QUIZ: HYBRIDIZATION

SCH3UE 2004 –2005 NAME: __________

1. Which of the following compounds possesses at least one σ bond:

   A. CH_4 B. C_2H_2 C. C_2H_4 D. All of the above

2. In a double-bonded carbon atom:

   A. hybridization between the s orbital and one p orbital occurs.
   B. hybridization between the s orbital and two p orbital occurs.
   C. hybridization between the s orbital and three p orbital occurs.
   D. no hybridization occurs between the s and p orbitals.

3. The hybridization of the carbon atom and the nitrogen atom in the ion CN^{-1} are:

   A. sp^3 and sp^3, respectively. B. sp^3 and sp, respectively.
   C. sp and sp^3, respectively. D. sp and sp, respectively.

4. Which of the following hybridizations does the Be atom in BeH_2 assume?

   A. sp B. sp^2 C. sp^3 D. None of the above

5. π bonds are formed by which of the following orbitals?

   A. two s orbitals B. two p orbitals
   C. one s and one p orbital D. All of the above

6. Which of the following decrease(s) as the number of bonds between two atoms increases?

   I. Bond length **II. Bond strength**

   A. I only B. II only C. Both I and II D. Neither I nor II

7. What hybrid orbitals are present in the compound Buta-1,3-diene, $H_2C{=}CH{-}CH{=}CH_2$?

   A. sp hybrids only B. sp^2 hybrids only
   C. sp and sp^2 only D. sp, sp^2 and sp^3

8. For the molecule given below, which statement is **TRUE**?

   $CH_2 = CH\ C \equiv C\ CH_2\ CH_2\ OH$

   A. The molecule contains a total of 14 sigma bonds.
   B. Carbon number 1 is best described by sp hybridization.
   C. The molecule contains two pi bonds.
   D. Carbon number 3 is best described by sp^3 hybridization.

9. What type of hybrid orbitals are used for bonding by Xe in the XeF_4 molecule?

   A. sp^2 B. sp^3 C. dsp^3 D. d^2sp^3

10. The hybridization of the carbon atom in the carbonate ion, CO_3^{2-}, is best described as :

    A. sp B. sp^2 C. sp^3 D. sp^3d^2

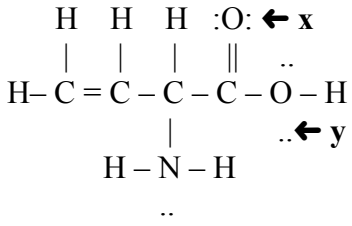
11. What is the hybridization of As in the AsF_4^{-1} ion?

a. sp b. sp^2 c. sp^3 d. dsp^3 e. d^2sp^3

12. Which of the molecules have the same sp^2 hybridization:
a. CH_4 and SF_4 b. CO_2 and H_2O
c. CO_2 and BeH_2 d. N_2O and NO_2

13. How many unhybridized p– atomic orbitals are there on an *sp* hybridized carbon atom?
a. 1 b 2 c. 3 d. 4

The **next four questions**, refer to the following molecule:



14. What is the hybridization of the oxygen atom labeled **x** ?
a. sp b. sp^2 c. sp^3 d. dsp^3 e. d^2sp^3

15. What is the hybridization and the H – O – C bond angle for the oxygen atom labeled **y** ?
a. sp, 180^0 b. sp^2, 109^0 c. sp^3, 109^0 d. dsp^3, 90^0

16. How many π – bonds are shown in the above diagram?
a. 0 b. 1 c. 2 d. 3 e. 4

17. What is the hybridization of the nitrogen atom?
a. sp b. sp^2 c. sp^3 d. dsp^3 e. d^2sp^3

18. Describe any changes in the hybridization of the nitrogen and boron atoms in the following reaction:

$$BF_{3\,(g)} + NH_{3\,(g)} \longrightarrow F_3B — NH_{3\,(s)}$$

3

MULTIPLE CHOICE ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17