Chemical Bonding and Molecular Structure

Q.1. The species having pyramidal shape is :

a) SO_3
b) BrF_3
c) SiO_3^{2-}
d) OSF_2

Q.2. The number of types of bonds between two carbon atoms in calcium carbide is

a) One sigma, One pi
b) Two sigma, one pi
c) Two sigma, two pi
d) One sigma, two pi

Q.3. In which of the following ionization processes, the bond order has increased and the magnetic behaviour has changed?

a) $N_2 \rightarrow N_2^+$
b) $C_2 \rightarrow C_2^+$
c) $NO \rightarrow NO^+$
d) $O_2 \rightarrow O_2^+$

Q.4. The molecule having smallest bond angle is :

a) NCl_3
b) $AsCl_3$
c) $SbCl_3$
d) PCl_3

Q.5. In allene (C_3H_4), the type(s) of hybridisation of the carbon atoms is (are) :

a) sp and sp^3
b) sp and sp^2
c) only sp^3
d) sp^2 and sp^3

Q.6. Which of the following hydrogen bonds is the strongest?

a) – H - - - F
b) – H - - - H
c) F – H - - - F
d) – H - - - O

Q.7. Which one of the following arrangements of molecules is correct on the basis of their dipole moments?

a) $BF_3 > NF_3 > NH_3$
b) $NF_3 > BF_3 > NH_3$
c) $NH_3 > BF_3 > NF_3$
d) $NH_3 > NF_3 > BF_3$

Q.8. The experimental value of the dipole moment of HCl is 1.03 D. The length of H – Cl bond is 1.275 Å. The percentage of ionic character on HCl

a) 7
b) 17
c) 43
d) 21

Q.9. CaO and NaCl have the same crystal structure and approximately the same ionic radii. If U is the lattice energy of NaCl, the approximate lattice energy of CaO is

a) U/2
b) 2U
c) 4U
d) U

Q.10. Which one of the following molecules will have unequal M – F bond lengths ?

a) NF_3
b) BF_3
c) PF_5
d) SF_4

Q.11. Which of the following substances has a dipole moment more than zero?

a) Water
b) Methane
c) Carbon dioxide
d) Nitrogen

Q.12. In the resonating structures of benzene, the number of sigma and pi bonds are

a) 3π and 12σ
b) 3σ and 3π
c) 6σ and 6π
d) 12σ and 12π

Q.13. The correct bond order in the following species is

a) $O_2^+ < O_2^- < O_2^{2+}$
b) $O_2^- < O_2^+ < O_2^{2+}$
c) $O_2^{2+} < O_2^+ < O_2^-$
d) $O_2^{2+} < O_2^- < O_2^+$

Q.14.Which is The Correct Geometry and Hybridisation of XeF_4?

a) Octahedral, sp^3d^2
b) Square planar, sp^3d^2
c) Trigonal bipyramidal, sp^3d^2
d) Planar triangle, sp^3d^3

Q.15.pπ – dπ bonding is found in _____ molecule.

a) SO_3^{2-}
b) NO_3^-
c) CO_3^{2-}
d) BO_3^{3-}

Q.16. _____ Has The Lowest Melting Point.

a) $CaCl_2$
b) CaI_2
c) $CaBr_2$
d) CaF_2

Q.17. Which of These Statements Is False?

a) The canonical structure does not have a real existence.
b) Every AB_5 molecule has a square pyramid structure.
c) Electron deficient molecules act as Lewis acids.
d) Multiple bonds are shorter than their corresponding single bonds

Q.18. Which of the following pairs of molecules will have permanent dipole moment for both members?

a) NO_2 and CO_2
b) NO_2 and O_3
c) SiF_4 and CO_2
d) SiF_4 and NO_2

Q.19. Which one of the following does not contain coordinate bond?

a) BH_4^-
b) NH_4^+
c) CO_3^{2-}
d) H_3O^+

Q.20. Which of the following are iso-structural?

a) XeF_2, IF_2^-
b) NH_3, BF_3
c) CO_3^{2-}, SO_3^{2-}
d) PCl_5, ICl_5

Q.21. Number of π bonds in Naphthalene is

a) 6
b) 3
c) 4
d) 5

Q.22. Hydrogen bonding is not present in

a) Glycerine
b) Water
c) Hydrogen sulphide
d) Hydrogen fluoride

Q.23. In which of the following bond angle is maximum?

a) NH_3
b) NH_4^+
c) PCl_5
d) SCl_2

Q.24. Among the following the molecule with, highest dipole moment is

a) CH_3Cl
b) CH_2Cl_2
c) $CHCl_3$
d) CCl_4

Q.25. In OF_2, number of bond pairs and lone pairs of electrons are respectively

a) 2, 0
b) 2, 8
c) 2, 10
d) 2, 9