

S-Block

Property

Alkali Metal

Alkaline Earth Metals

Li, Na, K, Rb, Cs, Fr
↓
radio active

Be, Mg, Ca, Sr, Ba, Ra
↓
Radio active

General Configurationⁿ

[] ns¹

[] ns²

D. State.

+1

+2

Atomic Radius

Li < Na < K < Rb < Cs < Fr

Be < Mg < Ca < Sr < Ba < Ra

IE

Li > Na > K > Rb > Cs < Fr
↓
Poor shielding

Be > Mg > Ca > Sr > Ba < Ra
↓
Poor shielding

Electro +ve nature $\propto \frac{1}{EN}$

Li < Na < K < Rb < Cs > Fr

Be < Mg < Ca < Sr < Ba > Ra

M.P. $\propto \frac{1}{\text{Metallic Radius}}$

Li > Na > K > Rb > Cs

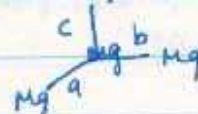
expected

Be > Mg > Ca > Sr > Ba

exper.

Be > Mg < Ca > Sr > Ba

Mg a = b ≠ c ↑



Density $\frac{M}{V}$

expected

Li < Na < K < Rb < Cs

exper

Li < Na > K < Rb < Cs

E.C.

Be > Mg > Ca < Sr < Ba
(abnormal) (abnormal E.C.)

DNA → GC
AT H-bond.

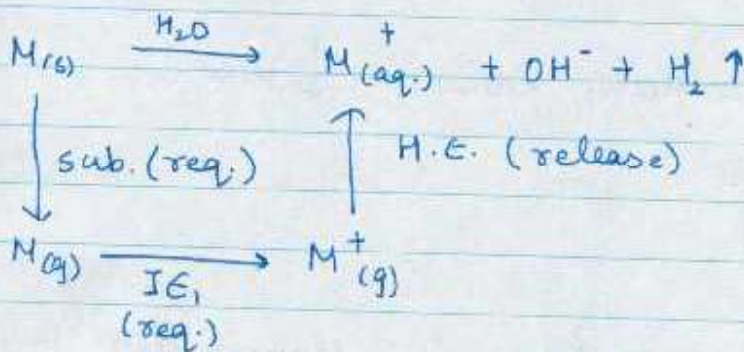
Photoelectric
effect $\propto \frac{1}{IG}$

K, Rb, Cs

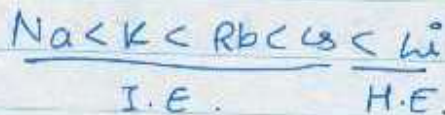
X

* Reactivity towards Water ⇒

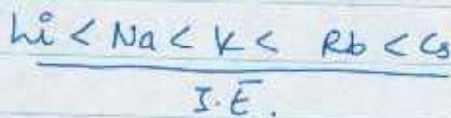
- Alkali metals,



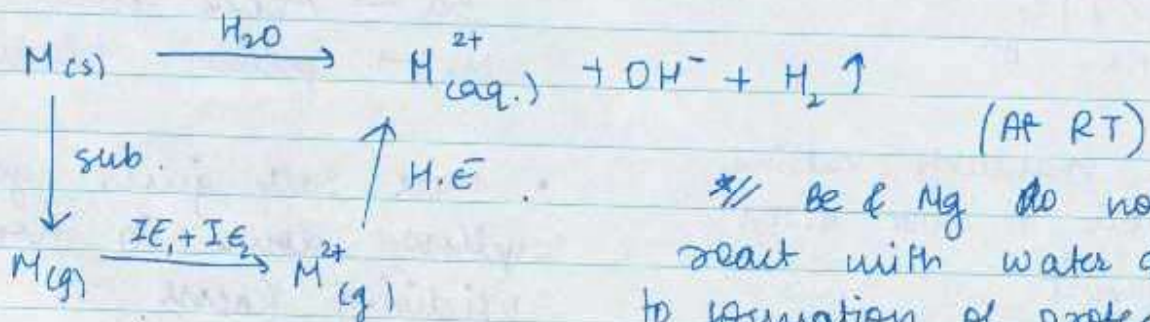
Thermodynamic
Reactivity (Net
change in energy)



Kinetic reactivity
(per sec release
energy)

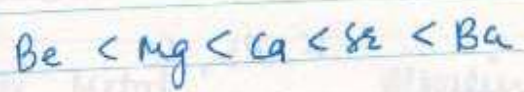


- Alkaline earth metals,

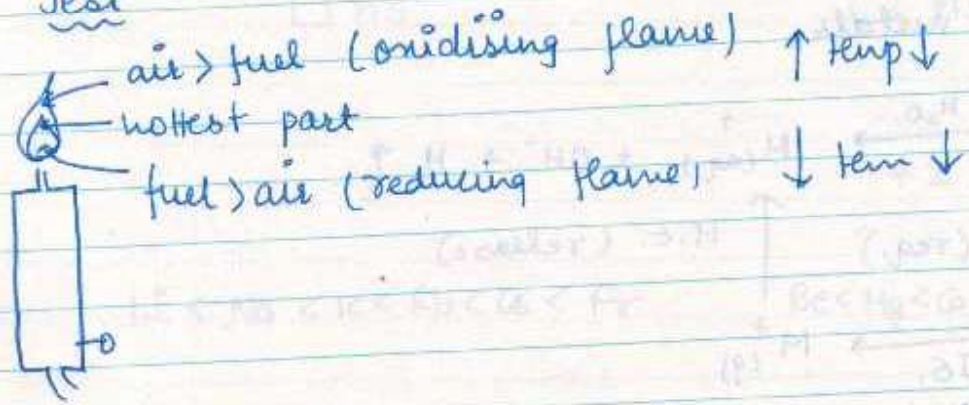


*// Be & Mg do not
react with water due
to formation of protective
layer of hydride.

Thermodynamic/
Kinetic reactivity



* Flame Test



I • Be & Mg do not give colour in flame due to high I.E.

Ex • Reason of colour is low I.E. & emission spectrum transition.

~~Na~~ ~~K~~ ~~Rb~~ ~~Cs~~
attr, energy release

Colour in flame

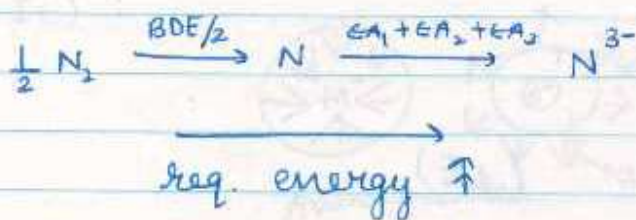
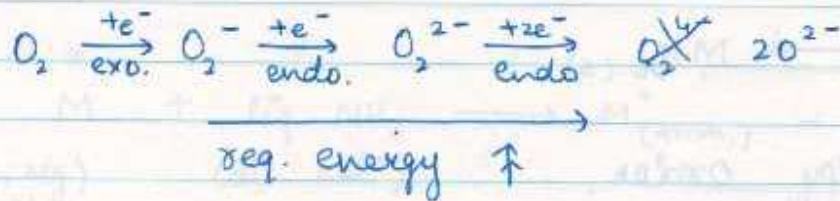


- Li, Sr → crimson red
- Ca → Brick red
- K → Violet (lilac)
- Cs → Blue
- Ba → Apple green
- Na → Golden Yellow

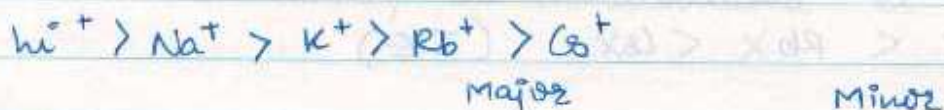
Dev मीरि, Shahrukh, Katrina
Ranbir के साथ बांग्ला
में मीरु
(...:b)

• NaCl salt gives golden yellow colour in non luminous oxidising flame.

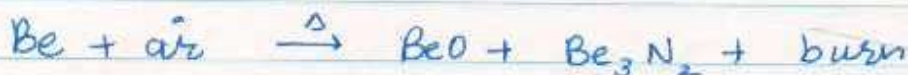
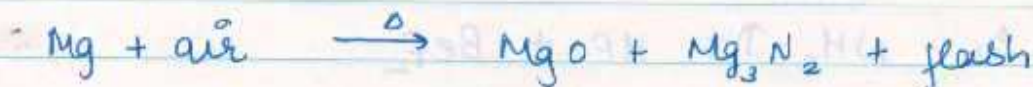
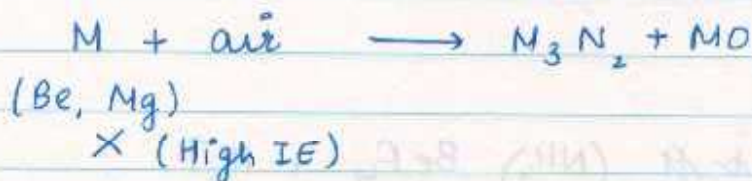
* Reactivity towards air \Rightarrow



Contribution in lattice energy,



Alkaline earth metals,



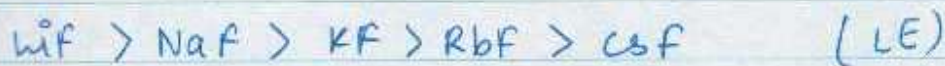
HW: → Ex. 2, Ex. 3, Ex. 4 (NCERT exemplar)
S. block NCERT.

* Reactivity towards H₂ & halogen :->



~~Formation~~ formation enthalpy order,

F⁻ of alkali metals $r^- \approx r^+$

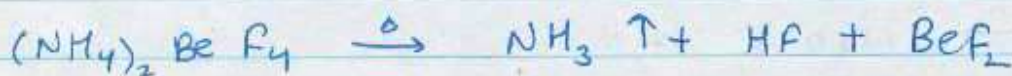
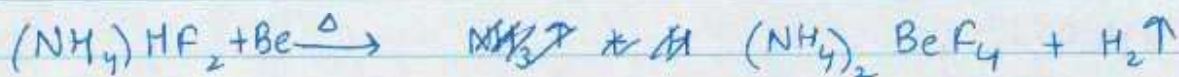
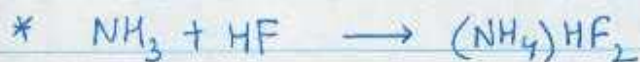


H⁻/Cl⁻/Br⁻/I⁻ of alkali metals $r^- \gg r^+$

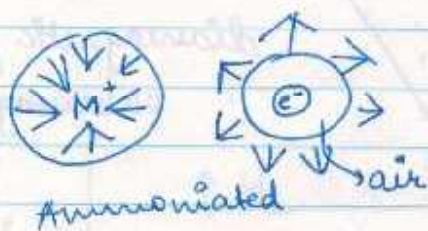
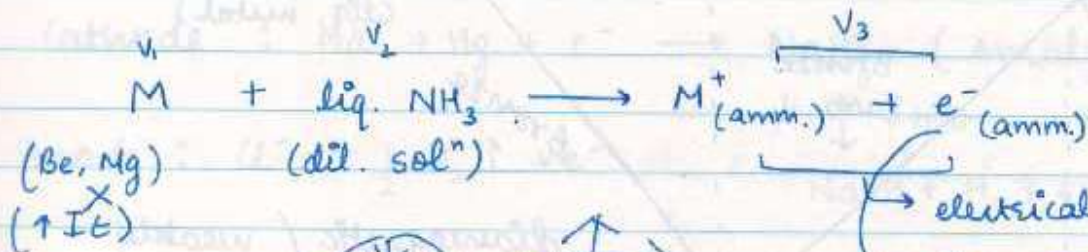


Alkaline earth metals,

- BeX₂ x = F, Cl, Br, I, H all are covalent
- MgH₂ also is covalent (chain structure)
- MgCl₂, MgI₂, MgBr₂ are predom. covalent

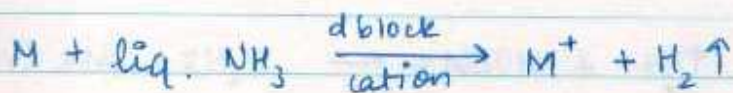


* Reaction with liq. NH₃ :->

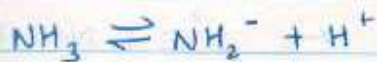


electrical conductivity
 paramagnetism
 Reducing nature
 blue colour

Volume $V_3 > V_1 + V_2$
 due to cavity in ammoniated e^-

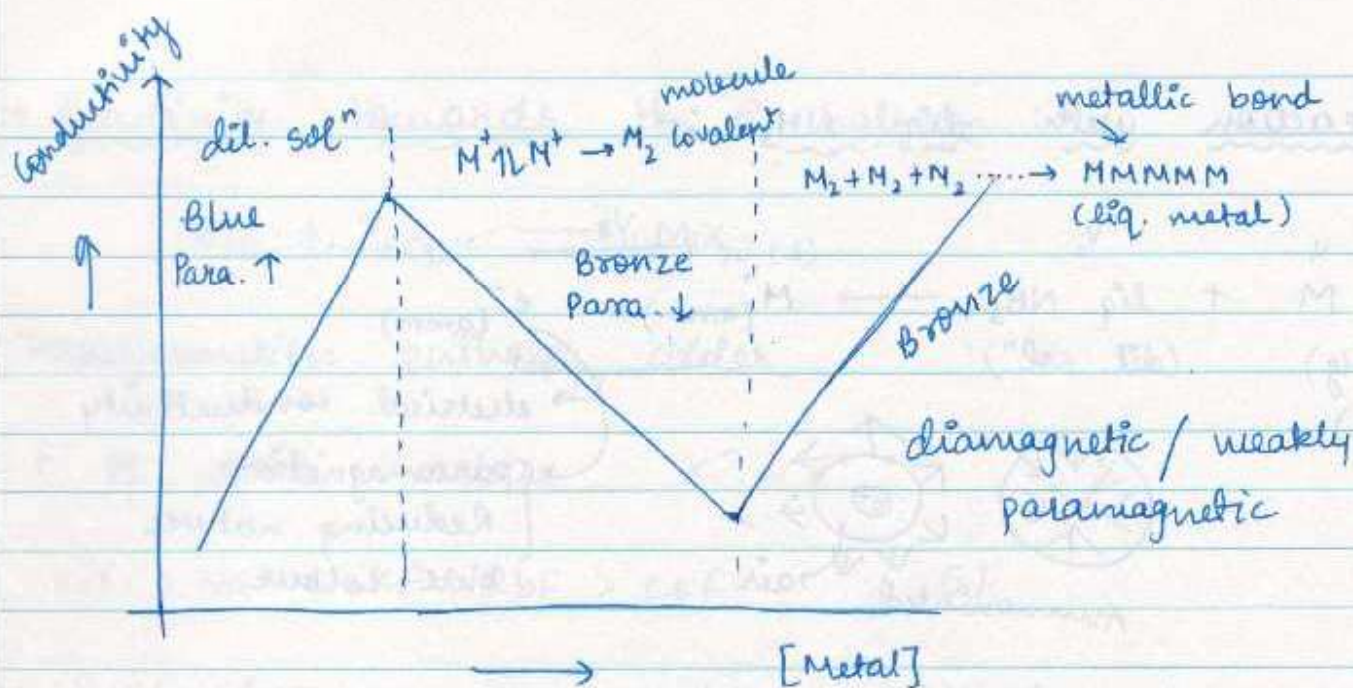


electrical conductivity
 Diamagnetic
 colourless



$\text{NH}_3 < \text{NH}_2^-$ lewis base

s block < d block P.P.

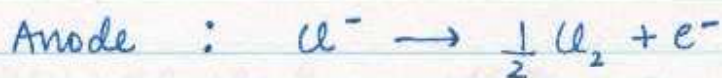


* Important s-block compounds, their preparation and properties :->

1. NaOH

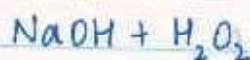
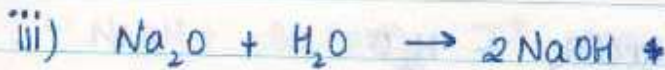
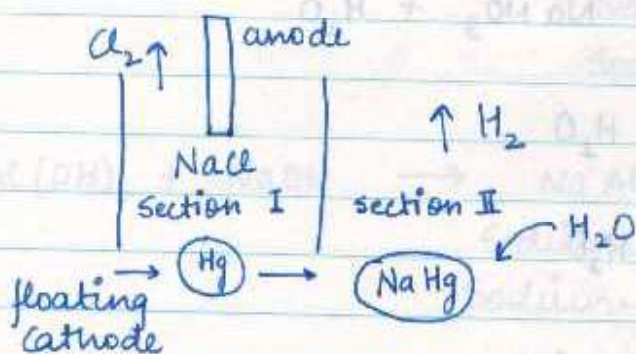
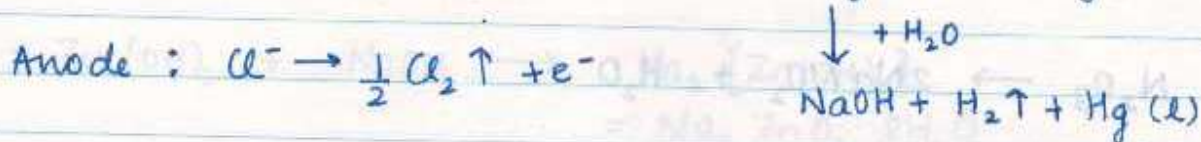
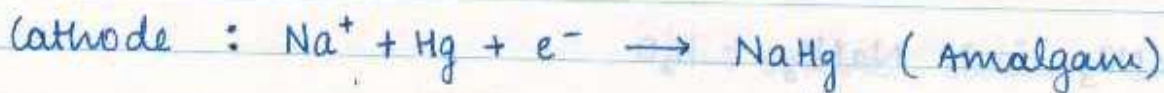
• Preparation :->

i) electrolysis of brine (NaCl (aq.))



Product in solⁿ : NaOH

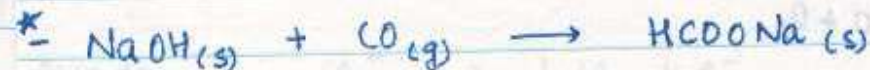
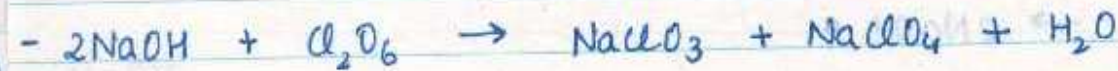
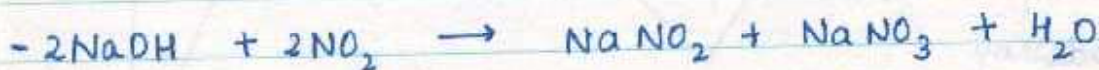
ii) Castner-Kellner cell



• Properties :-

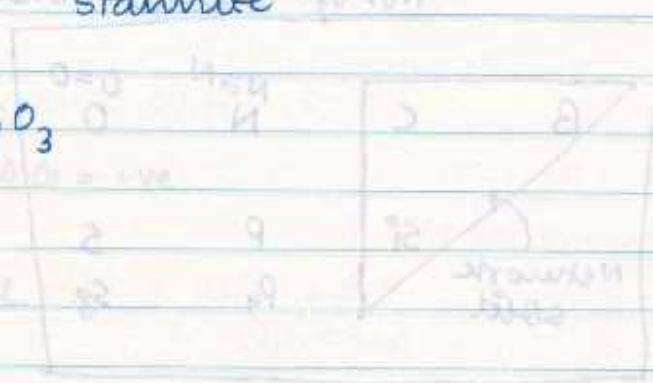
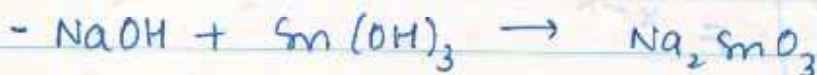
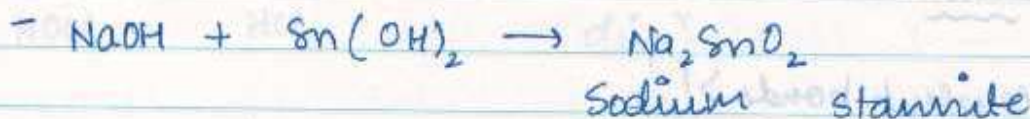
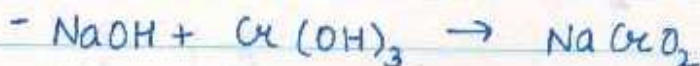
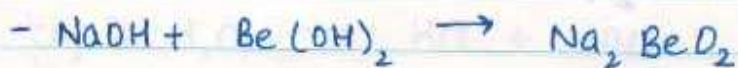
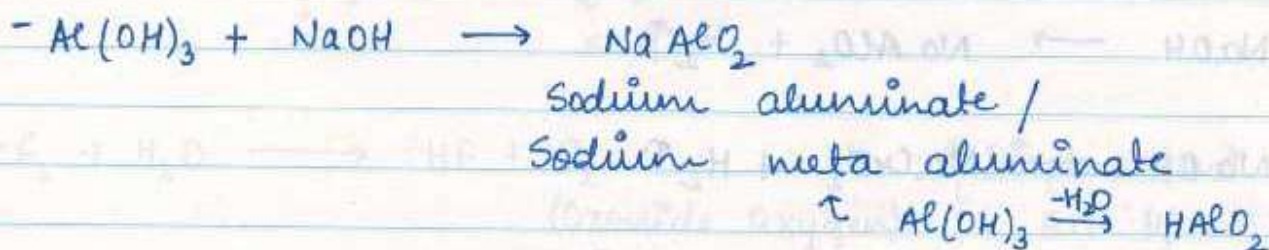
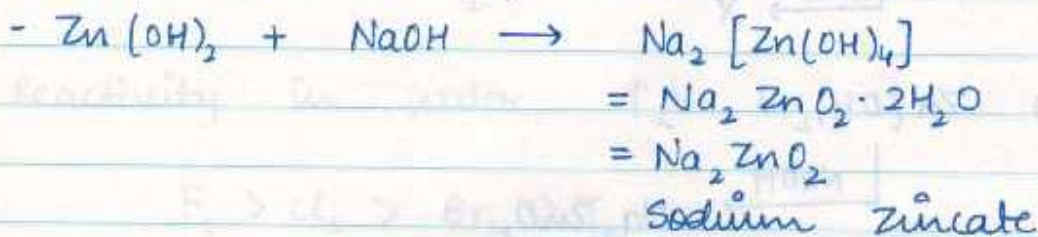
i) Ran with acids / acidic oxides :-

NaOH is a strong alkali

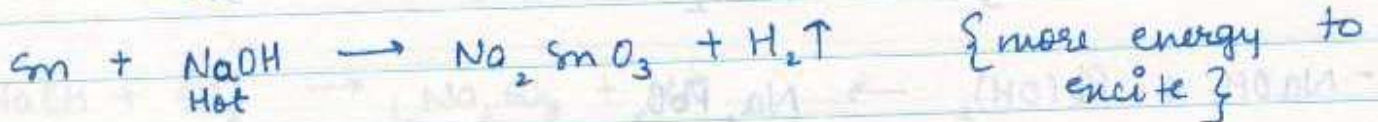
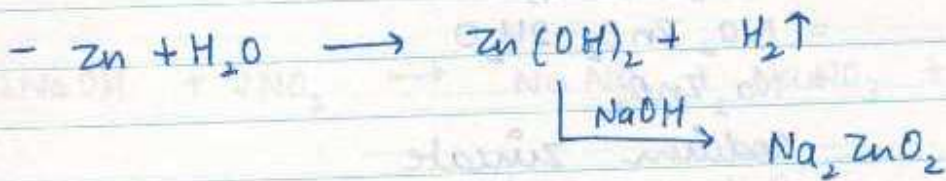


ii) Amphoteric oxide / hydroxide + NaOH \rightarrow soluble sodium salt
LA LB

\rightarrow soluble sodium salt

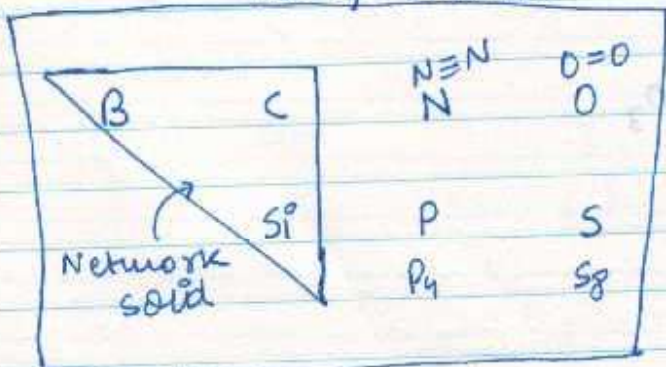


iii) Metal + NaOH \longrightarrow soluble sodium salt + $H_2 \uparrow$



iv) Non-metal + NaOH

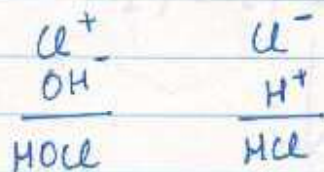
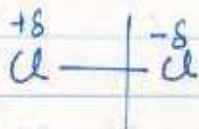
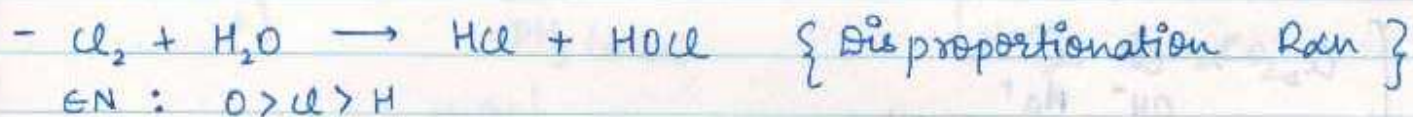
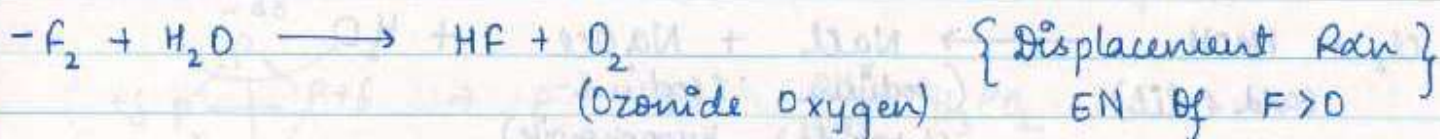
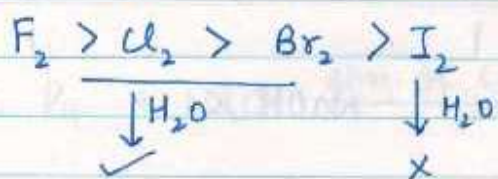
No. of covalent bonds > 1



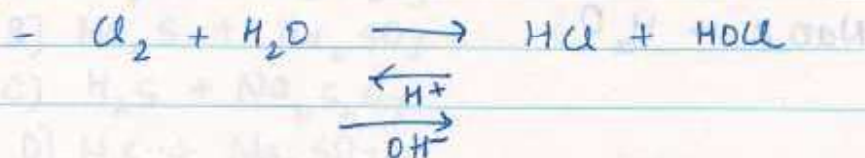
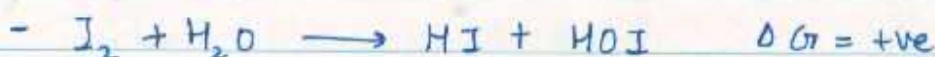
$\hookrightarrow H_2O \times$

- Nonmetals are non polar, H_2O is polar so interaction b/w non metal & H_2O is very weak. Release energy is not so much sufficient that all non-metal can react with H_2O

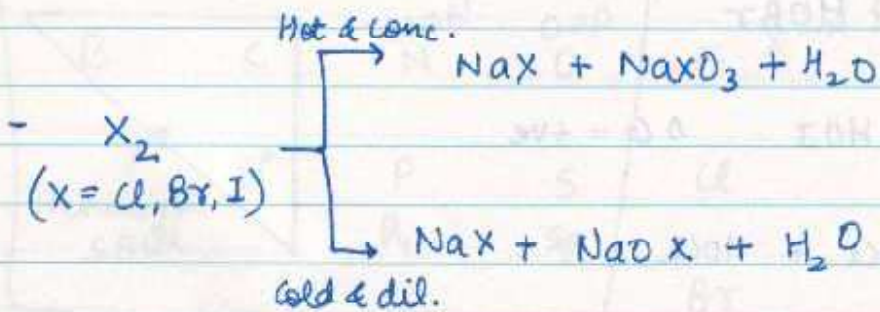
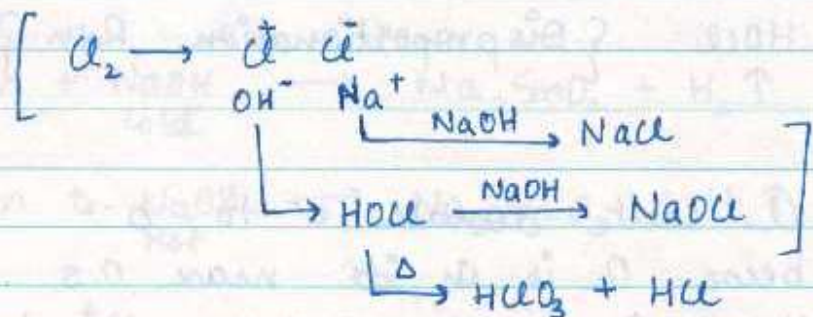
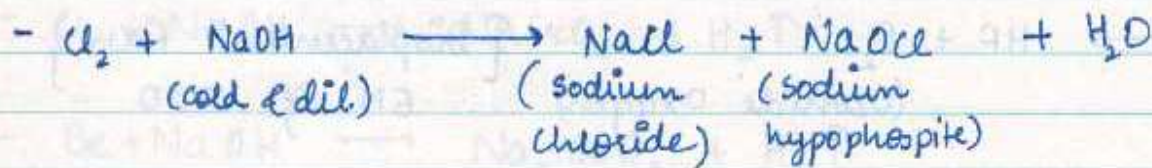
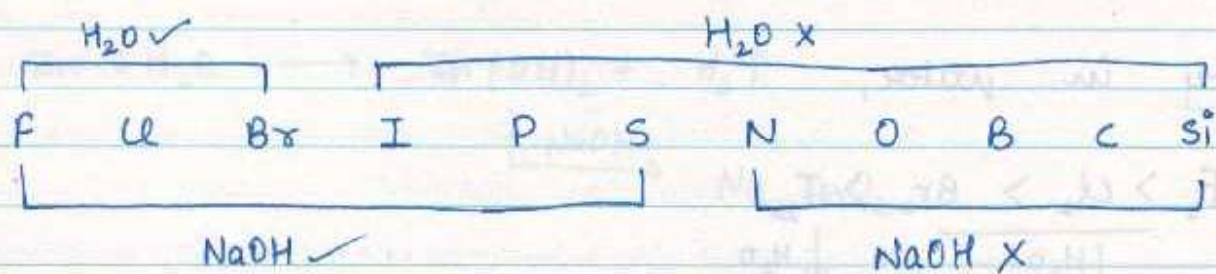
Reactivity in water,

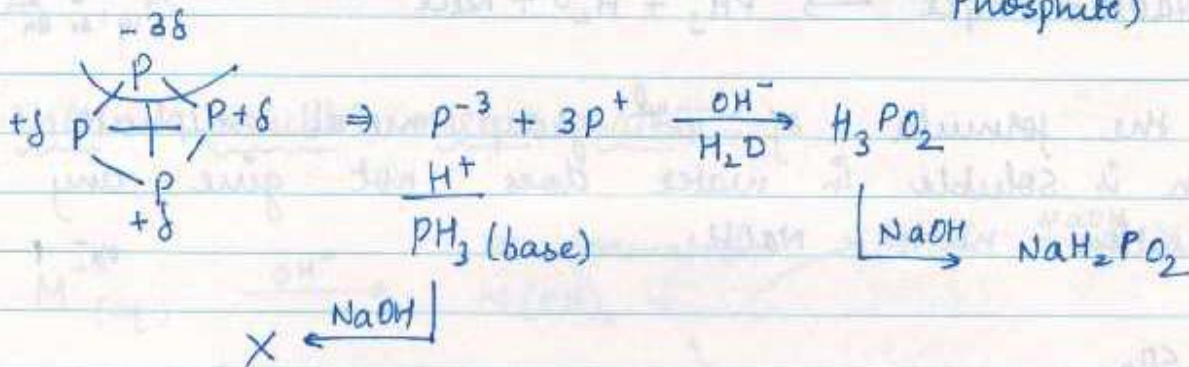
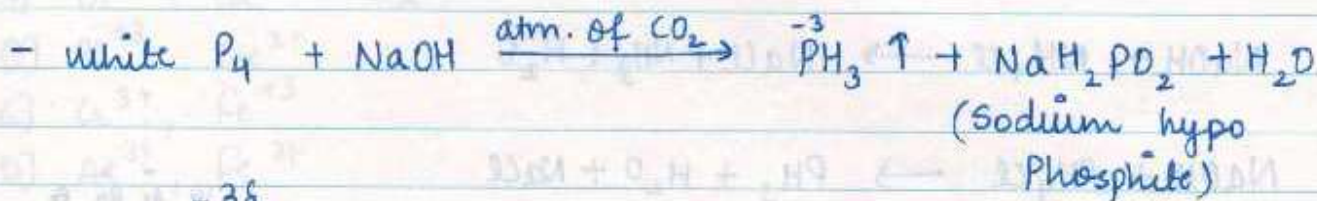
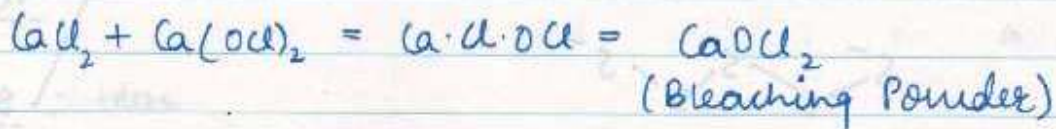
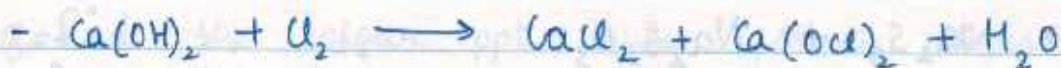


* Cl can't donate e^- to O^{-2} becuz O is in its max. O.S.
Cl can't accept e^- from H^+ becuz H^+ doesn't have e^- so Cl_2 disp^r

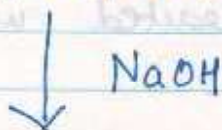


* $\text{Cl}_2 + \text{H}_2\text{O}$ forms acid which can be neutralized by NaOH so rxn moves in forward direcⁿ, ΔG becomes more -ve due to release energy during neutralisation

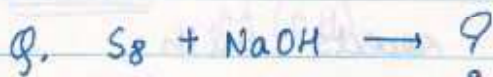




* $\text{Cl}_2 / \text{Br}_2 / \text{I}_2 / \text{P}_4 / \text{S}_8$

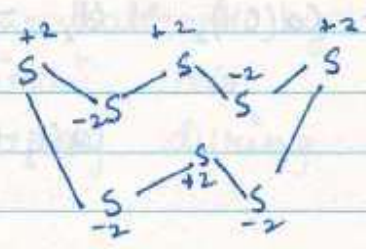
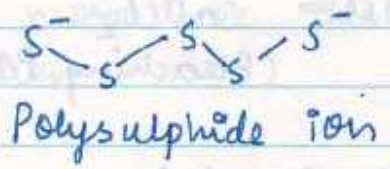
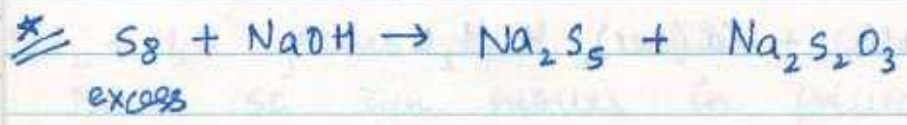


lowest o.s. product + Hypo -ous o.s. product

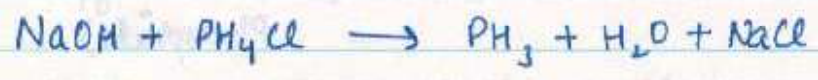


- A] $\text{Na}_2\text{S} + \text{Na}_2\text{S}_2\text{O}_3$ ✓
- B] $\text{Na}_2\text{S} + \text{Na}_2\text{SO}_3$
- C] $\text{H}_2\text{S} + \text{Na}_2\text{S}_2\text{O}_3$
- D] $\text{H}_2\text{S} + \text{Na}_2\text{SO}_3$

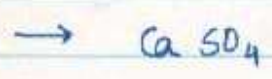
$\text{NH}_4\text{OH} + \text{NaCl}$
 $\text{PH}_4\text{OH} + \text{NaCl}$



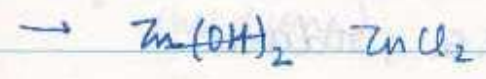
⇒ NaOH with NH₄⁺ / PH₄⁺ salt :



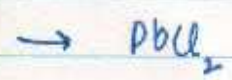
Q. Find the formula of IInd group metal sulphate which is soluble in water does not give any observation with NaOH



Q. Find the formula of d-block metal chloride which gives white ppt when reacted with NaOH & ppt is soluble in excess NaOH.



Q. A insoluble metal chloride when reacts with NaOH gives a white ppt (ppt exchange rxn) which is soluble in excess NaOH



PS see pg 11
colour

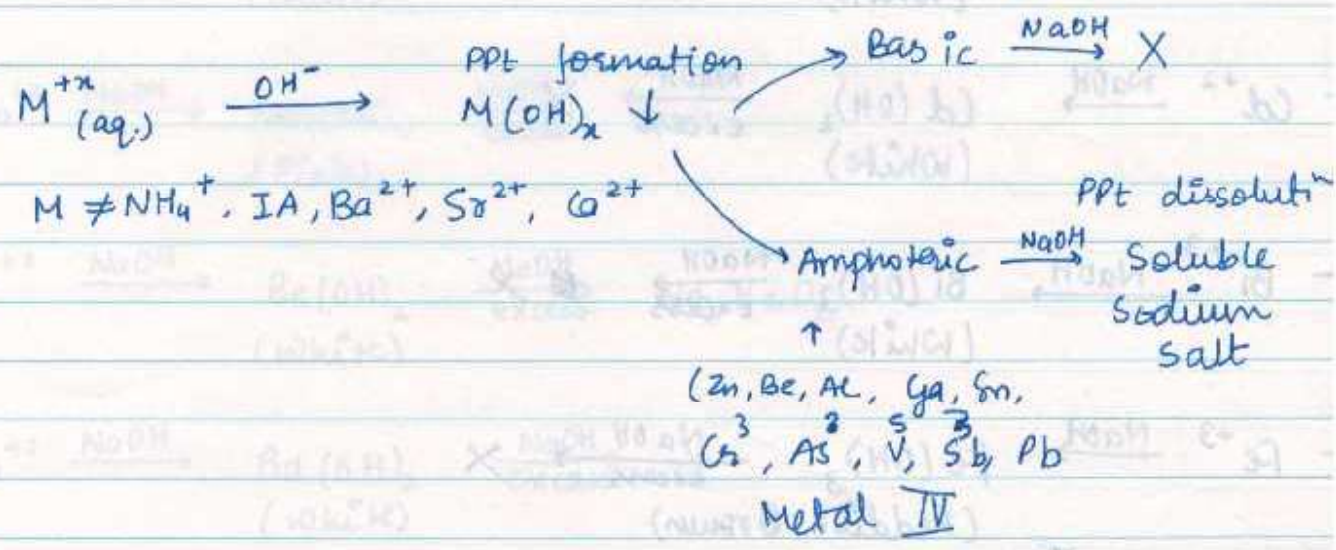
g. Find the colour ppt which forms when a transition metal reacts with NaOH. PPT is also soluble in NaOH.

→ Cr green ; blue

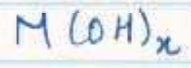
g. Which pair of ions can be separated by using NaOH.

- A) Bi^{3+} , Cu^{2+} -X
- B) Al^{3+} , Cr^{3+}
- C) Co^{3+} , Fe^{3+}
- D) Al^{3+} , Fe^{3+}

* NaOH + soluble metal salts \Rightarrow



Colours



s-block, p-block, $d^{10} \rightarrow$ white

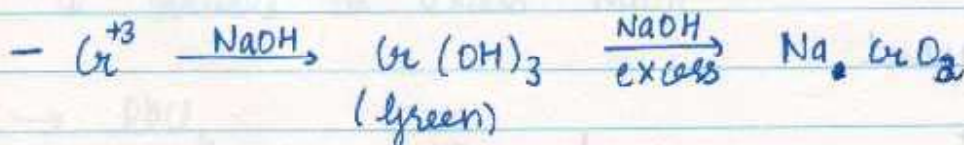
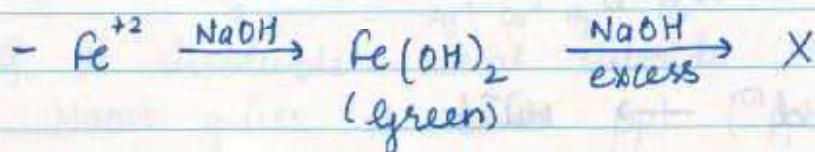
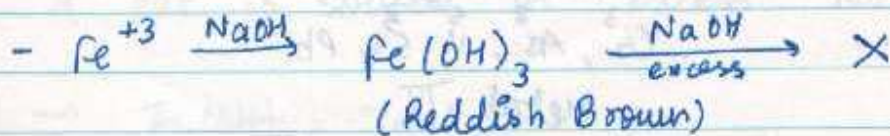
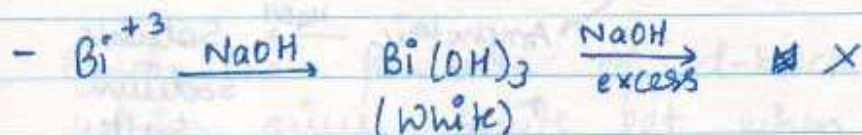
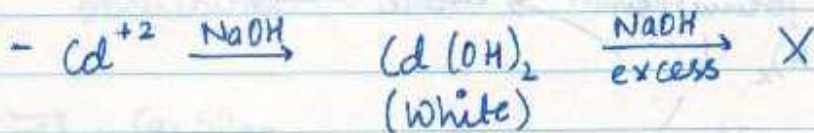
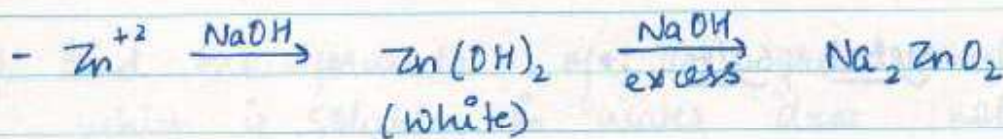
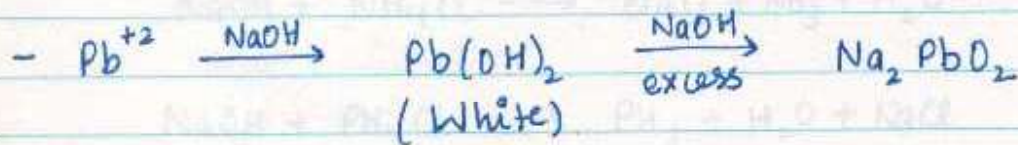
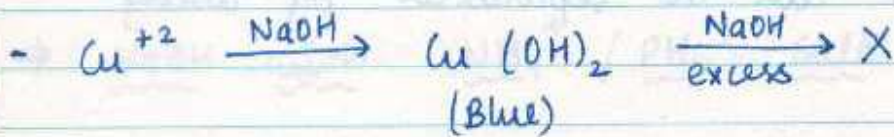
$d^{1-9} \rightarrow$ coloured

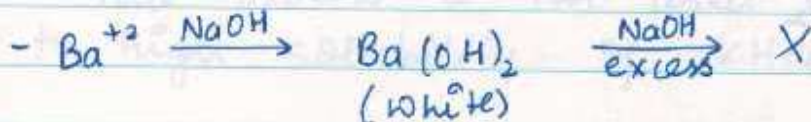
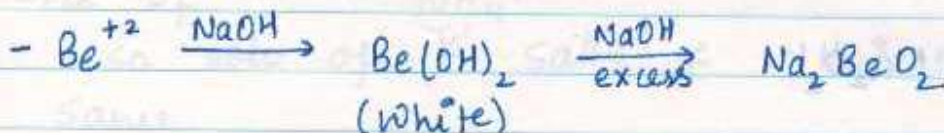
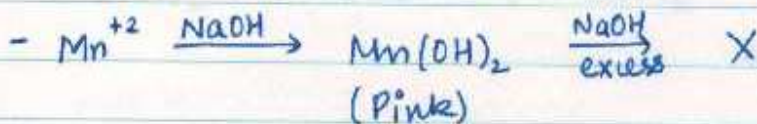
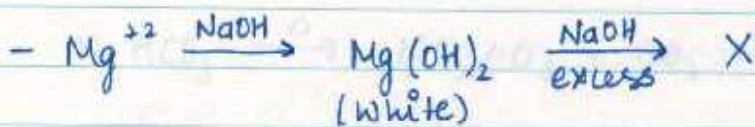
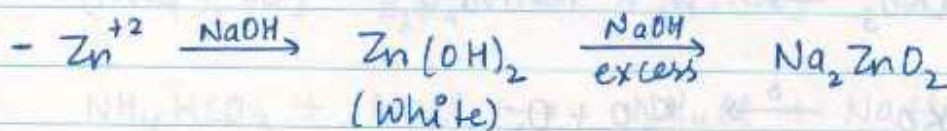
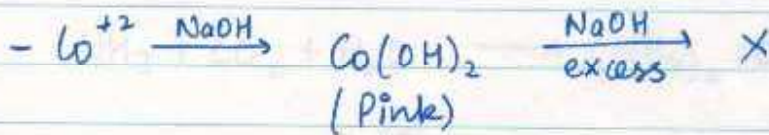
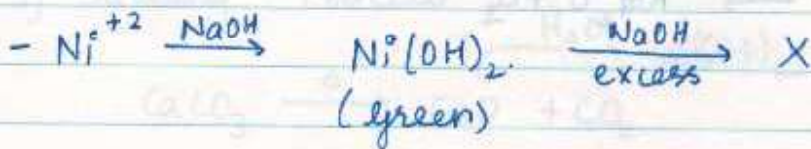
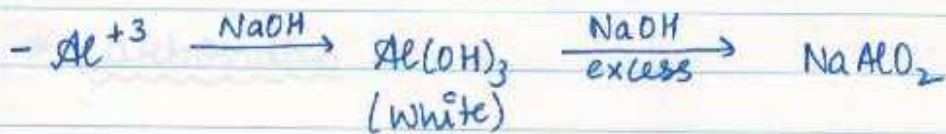
Cr^{3+} , Fe^{2+} , $\text{Ni}^{2+} \rightarrow$ green | Cu^{2+} , $\text{Cr}^{6+} \rightarrow$ Blue

$Mn^{2+}, Co^{2+} \rightarrow$ Pink

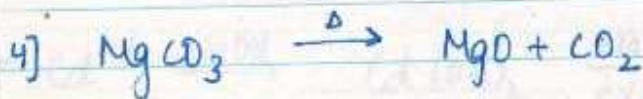
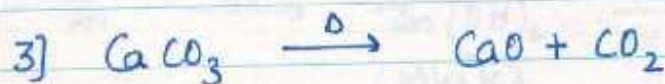
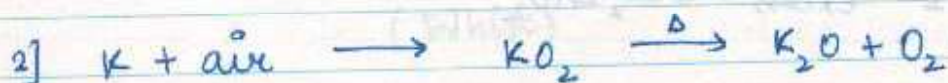
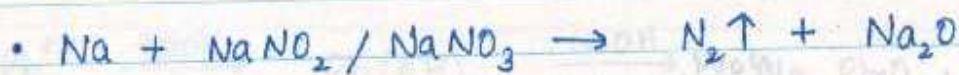
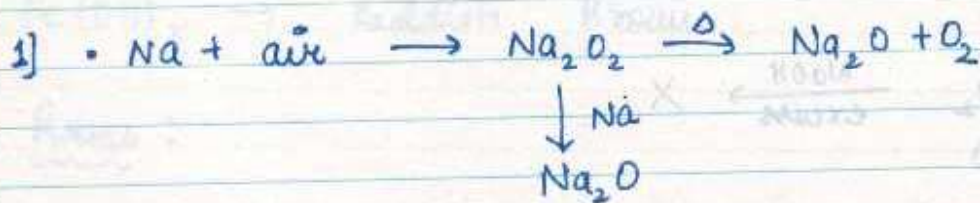
$Fe(OH)_3 \rightarrow$ Reddish Brown.

Reans:

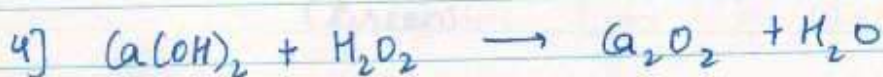
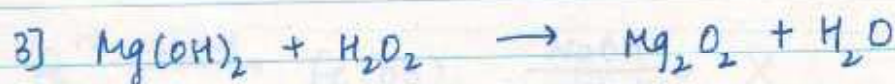
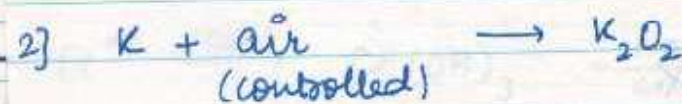
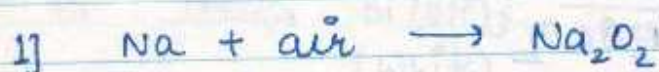




* Oxides :->

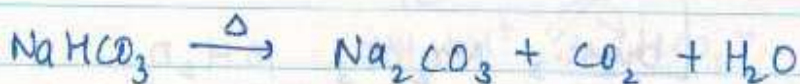
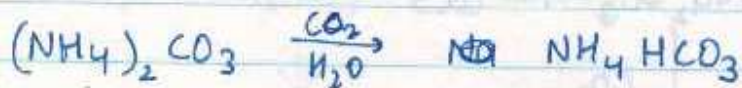
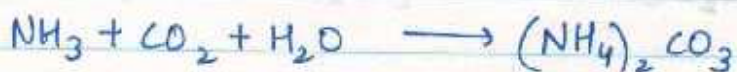
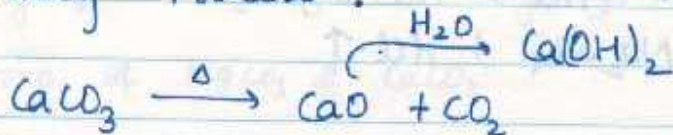


* Peroxides :->



* Carbonates \rightarrow

1] Solway Process:

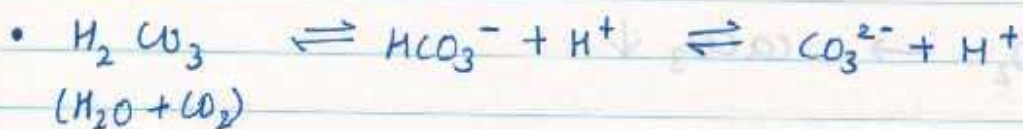
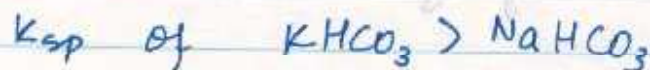


recovery of ammonia

Size of $\text{K}^+ \approx \text{NH}_4^+$

so solu. of 'K' salts & NH_4^+ salts is almost same.

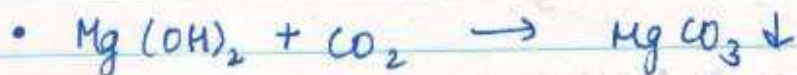
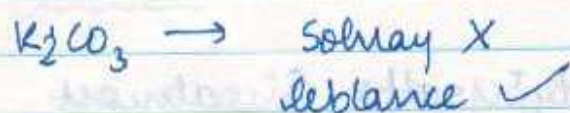
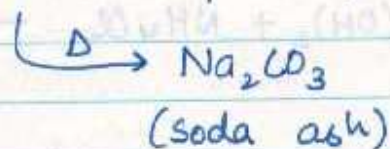
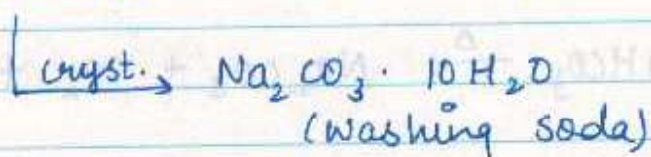
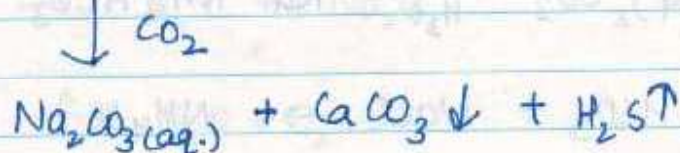
this process is not used to prepare K_2CO_3 due to high solubility of KHCO_3

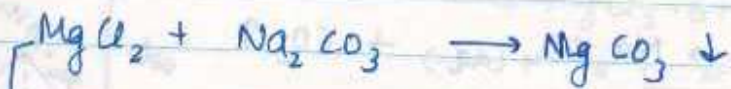
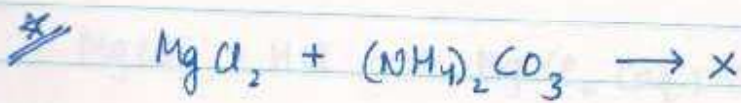


2] Leblance Process :

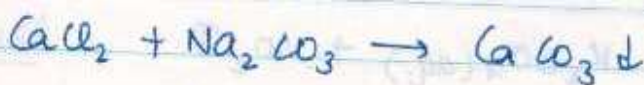
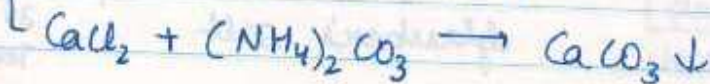


Acidic nature of
 $\text{CO}_2 > \text{H}_2\text{S}$





prep. of $MgCO_3$ & $CaCO_3$



\Downarrow

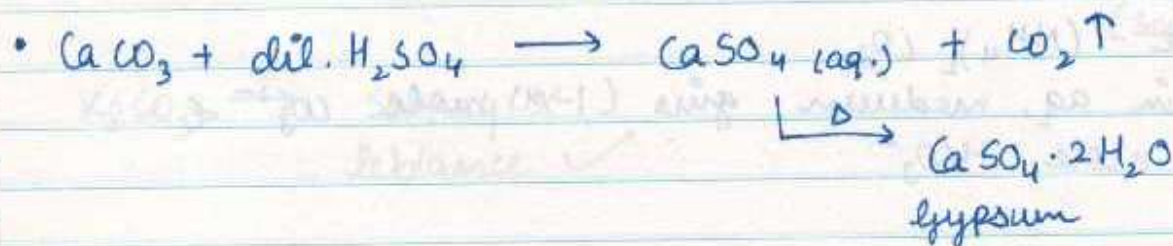
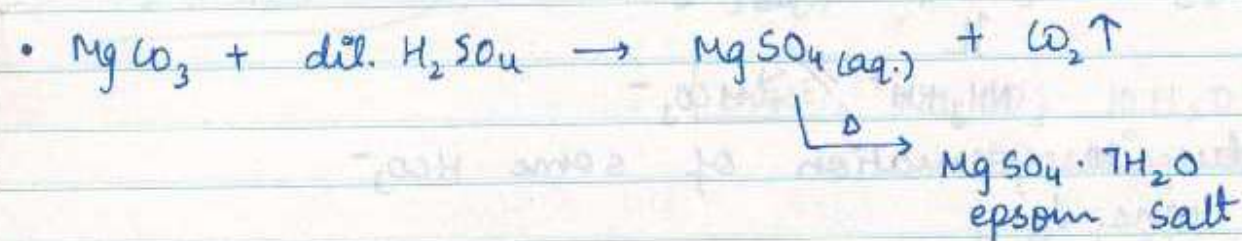
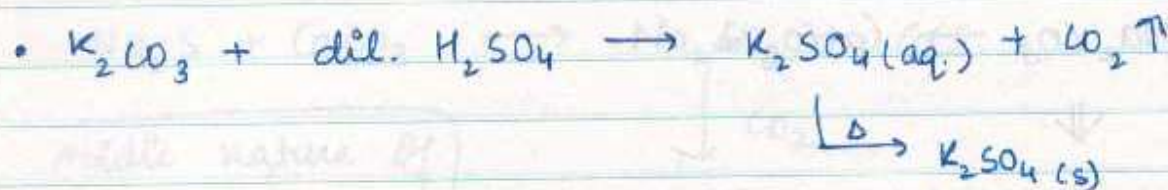
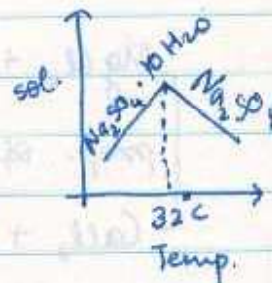
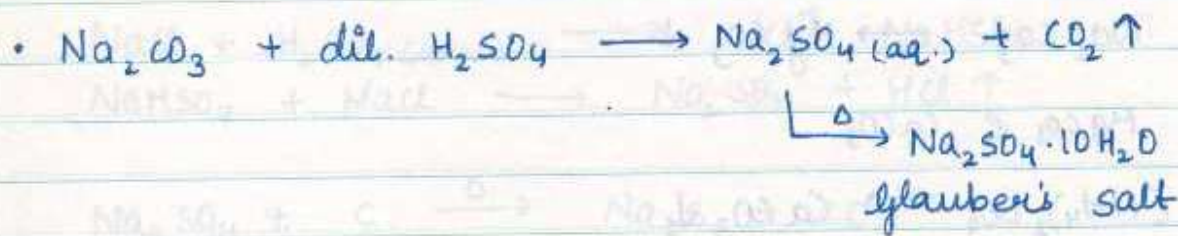


due to formation of some HCO_3^-
 CO_3^{2-} conc. \downarrow

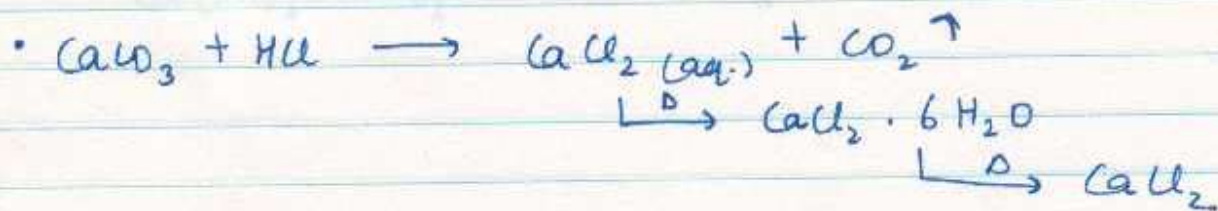
one mole $(NH_4)_2CO_3$
 in aq. medium gives $(1-x)$ mole CO_3^{2-} &
 x mole HCO_3^-

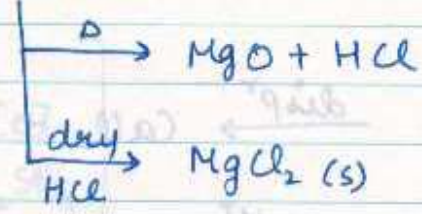
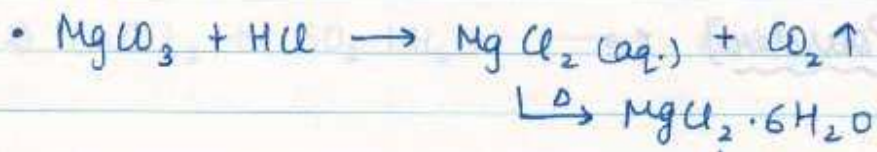
one mole Na_2CO_3
 in aq. medium gives one mole CO_3^{2-}

* Sulphates :



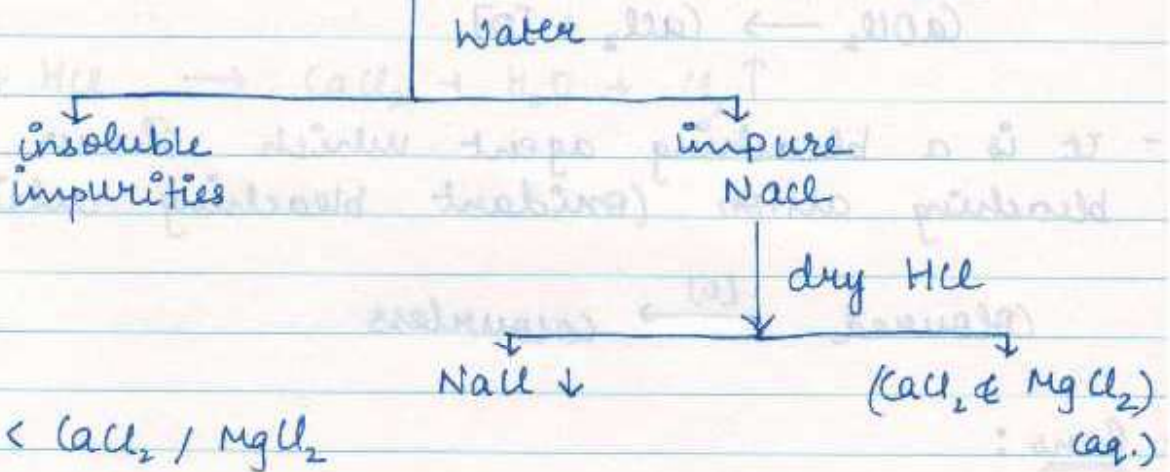
* Chlorides :





• NaCl

Sea water $\xrightarrow{\text{evap}^r}$ crude salt (Impure NaCl)
 $\uparrow CaCl_2, MgCl_2$



$K_{sp}: NaCl < (CaCl_2 / MgCl_2)$

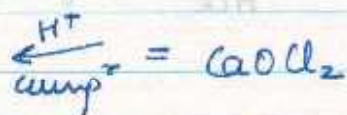
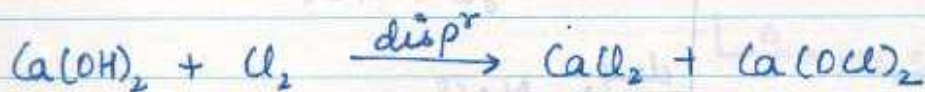
$K_{sp} = [Na^+][Cl^-]$
 (fix)

$K_f = [Na^+][Cl^-]$ in presence of HCl

$K_f > K_{sp} \Rightarrow$ p.p.t.

* CaOCl₂ [Bleaching Powder] :-

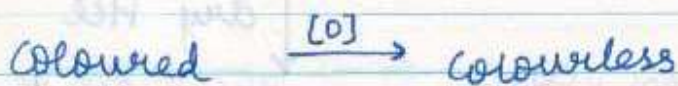
• Prep.



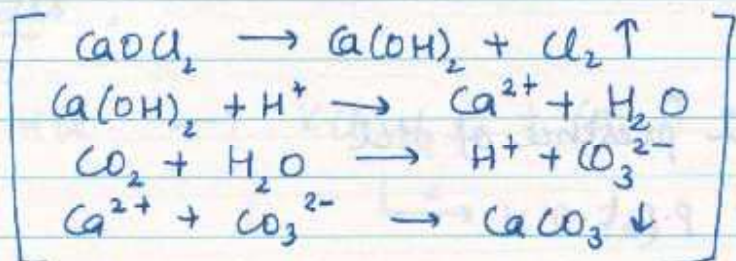
- It is an oxidising agent

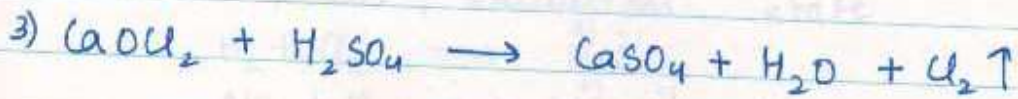
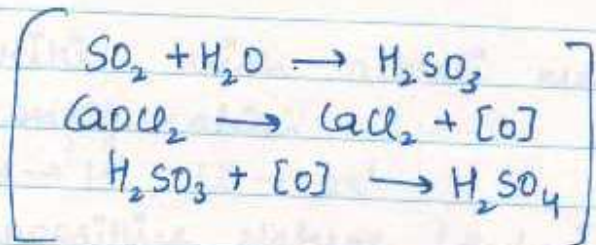
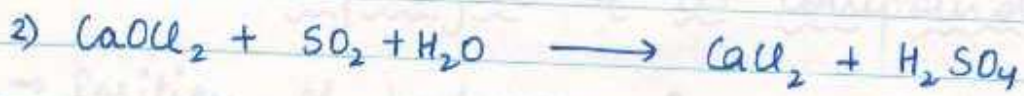


- It is a bleaching agent which shows stable bleaching action (oxidant bleaching action)



• Reas:





* Similarities with halogens

1) e^- configuration

$1s^2 2s^2 2p^6 3s^2 3p^4$ configuration

2) Electronegative nature / oxidising nature /
can with metals



3) Oxidation at anode



anode

$\text{H}_2 \uparrow$

$\text{Cl}_2 \uparrow$

* Hydrogen & its compounds *

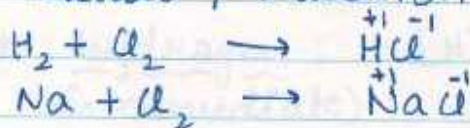
→ Position of hydrogen is not fixed in periodic table.

• similarities with alkali metals,

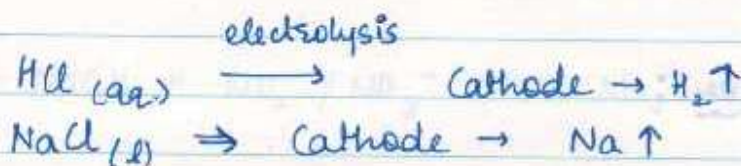
1) e^- configuration



2) Electropositive Nature / Reducing nature / can with non metals / oxidation state



3) liberation at cathode



• similarities with halogens,

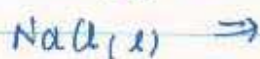
1) e^- configuration

1 e^- less from inert gas configuration

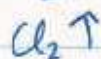
2) Electronegative nature / o.s. / Reducing nature / can with metals



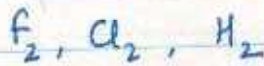
3) liberation at anode



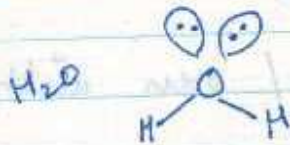
anode



4) existence in nature (Diatomic form)



5) Formation of covalent compound / covalency



6) IE

$H = 13.6 \text{ eV}$

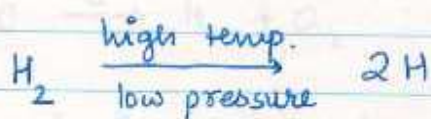
$F = 18 \text{ eV}$

* Isotopes of hydrogen:

	H_2	D_2	T_2
Abundance	>	>	
MW	<	<	
BP/MP	<	<	
BE	<	-	
BL	=	-	

* Different forms of hydrogen :

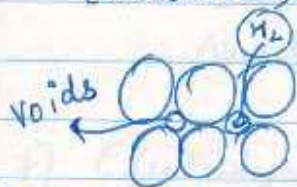
1] Atomic hydrogen :



2] Nascent hydrogen : [H]
(Ran intermediate)



3] Occluded hydrogen :
(absorbed)



→ Interstitial hydride

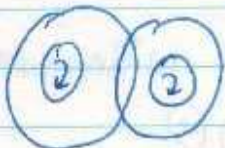
(interstitial sites)

B] On the basis of oxidation state :

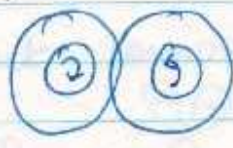


Q] On the basis of Nuclear spin

Nuclear Isomers,



ortho
 H_2



para
 H_2

Stability,

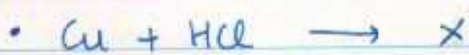
ortho < para (due to cancellation of magnetic fields produced)

• At room temperature, 25%. p- H_2 & 75% o- H_2 is present.

But as temp ↓ % of para- H_2 ↑

* Preparation of dihydrogen:

1] From acids,



2] By Alkalis,

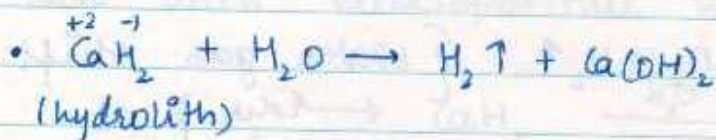




3] By H_2O



4] From ionic hydride



5] From B_2H_6 / SiH_4



6] Electrolysis of Brine ($NaCl(aq)$)

Cathode $H_2 \uparrow$

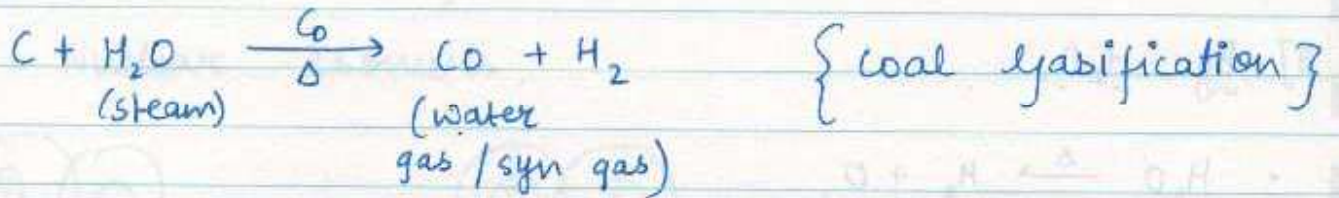
Anode $Cl_2 \uparrow$

7] Electrolysis of alkaline / acidic water

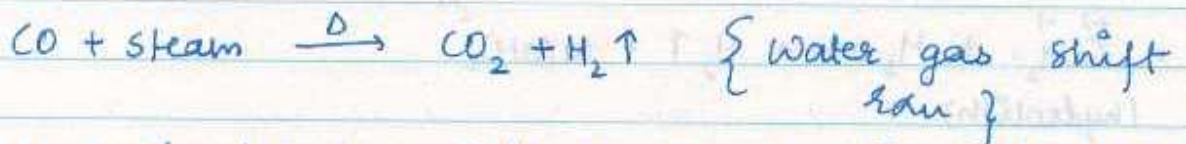
Cathode $H_2 \uparrow$

due to formation of $(H_2O)_n H^+$ / $(H_2O)_n OH^-$ (isomeric H-bonding) conductivity increases abnormally

c) 8] By coal

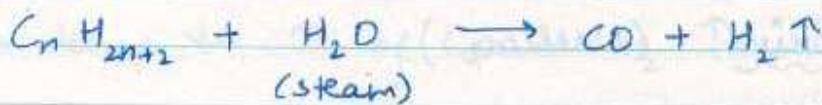


Amount of H_2 can be increased by



CO_2 is removed from mixture by passing it from sodium arsenite solution.

c) 9] By Petroleum



* Production of Dihydrogen,

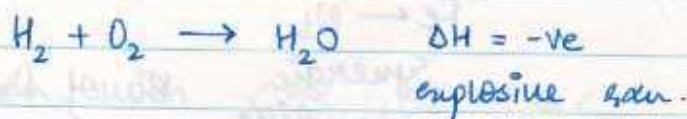
Petroleum > coal > Electrolysis > other.

• Physical properties of Dihydrogen :

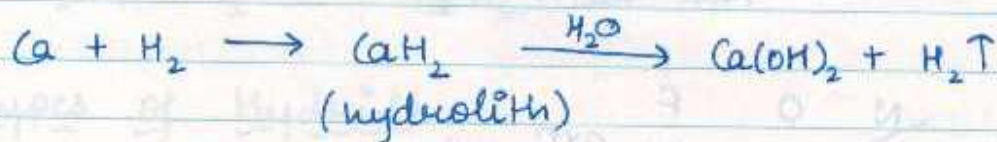
- Colourless
- tasteless
- odourless
- combustible
- gas
- Insoluble in water

• Chemical properties :

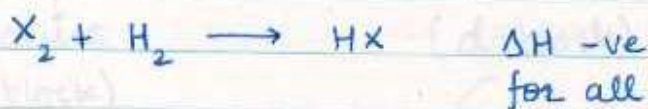
1] Combustible nature



2] Rn with electropositive metals



3] Rn with halogens

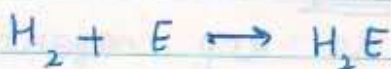


X = F, Cl, Br, I

Reactivity $\text{F}_2 > \text{Cl}_2 > \text{Br}_2 > \text{I}_2$
in dark $h\nu$

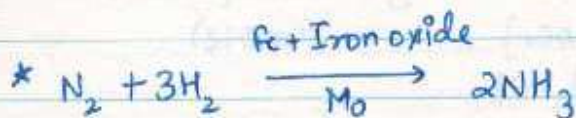
Release Energy $\text{HF} > \text{HCl} > \text{HBr} > \text{HI}$

4] Rn with gp 16 elements



Release Energy $\text{H}_2\text{O} > \text{H}_2\text{S} > \text{H}_2\text{Se} > \text{H}_2\text{Te}$
exo endo

5) Ran with gp 15 elements



(Haber's Process)



Synergic bonding

BO of $N_2 \downarrow$

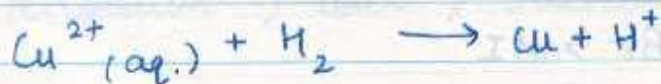
Ran with H_2

	N	O	F	
	P	S	Cl	exo
	As	Se	Br	
endo	Sb	Te	I	

6) Ran with metal ions



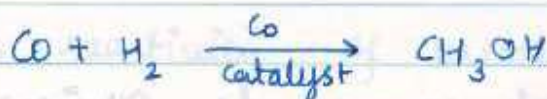
Reactivity of $M < H$



7) Ran with metal oxide (metallurgy)



8] Run with CO



(synergic)

9] Run with $\text{C}=\text{C}$ or $\text{C}\equiv\text{C}$
(Hydrogenation)



* Types of Hydride

↳ (Binary compds of H_2)

ionic / salt like
/ saline
(s-block)
except BeH_2 & MgH_2

Interstitial
(d-block)

Covalent

e^- deficient e^- precise e^- rich
gp 13 gp 14 gp 16, 17
& BeH_2 , octet w/ octet
 MgH_2 d.p. = 0 & p. ≠



→ Ionic hydrides are crystalline, non-volatile, non-conducting in solid state however their melts conduct electricity & on electrolysis liberate dihydrogen gas at anode which confirms the existence of H^- .

→ Saline hydrides react violently with water producing dihydrogen gas

→ LiH is rather unreactive at moderate temp. with O_2 & Cl_2 .

→ Interstitial hydrides are not compounds, their formula is not in simple ratio.

→ Generally there is no bond b/w metallic atoms & H_2 in interstitial hydride so electrical cond. remains same, hardness, density, M.P. increases and ductility & malleability ↓ in comparison of pure metal.

* Water :->

Physical Properties :

→ colourless, tasteless liquid having max. density at $4^\circ C$ so ice floats on water.

→ At $0^\circ C$ it has hexagonal H-bonded ring structure.

→ At very low temp. it has H-bonded cubic structure.

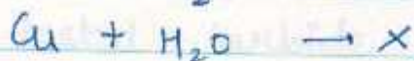
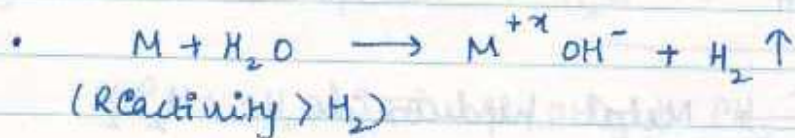
Chemical Properties :

→ amphoteric behaviour



→ Reaction with metals

- As reactivity of metals \uparrow req. temp. for rxn \uparrow .

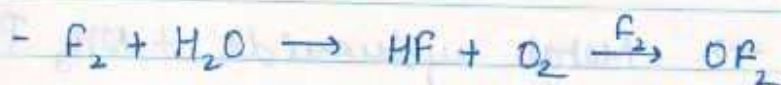


- Na + cold water \rightarrow NaOH + $H_2 \uparrow$
- Mg + warm water \rightarrow Mg(OH)₂ + $H_2 \uparrow$
- Zn + boiling water \rightarrow Zn(OH)₂ + $H_2 \uparrow$
- Fe + Steam \rightarrow Fe₃O₄ + $H_2 \uparrow$
(Red hot)

- Metals which form insoluble hydroxide do not react with water at R.T. practically due to formation of protective layer of oxide / hydroxide
eg: Al, Pb, Be

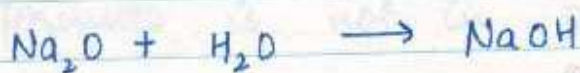
→ Reaction with non-metals

Only F₂, Cl₂, Br₂ seen with H₂O at R.T.



→ Reaction with ionic compounds :

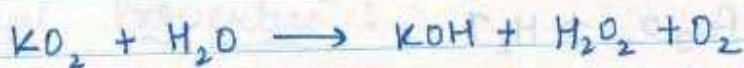
i] Oxide + $H_2O \rightarrow$ hydroxide



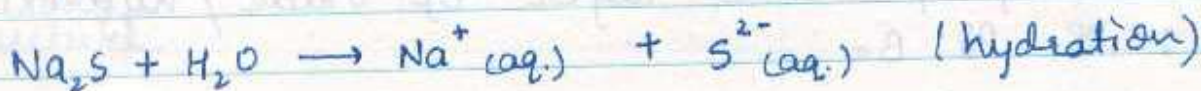
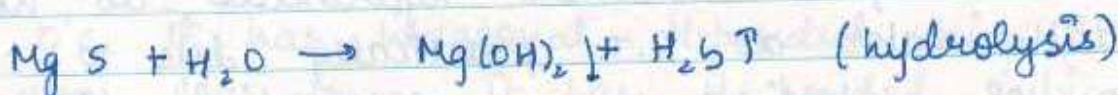
ii] Metal peroxide + $H_2O \rightarrow$ Metal hydroxide + H_2O_2



iii] Metal superoxide + $H_2O \rightarrow$ Metal hydroxide + $H_2O_2 + O_2$



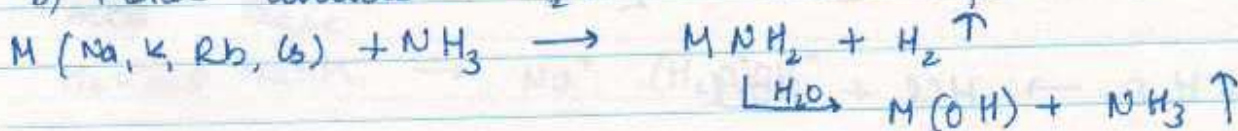
iv] Metal sulphide + $H_2O \rightarrow$ Metal hydroxide \downarrow + $H_2S \uparrow$

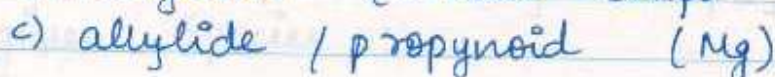
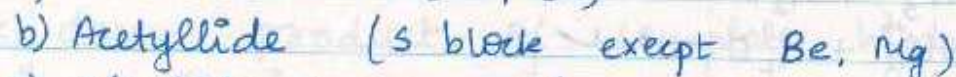
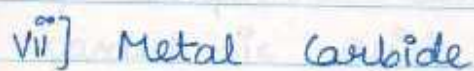
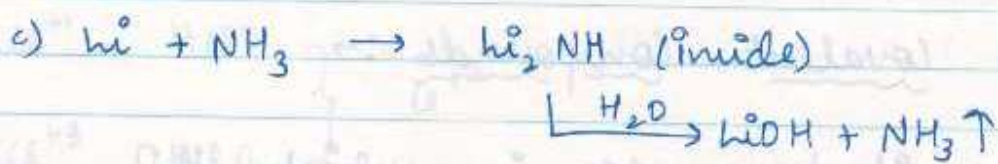


v] a) Metal nitride + $H_2O \rightarrow$ Metal hydroxide + $NH_3 \uparrow$



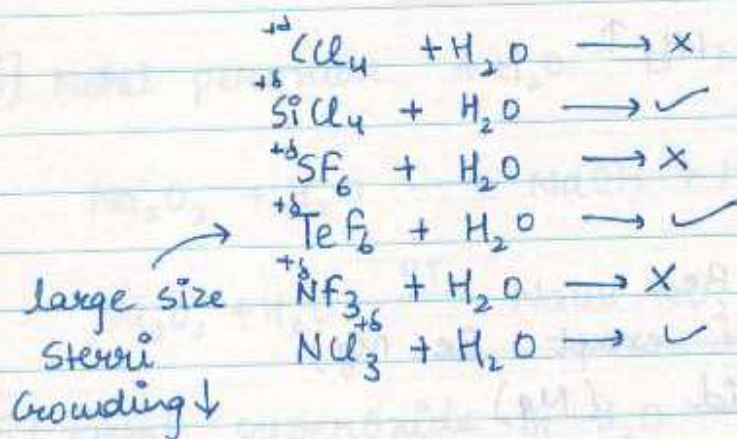
b) Metal amide + $H_2O \rightarrow$ Metal hydroxide + $NH_3 \uparrow$





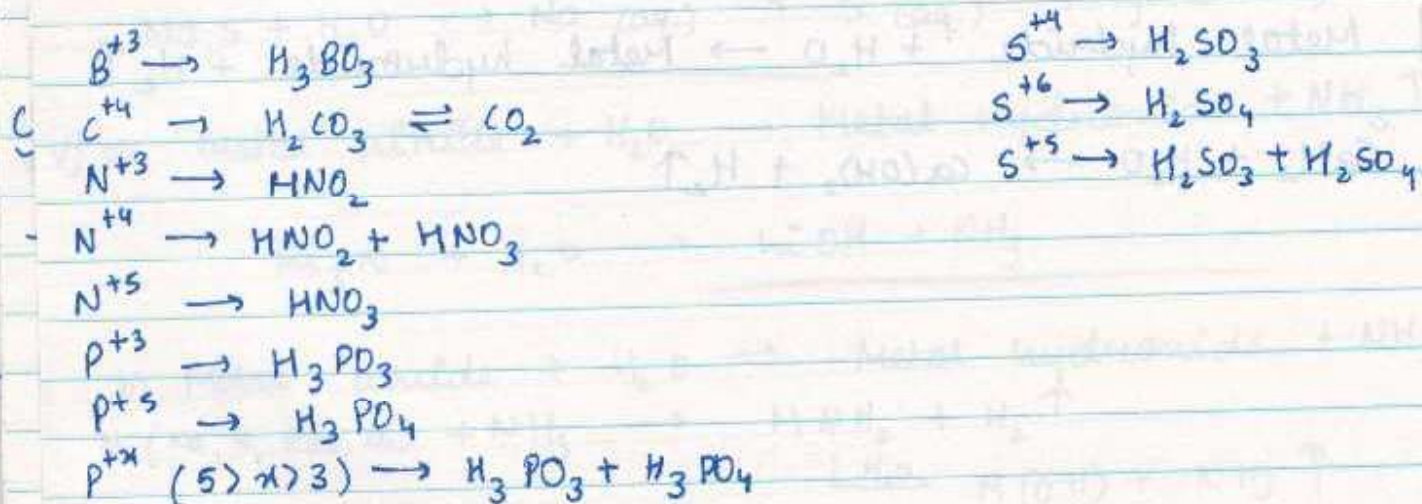
→ Hydrolysis of Covalent Compounds :-

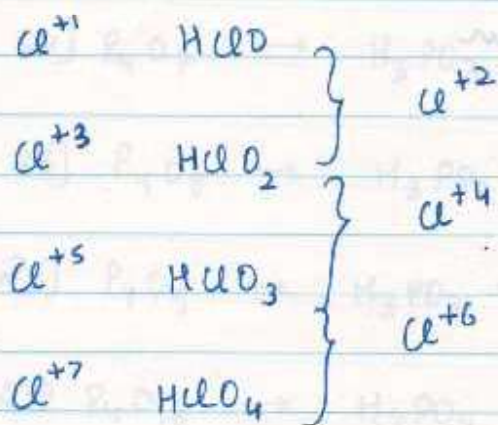
It is a Lewis acid-base rxn in which H_2O molecule acts as Lewis base. Substance acts as Lewis acid.



! Complete hydrolysis

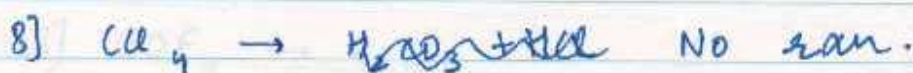
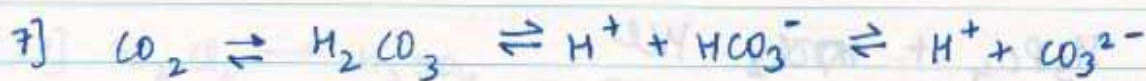
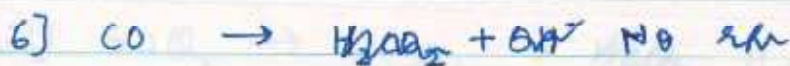
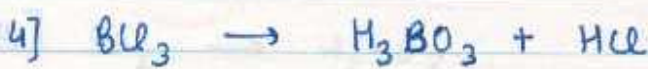
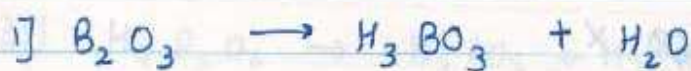
- Generally covalent compds are made of non metals
- More Electropositive element in compound forms bond with OH^- of water so one of the product of complete hydrolysis is non metal + O + H (oxy acid).

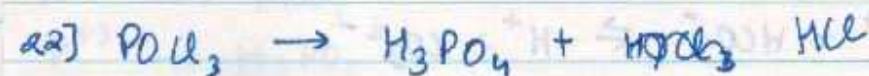
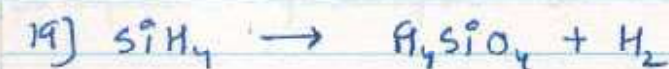
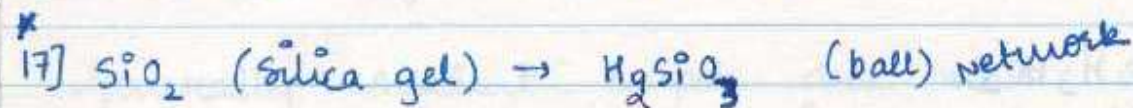


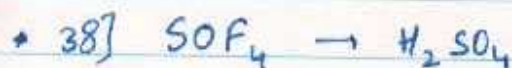
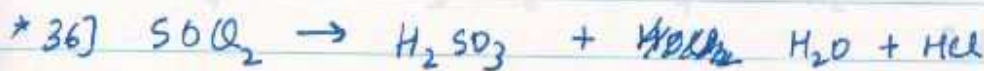
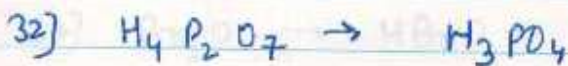
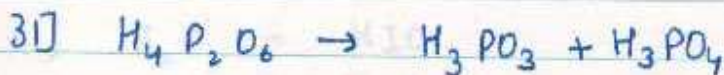
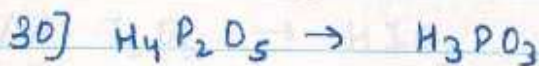
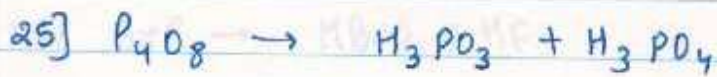


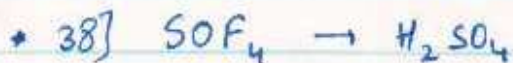
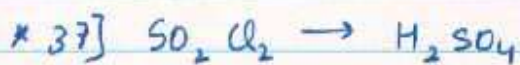
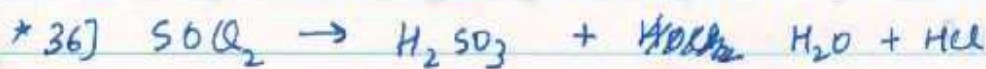
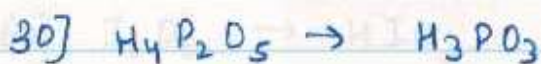
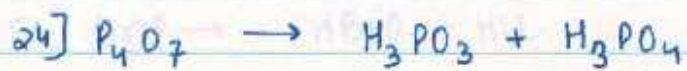
• If compound contains peroxy linkage, it gives parent-ic acid & H_2O_2 on complete hydrolysis.

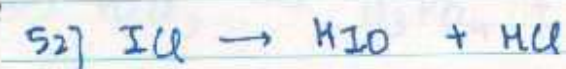
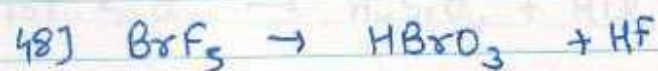
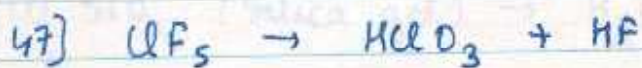
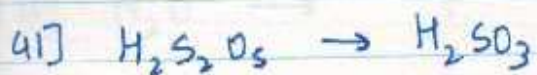
Q. Write down product of complete hydrolysis of given species :

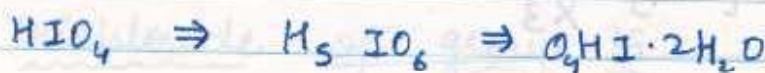








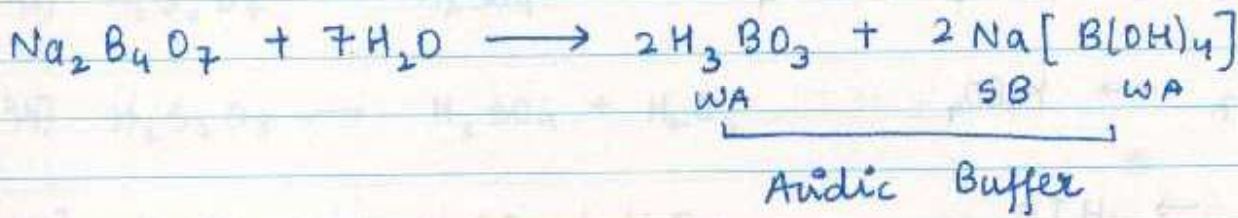




med. acids

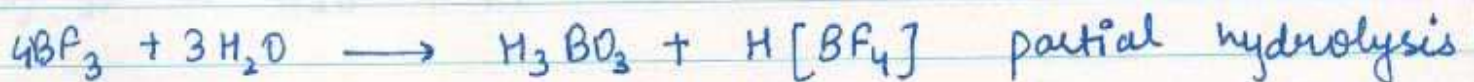
* Special Case \rightarrow

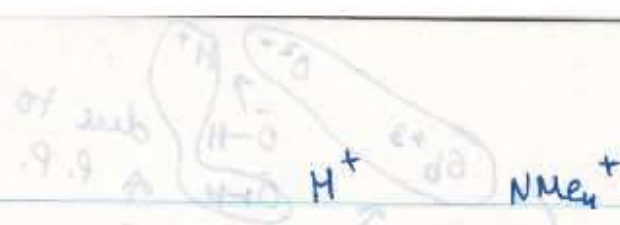
1) Borax



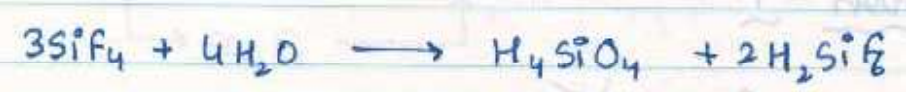
- Aq. solution of Borax is basic
- Aq. solution of Borax act as Acidic buffer

2) BF₃





3] SiF_4

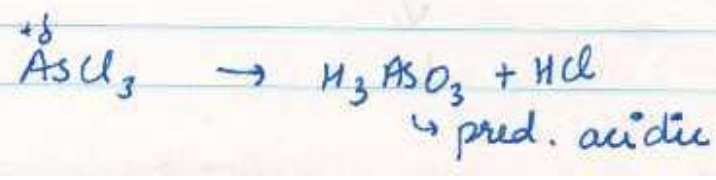
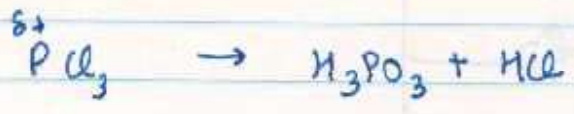
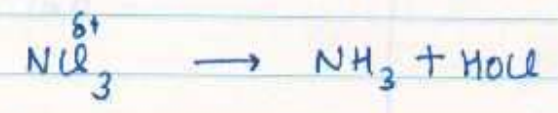


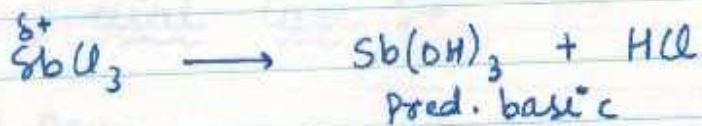
SiF_6^{2-} exists
 but SiCl_6^{2-} , SiBr_6^{2-} , SiI_6^{2-} do not exist

$\text{SiF}_4 \longrightarrow$ Partial hydrolysis

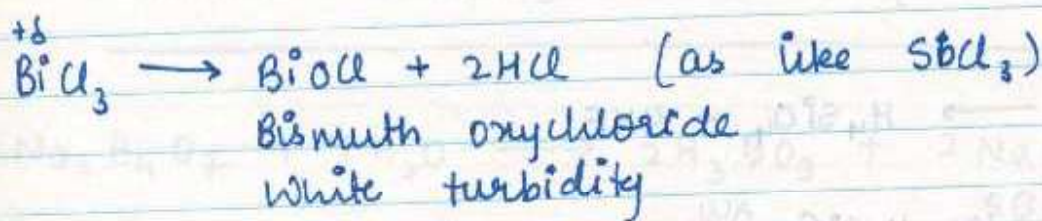
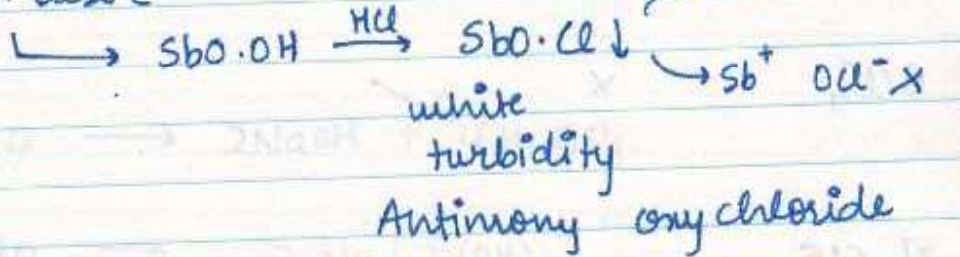
SiCl_4 , SiBr_4 , $\text{SiI}_4 \longrightarrow$ Complete hydrolysis

4] Trichloride of group 15

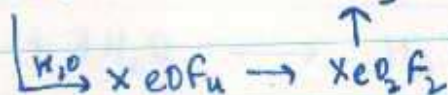
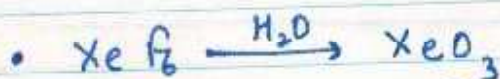
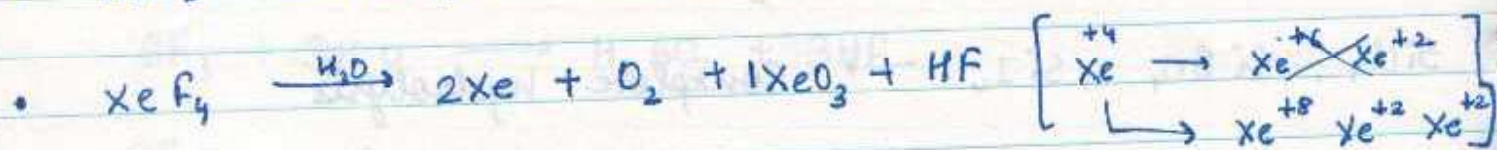




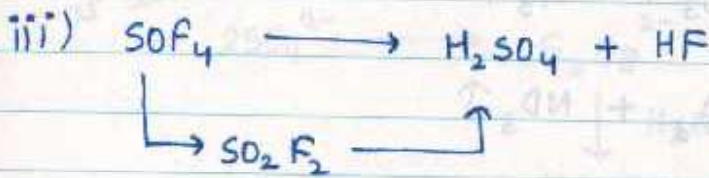
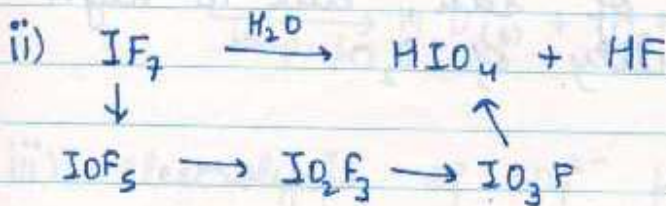
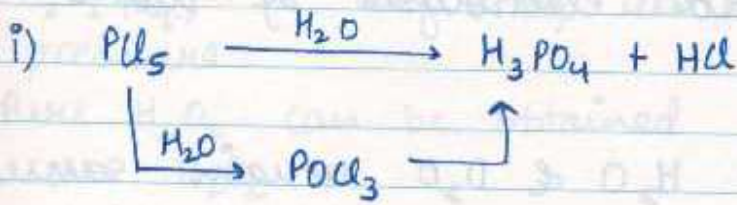
Prod. basic



5] Hydrolysis of Xenon F⁻

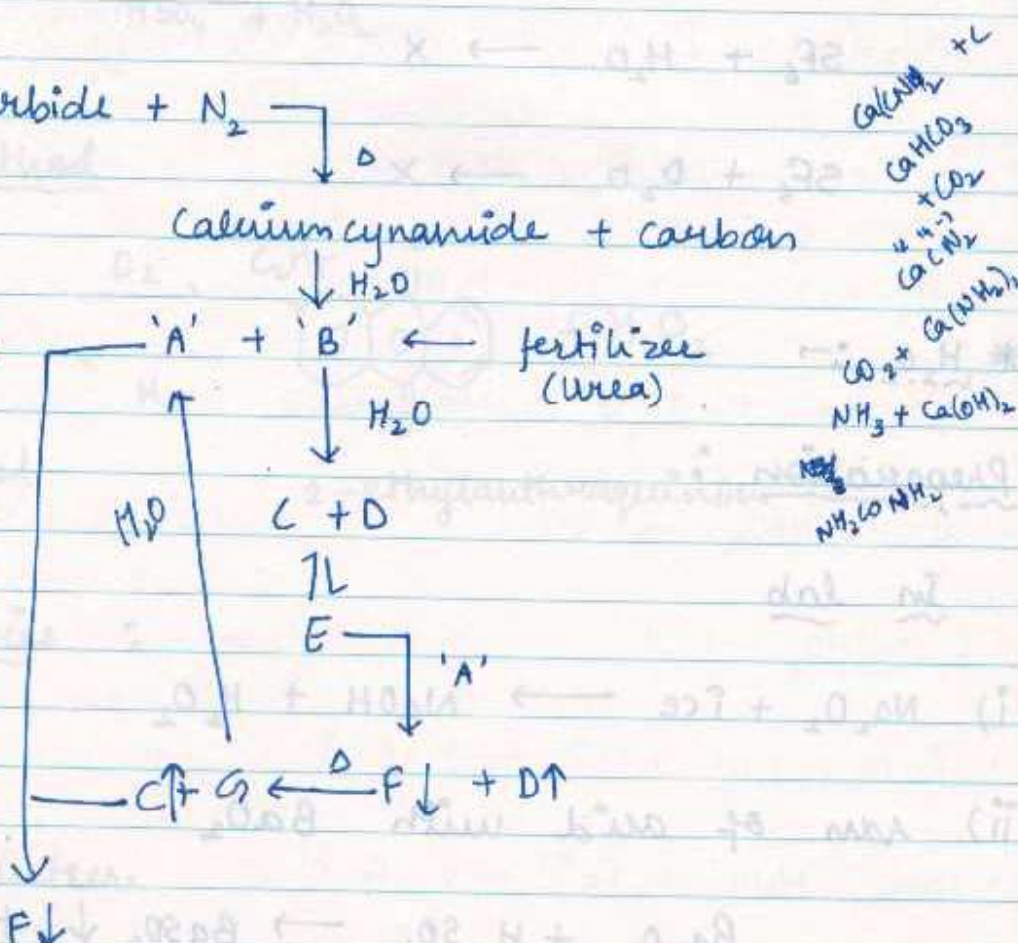


• Partial hydrolysis:

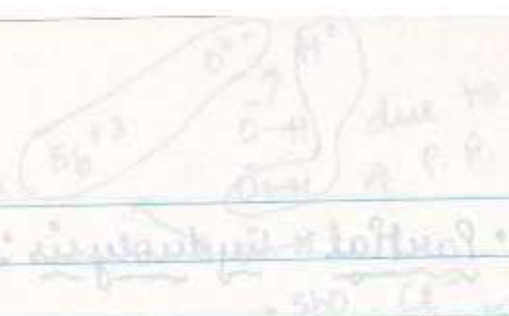


g. Calcium carbide + $N_2 \xrightarrow{\Delta}$ Calcium cyanamide + Carbon

- A → $Ca(OH)_2$
- B → NH_2CONH_2
- C → NH_3
- D → NH_3
- E → $(NH_4)_2CO_3$
- F → $CaCO_3$
- G → CaO



$CaCN_2 + C$
 $CaHCO_3$
 $+ CO_2$
 $CaCN_2$
 $Ca(NH_2)_2$
 $CO_2 + Ca(OH)_2$
 $NH_3 + Ca(OH)_2$
 NH_2CONH_2

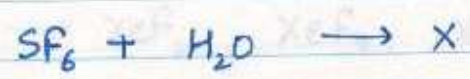
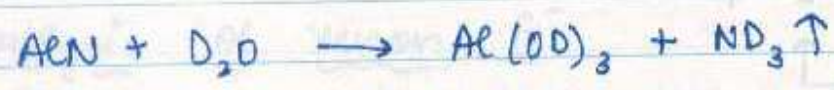
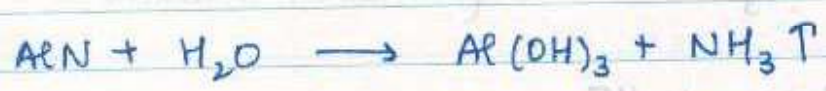


* $\underline{D_2O} \rightarrow$

• It is obtained by repeated electrolysis of water containing D_2O

* Chemical properties of H_2O & D_2O remain same but they differ in rate of rxn, due to high molecular mass & low mobility of D_2O .

eg.



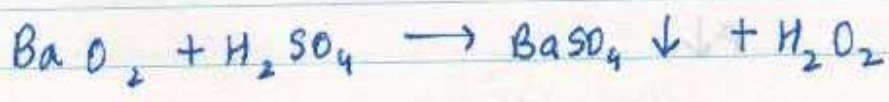
* $\underline{H_2O_2} \rightarrow$

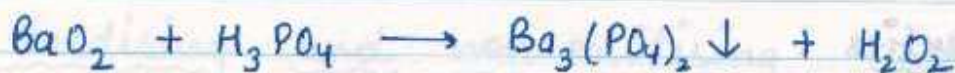
Preparation :

In lab



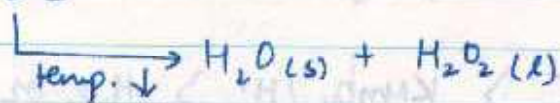
ii) rxn of acid with BaO_2



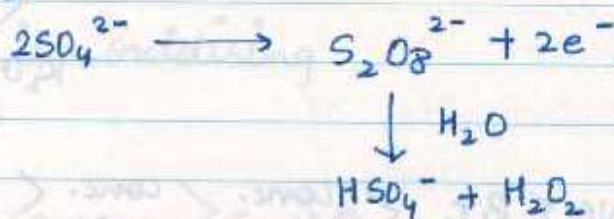


H_2O_2 (aq.) is conc. by distillation under reduced pressure.

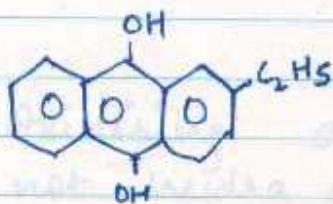
Pure H_2O_2 can be obtained by decreasing temp. of conc. H_2O_2



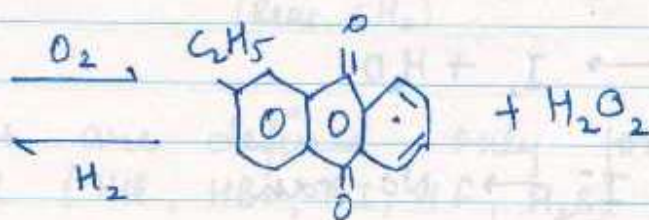
iii) electrolysis of SO_4^{2-} followed by hydrolysis at anode



Industrial Method



2-ethylanthraquinol



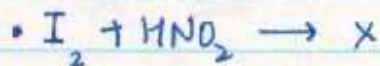
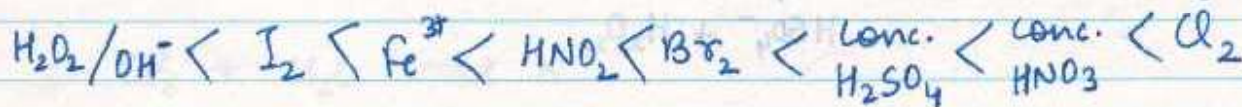
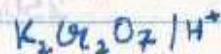
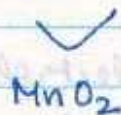
2-ethylanthraquinone + H_2O_2

• Physical Properties :

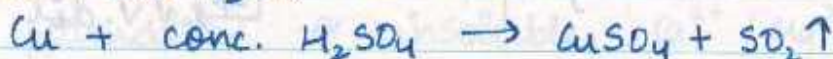
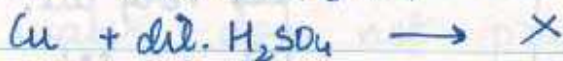
- colourless
- slightly acidic
- open book structure

• Chemical Properties :

- Oxidising agent as well as reducing agent
- Bleaching agent



* Oxidising and non-oxidising acids :->

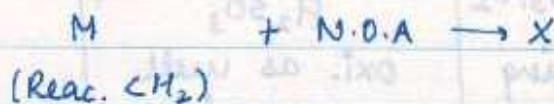
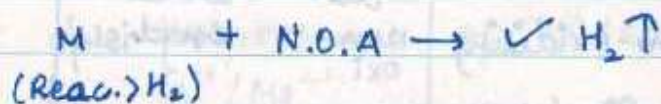
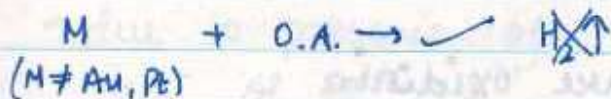


↓
Oxidising
Acids

↓
Non-oxidising
Acids

- Anion is oxidising agent

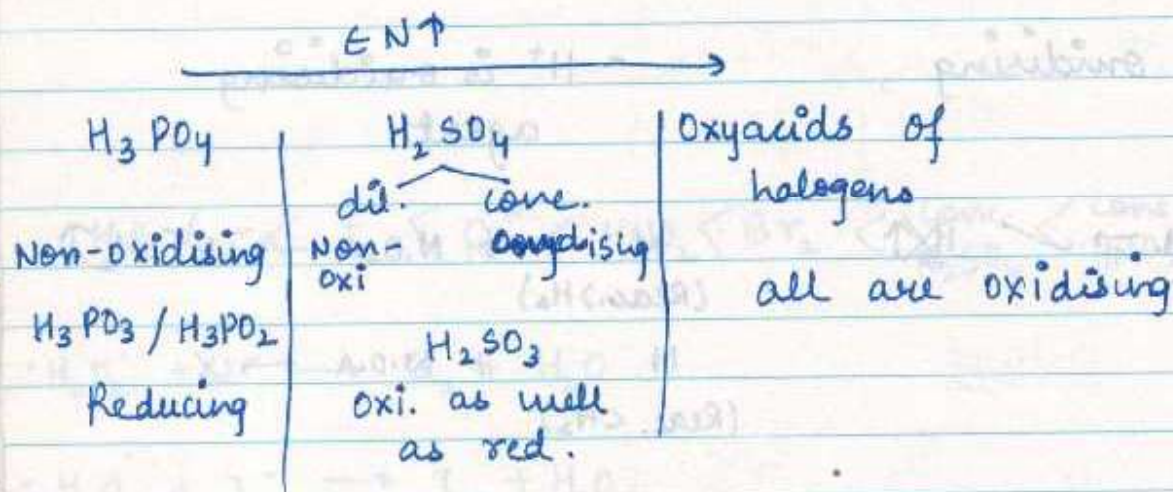
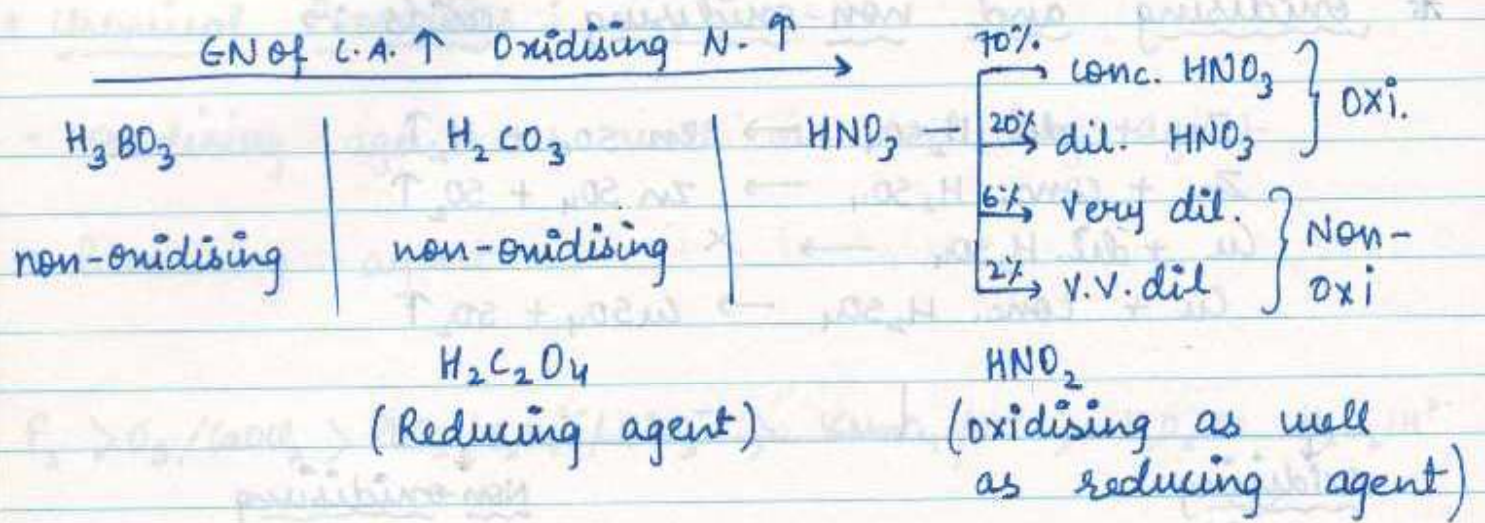
- H^+ is oxidising agent



• Oxidising acids are defined only for oxyacids not hydro acid (HCl , HBr , HI , HF , H_2S)

• As H^+ ↑ oxidising nature ↑

• As EN of C.A of oxyanion ↑
 e^- acceptance tendency ↑
 Oxidising Nature ↑



Storage of H_2O_2 :

- It is ^{un}stable at room temp., so it is stored in dark bottles.
- In presence of impurity of alkali metal cations ~~is~~ in glass catalyse decomposition of H_2O_2 . So H_2O_2 is stored in dark glass bottle lined with wax, or in plastic vessels.
- Rust particles also catalyse decomposition of H_2O_2 .
- Urea is used as a stabilizer.

* Hardness of Water :->

- due to presence of Ca^{2+} & Mg^{2+} soluble salt
- when water does not produce lather with soap due to formation of insoluble $\text{Ca}^{2+}/\text{Mg}^{2+}$ salt

Type of Hardness

Temporary

- can be removed by boiling
- due to presence of HCO_3^- of $\text{Ca}^{2+}/\text{Mg}^{2+}$

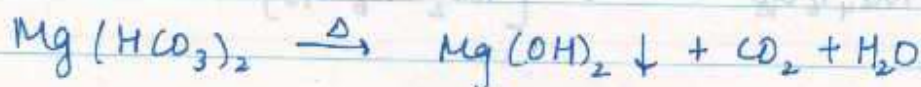
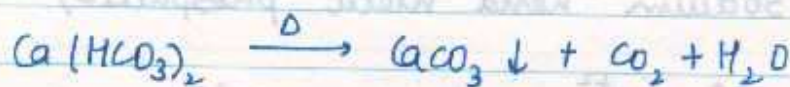
Permanent

- can't be removed by boiling
- due to presence of $\text{Cl}^-/\text{SO}_4^{2-}$ of $\text{Ca}^{2+}/\text{Mg}^{2+}$

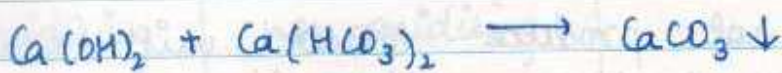
• Removal :

A) Temporary :

i) By Boiling



ii] Clark's Process



B] Permanent ($M^{2+} = \text{Ca}^{2+}/\text{Mg}^{2+}$)

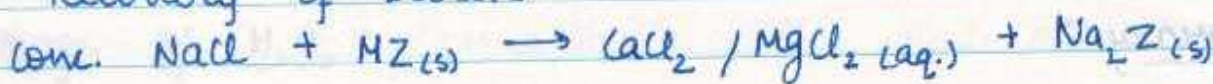
i] By Na_2CO_3



ii] By permutit / zeolite $\rightarrow \text{Na}_2\text{Z}$ (or ion exchange method) (Sodium aluminosilicate)

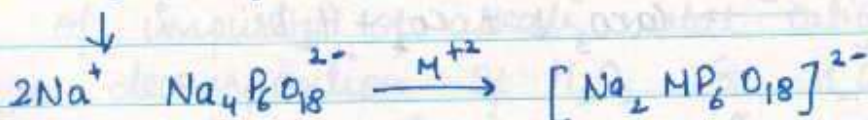


Recovery of Zeolite



iii] Calogen

$\rightarrow \text{Na}_6\text{P}_6\text{O}_{18}$ (Sodium hexa meta phosphate)



IV] Synthetic resins method

