

## PRELIMINARY:

EXPERIMENT	OBSERVATION	INFERENCE
Colour of the salt is noted	white/colorless	Absence of $\text{Cu}^{2+}/\text{Ni}^{2+}/\text{Mn}^{2+}$
Odour is noted	a) vinegar like smell	Presence of acetate ( $\text{CH}_3\text{COO}^-$ )
	b) smell of ammonia	Presence of $\text{NH}_4^+$ ion
	c) No characteristic odour	Absence of $\text{NH}_4^+$ or $\text{CH}_3\text{COO}^-$
Solubility is noted	1) Soluble in water	Presence of $\text{NH}_4^+$ <del>and</del> or $\text{Cl}^-$
	2) Insoluble in water	Absence of $\text{NH}_4^+$ or $\text{Cl}^-$

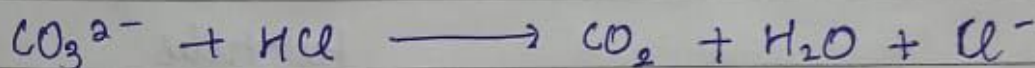
## TEST FOR ACID RADICAL (Anion)

### Test for $\text{CO}_3^{2-}$ (Carbonate ion)

Take aml of  
dil. HCl in test  
tube then add  
a pinch of  
salt into it.

Brisk  
effervescence  
with the  
liberation  
of colourless,  
odourless  
gas

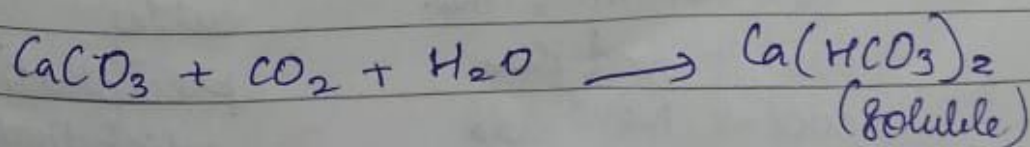
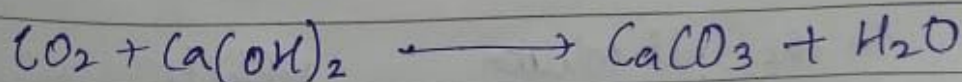
Presence of  
 $\text{CO}_3^{2-}$



### Confirmatory:

Pass the above  
gas through  
lime water

lime water  
turns milky

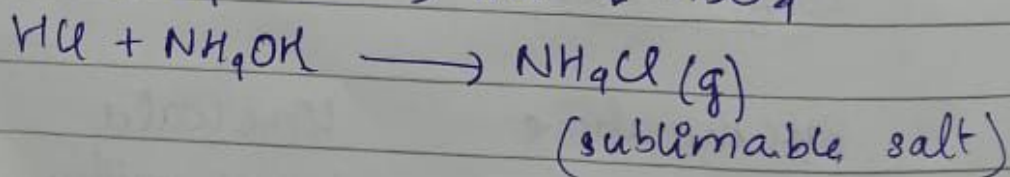


## TEST FOR $\text{Cl}^-$ , $\text{Br}^-$ , $\text{I}^-$

Take a dry test tube, add a pinch of salt into it. Then add 1-2 ml of conc.  $\text{H}_2\text{SO}_4$  to it and heat.

a) Colourless gas which gives a dense white fumes when a glass rod dipped in  $\text{NH}_4\text{OH}$  is shown near the mouth of test tube

Presence of  $\text{Cl}^-$



### Confirmatory Test

To the salt solution add 1-2 ml dil.  $\text{HNO}_3$ . Then heat it and then cool it. Now add  $\text{AgNO}_3$  to it

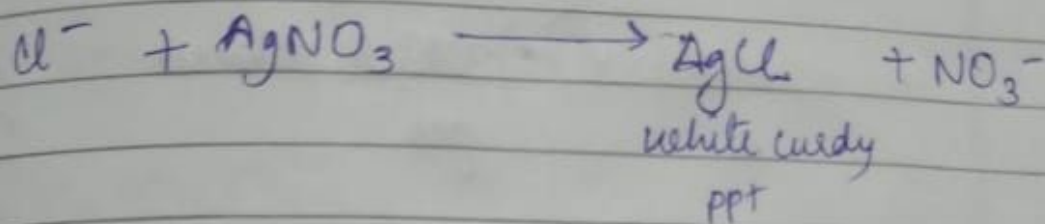
white curdy precipitate which dissolves in  $\text{NH}_4\text{OH}$  soln.

Presence of  $\text{Cl}^-$  is confirmed

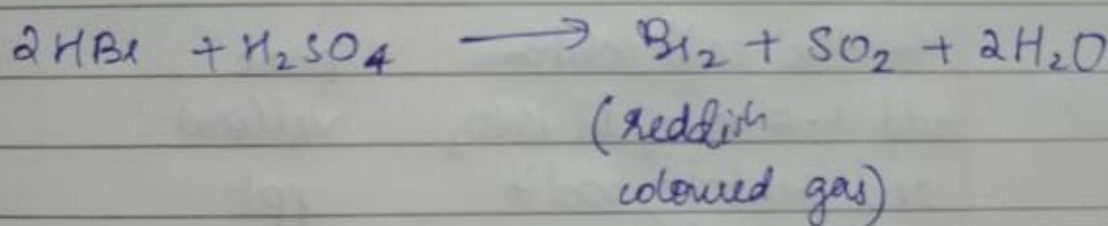
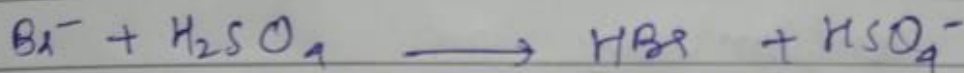


Cl<sup>-</sup> - greenish  
I<sup>-</sup> - violet  
P<sup>-</sup> - pale yellow

Page No.:
Date:



b) Reddish brown gas      Presence of Br<sup>-</sup>

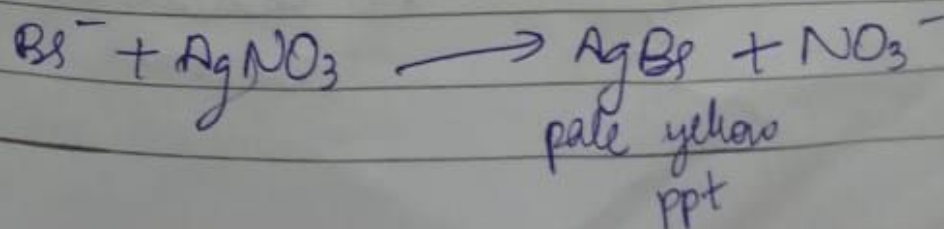


### Confirmatory Test:

To the salt soln  
add ~~the~~ dil HNO<sub>3</sub>,  
then heat and  
cool it, Then add  
AgNO<sub>3</sub> to it

Pale yellow ppt

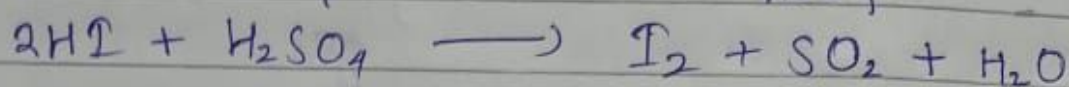
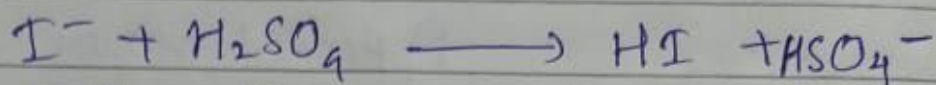
Presence of Br<sup>-</sup> is confirmed



X only for viva

c) Violet coloured gas

Presence of  $I^-$ .

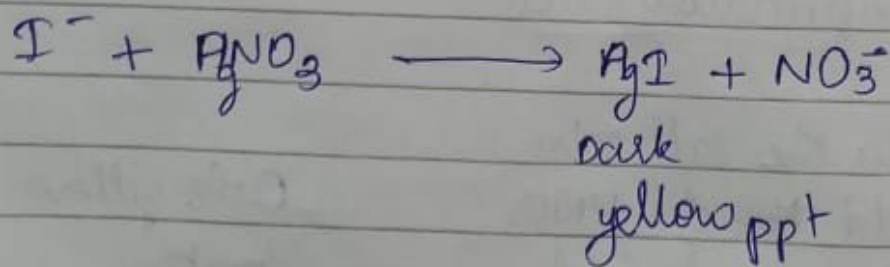


Confirmatory:

To the salt solution  
add 1-2 ml of dil.  $HNO_3$   
and heat it, cool it  
Then add  $AgNO_3$ .

dark  
yellow  
ppt

presence of  
 $I^-$  is  
confirmed



or

No characteristic  
reaction

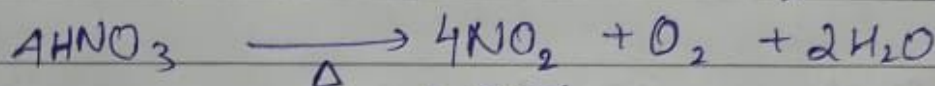
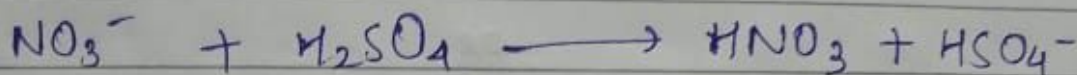
Absence  
of  $Cl^-$ ,  
 $Br^-$ ,  $I^-$

## TEST FOR NITRATE ( $\text{NO}_3^-$ )

To the above mixture add paper balls and heat strongly

Plenty of pale brown gas is produced

Presence of  $\text{NO}_3^-$



(pale brown coloured gas)

### Confirmatory Test (Brown ring test)

Take salt soln in the test tube (saturated)  
Add equal volume of freshly prepared  $\text{FeSO}_4$  soln.  
mix it well, then add conc.  $\text{H}_2\text{SO}_4$  along the sides of the test tube without shaking

Brown ring is formed

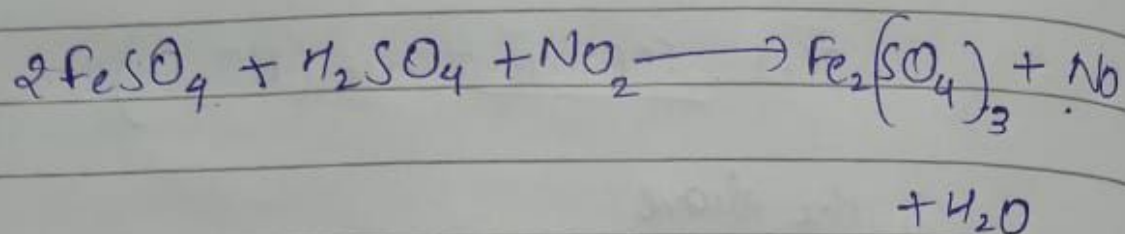
Presence of  $\text{NO}_3^-$  is confirmed.



M

Page No.:

Date:



nitroso ferrous sulphate  
(Beaumenit)

or

Dark

No characteristic  
reaction

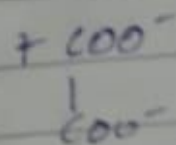
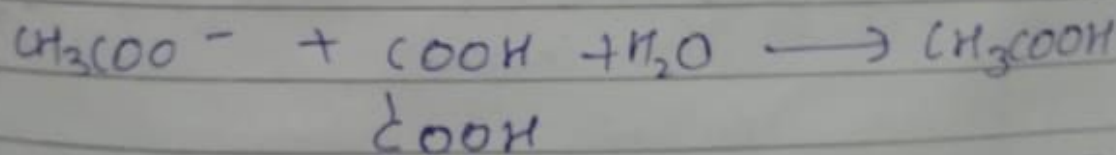
Absence of  
 $\text{NO}_3^-$

## TEST FOR SULPHATE ACETATE

Take salt  
in a watch  
glass add  
equal quantity  
of oxalic acid,  
then add 1-2  
drop of water  
Rub it using  
your finger  
and smell it

Vinegar like  
smell

Presence  
of acetate  
 $\text{CH}_3\text{COO}^-$



Confirmatory

To the salt  
soln add  
neutral  $\text{FeCl}_3$  soln

Red blood  
colouration



Add  $\text{NH}_4\text{OH}$  drop by drop to  $\text{FeCl}_3 \Rightarrow$  neutral

Page No:  $\text{FeCl}_3$ .

Date:

The red blood coloured soln is divided into two parts.

To one part add dil  $\text{HCl}$ .

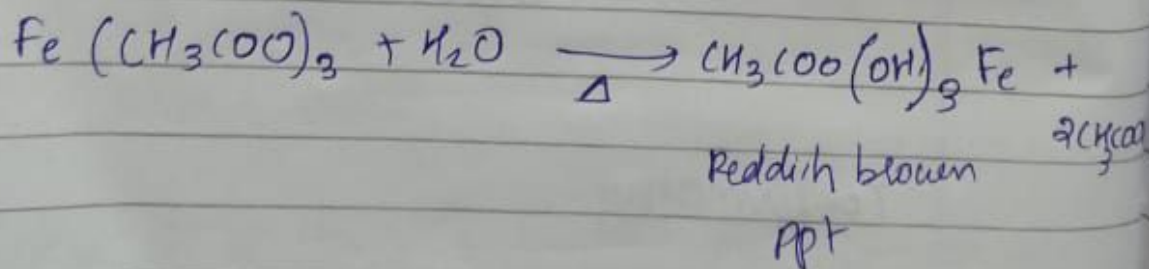
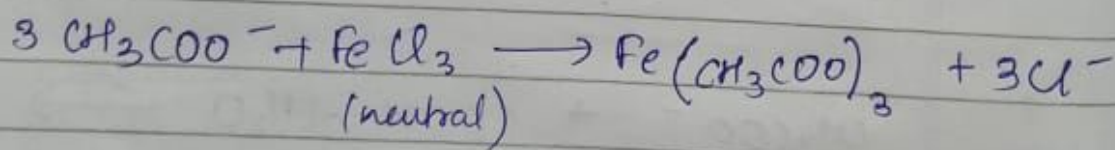
Red colour disappears.

Presence of  $\text{CH}_3\text{COO}^-$  confirmed

To the second part add water and boil it

Reddish brown ppt

Presence of  $\text{CH}_3\text{COO}^-$  confirmed.



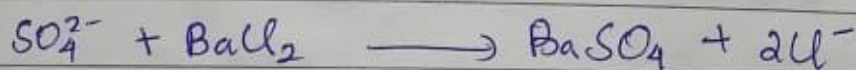
Test for SO<sub>4</sub> SULPHATE ( $\text{SO}_4^{2-}$ )

To the salt  
soln add  
 $\text{BaCl}_2$  soln.

white ppt  
insoluble in  
conc.  $\text{HCl}$ .

Presence of  
 $\text{SO}_4^{2-}$

Presence  
of  $\text{CH}_3\text{COO}^-$   
confirmed



Presence  
of  $\text{CH}_3\text{COO}^-$   
confirmed-

Confirmatory

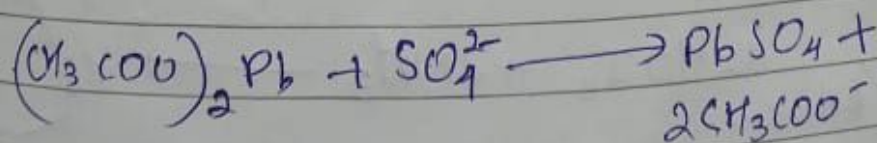
To the salt  
soln add lead  
acetate soln

white ppt  
soluble in  
excess of  
ammonium  
acetate soln

presence  
of  $\text{SO}_4^{2-}$   
confirmed

+  $3\text{Cl}^-$

$\text{Pb} + 2\text{CH}_3\text{COO}^-$   
when





## TEST FOR BASIC RADICAL

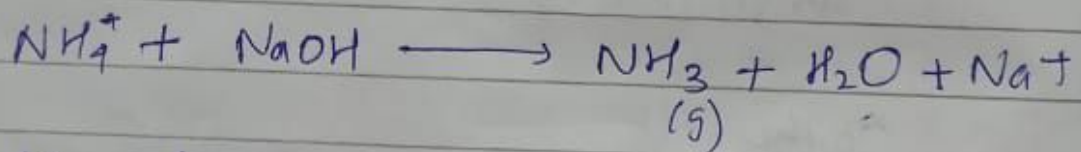
### Test for $\text{O}$ group:

To the dry salt  
add conc.  $\text{NaOH}$   
and heat

Smell of  
ammonia

Presence of  
 $\text{O}$  group  
( $\text{NH}_4^+$ )

confirmatory:

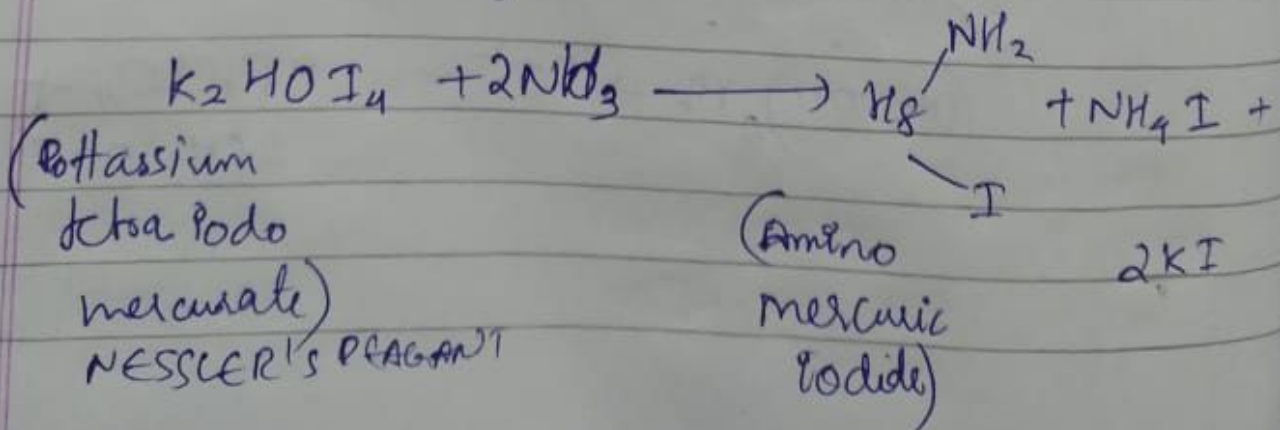


confirmatory:

Pass the above  
gas through  
Nessler's reagent

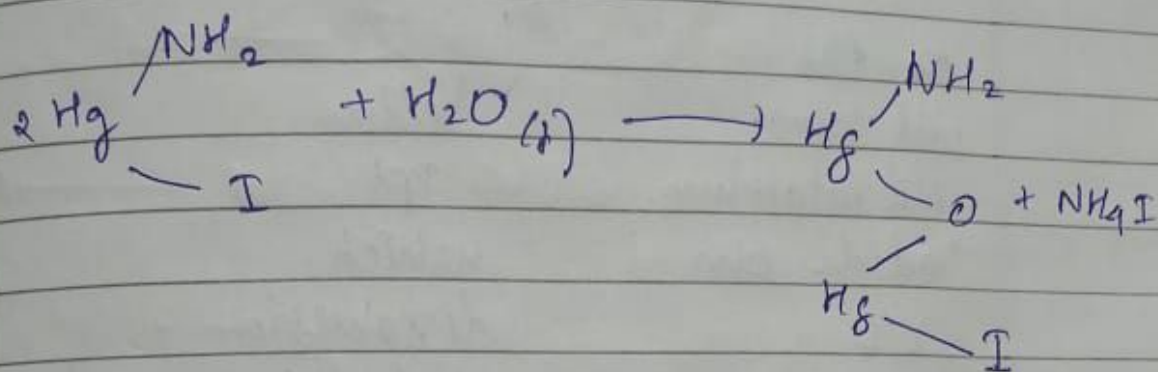
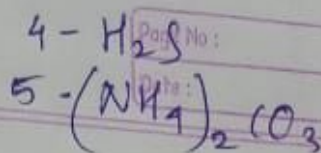
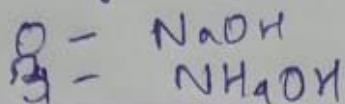
Brown ppt

Presence of  
 $\text{NH}_4^+$  Confir.





Group reagent

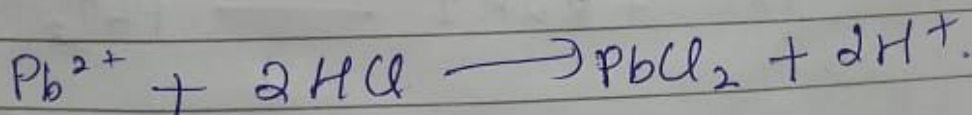


Test for 1 group:

To the salt soln add dil HCl

white ppt

presence of group 1.

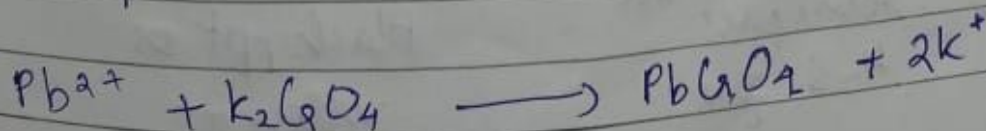


Confirmatory:

To the salt soln add Potassium chromate  $\text{K}_2\text{CrO}_4$

beige yellow ppt

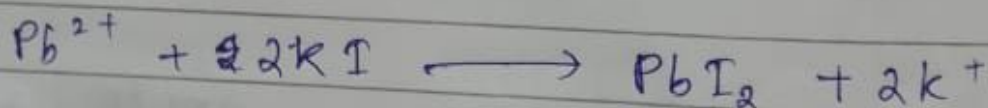
Presence of  $\text{Pb}^{2+}$  confirmed



To the  
salt soln.  
add potassium  
iodide soln  
KI

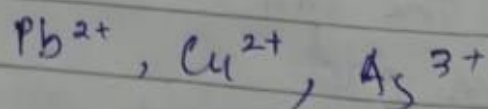
Yellow  
ppt  
which  
dissolves in  
hot water  
and reappears  
as golden  
sparkles  
on cooling

Presence  
of  $Pb^{2+}$   
confirmed



X only for viva

Test for group 2



To the salt  
soln, pass  
dil HCl  
 $H_2S$  gas

Black ppt or  
Yellow ppt

Presence of  
group 2.

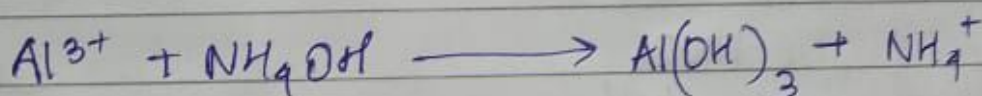
Test for group 3 $Al^{3+}$ ,  $Fe^{3+}$  X viva

To the salt

soln add excess  
of solid  $NH_4Cl$   
then add  
excess of  $NH_4OH$

gelatinous  
white ppt

Presence of  
group 3  
( $Al^{3+}$ )

Confirmatory:

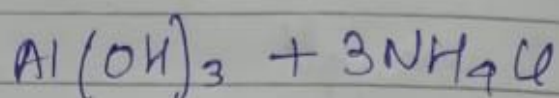
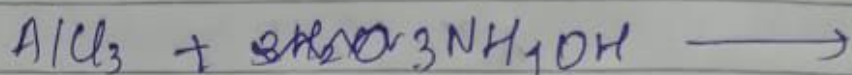
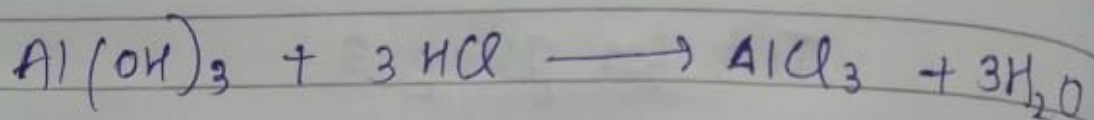
(Blue lake test)

Dissolve the  
above gelatinous  
ppt in dil.  $HCl$ .  
Add blue litmus  
soln. Then add  
 $NH_4OH$  soln  
in excess  
drop by drop

Blue lake  
formation

Presence of  
 $Al^{3+}$   
confirmed





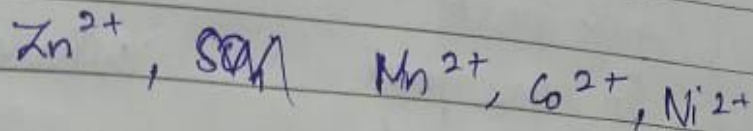
### Blue ash test

to the salt  
soln add  
dil  $\text{HNO}_3$   
and cobalt  
nitrate soln  
then heat  
it, then dip a  
filter paper into  
the soln, burn  
the filter paper

Blue  
ash is  
formed

Presence of  
 $\text{Al}^{3+}$   
confirmed

## Test for 4 group

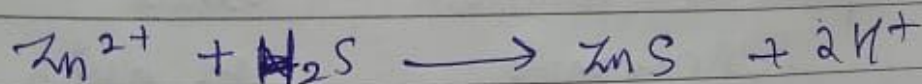


To the salt  
soln add solid  
 $\text{NH}_4\text{Cl}$  and  
add excess  
of  $\text{NH}_4\text{OH}$   
then add  
 $\text{H}_2\text{S}$

dirty  
white ppt

Presence  
of group 4  
( $\text{Zn}^{2+}$ )

### confirmatory



### Confirmatory :

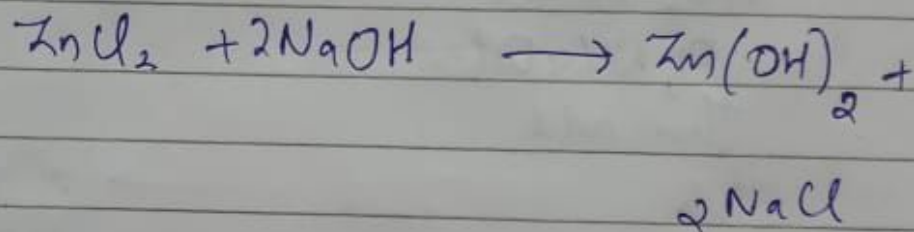
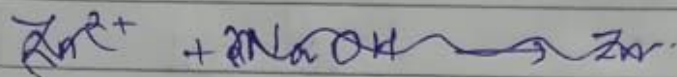
To the  
salt so  
dissolve the  
white ppt  
in dil  $\text{HCl}$   
boil off  $\text{H}_2\text{S}$   
then chloride

the soln into  
two parts.

To one part  
add NaOH soln  
dropwise

white ppt

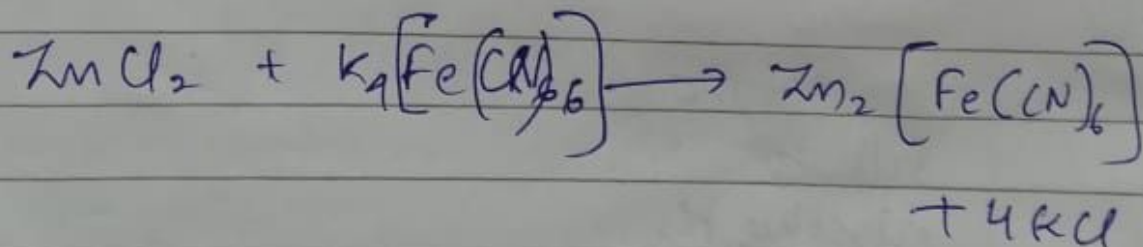
Presence  
of  $Zn^{2+}$   
confirmed



To the second  
part add Potassium  
ferrocyanide

white  
or bluish  
white ppt

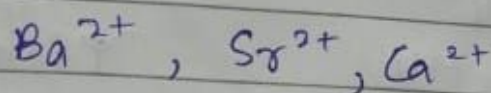
Presence  
of  $Zn^{2+}$   
Confirmed





Page No :  
Date :

## Test for group 5:

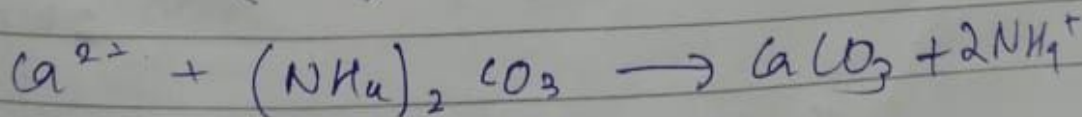
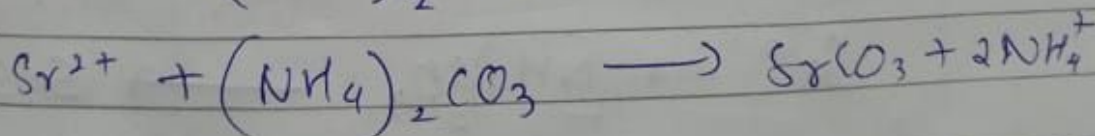
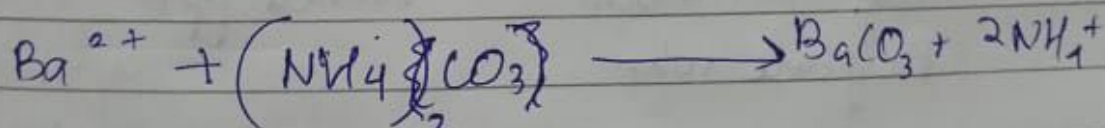


To the salt  
soln add  
solid  $\text{NH}_4\text{Cl}$   
add excess

white ppt

presence  
of group 5

of  $\text{NH}_4\text{OH}$   
then add  
ammonium  
carbonate soln



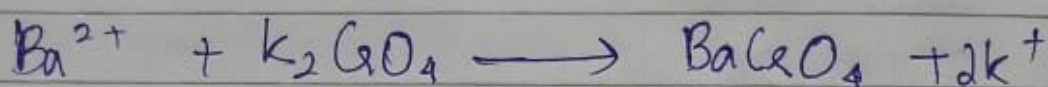
## confirmatory

redissolve the  
above ppt in  
acetic acid  
then boil off  $\text{CO}_2$

Then divide into  
3 parts  
To the  
first part add  
Potassium Chromate  
( $K_2CrO_4$ )

Yellow  
ppt

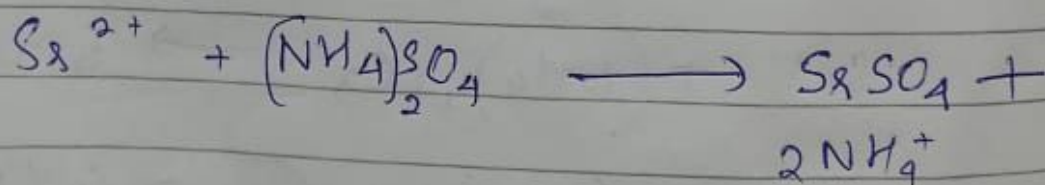
Presence of  
 $Ba^{2+}$   
confirm



To the  
second part  
add ammonium  
sulphate soln

White ppt

Presence of  
 $Sr^{2+}$   
Confirmed



To the third  
part add ammonium  
oxalate soln.

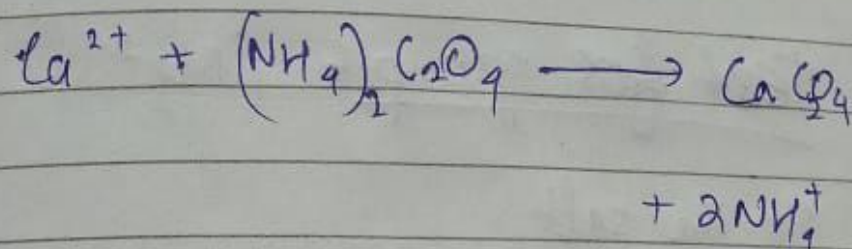
White ppt  
while scratching  
the side  
of the test  
tube

Presence  
of  $Ca^{2+}$   
confirmed



conc HCl is used to convert it to chloride bcz it is more volatile.

Date: \_\_\_\_\_



Flame test:

~~et~~  $e^-$  transition is <sup>from lower level to higher level and vice versa</sup> the principle

Take a dry watch glass add pinch of salt into it. Then add

2-3 drops of ~~conc. HCl~~ <sup>10% HCl</sup> and make

paste of salt. Take the salt in the glass rod. Show it to the flame.

Note the colour of flame.

1) apple green

$\text{Ba}^{2+}$

confirmed

2) crimson red

$\text{Sr}^{2+}$

confirmed

3) Brick red

$\text{Ca}^{2+}$

confirmed

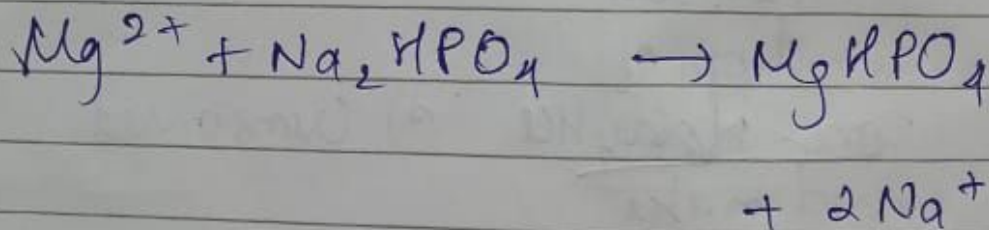


## Test for group 6 ( $Mg^{2+}$ )

To the salt  
soln add solid  
 $NH_4Cl$  and  
then excess of  
 $NH_4OH$ . Then  
add disodium  
hydrogen phosphate  
 $Na_2HPO_4$

white ppt

Presence  
of group  
6.



### Confirmatory

To the salt  
soln add magneson  
reagent

Blueish  
white  
ppt

Presence  
of  $Mg^{2+}$   
confirmed

# Organic compounds

papergrid

Date: / /

1. Preliminary Test  
Colour noted Colourless absence of phenol, cresol etc
2. Odour  
Carbolic smell Presence of phenolic grp.  
Pleasant fruity smell Presence of Ester

No characteristic odour Absence of Phenol/Ester

3. Take the given organic compound & burn it Sooty flame aromatic  
non-sooty flame aliphatic

4. Test for unsaturation

Baeyer's test

To the org. compound soln. Violet colour <sup>disappears</sup> unsaturated  
add alk.  $KMnO_4$  Violet colour persists saturated

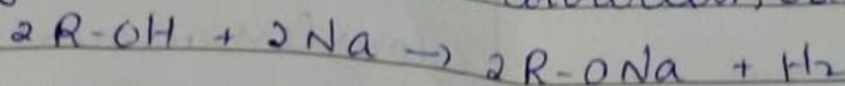
Test for Alcohol

Take the soln. of org. compound & dip a blue litmus paper. turn red presence of alc. group

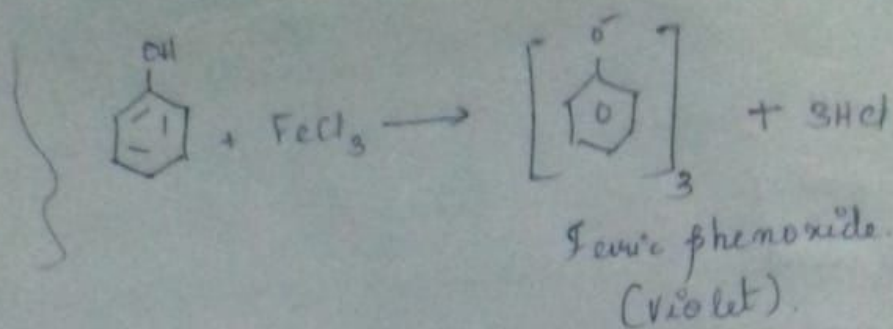
blue litmus paper.

5. Reaction with Na

Add a piece of Na metal Evolution of gas Presence of alcoholic group





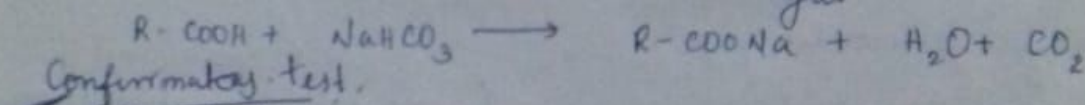


3) Test for carboxylic acid.  $>\text{C}=\text{O}$   
(Litmus test)

→  $\text{NaHCO}_3$  test

i) To the organic compound  
solid sodium bicarbonate.

Brisk effe-  
-escence with  
the liberation of  
colorless, odorless  
gas



Confirmatory test.

ii) Ester Test

i) To the organic compound.  
with ethanol.  $\text{C}_2\text{H}_5\text{OH}$

4) Test for carbonyl grp.

2,4 DNP test

→ To the given  
organic compound.  
add 1 ml alcohol



Bayer's test - test for saturation/unsaturation.

• Take  $\text{KMnO}_4$  sol.  
make it alkaline

→ To the soln of  
organic compound.  
add alkaline  $\text{KMnO}_4$ .

- Violet color disappears

unsat  
- unsat.

- violet color persists

saturated

1) Test for alcohol. (Aliphatic saturated)

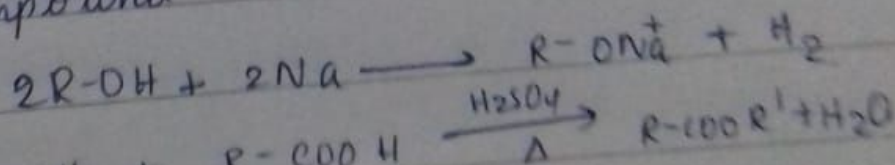
Take the soln of  
organic compound,  
dip in blue litmus  
paper.

litmus turns  
red.

Presence of  
OH grp

→ Add a piece of Na metal  
to organic compound.

Presence of  
OH grp



Confirmatory grp

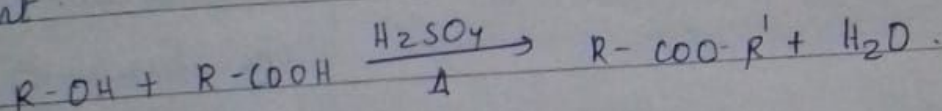
→ Take organic compound,  
then add 2ml of ethanol

acid into it  
→ Add 1 or 2 ml of  
conc  $H_2SO_4$  and  
heat strongly.

→ Transfer the contents  
into 15-20 ml of 5%  
aq.  $Na_2CO_3$  soln. taken  
in a beaker. Smell the  
content.

pleasant fruity  
smell.

presence  
of OH  
- grp.  
confirmed



2) Test for phenolic grp.

→ Blue litmus test

turns red.

presence  
of phenolic  
grp Ar-OH.

1. To the soln. of organic  
compound add blue litmus

To the aq. soln of organic  
compound add neutral  
ferric chloride soln.

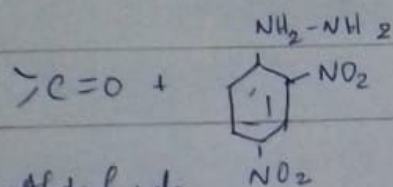
violet coloration.

Presence  
of phenol  
grp.



then add 4 ml of  
alcohol

2, 4 DNP reagent a yellow, orange  
and shake the or red ppt  
mixture. Will separate out



Test for Aldehyde

To the organic compound  
add Schiff's base.

pink color

presence of  
aldehyde

Confirmatory

- i) Tollen's reagent is  
added to organic compound.  
Heat strongly in a water bath.

appearance of  
~~the~~ silver mirror  
or grey ppt

Presence  
of CHO  
grp.

Take equal volume of  
Fehling's reagent no. 1 & 2.  
Then add organic compound  
and heat strongly in  
water bath.

Reddish brown  
ppt.

Prese  
nce of  
-CHO.



### Test for ketone

Lower Sodium Nitroprussiate test

Take 1 ml of Sodium nitroprusside soln. and make it alkaline by adding a few drops of NaOH soln.  $\rightarrow$  To it add a pinch of Organic compound and shake it

A red blood coloration

Presence of ketone

### Meta dinitro benzene test

To the given organic compound add 1 ml of ethanol and then add 1 ml of ethanolic soln of Metadinitro benzene. and a few drops of NaOH soln. and then shake.

Violet coloration

presence of  $\text{C}=\text{O}$