Delhi Public School,Jammu

Session: 2021-22

Class :XI

Month: July

(Assignment)

Topics:1) Chemical bonding and molecular structure.

2) Hydrogen.

Section A(MCQ's)

1.Water shows anomalous behavior between
(a) 0 to 4°C
(b) 0 to 5°C
(c) 0 to -4°C
(d) 4 to 0°C

2.The freezing point of heavy water is
(a) 0°C
(b) 3.8°C
(c) 4°C
(d) 1°C

3.Which of the following hydrides are generally nonstochiometric in nature?
(a) Ionic Hydrides
(b) Molecular Hydrides
(c) Interstitial Hydrides
(d) All of the Above.

4.Atomic hydrogen is called
(a) Protium
(b) Deutrium
(c) Nascent Hydrogen
(d) Tritium

5.The freezing point of heavy water is
(a) 0°C
(b) 3.8°C
(c) 4°C
(d) 1°C

6.Hydrogen is a good _____ agent.
(a) Oxidizing
(b) Reducing
(c) Acidic
(d) Basic

7.The bond length between hybridised carbon atom and other carbon atom is minimum in
(a) Propane
(b) Butane
(c) Propene
(d) Propyne

8.The number of nodal planes present in s × s antibonding orbitals is
(a) 1
(b) 2
(c) 0
(d) 3

9.The hybrid state of sulphur in SO2 molecule is :
(a) sp^2
(b) sp^3
(c) sp
(d) sp^3d

10.Which of the following will have the lowest boiling point?
(a) 2-MethylButane
(b) 2-MethylPropane
(c) 2,2-Dimethylpropane
(d) n-Pentane

Section B (case based study)

Hybridisation (or hybridization) is a process of mathematically combining two or more atomic orbitals from the same atom to form an entirely new orbital different from its components and hence being called as a hybrid orbital.

orbital hybridisation (or hybridization) is the concept of mixing atomic orbitals into new hybrid orbitals (with different energies, shapes, etc., than the component atomic orbitals) suitable for the pairing of electrons to form chemical bonds in valence bond theory. For example, in a carbon atom which forms four single bonds the valence-shell s orbital combines with three valence-shell p orbitals to form four equivalent sp3 mixtures which are arranged in a tetrahedral arrangement around the carbon to bond to four different atoms. Hybrid orbitals are useful in the explanation of molecular geometry and atomic bonding properties and are symmetrically disposed in space. Usually hybrid orbitals are formed by mixing atomic orbitals of comparable energies

1.Which one of the following does not have sp^2 hybridised carbon?
(a) Acetone
(b) Acetic acid

(c) Acetonitrile
(d) Acetamide

2.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

3.The species having pyramidal shape is
(a) SO3
(b) BrF3
(c) SiO32-
(d) OSF2

4.The structure of IF7 is
(a) Pentagonal bipyramid
(b) Square pyramid
(c) Trigonal bipyramid
(d) Octahedral

Section C (Reasoning assertion type)

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.

Q.6. Assertion : Lone pair-lone pair repulsive interactions are greater than lone pair-bond pair and bond pair-bond pair interactions.
Reason : The space occupied by lone pair electrons is more as compared to bond pair electrons.

Q.7. Assertion : Atomic size increases along a period.
Reason : Effective nuclear charge increases as the atomic number increases resulting in the increased attraction of electrons to the nucleus.

Q.8. Assertion : Second ionization enthalpy will be higher the first ionization enthalpy.
Reason : Ionization enthalpy is a quantitative measure of the tendency of an element to lose electron.

Q.9. Assertion : Alkali metals have least value of ionization energy within a period.
Reason : They precede alkaline earth metals in periodic table.

Q.10. Assertion : Helium is placed in group 18 along with p-block elements.
Reason : It shows properties similar to p-block elements.

Q.11. Assertion : Electron gain enthalpy can be exothermic or endothermic.
Reason : Electron gain enthalpy provides a measure of the ease with which an atom adds an electron to form anion.

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