



COORDINATION COMPOUNDS



1. $\text{KCl.MgCl}_2.6\text{H}_2\text{O}$ is a

- a) Mixed salt
- b) Double salt
- c) Basic salt
- d) Complex salt



2. $(\text{NH}_4)_2\text{SO}_4\text{FeSO}_4\cdot 6\text{H}_2\text{O}$ is

- a) Mohr's salt
- b) Alum
- c) Blue vitriol
- d) Simple salt



3. The number of ions furnished per molecule of the complex $[\text{Ni}(\text{NH}_3)_4]\text{Cl}_2$ is:

- a) 1
- b) 2
- c) 3
- d) 4



4. Which of the following compound will furnish Fe^{+3} ions in solution?

- a) $[\text{Fe}(\text{CN})_6]_3$
- b) $\text{Fe}_2(\text{SO}_4)_3$
- c) $\text{Fe}(\text{CN})_6^{4-}$
- d) None of these



5. In any ferric salt on adding potassium Ferro a Prussian blue is obtained which is.

- a) $K_3[Fe(CN)_6]$
- b) $K_4[Fe(CN)_6]$
- c) $FeSO_4 \cdot Fe_4(CN)_6$
- d) $Fe_4[Fe(CN)_6]_3$



6. During the formation of potassium ferricyanide which of the following acts as electron acceptor?

- a) Fe
- b) Fe^{2+}
- c) Fe^{3+}
- d) CN^-



7. Haemoglobin is an

- a) Iron (II) Complex
- b) Cobalt (II) Complex
- c) Magnesium (II) Complex
- d) Chromium (II) Complex



8. Which among the following is neutral ligands?

- a) Chloro
- b) Hydroxo
- c) Ammine
- d) Oxalato



9. Which of the following ligands is bidentate?

- a) $\text{C}_2\text{O}_4^{2-}$
- b) $\text{CH}_3\text{C}=\text{N}$.
- c) Br^-
- d) None of these

10. Ligands in a complex salt are:

- a) Anions linked by co-ordinate bonds to central metal atom or ion
- b) Cat ions linked by co-ordinate bonds to a central metal atom or ion
- c) Molecules linked by co-ordinate bonds to a central metal atom or ion
- d) Ions or molecules linked by co-ordinate bonds to a central metal atom or ion.



11. A ligands can also be regarded as:

- a) Lewis acid
- b) Bronsted base
- c) Lesis base
- d) Bronsted acid



12. Which of the following complex will give white precipitate with barium chloride solution?

- a) $[\text{Cr}(\text{NH}_3)_5\text{Cl}] \text{SO}_4$
- b) $[\text{Cr}(\text{NH}_3)\text{SO}_4]\text{Cl}$
- c) $[\text{Co}(\text{NH}_3)_6]\text{Br}_3$
- d) None of these



13. Which of the following complexes will be formed in the brown ring test for nitrates?

- a) $\text{FeSO}_4 \cdot \text{NO}$
- b) $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]^{2+}$
- c) $[\text{Fe}(\text{H}_2\text{O})\text{NO}_2]$
- d) None of these



14. For a complex $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$ pick up true statements :

- a) The coordination number of cobalt is 6
- b) The complex can show optical isomerism
- c) The complex contains simple anions
- d) The hybrid state of cobalt is dsp^3



15. In the co-ordination compound $K_4[Ni(CN)_4]$ the oxidation state of nickel is:

- a) -1
- b) 0
- c) 1
- d) $+2$



16. EAN of copper in $[\text{Cu}(\text{CN})_4]^{2-}$ is :

- a) 35
- b) 36
- c) 37
- d) 38



17. The EAN rule is not obeyed by:

- a) $[\text{Ni}(\text{CO})_4]$
- b) $\text{K}_4[\text{Fe}(\text{CN})_6]$
- c) $\text{K}_3[\text{Fe}(\text{CN})_6]$
- d) $[\text{Fe}(\text{CO})_5]$



18. Which of the following complex involves d^2sp^3 hybridization?

- a) $[\text{FeF}_6]^{3-}$
- b) $[\text{Fe}(\text{CN})_6]^{3-}$
- c) $[\text{Cr}(\text{NH}_3)_6]^{3+}$
- d) $[\text{Co}(\text{NH}_3)_6]^{3+}$



19. In $\text{Ni}(\text{CO})_4$ the nickel atom is
Hybridized.

- a) Sp^2
- b) Sp^3
- c) dsp^3
- d) Sp^3d



20. The IUPAC name of $[\text{Ni}(\text{CO})_4]$ is :

- a) Tetracarbonyl nickel (II)
- b) Tetracarbonyl nickel (0)
- c) Tetracarbonyl nickelate (II)
- d) Tetracarbonyl nickelate (0)



21. $K_4[Fe(CN)_6]$ is called :

- a) Potassium hexa cyanoferrate (II)
- b) Potassium fericyanide
- c) Potassium hexa cyanoferrate (III)
- d) Prussain blue



22. The number of unpaired electrons present in $[\text{Cr}(\text{NH}_3)_6]^{3+}$ an octahedral complex is:

- a) 2
- b) 3
- c) 4
- d) 5



Chemical Bonding – 2



1. The M.O theory was developed mainly by :
 - a) Linus Pauling
 - b) Hilbrand
 - c) Pauli
 - d) Hund & Mulliken



2. Main axis of a diatomic molecule is Z. Atomic orbital P_x and P_y overlap to form which of the following orbital?

- a) σ molecular orbital
- b) σ^* molecular orbital
- c) π molecular orbital
- d) No bond will be formed

3. What is not true about anti bonding orbital?

- a) It contributes to the destability of bond
- b) It is formed as a result of constructive interference.
- c) Anode always appears in between the nuclei of the atom involved in the bonding.
- d) Its energy is always lower than the energy of the participating orbital.

4. Combination of two AO's lead to the formation of :

- a) Two MO's
- b) One MO
- c) Three MO's
- d) Four Mo's

5. Which of the following theory provide explanation about paramagnetic nature of oxygen?

- a) Electronic theory of valence
- b) Valence bond theory
- c) Molecular orbital theory
- d) All of these.



6. The orbital configuration of a certain homo nuclear species is $\sigma_{1s}^2 \sigma_{1s}^*^2 \sigma_{2s}^2 \sigma_{2s}^*^2 \pi^2 p_z^1$. The bond order will be :

- a) $\frac{1}{2}$
- b) 2
- c) 3
- d) 0



7. Which combination of atomic orbital is not allowed according to MO theory?

a) $P_x - P_x$

b) $P_x - P_y$

c) $P_y - P_y$

d) $P_z - P_z$



8. According to LCAO method, the combination of two AO's of different atoms results in the formation of :

- a) A single MO
- b) Two MO's
- c) Three MO's
- d) Hybrid MO's



9. Half of the difference between the number of electrons is bonding and anti-bonding MO's is called:

- a) Molecular order
- b) Bond order
- c) Electronic order
- d) Bonding capacity



10. In a homo nuclear molecule, higher the bond order, larger will be :

- a) Bond length
- b) Bond strength
- c) Para magnetism
- d) Ionic character



11. Which of the following is non-existent according to molecular orbital theory?

- a) H_2
- b) O_2
- c) He_2
- d) O^{2+}



12. What is the correct sequence of bond order?

- a) $O_2^+ > O_2^- > O_2$
- b) $O_2 > O_2^- > O_2^+$
- c) $O_2^+ > O_2 > O_2^-$
- d) $O_2^- > O_2^+ > O_2$



13. The number of anti bonding electron pairs in O_2^{2-} ion on the basis of MO theory is:

- a) 4
- b) 3
- c) 2
- d) 5



14. Which orbital has highest energy out of the following ?

- a) $\sigma^* 1s$
- b) $\sigma 2p_x$
- c) $\sigma 2s$
- d) $\pi^* 2p_y$



15. The bond order in hydrogen molecule is :

- a) 1
- b) 2
- c) 3
- d) 4



16. Oxygen molecule is paramagnetic because :

- a) Bonding electrons are more than anti bonding electrons.
- b) It contains unpaired electrons.
- c) Bonding electrons are less than anti bonding electrons
- d) Bonding electrons are equal to anti bonding electrons.

17. Which of the following species is not diamagnetic?

- a) N_2
- b) F_2
- c) Li_2
- d) O_2



18. Which of the following molecules has unpaired electrons in anti bonding molecular orbital?

- a) O_2
- b) N_2
- c) C_2
- d) B_2



19. The metallic luster is attributed to :

- a) High density of metals
- b) Chemical inertness of metals
- c) Polishing agent applied to the surface of metals
- d) The presence of free mobile valence electrons.



20. Malleability and ductility of metals can be accounted due to :

- a) Presence of mobile electrons
- b) Crystalline structure in metals
- c) The capacity of the layers of metal ions to slide one over the other.
- d) The interaction of electrons with metal ions in the lattice.



21. Which of the following is not true about metallic conductor?

- a) There is no transfer of matter.
- b) There is no resistance to flow of electricity.
- c) There is no chemical change.
- d) Conductance is by electrons.