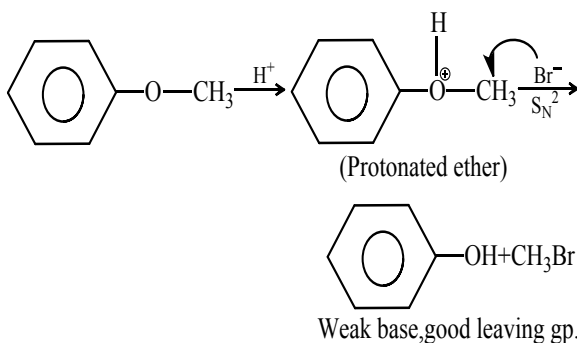
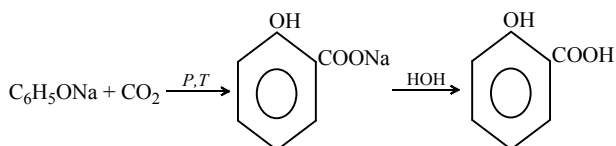


Topic :- Coordination Compounds

- 1 (a)
Trinitrobenzene is an explosive compound formed during nitration of C_6H_6 with fuming HNO_3 .
- 2 (c)
A ligand is a species that is capable of donating an electron pair(s) to the central metal ion. The substances which are capable of donating an electron pair are called Lewis base, so a ligand is also a Lewis base.
- 3 (d)
In $Ni(CO)_4$, Ni is in zero oxidation state. It has tetrahedral geometry but is diamagnetic. In $[Ni(CN)_4]^{2-}$, Ni is in +2 oxidation state. It is dsp^2 hybridised and have square planar shape. The compound is diamagnetic.
- 4 (d)
 $[Co(CN)_6]^{3-}$ has d^2sp^3 -hybridisation and six d -electrons are paired due to strong field ligand. Thus no unpaired electron.
- 5 (d)
 $HBr \rightarrow H^+ + Br^-$



- Ether reacts with acid to give protonated ether. The next step involves nucleophilic attack by halide ion with the displacement of weakly basic alcohol molecule.
- 6 (d)
Octahedral complex should have six hybridized orbitals.
- 7 (d)



Kolbe-Schmidt's reaction.

9

(b)

The pair of electron present with nitrogen will not be available to be donated as H^+ will consume that one.

10

(a)

It provides maximum number of ions (five) on ionization.

11

(d)

Follow Vorlander's rule.

12

(d)

Organometallic compounds are those in which metal is linked directly with carbon. CH_3Li , methyl lithium due to the presence of metal-carbon bond, is an organometallic compound.

13

(d)

The directive influence order is:

$O^- > NR_2 > NHR > NH_2 > OH > OCH_3 \approx NHCOCH_3 > CH_3 > X$

14

(c)

Hybridisation	Shape
dsp^2	Square planar
sp^3	Tetrahedral
sp^2	Trigonal planar

Hence, in tetrahedral complexes metal atom is sp^3 hybridised.

16

(b)

The number of ligands attached to the central metal ion is called the coordination number.

So, coordination numbers of Fe in

$[Fe(CN)_6]^{4-}$, $[Fe(CN)_6]^{3-}$ and $[FeCl_4]^-$ are 6, 6 and 4 respectively.

17

(d)

Tautomers may or may not be metamers

18

(c)

$EAN = (\text{Atomic number} - O.S + 2 \times C.N.)$

Hence, EAN of Ni in $[Ni(CN)_4]^{2-} = (28 - 2 + 2 \times 4) = 34$

19

(c)

Electron repelling nature of methoxy gp. facilitate the protonation of alcohol.

20

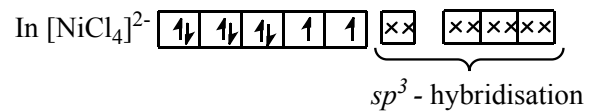
(d)

$[Ni(Cl)_4]^{2-}$ oxidation state of Ni is +2

So, configuration of $Ni^{2+} = 1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^8$

In Ni^{2+}

$3d$	$4s$	$4p$
<div style="border: 1px solid black; padding: 2px 5px;">1↓</div> <div style="border: 1px solid black; padding: 2px 5px;">1↓</div> <div style="border: 1px solid black; padding: 2px 5px;">1↓</div> <div style="border: 1px solid black; padding: 2px 5px;">1</div> <div style="border: 1px solid black; padding: 2px 5px;">1</div>		



Thus, due to sp^3 -hybridisation of Ni^{2+} in $[\text{NiCl}_4]^{2-}$, the shape of $[\text{NiCl}_4]^{2-}$ is tetrahedral.

PE

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

PE