DPP

DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutio

Subject : CHEMISTRY
DPP No. : 3

Topic :- Coordination Compounds

1 **(b)**

Chlorophyll is a complex having Mg-atom.

2 **(a)**

Primary valency of metal is satisfied only by the anion. It is simply ionic valency. While secondary valency is satisfied by ligands (which can give a lone pair of electron). The ligands satisfying secondary valency, are always written in coordination sphere. This concept was given by Werner. In $K_3[Fe(CN)_6]$, the CN^- ions satisfy both the primary as well as secondary valency of Fe^{3+} ion.

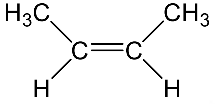
3 **(a)**

The following isomers the alkene have

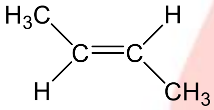
(i) $CH_3 - CH_2 - CH = CH_2$

(ii) $CH_3 - CH = CH - CH_3$

(iii)



(iv)



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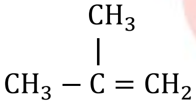


$$CH_3 - \overset{\overset{\large CH_3}{|}}{C} = CH_2$$

5 **(a)**

According to postulates of Werner's theory for coordination compounds, metal atoms exhibit two types of valencies *i.e.*, primary valency and secondary valency. The primary valency is ionisable whereas the secondary valency is non-ionisable.

6 **(d)**

$[Fe(CN)_6]^{4-}$ is **diamagnetic** (Fe^{2+} has $3d^6$ configuration and the 6 electron pairs up in three d-orbitals followed by d^2sp^3-hybridisation).

$[Cr(NH_3)_6]^{3+}$ is **paramagnetic** (Cr^{3+} has $3d^3$ configuration. Hybridisation is d^2sp^3. Due to 3 unpaired electrons it is **paramagnetic**)

$$[Cr(CO)_6 : Cr(Z = 25) : [Ar]^{18} 4s^1, 3d^5.$$

The one $4s$-electron pairs up with five $3d$-electrons in three d-orbitals. This is followed by d^2sp^3-hybridisation to give octahedral complex. No unpaired electron and hence complex is **diamagnetic**.

$$Fe(CO)_5 : Fe(Z = 26) : [Ar]^{18} 4s^2, 3d^6.$$

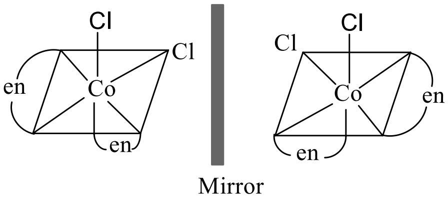
The six electrons in d-subshell pairs up in three d-orbitals. This is followed by d^2sp^3-hybridisation to give octahedral geometry with one vacant hybridised orbital. The resulting shape of the complex is square based pyramid. As there is no unpaired electron, the complex is **diamagnetic.**

7 **(d)**

A modified or extended Friedel-Crafts reaction.

8 **(a)**

cis$[Co(en)_2Cl_2]Cl$ is optically active hence, it will give a pair



9 **(a)**

Δ_t is roughly 4/9 times to Δ_0.

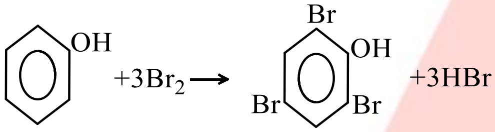
10 **(c)**

Follow IUPAC rules.

11 **(a)**

Alkanes having less than four carbon atoms in basic chain will not show chain isomerism

12 **(b)**



3 mole of Br_2 are needed.

13 **(b)**

Diamethyl glyoxime forms a colour complex with nickel

14 **(c)**

BF_4^- has sp^3-hybridisation and tetrahedral.

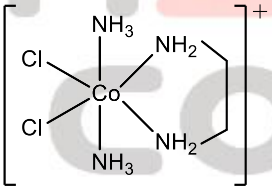
15 **(a)**

Oxidation state of iron in haemoglobin is +2.

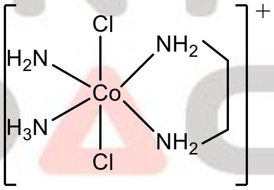
16 **(b)**

1. Geometrical isomers have same structural formula but differ in spatial arrangement of groups.

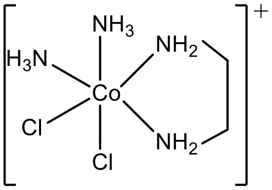
2. Different arrangement of atoms or groups in three dimensional space results in two optical isomers which are image of each other.



trans (w.r.t NH_3)
(optically inactive)



cis (w.r.t NH3)
(optically inactive)



(optically inactive)

Therefore, number of geometrical isomers, optical isomers and total number of isomers are 2, 2 and 3 respectively.

17 **(d)**

Hetero aromatics show aromatic nature due to $4n + 2\pi$ electrons.

18 **(b)**

CN^- ligand has strong ligand field because of higher value of Δ.

19 **(b)**

% Enantiomeric excess

$$= \frac{\text{observed specific rotation}}{\text{specific rotation of pure enantiomer}} \times 100$$

$$\text{Observed specific rotation} = \frac{3/4}{100} \times (+16°) \times 100$$

$$= +12°$$

20 **(c)**

Follow IUPAC rules.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	B	A	A	C	A	D	D	A	A	C
Q.	11	12	13	14	15	16	17	18	19	20
A.	A	B	B	A	C	B	D	B	B	C