Bonding Multiple Choice Quiz

1. The geometry of the $\text{SO}_3$ molecule is best described as
   (A) trigonal planar
   (B) trigonal pyramidal
   (C) square pyramidal
   (D) bent
   (E) tetrahedral

2. Which one of the following is linked with the correct intermolecular force of attraction?
   (A) $\text{NH}_3$..................... dipole-dipole
   (B) $\text{AlH}_3$..................... London dispersion forces
   (B) $\text{H}_2$..................... hydrogen bonding
   (D) $\text{C}_2\text{H}_4$................... covalent bonding
   (E) $\text{HCl}$...................... ionic

3. Which of the following molecules has the shortest bond length?
   (A) $\text{N}_2$
   (B) $\text{O}_2$
   (C) $\text{Cl}_2$
   (D) $\text{Br}_2$
   (E) $\text{I}_2$

4. Which of the following has a zero dipole moment?
   (A) $\text{HCN}$
   (B) $\text{NH}_3$
   (C) $\text{SO}_2$
   (D) $\text{NO}_2$
   (E) $\text{PF}_5$

5. For which substance would you predict the highest heat of vaporization?
   (A) $\text{F}_2$
   (B) $\text{H}_2\text{O}$
   (C) $\text{HF}$
   (D) $\text{NaCl}$
   (E) $\text{Br}_2$
6. For which of the following molecules are resonance structures necessary to describe the bonding satisfactorily?

(A) H₂S
(B) SO₂
(C) CO₂
(D) OF₂
(E) PF₃

7. The Lewis dot structure of which of the following molecules shows only one unshared pair of valence electron?

(A) Cl₂
(B) N₂
(C) NH₃
(D) CCl₄
(E) H₂O₂

8. CCl₄, CO₂, PCl₃, PCl₅, SF₆ Which of the following does not describe any of the molecules above?

(A) Linear
(B) Octahedral
(C) Square planar
(D) Tetrahedral
(E) Trigonal pyramidal

9. Which of the following indicates very strong intermolecular forces of attraction in a liquid?

(A) A very low boiling point.
(B) A very low critical temperature.
(C) A very low heat of vaporization.
(D) A very low vapor pressure.
(E) A very low surface tension.

10. The melting point of MgO is higher than that of NaF. Explanations for this observation include which of the following?

I. Mg²⁺ is more positively charged than Na⁺
II. O²⁻ is more negatively charged than F⁻
III. The O²⁻ ion is smaller than the F⁻ ion

(A) II only
(B) I and II only
(C) I and III only
(D) II and III only
(E) I, II, and III
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