

CLASS XI
CHEMICAL BONDING & MOLECULAR STRUCTURE
WORKSHEET - 04

ONE MARK QUESTIONS

- 1 Atomic orbital is monocentric while a molecular orbital is polycentric". Explain
- 2 Explain the term resonance.
- 3 HF has a higher boiling point than HCl.why?
- 4 Define hybridization.
- 5 Write electron dot structures of CO_2 and AlCl_3 .

TWO MARKS QUESTIONS

- 1 Define the term bond length. Arrange the following in the increasing order of their bond lengths:

Ethane, ethene, ethyne
- 2 Define the term bond angle. Arrange the following in the increasing order of their bond angle: Water, ammonia, methane, carbon dioxide.
- 3 Which hybrid orbitals are used by the carbon atoms in the following molecules?
 - a. $\text{CH}_3\text{-CH=CH}_2$
 - b. $\text{CH}_3\text{-CH}_2\text{-OH}$
 - c. CH_3CHO
 - d. CH_3COOH
- 4 What do you understand by formal charge of a molecule? Calculate the formal charges on all the atoms in the following molecules
 - i. HClO_4
 - ii. HSO_4
- 5 Differentiate between Bond energy and Bond dissociation energy

THREE MARKS QUESTIONS

- 1 What are
 - a) expanded octet molecules?
 - b) odd electron molecules?
 - c) Electron deficient molecules?Give two examples for each.
- 2 Differentiate between
 - b) Covalent and Van der Waal's radius

- c) Bonding and antibonding molecular orbital.
- 3 Draw the resonating structures for the following :
 CO_3^{2-} , NO_3^- , SO_2
- 4 Give reasons:
- BF_3 is non-polar while NF_3 is polar.
 - ClF_3 is T-shaped.
 - p_x orbital does not overlap with p_y orbital.
- 5 Justify the following
- Bonds in ozone are equivalent.
 - Oxygen is paramagnetic.
 - Acetic acid forms dimer.
- 6 Explain why
- Para nitro phenol has higher boiling point than ortho nitro phenol.
 - Hydrogen bonding in HCl is insignificant.
 - Bond angle in water is larger than bond angle in H_2S
- 7 Explain the formation of PCl_5 and SF_6 on the basis of hybridization.
- 8 Write the molecular orbital electronic configuration for O_2^- and O_2^+ , Calculate the bond order & comment on their stabilities.
- 9 Draw orbital overlap diagram for the following:
- H_3O^+
 - H_2O_2
 - NH_3
- 10 Which hybrid orbitals are used by the carbon atoms in the following molecules?
- $\text{CH}_3\text{-CH=CH}_2$
 - $\text{CH}_3\text{-CH}_2\text{-OH}$
 - CH_3CHO
 - CH_3COOH

VALUE BASED QUESTION(FOUR MARKS)

- 1 The Chemistry teacher was explaining the properties of two hydrides of Sulphur and Oxygen: H_2S and H_2O . H_2S and H_2O are having same hybridization states but different bond angles. H_2S has indefinite volume while H_2O has definite volume. H_2S cannot be placed in an open container but H_2O can be placed due to their different physical states.
- Write the hybridization states of central atom in H_2S and H_2O .
 - What are the physical states of H_2S and H_2O ?
 - Write bond angle of H_2O .
 - Why H_2S and H_2O have different bond angles .
