COORDINATION COMPOUNDS

1. $KCl.MgCl_2.6H_2O$ is a

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

Ans: b - Double salt

2. $(NH_4)_2SO_4FeSO_46H_2O$ is

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

Ans: a - Mohr's salt

3. The number of ions furnished per molecule of the complex $[Ni(NH_3)_4]Cl_2$ is:

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

Ans: c - 3

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

a) $[Fe(CN)_6]_3$
b) $Fe_2(SO_4)_3$
c) $Fe(CN)_6)^{4-}$
d) None of these

Ans: b - $Fe_2(SO_4)_3$

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) $FeSO_4.\ Fe_4(CN)_6$
d) $Fe_4[Fe(CN)_6\ ]_3$

Ans: 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^-

Ans: c - Fe^{3+}

7. Haemoglobin is an

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

Ans: a - Iron (II) Complex

8.Which among the following is neutral ligands?

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

Ans: c - Ammine

9.Which of the following ligands is bidentate?

a) $C_2O_4^{2-}$
b) $CH_3C = N.$
c) Br^-
d) None of these

Ans: a - $C_2O_4^{2-}$

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.

Ans: 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

Ans: c - Lesis base

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

a) $[Cr(NH_3)_5Cl]\ SO_4$
b) $[Cr(NH_3)SO_4]Cl$
c) $[Co(NH_3)_6]Br_3$
d) None of these

Ans: a - $[Cr(NH_3)_5Cl]\ SO_4$

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

a) $FeSO_4.NO$
b) $[Fe(H_2O)_5NO]^{2+}$
c) $[Fe(H_2O)NO_2]$
d) None of these

Ans: a - $FeSO_4.NO$

14. For a complex $[Co(NH_3)_3Cl_3]$ 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

Ans: a - The coordination number of cobalt is 6

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

Ans: b - 0

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

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

Ans: a - 35

17. The EAN rule is not obeyed by:

a) $[Ni(CO)_4]$
b) $K_4[Fe(CN)_6]$
c) $K_3[Fe(CN)_6]$
d) $[Fe(CO)_5]$

Ans: c - $K_3[Fe(CN)_6]$

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

a) $[FeF_6]^{3-}$
b) $[Fe(CN)_6]^{3-}$
c) $[Cr(NH_3)_6]^{3+}$
d) $[Co(NH_3)_6]^{3+}$

Ans: b - $[Fe(CN)_6]^{3-}$

19. In $Ni(CO)_4$ the nickel atom is …….. Hybridized.

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

Ans: b - Sp^3

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

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

Ans: b - Tetracarbonyl nickel (0)

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

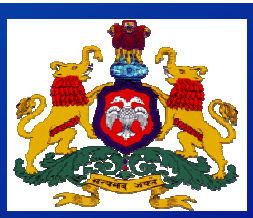
a) Potassium hexa cyanoferrate (II)
b) Potassium feericyanide
c) Potassium hexa cyanoferrate (III)
d) Prussain blue

Ans: a - Potassium hexa cyanoferrate (II)

22. The number of unpaired electrons present in $[Cr(NH_3)_6]^{3+}$ an octahedral complex is:

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

Ans: b - 3



Chemical Bonding – 2

1. The M.O theory was developed mainly by :

a) Linus Pauling
b) Hilbrand
c) Pauli
d) Hund & Mulliken

Ans: 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

Ans: c - π molecular orbital

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.

Ans: 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

Ans: a - Two 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.

Ans: c - Molecular orbital theory

6. The orbital configuration of a certain homo nuclear species is $\sigma_{1s}^{2}\ \sigma^{*}_{1s}{}^{2}\ \sigma_{2s}^{2}\ \sigma^{*2s2}\ \pi^{2}p_{z}^{1}$. The bond order will be :

a) ½
b) 2
c) 3
d) 0

Ans: a - ½

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) $P_z - P_z$

Ans: b - $P_x - P_y$

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

Ans: b - Two 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

Ans: b - Bond order

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

Ans: b - Bond strength

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+}

Ans: c - He_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) $O_2^- > O_2^+ > O_2$

Ans.: C - $O_2^+ > O_2 > O_2^-$

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

Ans: a - 4

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

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

Ans: d - $\pi^* 2p_y$

15. The bond order in hydrogen molecule is :

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

Ans: a - 1

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.

Ans: b - It contains unpaired electrons.

17. Which of the following species is not diamagnetic?

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

Ans: 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

Ans: a - O_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.

Ans: d - The presence of free mobile valence electrons.

20. Malleability land 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 metals ions in the lattice.

Ans: a - Presence of mobile electrons

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.

Ans: a - There is no transfer of matter.