Date 4th May 20

Expt. No. _____ Page No. _____

EXPERIMENT - 1

Aim:

Preparation of 250 ml of 0.05 M solution of Mohr's salt.

Theory:

Molecular mass of Mohr's salt, $FeSO_4.(NH_4)_2SO_4.6H_2O = 39$

Hence, for preparing 1000 ml of 1M Mohr's salt solution Mohr's salt required = 392 g

∴ For preparing 250 ml of $\frac{M}{20}$ Mohr's salt solution

Mohr's salt required = $\frac{392}{1000} \times 250 \times \frac{1}{20} = 4.9\,g$

Apparatus:

Watch glass, weight box, fractional weight box, 250m beaker, glass rod, 250 ml measuring flask dropper and wash bottle.

Chemicals Required

Mohr's salt, conc. H_2SO_4 and distilled water.

Procedure

1. Weigh the clean and dry watch glass and record its weight in the notebook.

Teacher's Signature : _____

Date _____

Expt. No. _____ Page No. _____

2. Weigh accurately 4.9 g of Mohr's salt crystals on the watch glass and record the weight in the notebook.
3. Transfer carefully the weighed Mohr's salt from the watch glass into a clean 250 ml measuring flask using a funnel.
4. Wash the watch glass thoroughly with distilled water to transfer the sticking salt completely into the flask. Dissolve the salt in the beaker with gentle stirring.
5. Add about 5ml of conc. H_2SO_4 to the solution in the measuring flask to check the hydrolysis of ferrous sulphate.
6. Wash the funnel with distilled water and transfer to the washing in the measuring flask.
7. Add enough distilled water to the measuring flask carefully upto just below the etched mark on its neck with the help of wash bottle.
8. Add the last few drops of distilled water with a pipette or a dropper until the lower level of the meniscus just touches the mark on the measuring flask.
9. Stopper the measuring flask and shake it gently to make the solution homogeneous.

Teacher's Signature : _____

(1) Weight of watch glass : 19.16 g
(2) Weight of salt : 4.9 g
(3) Weight of watch glass + salt : 24.06 g

Date

Expt. No. Page No.

Result :
$\frac{M}{20}$ Mohr's salt solution is prepared.

Precautions :
1. Weigh the salt very carefully.
2. H_2SO_4 is added in measuring flask to prevent hydrolysis.
3. Transfer the Mohr's salt into measuring flask very carefully.

Teacher's Signature : 11/5

Observations

* Weight of watch glass = 19.16 g
* Weight of watch glass + salt = 24.06 g
* Weight of Mohr's salt = 4.9 g
* Volume of Mohr's salt solution prepared = 250 ml
* Molarity of Mohr's salt solution = 0.05 M
* Volume of Mohr's salt solution taken for each titration = 10 ml.

S.No.	Vol of Mohr's salt/ml	Burette Readings		Vol. of $KMnO_4$ solution used (ml)
		Initial (ml)	Final (ml)	
1.	10 ml	0.0	9.8	9.8
2.	10 ml	9.8	19.6	9.8
3.	10 ml	19.6	29.4	9.8
4.	10 ml	29.4	39.2	9.8

Concordant reading = 9.8 ml

Calculations :

M_1 = Molarity of Mohr's salt = $\frac{1}{20}$
M_2 = Molarity of $KMnO_4$ solution
V_1 = Volume of Mohr's salt = 10 ml
V_2 = Volume of $KMnO_4$ solution = 9.8 ml
n_1 = Moles of Mohr's salt = 10
n_2 = Moles of $KMnO_4$ solution = 2

Date 4th May 2022

Expt. No. ..... Page No. .....

EXPERIMENT - 2

Aim:
Prepare 0.05 M solution of ferrous ammonium sulphate (Mohr's salt). Using this solution find out the molarity and strength of the given $KMnO_4$ solution

Chemical Equations:
Ionic equations

$$MnO_4^- + 8H^+ + 5e^- \longrightarrow Mn^{2+} + 4H_2O$$
$$Fe^{2+} \longrightarrow Fe^{3+} + e^- \quad) \times 5$$
$$MnO_4^- + 8H^+ + 5Fe^{2+} \longrightarrow 5Fe^{3+} + Mn^{2+} + 4H_2O$$

Indicator:
MnO_4 is a self-indicator

End Point:
Colourless to permanent pink colour ($KMnO_4$ in burette).

Procedure:
1. Prepare 250 ml of 0.05 N Mohr's salt solution by dissolving 4.9 g of Mohr's salt in water as described in experiment 1. Rinse the pipette with the 0.05 M Mohr's salt solution and pipette out 10 ml of it in a washed titration flask.

Teacher's Signature : .....

$$\frac{M_1V_1}{n_1} = \frac{M_2V_2}{n_2}$$

$$\frac{\frac{1}{20} \times 10}{10} = \frac{M_2 \times 9.8}{2}$$

$$M_2 = \frac{1}{20} \times \frac{2}{9.8} = \frac{1}{9.8} = 0.01\ M$$

∴ Strength = Molarity × Molar mass of $KMnO_4$
= 0.01 × 158
= 1.58 g/L.

Date

Expt. No. Page No.

2. Rinse and fill the burette with the given $KMnO_4$ solution.
3. Add one test tube 10 ml full of dilute sulphuric acid to the solution in titration flask.
4. Note the initial reading of the burette.
5. Now add $KMnO_4$ solution from the burette till a permanent light pink colour is imparted to the solution in the titration flask on addition of last single drop of $KMnO_4$ solution.
6. Note the final reading of the burette.
7. Repeat the above steps 4-5 times to get a set of three concordant readings.

Result:
Molarity of $KMnO_4$ = 0.01 mol/l
Strength of $KMnO_4$ = 1.58 g/L

Precautions:

1. Read the upper meniscus for the reading
2. Wash all the apparatus before use.
3. Must add dil. H_2SO_4 in conical flask each time for titration

Teacher's Signature: 11/5

Date 27th July 2022

Expt. No. ..... Page No. .....

EXPERIMENT - 3

Aim :

Prepare 250 ml of $\frac{M}{40}$ solution of oxalic acid from crystalline oxalic acid.

Theory :

Molecular mass of crystalline oxalic acid $\left[\begin{matrix}COOH \\ COOH\end{matrix} \cdot 2H_2O\right]$ = 126 g

Hence, for preparing 1000 ml of 1 M oxalic acid weight of oxalic acid crystals required = 126 g

∴ For preparing 250 ml of $\frac{M}{40}$ solution,

oxalic acid crystals required = $\frac{126}{1000} \times 250 \times \frac{M}{40}$ = 0.7875 g

Apparatus :

Watch glass, analytical balance, weight box, fractional weight box, 250 ml beaker, glass rod, 250 ml measuring flask and wash bottle.

Chemicals Required :

Oxalic acid crystals and distilled water.

Teacher's Signature : _____

Date .....

Expt. No. ..... Page No. .....

Procedure:

1. Take a watch glass, wash it with distilled water and then dry it.
2. Weigh the clean and dried watch glass accurately and record its weight in the notebook.
3. Weigh 0.7875g oxalic acid on the watch glass accurately and record this weight in the notebook.
4. Transfer gently and carefully the oxalic acid from the watch glass into a clean 250 ml measuring flask using a funnel. Wash the watch glass with distilled water with the help of a wash bottle to transfer the particles sticking to it into the flask. The amount of distilled water for this purpose should not be more than 50ml.
5. Finally wash the funnel well with distilled water with the help of a wash bottle to transfer the solution sticking to the funnel into measuring flask.
6. Swirl the measuring flask till solid oxalic acid dissolves.
7. Add enough distilled water to the measuring flask carefully upto just below the etched mark on it, with the help of a wash bottle.
8. Add the last few drops of distilled water with a pipette or a dropper until the lower level of the meniscus just touches the mark on the.

Teacher's Signature : .....

(1) Weight of watch glass : 16.65 g
(2) Weight of oxalic acid : 0.7875 g
(3) Weight of watch glass + oxalic acid : 17.4375 g

Expt. No. _____ Date _____
Page No. _____

measuring flask.
9. Stopper the measuring flask and shake gently to make the solution uniform throughout.

Result :
$\frac{M}{40}$ oxalic acid solution is prepared

Precautions :
1. Weigh the salt very carefully.
2. Wash all the apparatus before use.
3. Transfer the salt from the funnel to measuring flask very carefully

Teacher's Signature : _____

Observations

* Weight of watch glass = 16.65 g
* Weight of watch glass + oxalic acid = 17.4375 g
* Weight of oxalic acid = 0.7875 g
* Volume of solution prepared = 250 ml
* Molarity of oxalic acid solution = M/40
* Volume of oxalic acid solution taken for each titration = 10 ml

S No.	Vol of Oxalic acid (ml)	Burette Readings		Volume of the KMnO4 solution used (ml)
		Initial	Finale	
1.	10 ml	0.0	10.7	10.7
2.	10 ml	10.7	21.3	10.6
3.	10 ml	21.3	31.9	10.6
4.	10 ml	31.9	42.5	10.6

Concordant reading = 10.6 ml

Calculations:

M_1 = Molarity of oxalic acid = $\frac{1}{40}$

M_2 = Molarity of $KMnO_4$ solution

V_1 = Volume of oxalic acid = 10 ml

V_2 = Volume of $KMnO_4$ solution = 10 ml

n_1 = Moles of oxalic acid = 5

n_2 = Moles of $KMnO_4$ solution = 2

Date 9th July 2022

Expt. No. ..... Page No. .....

EXPERIMENT - 11

Aim:

Prepare M/40 solution of oxalic acid. With its help, determine the molarity and strength of the given solution of potassium permanganate ($KMnO_4$)

Chemical Equations:

Ionic equation

$$MnO_4^- + 8H^+ + 5e^- \longrightarrow Mn^{2+} + 4H_2O \quad]\times 2$$
$$C_2O_4^{2-} \longrightarrow 2CO_2 + 2e^- \quad]\times 5$$
$$2MnO_4^- + 16H^+ + 5C_2O_4^{2-} \longrightarrow 2Mn^{2+} + 8H_2O + 10CO_2$$

Indicator:

Self-indicator.

End point:

Colourless to permanent pink colour ($KMnO_4$ in burette).

Procedure:

1. Weigh 0.7875 g of oxalic acid crystals and dissolve them in water to prepare 250 ml of M/40 oxalic acid solution using a 500 ml measuring flask. Rinse the pipette with the M/40 oxalic acid solution and pipette out 20 ml of it in a washed titration flask.

Teacher's Signature : _____

$$\frac{M_1 V_1}{n_1} = \frac{N_2 V_2}{n_2}$$

$$\frac{\frac{1}{10} \times 10}{5} = \frac{N_2 \times 10 \times 5}{5}$$

$$N_2 = \frac{1}{4} \times \frac{1}{25} = \frac{1}{100} = 0.01M$$

∴ Strength = Molarity × Molar mass of $KMnO_4$
= 0.01 × 158
= 1.58 g/L

Date

Expt. No. _____ Page No. _____

2. Rinse and fill the burette with the given $KMnO_4$ solution.
3. Add one test tube (10 ml) full of dilute sulphuric acid to the solution in titration flask.
4. Note the initial reading of the burette.
5. Heat the flask to 60-70°C and add $KMnO_4$ solution from the burette till a permanent light pink colour is imparted to the solution in the titration flask on addition of a last single drop of $KMnO_4$ solution.
6. Note the final reading of the burette.
7. Repeat the above steps 4-5 times to get three concordant readings.

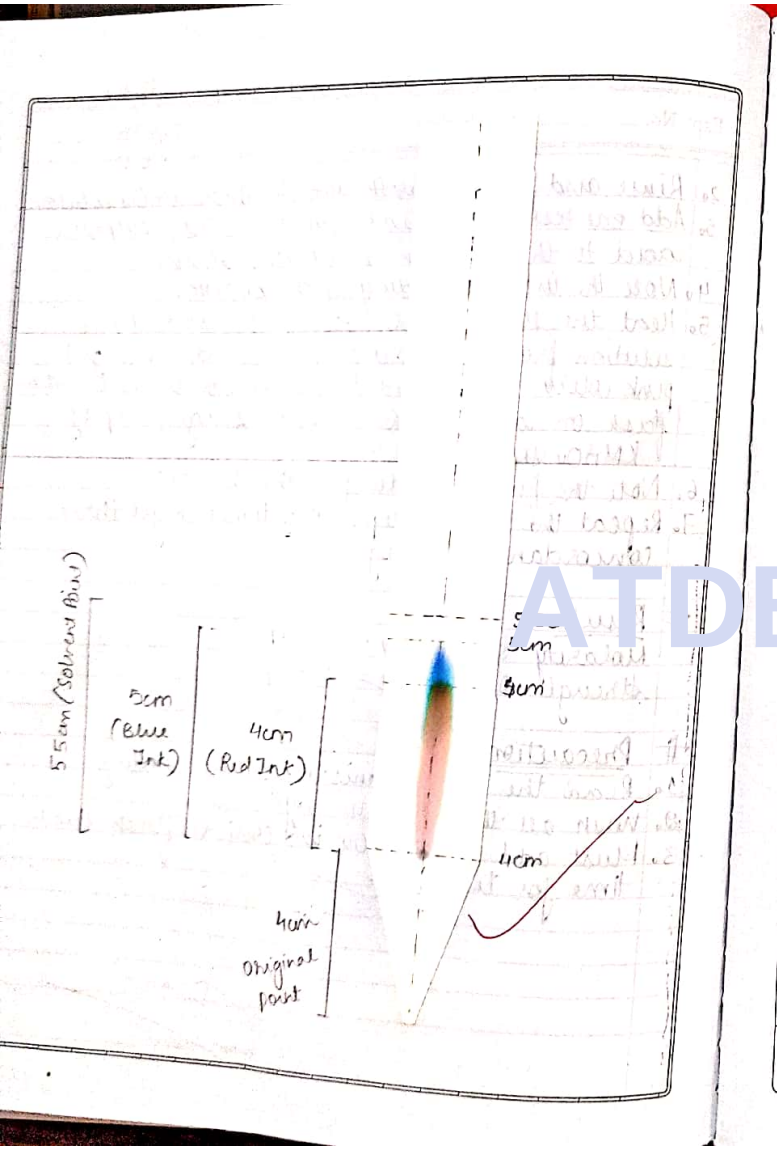
Result:

Molarity of $KMnO_4$ = 0.01M
Strength of $KMnO_4$ = 1.58 g/L

Precautions:

1. Read the upper meniscus for the reading
2. Wash all the apparatus before use.
3. Must add dil. H_2SO_4 in conical flask each time for titration.

Teacher's Signature : _____



Date 18th May

Expt. No. _____ Page No. _____

EXPERIMENT-5

 # Aim :
To separate the coloured components present in the mixture of black ink by ascending paper chromatography and find their R_f values.

 # Apparatus :
Gas jar, glass rod, filter paper strip (Whatman No.1 filter paper), jar cover and a fine capillary tube.

 # Requirment :
A[illegible] black ink, alcohole and distilled water

 # Procedure :
1. Take a whatman filter paper strip (20 X 2cm) and draw a line with pencil about 3cm from one end. Draw another line lengthwise from the centre of the paper as shown in fig.
2. With the help of fine capillary tube, put a drop of the mixture of red and blue inks at the point P. Let it dry in air. Put another drop on the same spot and dry again. Repeat 2-3 times, so that the spot is rich in the mixture.
3. Suspend the filter paper vertically in a gas jar containing the solvent (eluent) with the help of a

Teacher's Signature : _____

Observation

Sample	Distance travelled by components (cm)	Distance travelled by solvent (cm)	Rf value
Black Ink	Red Ink = 4cm	5.5 cm	$\frac{4}{5.5} = 0.727$
	Blue Ink = 5cm	5.5cm	$\frac{5}{5.5} = 0.909$

Date

Expt. No. Page No.

glass rod in such a way that the pencil line (and the spot) remains about 2cm above the solvent level (50% alcohol + distilled water).

4. Cover the jar and keep it undisturbed. Notice the rising solvent along with the mixture of black ink. After the solvent has risen about 15cm you will notice two different spots of blue and red colours on the filter paper.

5. Take the filter paper out of the jar and mark the distance that the solvent has risen on the paper with a pencil. This is called solvent front.

6. Dry the paper. Put pencil marks in the centre of its base to mark the spot.

7. Measure the distance of the two spots from the original line and the distance of the solvent from the original line.

8. Calculate the Rf values of the blue and red inks by using the formula.

Rf = Distance travelled by the blue or red ink from the point of application / Distance travelled by the solvent from the original line.

Result:

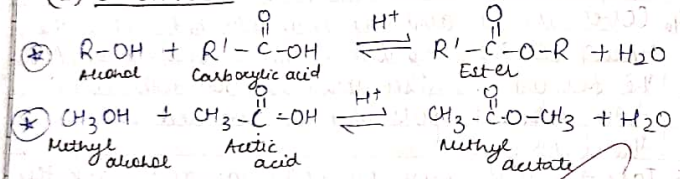
The Rf value of Red ink = 0.727

The Rf value of Blue ink = 0.909

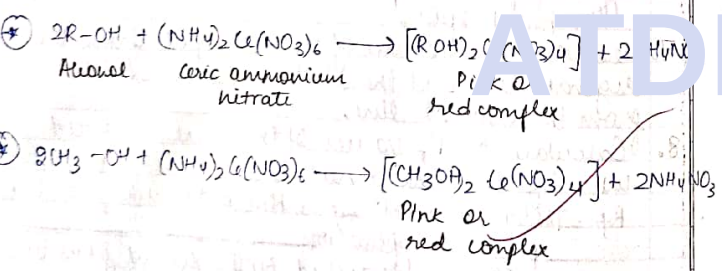
Teacher's Signature:

Reactions :

(1) ESTER TEST



(2) CERIC AMMONIUM NITRATE TEST



Date 3rd Aug 2022

Expt. No. _____ Page No. _____

EXPERIMENT - 6

Aim :
To identify the functional group present in the given organic sample.

	EXPERIMENT	OBSERVATION	INFERENCE
1.	ESTER TEST Take 1 ml of the given liquid in a clean dry test tube, add 1 ml of glacial acetic acid 2-3 drops of conc. sulphuric acid. [illegible] on a water [illegible] pour it into 20 ml of cold water taken in a beaker and smell	A fruity smell is Observed	Observation indicates the presence of an alcoholic group.
2.	CERIC AMMONIUM NITRATE TEST Place 1 ml of the given compound in a clean dry test-tube, add a few drops of ceric ammonium nitrate reagent and shake well	Appearance of pink or red colour is Observed	Observation indicates the presence of an alcoholic group

Result : The organic sample contains alcoholic group

Teacher's Signature :

Reactions :

(1) LITMUS TEST

$$R-\overset{O}{\overset{\|}{C}}-OH + H_2O \rightleftharpoons R-\overset{O}{\overset{\|}{C}}-O^- + H_3O^+$$

(2) SODIUM HYDROGENCARBONATE TEST

$$\underset{\text{Carboxylic acid}}{RCOOH} + NaHCO_3 \longrightarrow RCOONa + CO_2\uparrow + H_2O$$
(Effervescence)

(3) ESTER TEST

$$\underset{\text{Carboxylic acid}}{RCOOH} + C_2H_5OH \xrightarrow{H_2SO_4} \underset{\text{Ester (Fruity smell)}}{RCOOC_2H_5} + H_2O$$

Date 3rd Aug 20

Expt. No. _____ Page No. _____

EXPERIMENT - 7

Aim :
To identify the functional group present in the given organic sample.

EXPERIMENT	OBSERVATION	INFERENCE
1. LITMUS TEST Place a drop of the given liquid on a moist blue litmus paper and note the change in colour	The colour changes to red	It indicates the presence of carboxylic group.
2. SODIUM HYDROGENCARBONATE TEST To 1 ml of organic liquid in a test tube, add a pinch of sodium hydrogencarbonate ($NaHCO_3$)	A brisk effervescence is observed	It indicates the presence of carboxylic group.
3. ESTER TEST Take about 0.1 g of the organic compound, 1 ml of ethyl alcohol and 1-2 drops of conc. H_2SO_4 in a test tube. Heat the reaction	A fruity smell is observed	Observation indicates the presence of carboxylic group.

Teacher's Signature : _____

Date

Expt. No. Page No.

mixture on a water bath for about 5 mins. Pour the reaction mixture in a beaker containing water		

Result:

The organic sample contains carboxylic acid.

Teacher's Signature :

Reactions :

(1) TOLLEN'S TEST

$2Ag(NH_3)_2^+ + RCHO + 3OH^- \longrightarrow RCOO^- + 2Ag\downarrow + 4NH_3 + 2H_2O$

$2Ag(NH_3)_2^+ + CH_3CHO + 3OH^- \longrightarrow CH_3COO^- + 2Ag\downarrow + 4NH_3 + 2H_2O$

Acetaldehyde — Acetate ion — Silver

(2) FEHLING'S TEST

$RCHO + 2Cu^{2+} + 5OH^- \longrightarrow Cu_2O(s)\downarrow + RCOO^- + 3H_2O$

Aldehyde — Fehling's solution — (Red)

Date 3rd Aug 2

Expt. No. _____ Page No. _____

EXPERIMENT - 8

Aim :

To identify the functional group present in the given organic sample.

EXPERIMENT	OBSERVATION	INFERENCE
1. TOLLEN'S TEST Place 1ml of silver nitrate soln in a clean test tube and add 2-3ml of dilute NaOH solution. A brown ppt is formed. Now add dilute ammonia solution dropwise until the brown precipitate of silver oxide just dissolves. To this add 3-4 drops of the given liquid and warm the test tube on a water bath for about 5 minutes.	A shining mirror on the walls of the test tube is observed.	Observation indicates the presence of the aldehydic group.
2. FEHLING'S TEST Take 1 ml each of Fehling's solution A and B in a test tube. Add	Appearance of red precipitate	Observation indicates the presence

Teacher's Signature : _____

Date .....

Expt. No. ..... Page No. .....

	4-5 drops of the given organic compound and warm the test tube in hot water bath for 4-5 minutes.		Of the aldehydic group.

Result:

The organic sample contains the aldehydic group

Teacher's Signature : _____

Reaction :

(a) FERRIC CHLORIDE TEST

$FeCl_3$ + $6C_6H_5OH$ → $[Fe(OC_6H_5)_6]^{3-}$ + $3HCl$

Ferric chloride — Phenol — Violet complex

Date 17th Aug 2022

Expt. No. ..... Page No. .....

EXPERIMENT - 9

Aim :

To identify the functional group present in the given organic sample.

	EXPERIMENT	OBSERVATION	INFERENCE
1.	LITMUS TEST Place a drop of the given liquid or a crystal if solid on moist blue litmus paper.	The colour changes to red.	It indicates the presence of phenolic group.
2.	FERRIC CHLORIDE TEST Take 1ml of neutral ferric chloride solution in a clean test tube and 2-3 drops of the liquid compound.	A change in colour is observed	Observation indicates the presence of phenolic group.

Result :

Given organic sample contains phenolic group.

Teacher's Signature : _____

Reaction:

(2) SODIUM NITROPRUSSIDE TEST

$$CH_3COCH_3 + OH^- \longrightarrow CH_3COCH_2^- + H_2O$$

$$[Fe(CN)_5NO]^{2-} + CH_3COCH_2^- \longrightarrow [Fe(CN)_5NO.CH_3COCH_2]^{3-}$$

Nitroprusside ion — Red colouration

Date 17th Aug 2021

Expt. No. ..... Page No. .....

EXPERIMENT - 10

Aim:
To identify the functional group present in the given organic sample

	EXPERIMENT	OBSERVATION	INFERENCE
1.	m-DINITROBENZENE TEST Place 0.5 ml of the give liquid in a clean test tube and add about 0.1 g of finely powdered m-Dinitrobenzene. Ne[illegible] ml of dilute [illegible] and shake.	Appearance of violet colour which slowly fades	Observation indicates the presence of ketonic group.
2.	SODIUM NITROPRUSSIDE TEST Dissolve a crystal of sodium nitroprusside in about 1 ml of distilled water in a clean test tube and then add 0.5 ml of the given compound. Shake and add sodium hydroxide soln dropwise.	A red colouration is observed	Observation indicates the presence of ketonic group.

Result: The given organic sample contains ketonic group.

Teacher's Signature : .....

Reactions:

(2) FEHLING'S TEST

(*) $CHO(CHOH)_4CH_2OH + 2Cu(OH)_2 + NaOH \xrightarrow{\text{Tartrate ions}} COO^-Na^+(CHOH)_4CH_2OH + 3H_2O + Cu_2O$

Glucose — Sod. salt of gluconic acid — Red ppt.

(3) TOLLEN'S TEST

(*) $AgNO_3 + NH_4OH \longrightarrow NH_4NO_3 + AgOH$

$2AgOH \longrightarrow Ag_2O + H_2O$

$Ag_2O + 2NH_4OH \longrightarrow 2[Ag(NH_3)_2]OH + 3H_2O$ (Soluble)

(*) $CH_2OH(CHOH)_4CHO + Ag_2O \xrightarrow{NH_4OH} COOH(CHOH)_4COOH + 2Ag$

Glucose — Gluconic acid — Silver mirror

Date 31st Aug 2022

Expt. No. ..... Page No. .....

EXPERIMENT- 11

Aim:
To test the presence of carbohydrate in a given food sample.

	EXPERIMENT	OBSERVATION	INFERENCE
1.	MOLISCH'S TEST Take 1-2 ml of carbohydrate soln and add few drops of Molisch's reagent. Put 1ml of conc H_2SO_4 along the side of the test tube.	Red-violet ring is produced	It indicates the presence of carbohydrate in food sample
2.	Fehling's TEST Take 2 ml of aqueous soln of carbohydrate and add 1-2 ml each of Fehling's solution A and Fehling's solution B. Keep the test tube in boiling water bath.	Appearance of Reddish precipitate	It indicates the presence of carbohydrate in food sample
3.	TOLLEN'S TEST Take 2-3 ml of aqueous soln	A shining	It indicate

Teacher's Signature : _____

Date .....

Expt. No. ..... Page No. .....

of carbohydrate in a test tube. Add to it 2-3 ml of Tollen's reagent. Keep the test tube in a boiling water bath for 10 minutes	Silver mirror is observed	The presence of carbohydrates in food sample

Result:
Given food sample contains carbohydrates

Teacher's Signature : .....

Date 31st Aug 2022

Expt. No. _____ Page No. _____

EXPERIMENT-12

 # Aim:

To test the presence of proteins in a given food sample.

	EXPERIMENT	OBSERVATION	INFERENCE
1.	BIURET TEST Take a sample. Add 2ml of NaOH soln, Now add 4-5 drops of $CuSO_4$ solution. Warm the mixture for about 5 minutes.	Bluish violet colour appears	It indicates the presence of protein in food sample
2.	XANTHOPROTEIC TEST Take the sample. Add few drops of conc. HNO_3 and heat	Yellow ppt is formed	It indicates the presence of protein in food sample

 # Result:

Given food sample contains proteins.

Teacher's Signature : _____

⇒ Chemical Reactions Involved

$NH_4Cl + NaOH \xrightarrow{\Delta} NaCl + H_2O + NH_3\uparrow$

$NH_3 + HCl \xrightarrow{\Delta} NH_4Cl$
(White fumes)

⇒ Nessler's Reagent Test

$2K_2HgI_4 + NH_3 + 3KOH \longrightarrow H_2N.HgO.HgI\downarrow$
(Brown ppt)
$+ 7KI$
$+ 2H_2O$

Date

Expt. No. Page No.

EXPERIMENT - 13

Aim:
To test the presence of anion and cation in the given salt.

TEST FOR CATION

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To solid salt conc. NaOH is added	Ammonium smell is observed	Radical may be NH_4^+
2.	A glass rod dipped in dil. HCl is brought near the mouth of above test tube.	White fumes are observed	NH_4^+ is confirmed.
3.	Now the gas is pass through Nessler's Reagent.	Brown ppt is formed	NH_4^+ is confirmed.

Teacher's Signature :

⇒ Chemical Reactions Involved

1. SILVER NITRATE TEST

$KBr + AgNO_3 \longrightarrow KNO_3 + AgBr\downarrow$ (Pale Yellow ppt)

2. Chlorine water test

$2KBr + Cl_2 \longrightarrow 2KCl + Br_2$

Bromine (Br_2) being soluble in CCl_4/CS_2 gives an orange colour to CS_2 layer.

Date

Expt. No. Page No.

Test for anion

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To the pinch of salt add 1-2 ml of dil H_2SO_4	No reaction	dil group is absent
2.	Now, again to the pinch of salt add conc. H_2SO_4. Pass the reddish brown fumes through $FeSO_4$ solution	Reddish brown fumes evolve. Solution does not turn black	Radical may be Br^- & NO_3^-. Radical may be Br^-
	CONFIRMATORY TEST		
	Silver nitrate test: To the aqueous solution of salt, add dil HNO_3. Then boil, cool for sometime and add $AgNO_3$	Light yellow ppt is formed	Br^- is confirmed.
2.	Chlorine water test: To the salt, add conc. H_2SO_4 and add 1-2 ml of carbon disulphide and then chlorine water. Shake vigorously.	Carbon disulphide (CS_2) layer aquires organe colouration	Br^- is confirmed.

Result: The given salt contains anion: Br^- ; cation: NH_4^+

Teacher's Signature :

⇒ Chemical Reactions Involved

(F) AMMONIUM MOLYBDATE TEST

$K_3PO_4 + 3(NH_4)_2MoO_4 \longrightarrow 2(NH_4)_3PO_4 + 3K_2MoO_4$
Pot. Molybdate

$K_2MoO_4 + 2HNO_3 \longrightarrow H_2MoO_4 + 2KNO_3$
Molybdic acid

$(NH_4)_3PO_4 + 12MoO_3 + 6H_2O \longrightarrow (NH_4)_3PO_4 \cdot 12MoO_3 \cdot 6H_2O$
(Yellow ppt)

Date

Expt. No. Page No.

EXPERIMENT - 14

Aim:
To test the presence of anion and cation in the given salt sample.

Test for Anion

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To the pinch of salt add dil H_2SO_4	No Brisk effervescence evolves	CO_3^{2-} absent
2.	To the pinch of salt add conc. H_2SO_4	No fumes are evolved	Radical may be PO_4^{3-} (as Cl^-, Br^-, NO_2^-, CH_3COO^- is absent)
3.	To the salt add conc. HNO_3 sol^n and boil. Add ammonium molybdate solution in excess and boil again.	A deep yellow ppt is formed.	PO_4^{3-} is confirmed)

Teacher's Signature :

⇒ Chemical Reactions

$NH_4Cl + NaOH \xrightarrow{\Delta} NaCl + H_2O + NH_3\uparrow$

$NH_3 + HCl \longrightarrow NH_4Cl$
(white fumes)

Nessler's Reagent test

$2K_2HgI_4 + NH_3 + 3KOH \longrightarrow H_2N.HgO.HgI\downarrow$
(Brown ppt)
$+ KI + 2H_2O$

Date

Expt. No. Page No.

TEST FOR CATION

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To the pinch of salt add NaOH soln and heat	Ammonical smell is observed	Radical may be NH_4^+
	CONFIRMATORY TEST		
2.	Bring a glass rod dipped in dil HCl near the mouth of above test tube	White fumes are observed	NH_4^+ is confirmed.
3.	Add Nessler's reagent to [illegible]	Brown ppt is formed	NH_4^+ is confirmed.

Result: The given salt contains
anion : PO_4^{3-}
cation : NH_4^+

Teacher's Signature :

⇒ Chemical Reactions Involved

(1) Lime water test

$CaCO_3 + 2HCl \longrightarrow CaCl_2 + CO_2 + H_2O$

$Ca(OH)_2 + CO_2 \longrightarrow CaCO_3 + H_2O$

Lime water — Milkiness

(2) Magnesium sulphate test

$Na_2CO_3 + MgSO_4 \longrightarrow MgCO_3 \downarrow + Na_2SO_4$

(white ppt)

Date

Expt. No. Page No.

EXPERIMENT - 15

Aim :

To detect anion and cation in salt sample

TEST FOR ANION

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To the pinch of salt add dil H_2SO_4	Brisk effervescence	CO_3^{2-} may be present
	CONFIRMATORY TEST		
1.	Lime water test Pass the fumes evolved above through lime water	Lime water turns milky	CO_3^{2-} is confirmed
2.	Magnesium sulphate Test To the salt solution add Na_2CO_3 and then magnesium sulphate solution	White ppt is formed	CO_3^{2-} is confirmed.

Teacher's Signature :

⇒ Chemical Reactions Involved

$NH_4Cl + NaOH \xrightarrow{\Delta} NaCl + NH_3 \uparrow$

$NH_3 + HCl \longrightarrow NH_4Cl$
(white fumes)

Nessler's Reagent

$2K_2HgI_4 + NH_3 + 3KOH \longrightarrow H_2N{:}HgO{\cdot}HgI \downarrow$
(Brown ppt)

Date _____

Expt. No. _____ Page No. _____

TEST OF CATION

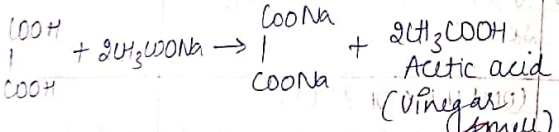
	EXPERIMENT	OBSERVATION	INFERENCE
1.	To the pinch of salt add NaOH solution and heat	Ammonical smell is observed	Radical may be NH_4^+
	CONFIRMATORY TEST		
1.	Bring a glass rod dipped in dil HCl near the mouth of above test tube	White fumes are observed	NH_4^+ is confirmed
2.	Add Nessler's Reagent to the above test tube.	Brown ppt is formed	NH_4^+ is confirmed.

Result: The given salt contains:
anion: CO_3^{2-}
cation: NH_4^+

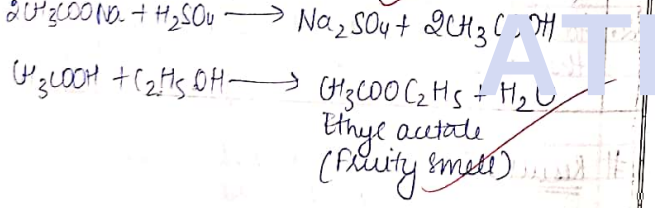
Teacher's Signature : _____

⇒ Chemical Reaction Involved

(1) Oxalic Acid Test



(2) Ester test



Date _____

Expt. No. _____ Page No. _____

EXPERIMENT - 16

Aim:
To detect the presence of cation and anion in the given salt.

TEST FOR ANION

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To the salt add dil H_2SO_4	No reaction	dil group is absent
2.	To the salt add conc. H_2SO_4	Smell of vinegar	CH_3COO^- may be present
	CONFIRMATORY TEST		
1.	Take some salt on a watch glass and mix it with solid oxalic acid.	Vinegar smell	CH_3COO^- confirmed
2.	Ester test Take some salt in a test tube. Add conc. H_2SO_4 and heat. Now add ethanol and pour the content of test tube in a beaker full of water	Fruity smell or ester	CH_3COO^- confirmed

Teacher's Signature : _____

⇒ Chemical Reactions Involved

(1) Potassium Iodide test

$PbCl_2 + 2KI \longrightarrow PbI_2 \downarrow + 2KCl$
(Hot solution) Yellow ppt

(2) Potassium chromate test

$PbCl_2 + K_2CrO_4 \longrightarrow PbCrO_4 \downarrow + 2KCl$
(hot solution) Yellow ppt

Date

Expt. No. Page No.

Test for cation

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To the pinch of salt add min. amount of water to dissolve salt. To the original solution add dil HCl. Now separate the white ppt form through filter paper and boil it and divide the solution into two parts	White ppt is formed	Radical may be Pb^{2+}
	CONFIRMATORY TEST for Pb^{2+} ion		
	To the first part of above soln, add KI soln	Yellow ppt is formed	Pb^{2+} is confirmed
2.	Potassium chromate Test To the second part of above solution, add K_2CrO_4 soln	Yellow ppt is formed	Pb^{2+} is confirmed

Result: The given salt contains:
anion : CH_3COO^-
cation : Pb^{2+}

Teacher's Signature :

⇒ Chemical Reaction Involved

(a) Copper chips Test

$KNO_3 + H_2SO_4 \longrightarrow KHSO_4 + HNO_3$

$4HNO_3 + C \longrightarrow 4NO_2 \uparrow + CO_2 + 2H_2O$
(Paper pellet)

(b) Ring Test

$6FeSO_4 + 3H_2SO_4 + 2HNO_3 \longrightarrow 2Fe(SO_4)_3 + 4H_2O + 2NO$

$FeSO_4 + NO + 5H_2O \longrightarrow [Fe(NO)(H_2O)_5]^{+} \cdot SO_4^{2-}$
(Brown ring)

Date _____

Expt. No. _____ Page No. _____

EXPERIMENT – 17

Aim:
To detect the presence of cation and anion in the given salt.

Test for anion.

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To pinch of salt, add dil H_2SO_4	No reaction	dil group absent
2.	To the pinch of salt, add conc. H_2SO_4	Reddish brown fumes evolved	Radical may be Br^- or NO_3^-
3.	To the boiled cold H_2SO_4	Solution turns black	NO_3^- may be present
	CONFIRMATORY TEST		
1.	Cu Chips test Heat a small quantity of soln with conc. H_2SO_4 add few copper chips	Dark brown fumes of NO_2 are formed	NO_3^- ion is confirmed
2.	Ring Test Add a small quantity of freshly prepared soln of ferrous sulphate to a part of aq. soln and then pour conc. H_2SO_4 acid slowly along the sides of test tube.	A dark brown ring is formed at the junction of the layers of the acid and the soln	NO_3^- is confirmed.

Teacher's Signature : _____

⇒ Chemical Reactions Involved

(1) Lake test

$Al(OH)_3 + 3HCl \longrightarrow AlCl_3 + 3H_2O$ – dissolution

$AlCl_3 + 3NH_4OH \longrightarrow 3NH_4Cl + Al(OH)_3 \downarrow$

Blue colour observes on this ppt

Date

Expt. No. Page No.

Test for cation

	EXPERIMENT	OBSERVATION	INFERENCE
1.	To the pinch of salt add conc NaOH and heat	No reaction i.e no ammonia smell	NH_4^+ is absent
2.	On adding HCl to original solution	No white ppt is formed	Pb^{2+} is absent
3.	To the above soln add Na_2S	No black or white ppt is formed	Pb^{2+}, Cu^{2+} are absent
4.	To the above soln of group II add conc HNO_3. Boil of Na_2S from the filtrate then boil the salt with added conc. HNO_3. Then add NH_4Cl and NH_4OH slowly till the ammonical smell appears	White ppt is formed	Al^{3+} may be present
5.	Lake test Dissolve the ppt in dil HCl and add two drops of blue litmus soln to it. Now add NH_4OH dropwise till blue colour develops	Blue ppt floating in the colourless solution	Al^{3+} is confirmed

Result : The given salt contains Anion : NO_3^- Cation : Al^{3+}

Teacher's Signature :

⇒ Anion Test

(1) Barium chloride Test

$Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + NaCl$
(white)

(2) Lead acetate test

$Na_2SO_4 + Pb(CH_3COO)_2 \longrightarrow PbSO_4 + 2CH_3COONa$

Date

Expt. No. Page No.

EXPERIMENT - 18

Aim:
To analyse the presence of anion and cation in a given salt no. 12.

Apparatus:
Test tube, dropper, test tube holder, burner, etc.

Chemical Required:
dil H_2SO_4, conc. H_2SO_4, $BaCl_2$ soln, dil HCl, NaOH soln, conc. HNO_3, solid NH_4Cl, NH_4OH, $(NH_4)_3PO_4$.

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
1. Dil H_2SO_4 test To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} is absent
2. Conc H_2SO_4 test To the pinch of salt add conc. H_2SO_4	No gas evolved	Cl^-, Br^-, I^-, NO_3^-, CH_3COO^- is absent.

Teacher's Signature :

Date .....

Expt. No. ..... Page No. .....

INDEPENDENT GROUP		
1. **Barium chloride test** To the aq. solution of salt add dil HCl and $BaCl_2$ soln	White ppt is formed which is insoluble in dil HCl	SO_4^{2-} is confirmed
2. **Lead Acetate test** To the aq. solution of salt add lead acetate solution	White ppt is formed which is soluble in hot ammonium acetate solution	SO_4^{2-} is confirmed.
CATION TEST		
To a pinch of salt add NaOH & heat	No ammonical smell observed	NH_4^+ is absent
→ To the small quantity of salt add water.	original soln is formed	
→ To the original soln add dil. HCl.	No white ppt formed	Pb^{2+} is absent
→ To the above soln add Na_2S.	No black ppt	Cu^{2+} is absent
→ To the above soln of group II add 4-5 drops of conc. HNO_3 and boil and cool the soln and then add NH_4OH in excess	No ppt is formed.	Fe^{2+}, Fe^{3+}, Al^{3+} absent.
→ To the soln of group III add Na_2S	No ppt is formed	Mn^{2+}, Zn^{2+} is absent.

Teacher's Signature : .....

⇒ Cation Test

(1.) Ammonium Phosphate Test

$MgCl_2 + NH_4OH + (NH_4)_2HPO_4 \longrightarrow \underset{\text{(white ppt)}}{Mg(NH_4)PO_4} + NH_4Cl + H_2O$

Date

Expt. No. _____ Page No. _____

→ Boil the above soln of group IV to remove Na_2S. Now add $(NH_4)_2CO_3$	No white ppt is formed	Ba^{2+}, Sr^{2+} Ca^{2+} absent
1. Ammonium Phosphate Test To the original soln. add NH_4Cl and NH_4OH in excess. Then add ammonium phosphate soln. and rub the sides of test tube with a glass rod.	White ppt is formed	Mg^{2+} is confirmed

Result :
Acid radical = SO_4^{2-} Cation : Mg^{2+}, Salt : $MgSO_4$
The given salt no. 12 is Magnesium sulphate.

Precautions :
* Use minimum quantity of reagents.
* Use chemicals carefully.
* Prolong heating of test tube should be avoided

Teacher's Signature :

⇒ Anion test

(1) Barium chloride Test

$Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + NaCl$
(white)

(2) Lead Acetate Test

$Na_2SO_4 + Pb(CH_3COO)_2 \longrightarrow PbSO_4 + CH_3COONa$

Date

Expt. No. Page No.

EXPERIMENT - 19

Aim:
To analyse the presence of anion and cation in a given salt no. 6

Apparatus:
Test tube, holder, dropper, burner, etc.

Chemicals Required:
dil H_2SO_4, conc. H_2SO_4, $BaCl_2$, $Pb(CH_3COO)_2$, NH_4OH, NH_4Cl, Na_2S, conc. HNO_3, dil. HCl.

	EXPERIMENT	OBSERVATION	INFERENCE
	ANION TEST		
1.	Dil H_2SO_4 test To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} is absent
2.	Conc. H_2SO_4 Test To the pinch of salt add conc. H_2SO_4	No gas evolved	Cl^-, Br^-, I^-, NO_3^-, CH_3COO^- absent

Teacher's Signature :

Date _____

Expt. No. _____ Page No. _____

	INDEPENDENT GROUP		
1.	**Barium chloride Test**		
	To the aq. soln of salt add dil HCl and $BaCl_2$ solution	White ppt is formed which is insoluble in dil HCl	SO_4^{2-} is confirmed
2.	**Lead Acetate Test**		
	To the aq. soln of salt add lead acetate soln	White ppt is formed which is soluble in ammonium acetate soln.	SO_4^{2-} is confirmed
	CATION TEST		
→	To the small quantity of salt ($+H_2O$)	Original soln is formed	
→	To the original soln add dil HCl	No white ppt formed	Pb^{2+} is absent
→	To the above soln add Na_2S	No black ppt formed	Cu^{2+} is absent
→	To the above soln of group II add 2-3 drops of conc. HNO_3. Boil the soln and then add NH_4Cl. Boil and cool the soln and then add NH_4OH in excess.	Gelatinous White ppt is formed	Radical may be Al^{3+}

Teacher's Signature : _____

⇒ cation test

(1) Lake Test

$AlCl_3 + 3NH_4OH \longrightarrow 3NH_4Cl + Al(OH)_3$

Blue colour absorbs on this ppt.

Date

Expt. No. Page No.

⇒	Confirmatory test		
1.	Lake Test		
	Dissolve the white ppt. in dil HCl. Add 2 drops of blue litmus soln to it. Now add NH_4OH dropwise till blue colour develops.	Blue ppt floating in colourless soln	Al^{3+} is confirmed

Result:

Anion : SO_4^{2-}

Cation : Al^{3+}

Salt : $Al_2(SO_4)_3$

Precautions:

1. Use minimum quantity of reagents.
2. Use chemicals carefully
3. Prolong heating should be avoided.

Teacher's Signature :

Date _____

Expt. No. _____ Page No. _____

EXPERIMENT - 20

 # Aim:

To analyse the presence of anion and cation in a given salt no 18

 # Apparatus:

Test tube, droppers, holder, burner, etc.

 # Chemicals Required:

dil. H_2SO_4, conc. H_2SO_4, dil HCl, Na_2S, solid NH_4Cl, NH_4OH

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
1. **Dil. H_2SO_4 Test** To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} absent
2. **Conc. H_2SO_4 Test** To the pinch of salt add conc. H_2SO_4. Now add Cu chips to above mixture and heat Pass the reddish brown gas through $FeSO_4$ soln	Solution turns black	Radical may be NO_3^-

Teacher's Signature : _____

⇒ Anion Test

(1) Ring test

$FeSO_4 + NO + 5H_2O \longrightarrow [Fe(NO)(H_2O)_5]SO_4$

⇒ Cation test

(1) Potassium Iodide Test

$PbCl_2 + 2KI \longrightarrow PbI_2 \downarrow + 2KCl$
(Yellow ppt)

Date

Expt. No. Page No.

Confirmatory Test		
1. Ring Test		
Add a small quantity of freshly prepared $FeSO_4$ to the aq. soln and then pour conc. H_2SO_4 slowly along the sides of test tubes.	A dark brown ring is formed at the junction of the layers of the acid and the soln	NO_3^- is confirmed
CATION TEST		
→ To the pinch of salt add NaOH soln and heat	No ammonical smell observed	NH_4^+ absent
→ To the pinch of salt add minimum amount of H_2O to dissolve salt	Original soln is formed	
→ To the original soln add dil HCl	White ppt. formed.	Radical may be Pb^{2+}
→ Now separate the white ppt. through filter paper and boil it with water.	White ppt. dissolves	
→ Divide the soln into two parts		
Confirmatory test		
1. Potassium Iodide Test To the first part of above soln add KI soln.	Yellow ppt. formed	Pb^{2+} confirmed

Teacher's Signature :

(2) Potassium chromate Test

$PbCl_2 + K_2CrO_4 \longrightarrow PbCrO_4 \downarrow + 2KCl$
(Yellow ppt)

Date

Expt. No. Page No.

2.	Potassium Chromate Test To the second part of above soln add. K_2CrO_4 soln	Yellow ppt formed	Pb^{2+} confirmed

Result :
Anion : NO_3^-
Cation : Pb^{2+}
Salt : $Pb(NO_3)_2$
The given salt no. 18 contains lead nitrate

Precautions
(1) Use the minimum quantity of reagents.
(2) Use [illegible] carefully
(3) [illegible] of test tube should be avoided

Teacher's Signature :

Date .....

Expt. No. ..... Page No. .....

EXPERIMENT-21

Aim:
To analyse the presence of anion and cation in a given salt no. 35.

Apparatus:
Test tube, dropper, test tube holder, burner etc.

Chemicals Required:
dil. H_2SO_4, conc. H_2SO_4, dil HCl, Na_2S, NH_4OH solid NH_4Cl, $BaCl_2$.

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
(1) Dil H_2SO_4 Test To the pinch of salt add dil H_2SO_4	No brisk effervescence evolved	CO_3^{2-} absent
(2) Conc. H_2SO_4 Test To the pinch of salt add conc. H_2SO_4	No gas / vapour evolved	Cl^-, Br^-, I^-, NO_3^-, CH_3COO^- absent.

Teacher's Signature : _____

⇒ Anion Test

(1) Barium chloride Test

$Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + 2NaCl$
(white)

(2) Lead Acetate Test

$Na_2SO_4 + Pb(CH_3COO)_2 \rightarrow PbSO_4 + 2CH_3COONa$

⇒ Cation Test

(1) $NH_4Cl + NaOH \xrightarrow{\Delta} NaCl + H_2O + NH_3\uparrow$

$NH_3 + HCl \longrightarrow NH_4Cl$
(white fumes)

(2) Nessler's Reagent

$2K_2[HgI_4] + NH_3 + 3KOH \longrightarrow H_2N.HgO.HgI\downarrow + 7KI + 2H_2O$
(Brown ppt)

Date _____

Expt. No. _____ Page No. _____

INDEPENDENT GROUP		
(1) Barium chloride Test To the aq. soln of salt add dil HCl and $BaCl_2$ soln	White ppt is formed which is insoluble in dil. HCl	SO_4^{2-} is confirmed
(2) Lead Acetate Test To the aqueous solution of salt add lead acetate solution.	White ppt is formed which is soluble in excess of hot ammonium acetate soln	SO_4^{2-} is confirmed
⇒ BASE RADICATION TEST To the salt add cold NaOH soln and heat	Ammonical smell observed	Radical may be NH_4^+
CONFIRMATORY TEST		
(1) Bring a glass rod dipped in dil HCl near the mouth of above test tube.	White fumes observed	NH_4^+ is confirmed
(2) Add Nessler's reagent to the above test tube.	Brown ppt formed	NH_4^+ is confirmed

Teacher's Signature : _____

Date _____

Expt. No. _____ Page No. _____

Result :

Anion : SO_4^{2-}

Cation : NH_4^+

Salt : $(NH_4)_2SO_4$

The given salt no. 35 contain ammonium sulphate

Precautions :

(1) Use chemicals carefully
(2) Use minimum quantity of reagents
(3) Prolong heating of test tube should be avoided.

Teacher's Signature : _____

Date _____

Expt. No. _____ Page No. _____

EXPERIMENT-22

 # Aim:
To analyse the presence of anion and cation in a given salt no: 49.

 # Apparatus:
Test tube, dropper, burner, test tube holder etc.

 # Chemicals Required:
dil H_2SO_4, $MgSO_4$, NaOH, dil. HCl, Nessler's Reagent

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
(1) Dil H_2SO_4 Test To the pinch of salt add dil H_2SO_4	No brisk effervescence evolved	CO_3^{2-} is absent
(2) Conc. H_2SO_4 Test To the pinch of salt add conc. H_2SO_4	colourless gas is evolved	Radical may be Cl^-
Bring a glass rod dipped in NH_4OH to the mouth of the test tube.	White fumes evolved out	Radical may be Cl^-.

Teacher's Signature : _____

⇒ Anion Test

(1) Silver nitrate test

$KCl + AgNO_3 \longrightarrow KNO_3 + AgCl$ (curd white ppt.)

⇒ Cation Test

(1) $NH_4Cl + NaOH \xrightarrow{\Delta} NaCl + H_2O + NH_3\uparrow$

$NH_3 + HCl \longrightarrow NH_4Cl$, (white fumes)

(2) Nessler's Reagent

$2K_2[HgI_4] + NH_3 + 3KOH \longrightarrow H_2NHgO.HgI\downarrow + 7KI + 2H_2O$

Brown ppt.

Date

Expt. No. Page No.

	Confirmatory Test		
(1)	SILVER NITRATE TEST To the aq. soln of the salt, add dil HNO_3. Boil, cool and add $AgNO_3$ soln.	curd white ppt is formed	Cl^- is confirmed
	CATION TEST To the pinch of salt, add NaOH soln and heat.	Ammonical smell observed	Radical may be NH_4^+
	Confirmatory Test		
(1)	Bring a glass rod dipped in dil HCl near the mouth of above test tube.	White fumes observed	NH_4^+ is confirmed
	Add Nessler's reagent to the above test tube.	Brown ppt forms	NH_4^+ is confirmed

Result :
Anion : Cl^-, Cation : NH_4^+, Salt : NH_4Cl
The given salt no. 49 is ammonium chloride.

Precautions :
1. Use chemicals carefully
2. Use minimum quantity of reagents.
3. Prolong heating of test tube should be avoided.

Teacher's Signature :

Date _____

Expt. No. _____ Page No. _____

EXPERIMENT - 23

 # Aim :
To analyse the presence of anion and cation in a given salt no.10.

 # Apparatus :
Test tube, dropper, test tube holder, burner etc.

 # Chemicals Required :
dil. H_2SO_4, conc. H_2SO_4, dil. HCl, Na_2S, solid NH_4Cl, NH_4OH

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
(1) Dil. H_2SO_4 Test To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} absent
(2) Conc. H_2SO_4 Test To the pinch of salt add conc. H_2SO_4 Now add Cu chips to above mixture and heat. Pass the reddish brown gas through $FeSO_4$ solution	Reddish brown gas is evolved Solution turns black	Radical may be Br^- or NO_3^-

Teacher's Signature : _____

⇒ Anion Test

(1) Ring Test

$FeSO_4 + NO + 5H_2O \longrightarrow [Fe(NO)(H_2O)_5]SO_4$

Date

Expt. No.

Page No.

	Confirmatory Test.		
1.	RING TEST		
	Add a small quantity of freshly prepared $FeSO_4$ to the aq. soln and then pour conc. H_2SO_4 slowly along the sides of test tube.	A dark brown ring is formed at the junction of the layers of the acid & solution.	NO_3^- is confirmed
	CATION TEST		
→	To the pinch of salt add NaOH and heat.	No ammonical smell observed	NH_4^+ absent
→	To small quantity of salt add water.		
→	To the aqueous solution add dil HCl	No white ppt formed	Pb^{2+} absent
→	To the above soln of group I, add Na_2S. To the above soln of group II, boil it then add solid NH_4Cl and boil and then cool. Now add excess of NH_4OH to it.	No black ppt formed	Cu^{2+} absent
		No ppt formed	Fe^{3+} and Al^{3+} absent
→	To the above soln of group III add Na_2S.	NO ppt formed	Mn^{2+} and Zn^{2+} absent
→	Boil the above soln of group IV to remove Na_2S. Now add $(NH_4)_2CO_3$ to it.	White ppt formed	Ba^{2+}, Ca^{2+}, Sr^{2+} may be present

Teacher's Signature :

⇒ Cation Test

(1) Flame Test

Barium imparts grassy green colour to the flame.

(2) Potassium chromate Test

$(CH_3COO)_2Ba + K_2CrO_4 \longrightarrow 2CH_3COOK + BaCrO_4\downarrow$ (yellow ppt)

Date

Expt. No. Page No.

	Dissolve the white ppt in hot dil. acetic acid and divide the soln into three parts.		
	Confirmatory Test For Ba^{2+}		
1.	Flame Test		
	Dip the glass rod in conc. HCl and wash it with the salt	Apple green flame is observed.	Ba^{2+} is confirmed
2.	Potassium Chromate Test		
	To one part of the soln, add a few drops of the soln. Add a few drops of potassium chromate solution	Yellow ppt. is formed	Ba^{2+} is confirmed

Result:

Anion: NO_3^-, Cation: Ba^{2+}, Salt: $Ba(NO_3)_2$

The given salt is Barium nitrate.

Precautions:

1. Use minimum quantity of reagent.
2. Use chemicals carefully
3. Prolong heating of test tube should be avoided.

Teacher's Signature:

Date _____

Expt. No. _____ Page No. _____

EXPERIMENT - 27

Aim :

To analyse the presence of anion and cation in the given salt no. 32.

Apparatus :

Test tube, dropper, test tube holder, burner etc.

Chemicals Required :

dil H_2SO_4, conc. H_2SO_4, dil HCl, Na_2S, NH_4OH, solid NH_4Cl, $BaCl_2$

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
1. Dil H_2SO_4 Test To the pinch of salt add dil H_2SO_4	No brisk effervescence evolved	CO_3^{2-} absent
2. Conc. H_2SO_4 Test To the pinch of salt add conc. H_2SO_4	No gas/vapour evolved	Cl^-, Br^-, I^-, NO_3^-, CH_3COO^- absent.

Teacher's Signature : _____

⇒ Anion Test

(1). Barium Chloride Test

$Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + NaCl$ (white ppt)

(2) Lead Acetate Test

$Na_2SO_4 + Pb(CH_3COO)_2 \longrightarrow PbSO_4 + 2CH_3COONa$

Date

Expt. No. Page No.

	INDEPENDENT GROUP		
1.	Barium Chloride Test		
	To the aq. soln of salt add dil HCl and $BaCl_2$ solution.	White ppt is formed which is insoluble in dil HCl	SO_4^{2-} is confirmed
2.	Lead Acetate Test		
	To the aq. soln of salt add lead acetate solution	White ppt is formed which is soluble in excess of ammonium acetate soln	SO_4^{2-} is confirmed
	CATION TEST		
→	To the original soln add dil HCl	No white ppt is formed	Pb^{2+} is absent
→	To the above solution, add Na_2S	No black ppt is formed	Cu^{2+} is absent
→	Boil the above soln, add NH_4Cl, boil and cool.	No ppt. is formed	Radical of group III are absent.
→	Now add NH_4OH in excess to the above soln of group III add Na_2S	Dull white ppt. is formed	Zn^{2+} may be present

Teacher's Signature :

⇒ Cation Test

(1) Sodium Hydroxide Test

$ZnCl_2 + 2NaOH \longrightarrow Zn(OH)_2 \downarrow + 2NaCl$
(white ppt.)

$Zn(OH)_2 + 2NaOH \longrightarrow Na_2ZnO_2 + 2H_2O$

(2) Potassium Ferrocyanide Test

$2ZnCl_2 + K_4[Fe(CN)_6] \longrightarrow Zn_2[Fe(CN)_6] \downarrow + 4KCl$
(White ppt.)

Date

Expt. No. Page No.

	Confirmatory Test Dissolve the ppt in dil HCl. Boil H_2S. Divide the soln into two parts		
1.	Sodium hydroxide soln To the first part add NaOH soln dropwise	White ppt is formed	Zn^{2+} is confirmed
2.	Potassium ferrocyanide Test To the second part, add potassium ferrocyanide soln	White ppt is formed	Zn^{2+} is confirmed

Result:
Anion : SO_4^{2-}
Cation : Zn^{2+}
Salt : $ZnSO_4$
The given salt is Zinc Sulphate

Precautions:
1. Use minimum quantity of reagent.
2. Prolong heating of test tube should be avoided
3. Use chemicals carefully

Teacher's Signature :

Date .....

Expt. No. ..... Page No. .....

EXPERIMENT - 25

 # Aim :
To analyse the presence of anion and cation in a given salt no. 15.

 # Apparatus :
Test tube, dropper, test tube holder, burner etc.

 # Chemicals required :
dil. H_2SO_4, conc. H_2SO_4, dil HCl, Na_2S, solid NH_4Cl, NH_4OH

EXPERIMENT	OBSERVATION	INFERENCE
ANION TEST		
1. **Dil H_2SO_4 Test** To the pinch of salt add dil. H_2SO_4	No brisk effervescence evolved	CO_3^{2-} is confirmed
2. **Conc. H_2SO_4 Test** To the pinch of salt add conc. H_2SO_4. Now add Cu chips to above mixture and heat. Pass the reddish brown gas through $FeSO_4$ solution	Reddish brown gas is evolved Solution turns black	Radical may be Br^- or NO_3^- Radical may be NO_3^-

Teacher's Signature : .....

⇒ Anion Test

(1) Ring Test

$FeSO_4 + NO + 5H_2O \longrightarrow [Fe(NO)(H_2O)_5]SO_4$

Date _____

Expt. No. _____ Page No. _____

	Confirmatory Test		
1.	Ring Test		
	Add a small quantity of freshly prepared $FeSO_4$ to the aq. soln and then pour conc. H_2SO_4 slowly along the sides of test tube.	A dark brown ring is formed at the junction of the layers of acid and the soln	NO_3^- is confirmed
	CATION TEST		
→	To the pinch of salt, add NaOH and heat	No ammonical smell observed	NH_4^+ absent
→	To the original soln add dil HCl	No white ppt. is formed	Pb^{2+} absent
→	To the left of group I add Na_2S	No black ppt. is formed	Cu^{2+} absent
→	Add solid NH_4Cl and boil and then cool, to the above soln. Now add excess of NH_4OH to it.	No ppt formed	Fe^{3+} and Al^{3+} absent
→	To the above soln of group III add Na_2S.	No ppt formed	Mn^{2+} and Zn^{2+} absent
	Boil the above soln of group IV to remove Na_2S. Now add $(NH_4)CO_3$ to it.	White ppt formed	Ba^{2+}, Ca^{2+}, Sr^{2+} may be present

Teacher's Signature : _____

⇒ Cation Test

(1) Ammonium Sulphate Test

$[CH_3(COO)_2Sr] + (NH_4)_2SO_4 \longrightarrow 2CH_3COONH_4 + SrSO_4 \downarrow$ (White ppt)

(2) Flame Test

Strontium produces crimson red flame.

Date

Expt. No. Page No.

	Dissolve the white ppt. in hot dil. acetic acid and divide the solution into three parts		
	Confirmatory test		
1.	FLAME TEST		
	Dip the glass rod in conc. HCl and wrap it with salt.	Crimson red flame observed	Sr^{2+} is confirmed
2.	Ammonium Sulphate Test To the test part of solution, add 1 ml of ammonium sulphate solution and warm it	White ppt is formed	Sr^{2+} is confirmed

Result :

Anion : NO_3^- Cation : Sr^{2+} Salt : $Sr(NO_3)_2$

The given salt is strontium nitrate

Precautions :

1. Use minimum quantity of reagent
2. Prolong heating of test tube should be avoided.
3. Use chemicals carefully.

Teacher's Signature :