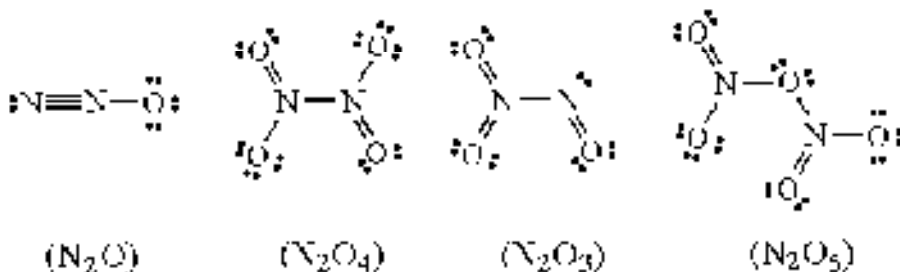


Bonding Multiple Choice Practice

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. Use VSEPR theory to predict the molecular geometry of SF_6 .
 - a. bent
 - b. linear
 - c. triangular planar
 - d. t-shaped
 - e. octahedral
2. All of the following Lewis structures of nitrogen oxides are possible EXCEPT

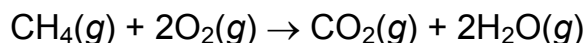


- a. N_2O .
 - b. N_2O_4 .
 - c. N_2O_3 .
 - d. N_2O_5 .
 - e. All of the above are correct structures.
3. Which of the following are correct resonance structures of SO_3 ?

The image shows five Lewis structures of SO_3 , each with a label in parentheses below it:

 - (1): Sulfur atom double-bonded to two oxygen atoms and single-bonded to one oxygen atom. All oxygen atoms have two lone pairs.
 - (2): Sulfur atom double-bonded to one oxygen atom and single-bonded to two oxygen atoms. All oxygen atoms have two lone pairs.
 - (3): Sulfur atom double-bonded to one oxygen atom and single-bonded to two oxygen atoms. All oxygen atoms have two lone pairs.
 - (4): Sulfur atom double-bonded to one oxygen atom and single-bonded to two oxygen atoms. All oxygen atoms have two lone pairs.
 - (5): Sulfur atom double-bonded to one oxygen atom and single-bonded to two oxygen atoms. All oxygen atoms have two lone pairs.
 4. Which of the following species has a Lewis structure with a molecular geometry similar to NH_3 ?
 - a. CO_3^{2-}
 - b. BH_3
 - c. H_3O^+
 - d. ICl_3
 - e. SO_3
 5. Which of the following species has a Lewis structure with a molecular geometry similar to SF_4 ?
 - a. BrF_4^+
 - b. ICl_4^-
 - c. NH_4^+
 - d. SO_4^{2-}
 - e. CCl_4
 6. Which of the following has a zero dipole moment?
 - a. HCN
 - b. NH_3
 - c. SO_2
 - d. NO_2
 - e. PF_5

7. What is the hybridization of the central atom in I_3^- ?
a. sp b. sp^2 c. sp^3 d. sp^3d e. sp^3d^2
8. How many sigma and pi bonds are present in H_2CO ?
a. 1 sigma bond and 3 pi bonds d. 3 sigma bonds and 1 pi bond
b. 2 sigma bonds and 2 pi bonds e. none of the above
c. 2 sigma bonds and 1 pi bond
9. Which of the following molecules has the shortest bond length?
a. N_2 b. O_2 c. Cl_2 d. Br_2 e. I_2
10. What are the bond angles in a phosphate ion?
a. 90° c. 120° e. 180°
b. 109.5° d. 90° and 120°
11. What hybridization change does the carbon atom undergo in the combustion of methane?



- a. $\text{sp} \rightarrow \text{sp}^2$ b. $\text{sp}^2 \rightarrow \text{sp}^3$ c. $\text{sp}^3 \rightarrow \text{sp}$ d. $\text{sp}^2 \rightarrow \text{sp}$ e. none
12. For which of the following molecules are resonance structures necessary to describe the bonding satisfactorily?
a. H_2S b. SO_2 c. CO_2 d. OF_2 e. PF_3
13. How many lone pairs of electrons are on the sulfur atom in sulfite ion, SO_3^{2-} ?
a. 0 b. 1 c. 2 d. 3 e. 4
14. How many possible resonance structures exist for the formate ion, HCO_2^- ?
a. 0 b. 2 c. 3 d. 4 e. 8
15. Use VSEPR theory to predict the molecular geometry of SO_3^{2-} .
a. bent c. square planar e. triangular pyramidal
b. tetrahedral d. triangular planar