

AP chem solutions MCQ Unit 2 - set 1

Molecular and Ionic Compound Structure and Properties

Multiple Choice I

Name: \_\_\_\_\_

**CALCULATORS CANNOT BE USED IN THIS SECTION**

1. Identify the answer choice that contains only non-polar molecules.

- (A)  $\text{BH}_3$ ,  $\text{PH}_3$ ,  $\text{CH}_4$
  - (B)  $\text{O}_3$ ,  $\text{BCl}_3$ ,  $\text{PCl}_3$
  - (C)  $\text{CO}_2$ ,  $\text{O}_3$ ,  $\text{CF}_4$
  - (D)  $\text{CH}_2\text{F}_2$ ,  $\text{NH}_3$ ,  $\text{CO}_2$
- 

2. Identify the compound from the list below that contains the most polar bonds.

- (A)  $\text{CBr}_4$
  - (B)  $\text{NF}_3$
  - (C)  $\text{BF}_3$
  - (D)  $\text{CF}_4$
- 

3. Which answer choice identifies the bonds that exist between the carbon and nitrogen atoms in the  $\text{HCN}$  molecule?

- (A) Two  $\sigma$ -bonds and two  $\pi$ -bonds
  - (B) Two  $\sigma$ -bonds and one  $\pi$ -bond
  - (C) One  $\sigma$ -bond and one  $\pi$ -bond
  - (D) One  $\sigma$ -bond and two  $\pi$ -bonds
- 

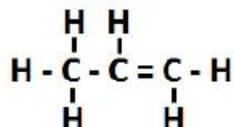
4. What is the effective number of bonds (bond order) between the sulfur and oxygen atoms in  $\text{SO}_2$ ?

- (A) 1
  - (B) 1.3
  - (C) 1.5
  - (D) 2
- 

5. Which of the following lists compounds in order of increasing melting point?

- (A)  $\text{NaBr} < \text{NaCl} < \text{MgS}$
- (B)  $\text{LiF} < \text{LiCl} < \text{LiBr}$
- (C)  $\text{NaCl} < \text{CO}_2 < \text{NF}_4$
- (D)  $\text{BeO} < \text{BeS} < \text{LiF}$

6.



Use the Lewis above structure for  $\text{C}_3\text{H}_5$  to identify the type(s) of hybrid orbitals that exist around the three carbon atoms.

- (A)  $\text{sp}^3$ ,  $\text{sp}^2$ , and  $\text{sp}$
- (B)  $\text{sp}^3$ ,  $\text{sp}^2$ , and  $\text{sp}^2$
- (C)  $\text{sp}^2$ ,  $\text{sp}^2$ , and  $\text{sp}$
- (D)  $\text{sp}^3$ ,  $\text{sp}^3$ , and  $\text{sp}^3$

—

7. A certain compound exhibits  $\text{sp}^2$  hybridization around the central atom. What shape results from the mutual repulsion of these hybrid orbitals?
- (A) linear
  - (B) trigonal planar
  - (C) trigonal pyramidal
  - (D) tetrahedral

—

8. Which of the following sets lists compounds in order of increasing bond angle?
- (A)  $\text{SF}_6 < \text{BH}_3 < \text{XeF}_2$
  - (B)  $\text{BF}_3 < \text{H}_2\text{O} < \text{CH}_4$
  - (C)  $\text{H}_2\text{O} < \text{Cl}_4 < \text{PH}_3$
  - (D)  $\text{O}_3 < \text{BBr}_3 < \text{NF}_3$

—

9. Which of the following correctly identifies the type of bonding that occurs in  $\text{SO}_2$ ,  $\text{ZrO}_2$ , and  $\text{O}_3$ ?
- (A)  $\text{SO}_2$  – polar covalent;  $\text{ZrO}_2$  – ionic;  $\text{O}_3$  – non-polar covalent
  - (B)  $\text{SO}_2$  – non-polar covalent;  $\text{ZrO}_2$  – ionic;  $\text{O}_3$  – polar covalent
  - (C)  $\text{SO}_2$  – ionic;  $\text{ZrO}_2$  – polar covalent;  $\text{O}_3$  – non-polar covalent
  - (D)  $\text{SO}_2$  – polar covalent;  $\text{ZrO}_2$  – non-polar covalent;  $\text{O}_3$  – ionic