

Acids | Bases | Salts

① Differentiate between organic and inorganic acids giving example.

<u>Ans</u> <u>Organic</u> (weak)	<u>Inorganic</u> (strong)
Acetic acid CH_3COOH	H_2SO_4
formic acid HCOOH	HNO_3
oxalic acid $(\text{COOH})_2$	H_3PO_4

② Name an inorganic acid which is weak.

Ans Carbonic acid H_2CO_3

Note: Generally inorganic acids are strong.

③ What is Basicity of an acid? What is Basicity of some common acids?

Ans The no. of ionisable H^+ ions present in an acid are called Basicity of an acid

<u>Acid</u>	<u>Basicity</u>
$\text{HCl}, \text{HNO}_3, \text{CH}_3\text{COOH},$ $\text{HCOOH}, \text{HBr}, \text{HI}$	1 (Monobasic)

$\text{H}_2\text{SO}_4, \text{H}_2\text{CO}_3, \text{H}_2\text{SO}_3,$ $\text{H}_3\text{PO}_3, (\text{COOH})_2$	2 (Dibasic)
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H_3PO_4	3 (Tribasic)
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④ Name the types of particles present in aqueous solution of -

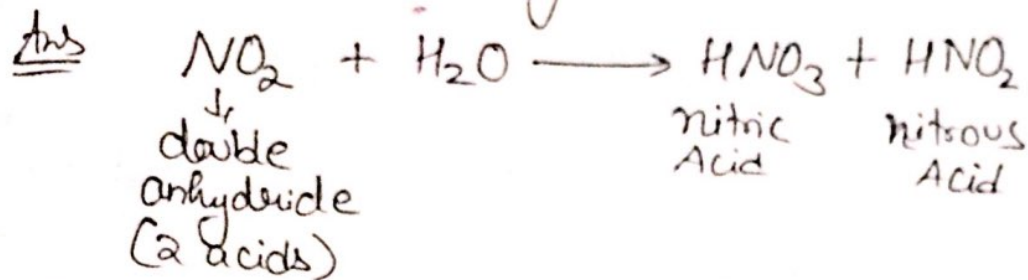
a) Strong Acid $\text{H}_2\text{SO}_4, \text{HNO}_3, \text{HCl} \rightarrow$ ions

b) weak Acid $\text{H}_2\text{CO}_3, \text{CH}_3\text{COOH}, \text{HCOOH} \rightarrow$ ions and molecules

Name the acid present in:-

- i) Vinegar \longrightarrow Acetic acid CH_3COOH
- ii) Fertilizers \longrightarrow Phosphoric acid
- iii) Flavoured drinks \longrightarrow Carbonic Acid
- iv) Food preservation \longrightarrow Citric Acid

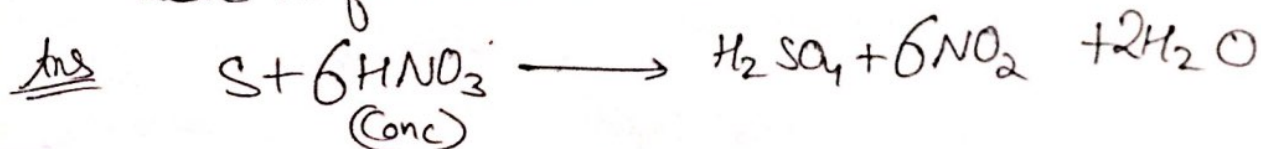
⑥ Name an acid anhydride which is double anhydride.



⑦ Name the kind of particles present in:-

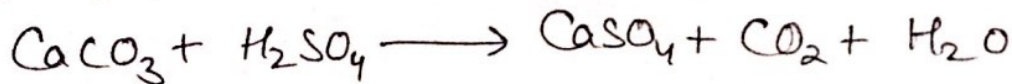
- a) Carbonic acid $\text{H}_2\text{CO}_3 \longrightarrow$ ions & molecules
- b) Sugar solution \longrightarrow molecules only
- c) $\text{HCl} \longrightarrow$ ions

⑧ Give an example where a non-metal is oxidised by an acid to form another acid.

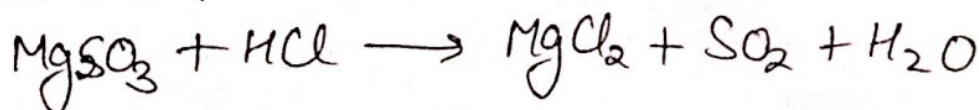


⑨ Write one example for an acid reacting with

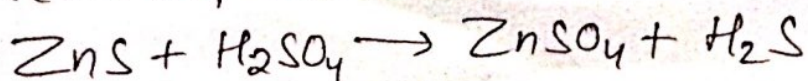
a) Metal Carbonate.



b) Metal Sulphite

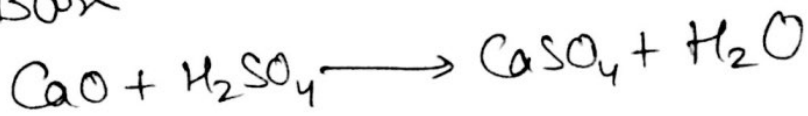


c) Metal sulphide



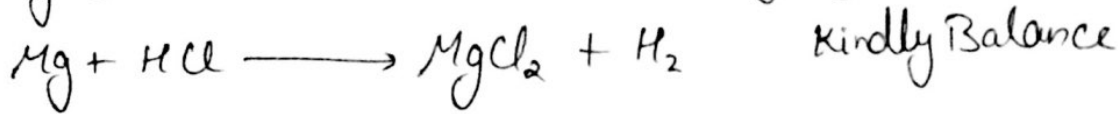
Kindly
Balance

Base

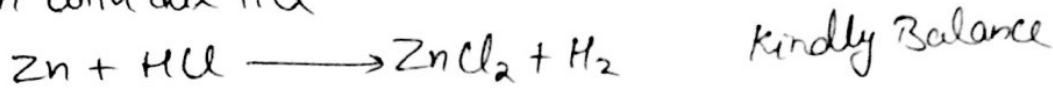


⑩ Write Balanced reaction for (Video Recommended)
[Highly]

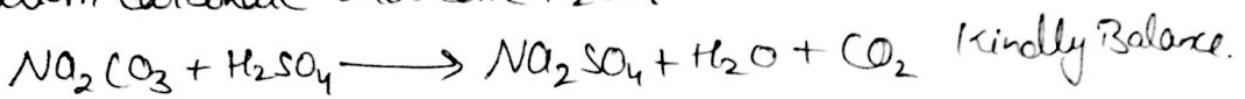
a) Mg with dil HCl



b) Zn with dil HCl



c) Sodium carbonate and conc H_2SO_4



⑪ What is the effect of an acid on

i) pH scale ii) litmus iii) phenolphthalein iv) Methyl orange

Ans i) $\text{pH} < 7$ lesser pH \rightarrow Stronger Acid

ii) litmus \rightarrow Blue litmus to red

iii) phenolphthalein \rightarrow Pink to colourless

iv) Methyl orange \rightarrow Orange to Pink C

⑫ Name i) Strong Bases ii) Alkalies iii) weak Bases

Ans i) Strong Bases \rightarrow NaOH, KOH, $\text{Ba}(\text{OH})_2$

ii) Alkalies \rightarrow (water soluble base) \rightarrow NaOH, KOH, NH_4OH

iii) weak Bases \rightarrow NH_4OH , $\text{Ca}(\text{OH})_2$, ZnO

⑬ Explain Acidity of a Base.

Ans The no. of OH^- ions present in a base \rightarrow Acidity

ex NaOH \rightarrow Acidity = 1

$\text{Mg}(\text{OH})_2 \rightarrow$ " = 2

$\text{Al}(\text{OH})_3 \rightarrow$ " = 3

How can you test a Base.

Ans: It is bitter in taste. It turns

- i) Litmus \longrightarrow Red to blue
- ii) phenolphthalein \longrightarrow colourless to pink
- iii) Methyl orange \longrightarrow pink to orange

(15) Define Neutralisation.

Ans The reaction of an acid and base to give salt and water

(16) What kinds of ions are given in aqueous solution by

- a) Acid \longrightarrow H^+ or H_3O^+ (Hydronium ions)
- b) Alkali \longrightarrow OH^- (hydroxyl ions)

(17) Match the salts with normal, acid, Basic, mixed, double, Complex salt

i) Tetraamine Copper(II) sulphate
Sodium argentocyanide
Tetraamine Zinc(II) sulphate
 $[Zn(NH_3)_4]SO_4$ } \longrightarrow Complex salt

ii) Sodium Hydrogen Phosphate
Potassium Hydrogen Carbonate } \longrightarrow Acidic salt
(Contains H)

iii) Basic lead chloride $Pb(OH)Cl$
Basic copper chloride $Cu(OH)Cl$ } \longrightarrow Basic salt
(Contains OH)

iv) Ferric Ammonium Sulphate
X (Mohr's Salt) $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$
Alums } \longrightarrow Double salt
2 $\frac{1}{2}$ salts

v) Na_2SO_4 , $CaCO_3$, $Mg(NO_3)_2$ \longrightarrow Normal salt

ample : Conc H_2SO_4 , CaO (Quicklime)

d) Deliquescent substance: Certain water soluble substances, when exposed to atmosphere at ordinary temperature, absorb moisture to become moist and ultimately dissolve in it forming a saturated solution

ex

$NaOH$

KOH

$MgCl_2$

$FeCl_3$

$ZnCl_2$

Salts solubility in water:

All salts of Na , K , NH_4 are soluble.

All NO_3^{2-} nitrates & NO_2^{1-} nitrites are soluble.

All SO_4^{2-} sulphates are soluble.

Except: Pb , Ba , Al , Ca .

All Cl^{-} chlorides are soluble.

Except: Pb , Hg , Ag .

PbCl_2 is soluble in hot water.

All HCO_3^{1-} bicarbonates are soluble.

Except: (K , Na) sparingly soluble.

All CO_3^{2-} carbonates, SO_3^{2-} sulphites, S^{2-} sulphides, PO_4^{3-} phosphates are insoluble.

Except: K , Na , NH_4 .

All oxides & hydroxides are insoluble

except Na , K , Ca (sparingly), NH_4 (~~sparingly~~)

$\text{Cu}(\text{OH})_2 \rightarrow$ soluble in NH_4OH

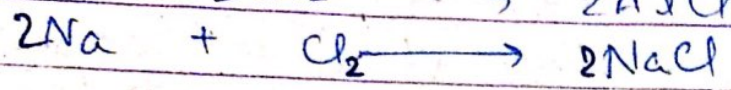
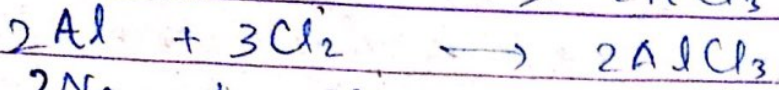
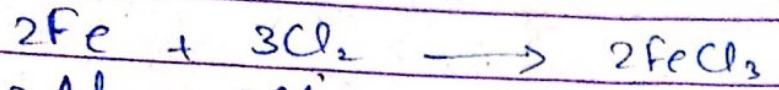
$\text{Pb}(\text{OH})_2 \rightarrow$ " " NaOH

$\text{Zn}(\text{OH})_2 \rightarrow$ " " both

Insoluble salts cannot be formed by Decomposition.

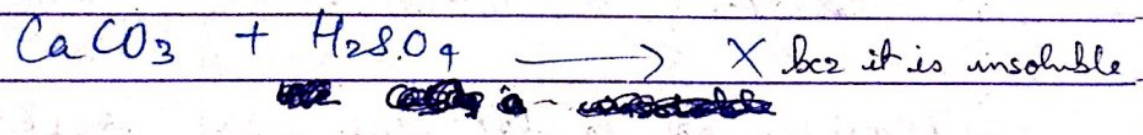
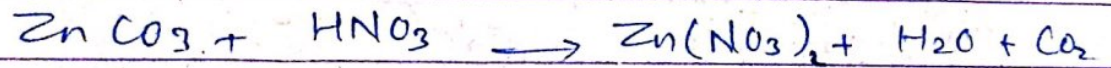
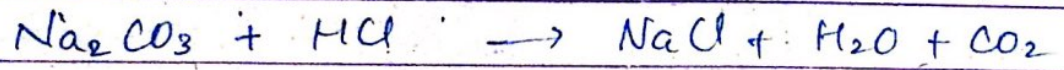
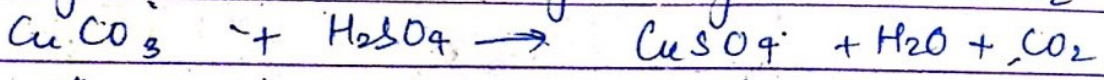
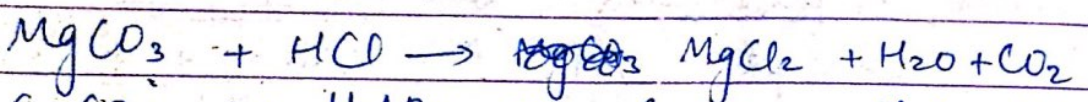
Preparation of Soluble Salts:

① Synthesis - Direct Combination

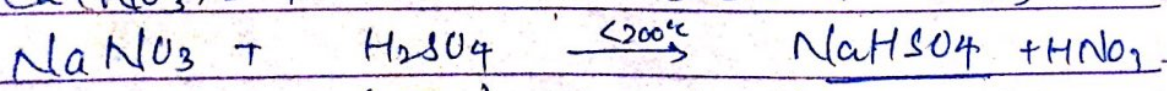
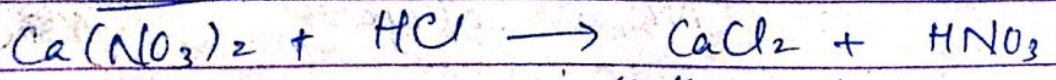


② By decomposition:

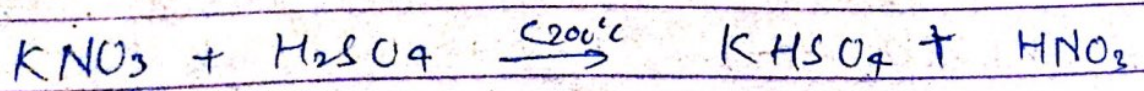
Breaking of a compound into small compounds.



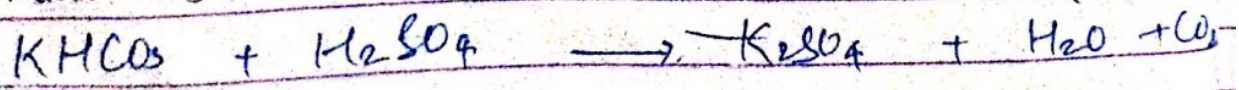
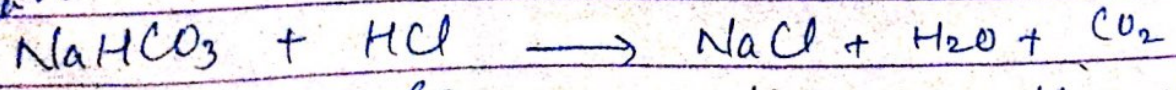
Nitrates



(conc.) formed by decomposition



Bicarbonates



③ Neutralisation:

Reaction of H^+ ions of an acid and OH^- of a base to give salt and water.

Titration:

Base should be soluble.

$KOH, NaOH, Ca(OH)_2, NH_4OH$

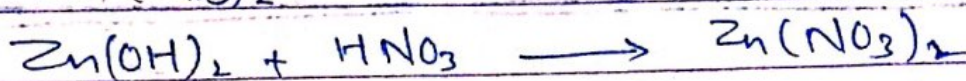
~~Soluble salts~~

i) $NaCl \rightarrow$ Titration

ii) $K_2SO_4 \rightarrow$ Titration

iii) $CuSO_4 \rightarrow$ Neutralisation

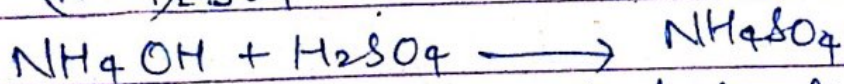
iv) $Zn(NO_3)_2 \rightarrow$ Neutralisation



Insoluble Base

(v) $NaNO_3 \rightarrow$ Titration

(vi) $(NH_4)_2SO_4 \rightarrow$ Titration



(vii) $MgSO_4 \rightarrow$ Neutralisation

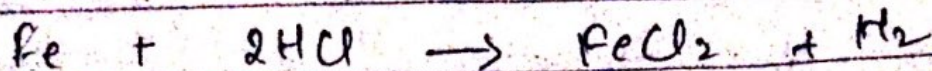
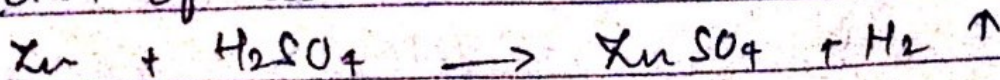
(viii) $FeCl_3 \rightarrow$ Neutralisation

$NaHSO_4 \rightarrow$ By decomposition.

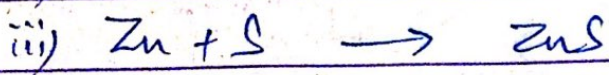
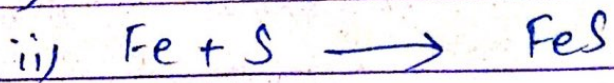
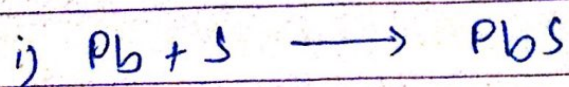
$KHSO_4 \rightarrow$ By decomposition.

④ Simple Displacement -

Action of dil. acids on active metals)



Synthesis or Direct Combination

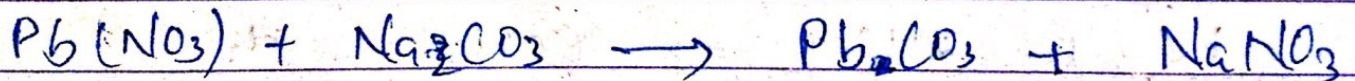
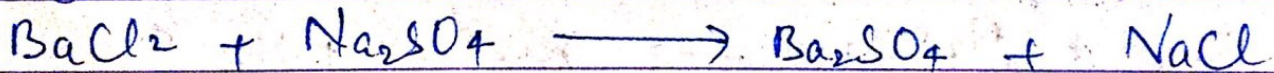
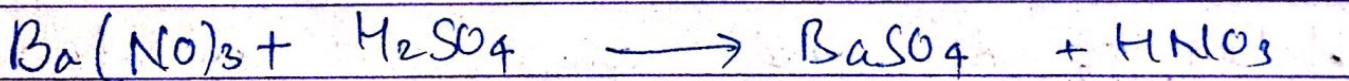
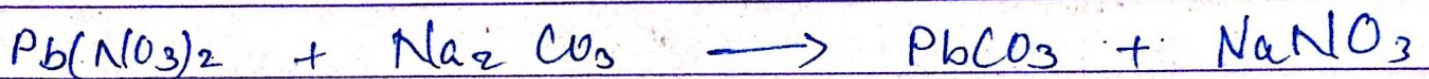


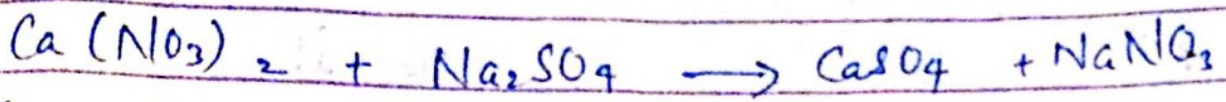
Double Decomposition: Precipitation.

Soluble salt

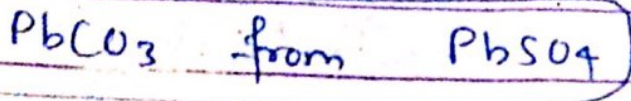
Acid/Na/K
salt

Insoluble salt





V.V.I



~~To~~ PbSO_4

To prepare insoluble salt from insoluble we follow two step

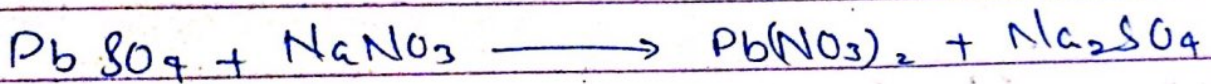
Insoluble



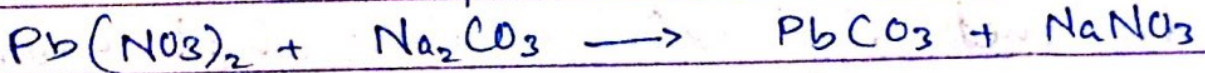
soluble



Insoluble



Double Decomposition

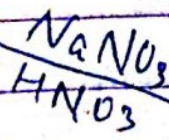


Double Decomposition

Q) PbCl_2 from PbO .

Insoluble

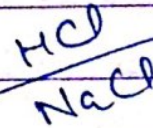
PbO



$\text{Pb}(\text{NO}_3)_2$
Soluble

Insoluble

PbCl_2



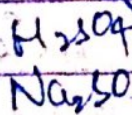
Insoluble

BaSO_4

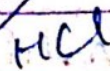
Obtain BaSO_4 from BaCO_3

Insoluble

BaCO_3



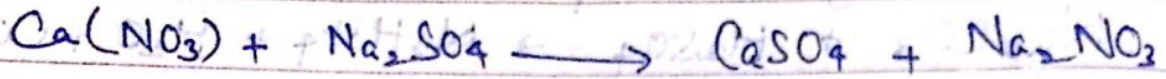
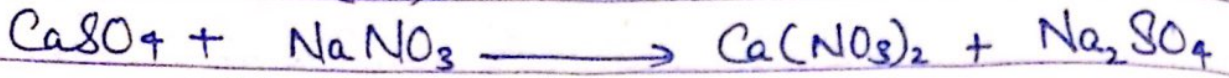
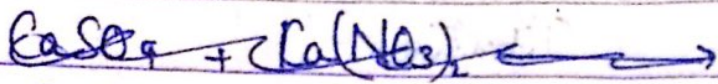
BaCl_2
soluble



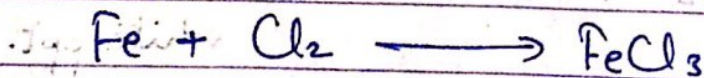
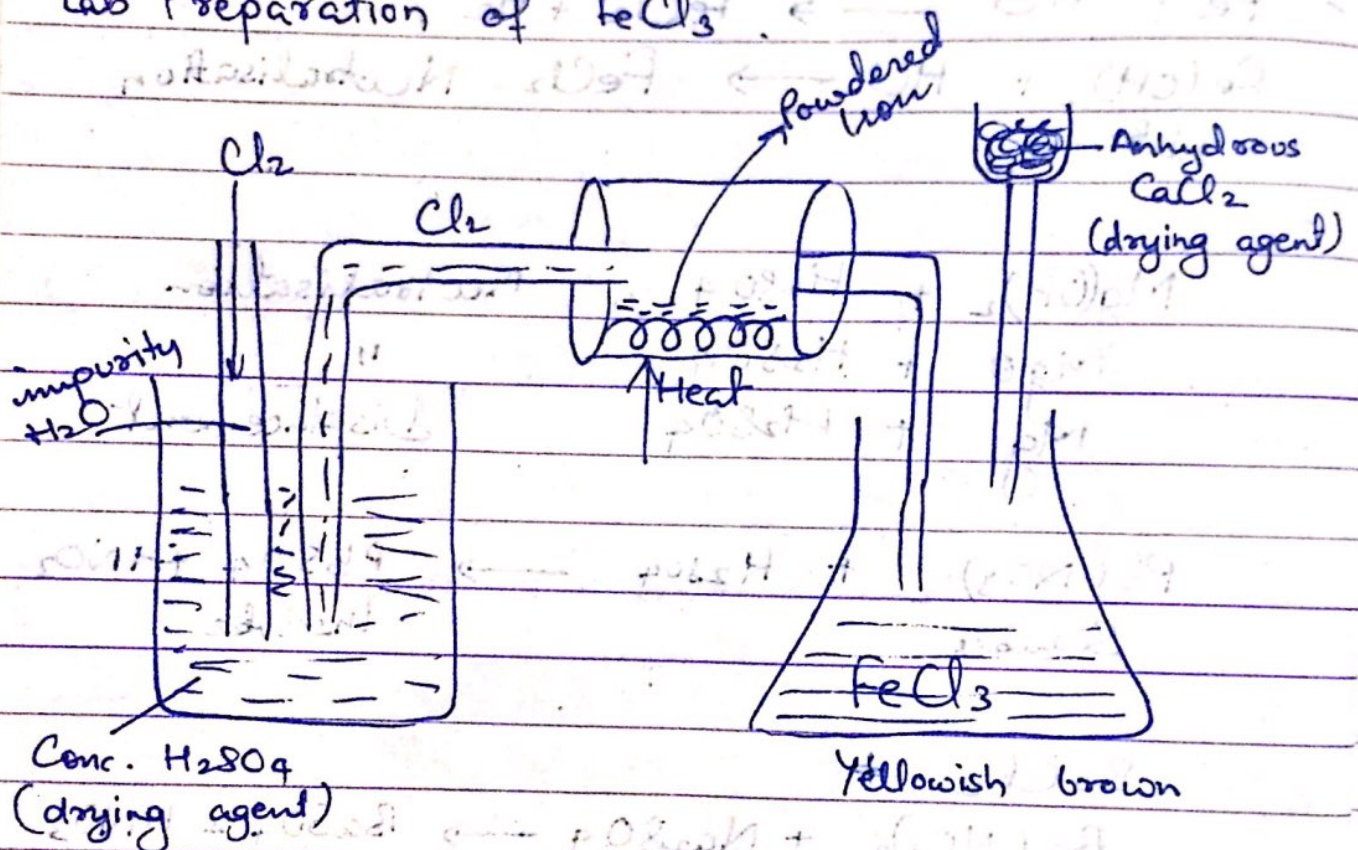
Q)

List I	List II
i) Sodium nitrate	neutralisation
ii) Iron(III) chloride	Direct Synthesis
iii) lead chloride	Double Decomposition
(iv) Zinc sulphate	Simple Displacement Direct synthesis
v) Sodium hydrogen sulphate	Decomposition.

Obtain CaSO_4 from CaCO_3 .



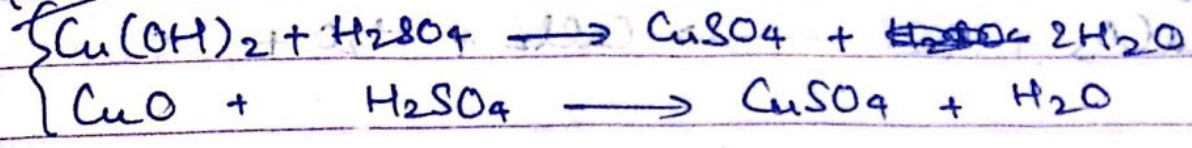
Lab Preparation of FeCl_3 .



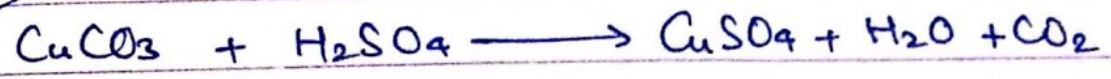
Water of crystallisation: Certain crystalline salts while crystallising out from their solution attach some H_2O molecule with itself, these molecules are called water of crystallisation. Ex: $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ (blue vitriol), white vitriol ($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$), Potash alum ($\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$)

Blue vitriol $CuSO_4 \cdot 5H_2O$

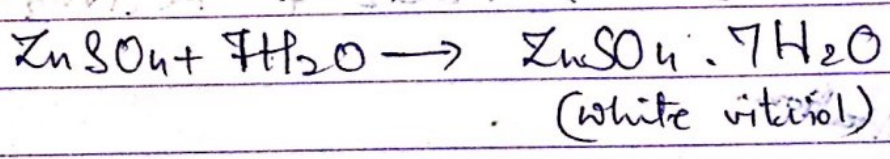
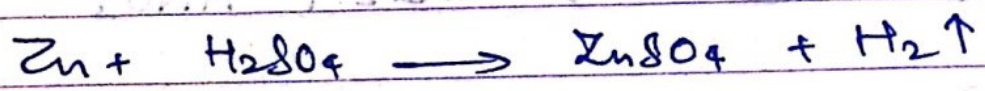
Neutralisation



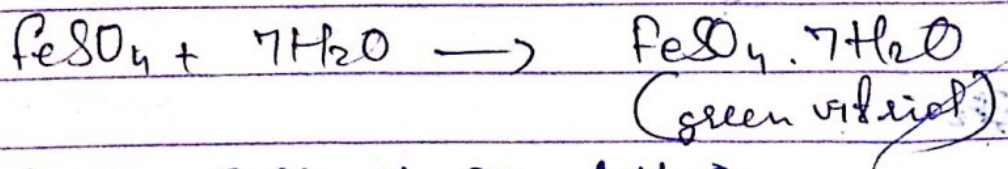
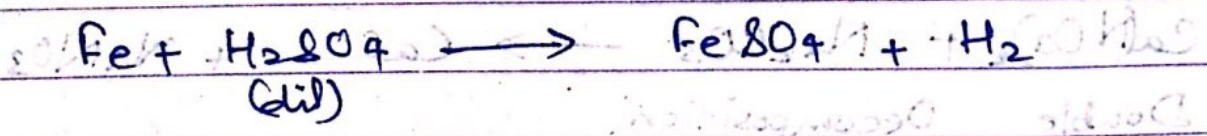
Decomposition by acid.



White vitriol $ZnSO_4 \cdot 7H_2O$



Green vitriol $FeSO_4 \cdot 7H_2O$



Glauber's Salt $Na_2SO_4 \cdot 10H_2O$

