

**NAAHAR PUBLIC SCHOOL (CBSE) SENIOR SECONDARY
ACADEMIC YEAR(2022-2023)**

CLASS: XI
SUBJECT: CHEMISTRY
TEACHER'S INITIAL: Mrs.UMA

DATE: 19.11.2022
MARKS: 50
DUR: 40 Mins

I. MULTIPLE CHOICE QUESTIONS

10x1=10

- 1) The bond length between hybridised carbon atom and other carbon atom is minimum in
(a) Propane (b) Butane (c) Propene (d) Propyne
2. The number of nodal planes present in $s \times s$ antibonding orbitals is
(a) 1 (b) 2 (c) 0 (d) 3
- 3) Which one of the following does not have sp^2 hybridised carbon?
(a) Acetone (b) Acetic acid (c) Acetonitrile (d) Acetamide
- 4) Which of the following will have the lowest boiling point?
(a) 2-Methylbutane (b) 2-Methylpropane (c) 2,2-Dimethylpropane (d) n-Pentane
- 5) Among the following the maximum covalent character is shown by the compound
(a) $MgCl_2$ (b) $FeCl_2$ (c) $SnCl_2$ (d) $AlCl_3$
- 6) Among the following mixtures, dipole-dipole as the major interaction, is present in
(a) benzene and ethanol (b) acetonitrile and acetone
(c) KCl and water (d) benzene and carbon tetrachloride
- 7) The value of n in the molecular formula $Be_nAl_2Si_6O_{18}$ is
(a) 3 (b) 5 (c) 7 (d) 9
- 8) Which of the following types of hybridisation leads to three dimensional geometry of bonds around the carbon atom?
(a) sp (b) sp^2 (c) sp^3 (d) None of these
- 9) An atom of an element A has three electrons in its outermost orbit and that of B has six electrons in its outermost orbit. The formula of the compound between these two will be
(a) A_3B_6 (b) A_2B_3 (c) A_3B_2 (d) A_2B
- 10) The maximum number of hydrogen bonds that a molecule of water can have is
(a) 1 (b) 2 (c) 3 (d) 4

II. ASSERTION AND REASONING

5x1=5

Directions : Each of these questions contain two statements, Assertion and Reason. Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

- (a) Assertion is correct, reason is correct; reason is a correct explanation for assertion.
- (b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion
- (c) Assertion is correct, reason is incorrect
- (d) Assertion is incorrect, reason is correct.

Q.1. Assertion : The bond order of helium is always zero.

Reason : The number of electrons in bonding molecular orbital and antibonding molecular orbital is equal.

Q.2. Assertion : The lesser the lattice enthalpy more stable is the ionic compound.

Reason : The lattice enthalpy is greater, for ions of highest charge and smaller radii.

Q.3. Assertion : Atoms can combine either by transfer of valence of electrons from one atom to another or by sharing of valence electrons.

Reason : Sharing and transfer of valence electrons is done by atoms to have an octet in their valence shell.

Q.4. Assertion : BF_3 molecule has zero dipole moment.

Reason : F is electronegative and B-F bonds are polar in nature.

Q.5. Assertion : CH_2Cl_2 is non-polar and CCl_4 is polar molecule.

Reason : Molecule with zero dipole moment is non-polar in nature.

III. CASE STUDY BASED QUESTIONS

5x1=5

The covalent bond may be classified into two types depending upon the types of overlapping:

(i) Sigma(σ) bond, and (ii) pi(π) bond

i) Sigma(σ) bond : This type of covalent bond is formed by the end to end (head-on) overlap of bonding orbitals along the inter nuclear axis. This is called as head on overlap or axial overlap. This can be formed by any one of the following types of combinations of atomic orbitals.

- 3) The angle between sp^3 hybrid orbital is
 (a) 5° (b) 9° (c) 5° (d) 120°
- 4) A sigma bond is formed by the overlapping of ...
 (a) s-s, (b) s-p (c) p-p (d) All the above
- 5) When one 2s and three 2p-orbitals of carbon hybridise, there is the formation of four new ... hybrid orbitals.
 (a) sp^3 (b) sp^2 (c) sp (d) None of above

IV. ANSWER THE FOLLOWING IN SHORT

4x2=8

- 1) Arrange the following in order of increasing strengths of hydrogen bonding O, F, S, Cl, N.
- 2) Explain the shape of BrF_5 .
- 3) Choose the compounds containing ionic, covalent, and coordinate bonds out of the following: MgO , CH_4 , $CaCl_2$, HCl , NH_4^+ , O_3 .
- 4) Which of the following has the maximum bond angle? Why?
 H_2O , CO_2 , NH_3 , CH_4 .

V. ANSWER THE FOLLOWING IN BRIEF

4x3=12

- 1) Which out of CH_3F and CH_3Cl has a higher dipole moment and why?
- 2) Define the term chemical bond. What are its different types?
- 3) Why covalent bonds are called directional bonds whereas ionic bonds are called non-directional?
- 4) Using the VSEPR theory identify the type of hybridization and draw the structure of OF_2 . What are the oxidation states of O and F?

VI. ANSWER THE FOLLOWING IN DETAIL

5x2=10

- 1) Use the molecular orbital energy level diagram to show that N_2 would be expected to have a triple bond, F_2 , a single bond and Ne_2 , no bond.
 - 2) Discuss the significance/ applications of dipole moment.
 (ii) Represent diagrammatically the bond moments and the resultant dipole moment in CO_2 , NF_3 and $CHCl_3$.
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