Saitechinfo NEET JEE Academy

43, Haridoss Main Rd, CH-99. Ph:9444929163

CHEMICAL BONDING

Class 11 - Chemistry

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 45**

1. The valence bond theory explains the shape, the formation and directional properties of bonds in polyatomic molecules like CH_4, NH_3 and H_2O etc, in terms of **[1]**

   a) overlapping of atomic orbitals
   b) None of these
   c) Both overlapping of atomic orbitals and hybridisation of atomic orbitals
   d) hybridisation of atomic orbitals

2. The pair of species with the same bond order is **[1]**

   a) No, CO
   b) O_2^+, NO^+
   c) N_2, O_2
   d) O_2^{2-}, B_2

3. Four diatomic species are listed below. Identify the correct order in which the bond order is increasing in them **[1]**

   a) $He_2^+ < O_2^- < NO < C_2^{2-}$
   b) $NO < O_2^- < C_2^{2-} < He_2^+$
   c) $O_2^- < NO < C_2^{2-} < He_2^+$
   d) $C_2^{2-} < He_2^+ < O_2^- < NO$

4. In case of bond formation between sodium and chlorine, the electron transfer takes place from **[1]**

   a) chlorine to sodium
   b) None of these
   c) Both sodium to chlorine and chlorine to sodium
   d) sodium to chlorine

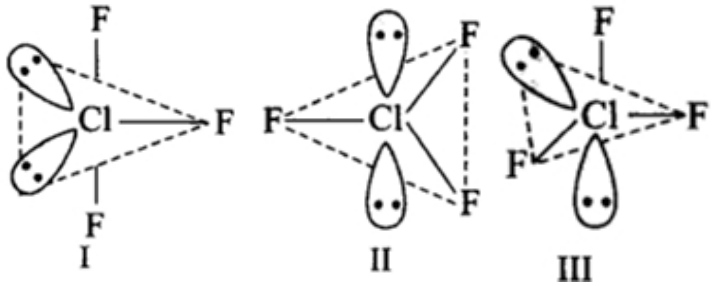
5. In which of the following pairs of molecules/ions both the species are not likely to exist? **[1]**

   a) H_2^-, He_2^{2-}
   b) H_2^+, He_2
   c) H_2^+, He_2^{2-}
   d) H_2^-, He_2^{2+}

6. Which of the molecules has trigonal bipyramidal geometry with bond angles 120^o and 90^o? **[1]**

   a) BF_3
   b) CH_4
   c) SF_6
   d) PCI_5

7. Which of the following structures is most stable? **[1]**



a) Only I
b) Only II
c) Only III
d) All three have same structure

8. Nitrogen, oxygen and fluorine are the highly electronegative elements. When they are attached to a hydrogen atom to form covalent bond, the electrons of the covalent bond are shifted towards the more electronegative atom. This partially positively charged hydrogen atom forms a bond with the other more electronegative atom. This bond is known as **[1]**

a) covalent bond
b) hydrogen bond
c) π-bond
d) σ-bond

9. Which of the following forms a monoatomic ion: **[1]**

a) P
b) Be
c) S
d) K

10. Lithium combines with oxygen to form: **[1]**

a) LiO
b) Li_3O_4
c) Li_2O
d) LiO_2

11. Differentiate between atomic and molecular orbital? **[3]**

12. What is the effect of the following ionisation processes on the bond order in C_2 and O_2? **[3]**

i. $C_2 \longrightarrow C_2^+ + e^-$
ii. $O_2 \longrightarrow O_2^+ + e^-$

13. Apart from tetrahedral geometry, another possible geometry for CH_4 is square planar with the four H-atoms at the corners of the square and the C-atom at its centre. Explain, why CH_4 is not square planar? **[3]**

14. Draw the shape of the following hybrid orbitals sp, sp^2 and sp^3. **[3]**

15. Give example each of the molecules which have the following geometries. **[3]**

i. Linear
ii. Trigonal planar
iii. Tetrahedral
iv. Trigonal bipyramidal
v. Octahedral
vi. Bent

16. A. Calculate the heat of formation of NaCI from the following data: **[5]**

Heat of sublimation of sodium = 108.5 kJ mol^{-1}

Dissociation energy of chlorine = 243.0 kJ mol^{-1}

Ionization energy of sodium = 495.8 kJ mol^{-1}

Electron gain enthalpy of chlorine = -348.8 kJ mol^{-1}

Lattice energy of sodium chloride = -758.7 kJ mol^{-1}

B. a. How do you represent enthalpy of solution of ionic solids?

b. What happens if $\Delta H_{\text{hydration}} > \Delta H_{\text{lattice}}$

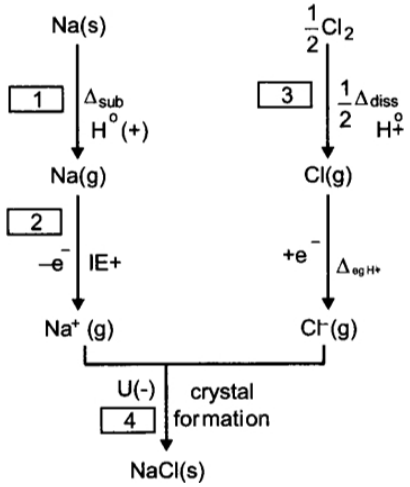
17. A. State the names of oxyacids of chlorine. **[5]**

B. Draw the structure of perchloric acid.

C. Name the oxyacid of chlorine which does not possess coordinate linkage?

D. How does coordinate bonds formed?

18. A. Complete the following table: **[5]**



Write the reaction involved for amount of heat liberated during the formation of sodium chloride by Born-Haber cycle.

B. Out of benzene and water, in which case ionic solids will dissolve. Why?

19. A. BF_3 does not follow octet rule for its existence. Explain. **[5]**

B. Name the scientist who explained the existence of BF_3 molecule. Justify.