^3$             d)  $sp^3d$             e)  $sp^3d^2$
21. Which of the following best describes a pi bond?  
a) end to end d orbital overlap            b) s to s orbital overlap            c) side by side p orbital overlap  
d) side by side  $sp^3$  orbital overlap
22. How many pi bonds are present in a molecule of  $NH_3$ ?  
a) 0            b) 1            c) 2            d) 3            e) 4
23. The strong electrostatic attraction between cations and anions causes the formation of ionic compounds to be \_\_\_\_\_ process.  
a) an endothermic            b) an exothermic            c) both an endothermic and an exothermic
24. Which of the following has charged particles arranged in a highly ordered crystalline lattice?  
a)  $H_2$             b)  $NaCl$             c)  $MgO$             d)  $CH_4$             e) more than one of these
25. Molecules are the smallest representative particle for which of the following?  
a)  $H_2O$             b)  $NaCl$             c)  $MgO$             d)  $He$             e) more than one of these
26. T or F. If a molecule possesses polar bonds, then the molecule will definitely exhibit molecular polarity.
27. Ionic compounds which are insoluble tend to have  
a) low lattice energy            b) covalent bonds            c) delocalized pi bonding            d) high lattice energy
28. Which of the following pairs of substances would exhibit ion-dipole forces when mixed together?  
a)  $Fe, H_2O$             b)  $CH_4, H_2O$             c)  $NaCl, NH_3$             d)  $He, Ar$             e) none of these
29. Which of the following compounds exhibits dipole-dipole forces?  
a)  $BI_3$             b)  $BrF_3$             c)  $PCl_3$             d) a & b            e) b & c
30. Which of the following compounds exhibits LDF's?  
a)  $BI_3$             b)  $BrF_3$             c)  $PCl_3$             d) a & b            e) all of these
31. Which of the following best explains why the boiling point of  $H_2Se$  is higher than the boiling point of  $H_2S$ ?  
a)  $H_2Se$  is less polar than  $H_2S$   
b)  $H_2Se$  is a larger molecule, leading to stronger LDF's than for  $H_2S$   
c) hydrogen bonds exist among molecules of  $H_2Se$   
d)  $H_2Se$  is more polar than  $H_2S$