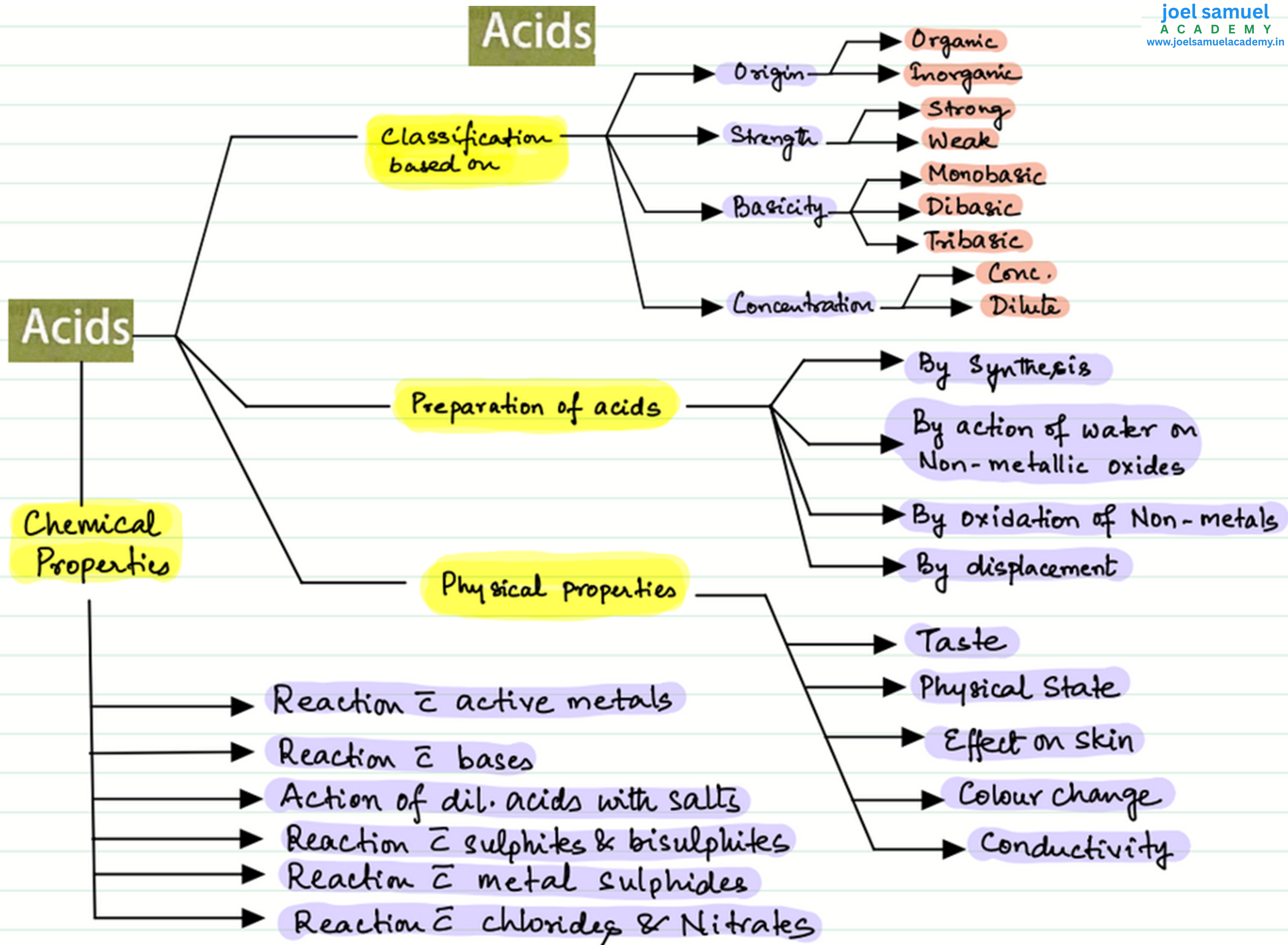
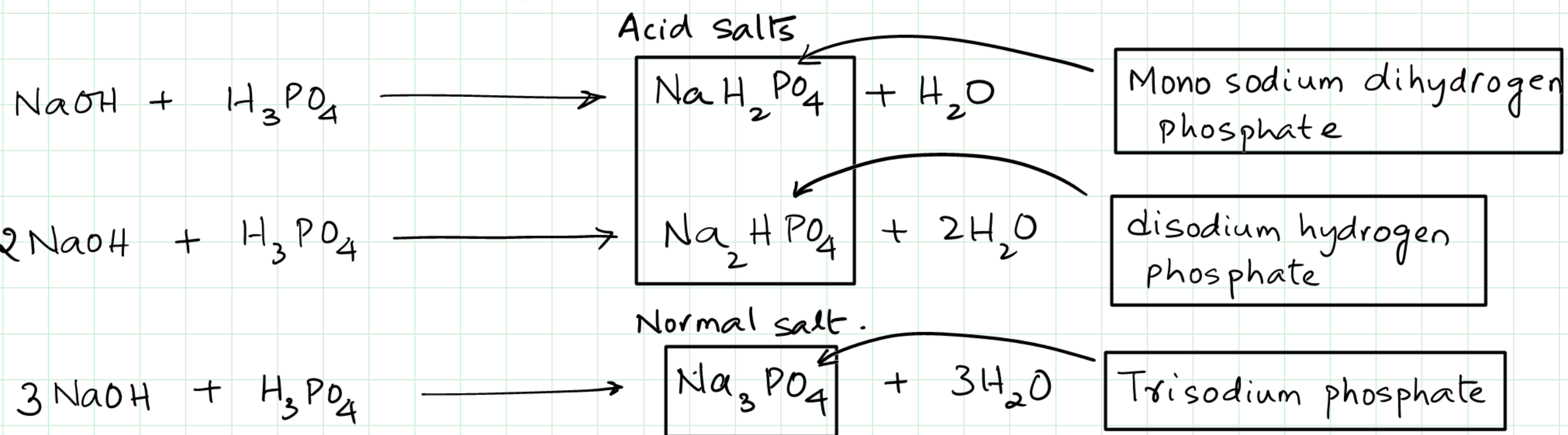




- Tribasic acids can form two different acid salts and one normal salt-



Note: Silicic acid H_4SiO_4 has a basicity 4.

Introduction

Definition —

A base is either • a metallic oxide or
• a metallic hydroxide or
• NH_4OH

which reacts with H_3O^+ ions of an acid to form salt & water ONLY.

Examples: CuO , NaOH , etc.

Basic Oxide — A metallic oxide which contains oxide O^{2-} ion and reacts with an acid to form salt and water ONLY

Ex: CuO , ZnO , Fe_2O_3 etc.



└ Not a base, since it produces salt + water + Cl_2

A base + acid produces salt + water ONLY

Basic hydroxide — A metallic hydroxide which contains OH^- ion, and reacts with acid to form salt and water ONLY.

Ex: Ca(OH)_2 , Mg(OH)_2 etc.

Physical properties

- Taste
- Colour change
- Slippery to touch
- Electrolyte
- Effect on skin

1. Taste : Sharp and bitter taste

2. Colour change in Indicators :

Indicator

Litmus

Methyl Orange

Phenolphthalein

Colour change

Red to blue

Orange to yellow

Colourless to pink

* 5. **Double Salt** - Salts which have either two cations or two anions such that neither H^+ nor OH^- ions are present.

Ex: Sodium potassium sulphate $NaKSO_4$
Disodium potassium phosphate Na_2KPO_4
Calcium chlorohypochlorite $Ca(OCl)Cl$
(Bleaching powder)

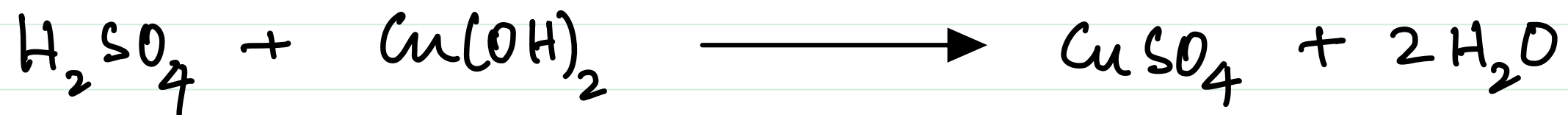
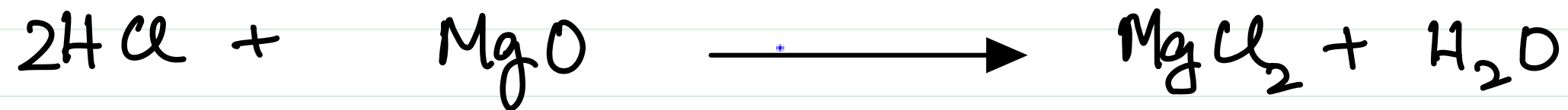
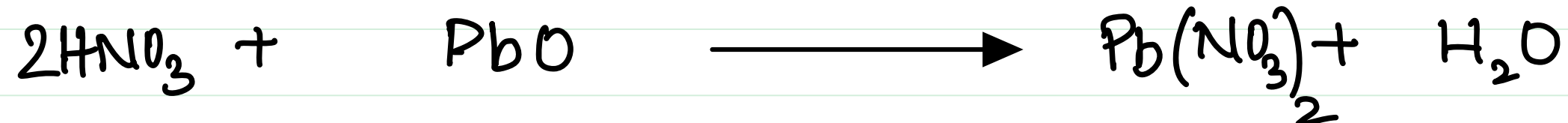
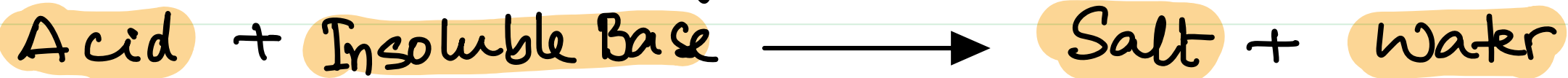
* 6. **Complex Salts** - Are salts which on dissociation give one simple ion and one complex ion.

• The complex ion is written in square brackets

Ex: • Sodium zincate $Na_2[ZnO_2] \xrightarrow{aq.} 2Na^+ + \textcircled{ZnO_2^{2-}}$
Complex ion.
• Tetra amine copper (II) sulphate $[Cu(NH_3)_4]SO_4$

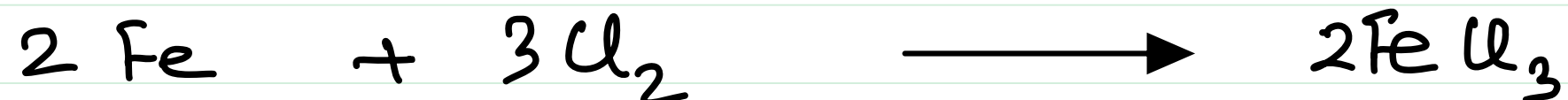
2. Neutralization

- Method - Neutralizing an acid with an Insoluble base



3. Direct Combination or Synthesis

- Method - By heating two elements together.



- 7 Cations : Zn^{2+} , Pb^{2+} , Ca^{2+} , Cu^{2+} , Fe^{2+} , Fe^{3+} , NH_4^+

Cations	Add NaOH		Add NH_4OH	
	few drops	Excess	few drops	Excess
Zn^{2+}	White ppt.	Ppt. dissolve to form a Colourless Solu ⁿ .	White ppt.	Ppt. dissolve to form a Colourless Solu ⁿ .
Pb^{2+}	White ppt.	Ppt. dissolve to form a Colourless Solu ⁿ .	White ppt.	Ppt. remains Insoluble.
Ca^{2+}	White ppt.	Ppt. Insoluble.	No ppt.	No ppt.

* Conclusions

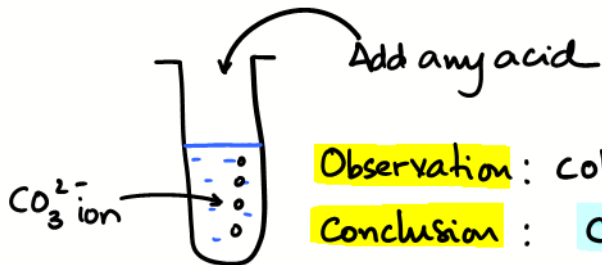
- With few drops of NaOH, we know it is Zn^{2+} or Pb^{2+} or Ca^{2+} due to the white ppt.
- By adding excess NaOH, Ca^{2+} stands out $\rightarrow$ Insoluble.
- To identify Zn^{2+} or Pb^{2+} , we use NH_4OH which also results in the formation of white ppt.
- But in excess, in case of Zn^{2+} , the ppt. dissolves, whereas the ppt. remains insoluble in case of Pb^{2+} .
- No ppt. forms for Ca^{2+} ions $\bar{c}$ NH_4OH .

Tests and Observations to identify anions

4 Cations to be tested

- (i) Carbonate ion (CO_3^{2-})
- (ii) Chloride ion (Cl^-)
- (iii) Sulphate ion (SO_4^{2-})
- (iv) Nitrate ion (NO_3^-)

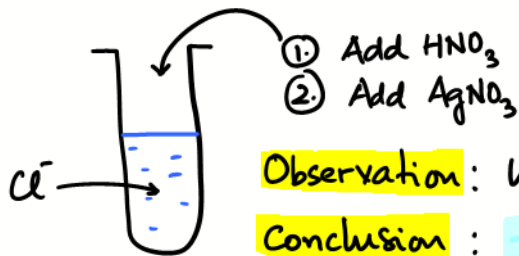
(i) Carbonate ion



Observation: colourless gas bubbles evolve

Conclusion: CO_3^{2-} ion present

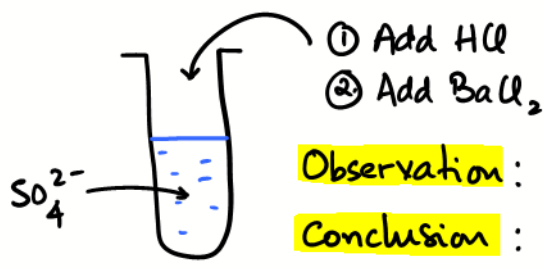
(ii) Chloride ion



Observation: White ppt. (of $\text{AgCl} \downarrow$)

Conclusion: Cl^- ion present

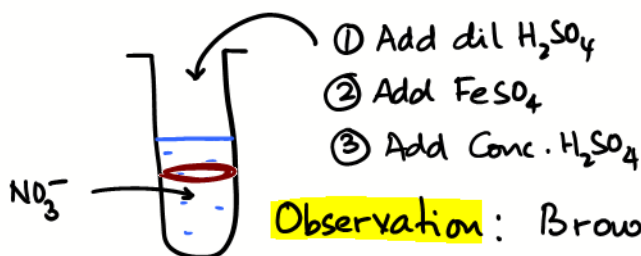
(iii) Sulphate ion



Observation: White ppt. (of $\text{BaSO}_4 \downarrow$)

Conclusion: SO_4^{2-} ion present

(iv) Nitrate ion



Observation: Brown ring

Conclusion: NO_3^- ion present