પુ•ના International School
Shree Swaminarayan Gurukul, Zundal

Class – XII **Subject: Chemistry (Practical)** **Experiments (2025-26)**

Exp. No		Aim
		QUANTITATIVE ANALYSIS
1		Prepare 250 ml of 0.1MSolution of Oxalic Acid From Crystalline Oxalic Acid
2		Determination of Concentration/Morality of $KMnO_4$ Solution by Titrating it against a0.1M Standard Solution of Oxalic acid
3		Determination of Concentration/Morality of $KMnO_4$ Solution by Titrating it against aStandard Solution of Ferrous ammonium sulphate
		QUALITATIVE ANALYSIS
4		To Identify the given inorganic salt[$Ba(NO_3)_2$]
5		To Identify the given inorganic salt [$ZnCO_3$]
6		To Identify the given inorganic salt [$Pb(NO_3)_2$]
7		To Identify the given inorganic salt $PbCl_2$
8		To Identify the given inorganic salt $MgSO_4$
9		To Identify the given inorganic salt [$BaSO_4$]
10		To Identify the given inorganic salt [$Sr(NO_3)_2$]
		Content based Experiment
11		Test for functional group present in organic compound: Aldheyde, Ketone, Alcohol ,Carboxylic Acid, Phenol, Amine
12		Prepration of inorganic compound, Ferrous ammonium sulphate (potash alum)

EXPERIMENT-1

Aim: Prepare 250 ml of M/10 Solution of Oxalic AcidFrom Crystalline Oxalic Acid

Theory

Molecular mass of crystalline oxalic acid $\begin{pmatrix} COOH \\ | \\ COOH \end{pmatrix} . 2H_2O = 126$

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

∴ For preparing 250 ml of 0.1M solution,

oxalic acid crystals required = $\frac{126}{1000} \times 250 \times 0.1 = 3.150$ g.

Apparatus

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

Chemical Required

Oxalic acid crystals and distilled water.

Procedure

1. Take a watch glass, wash it with distilled water and then dry it.

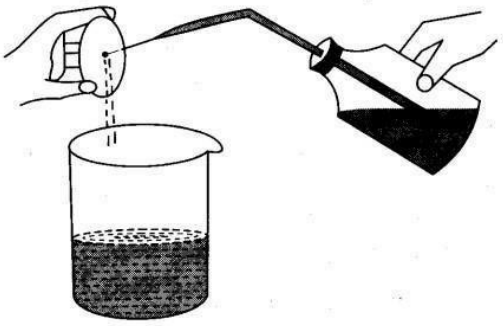

Fig. Washing of watch glass to transfer sticking particles to beaker.

2. Weigh the clean and dried watch glass accurately and record its weight in the notebook.

3. Weigh 3.150 g oxalic acid on the watch glass accurately and record this weight in thenote-book.
4. Transfer gently and carefully the oxalic acid from the watch glass into a clean 250 mlbeaker. Wash the watch glass with distilled water with the help of a wash bottle to transfer the particles sticking to it into the beaker [Fig].
   The volume of distilled water for this purpose should not be more than 50 ml.
5. Dissolve oxalic acid crystals in the beaker by gentle stirring with a clean glass rod.
6. When the oxalic acid in the beaker is completely dissolved, transfer carefully the entiresolution from the beaker into a 250 ml measuring flask (volumetric flask) with the help of a funnel [Fig].

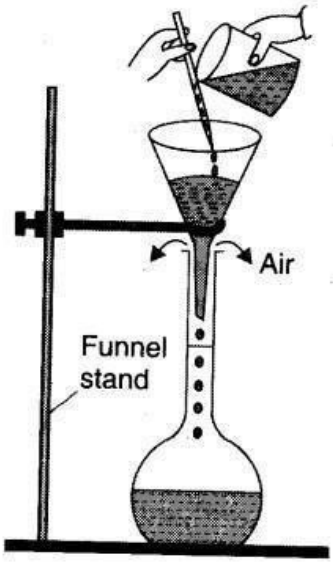

Fig. Transferring solution to measuring flask

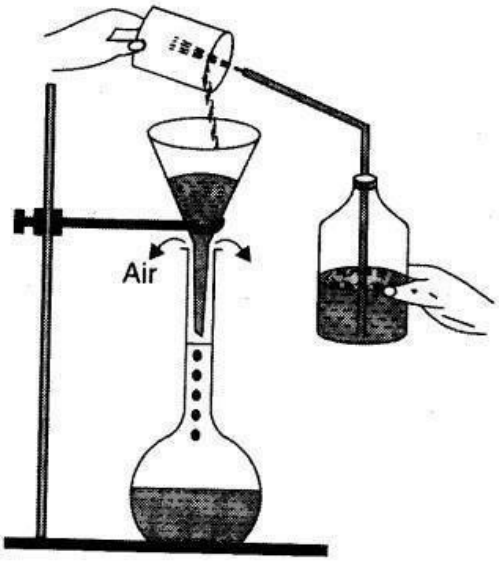

Fig. Transferring last traces of

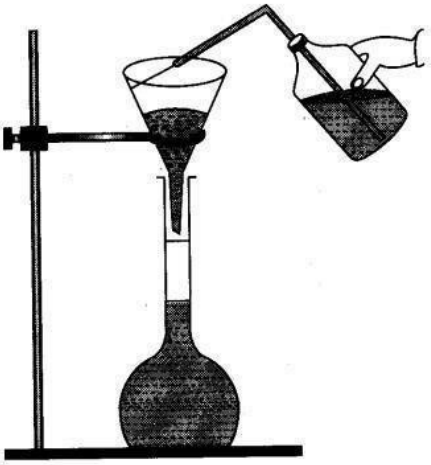

Fig. Washing last traces of solution from funnel to the measuring flask.

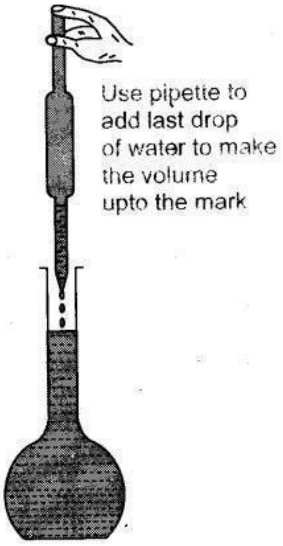

Fig. Using pipette to add last drop of water to make the volume upto the mark.

7. Wash the beaker with distilled water. Transfer the washings into the measuring flask[Fig].

8. Finally wash the funnel well with distilled water with the help of a wash bottle to transfer the solution sticking to the funnel into the measuring flask [Fig].
9. Add enough distilled water to the measuring flask carefully, up to just below the etched mark on it, with the help of a wash bottle.

10. Add the last few drops of distilled water with a pipette until the lower level of them enisc us just touches the mark on the measuring flask [Fig].
11. Stopper the measuring flask and shake gently to make the solution uniform through-out. Label it as oxalic acid solution.

Result:- 250 ml of M/10 Solution of Oxalic Acid From Crystalline Oxalic Acid is prepared.

EXPERIMENT-2

AIM: To determine the strength of potassium permanganate by titrating it against the standard solution of 0.1M oxalic acid.

Theory:

Potassium permanganate is a strong oxidising agent and in the presence of sulfuric acid it acts as a powerful oxidising agent. In acidic medium the oxidising ability of $KMnO_4$ is represented by the following equation.

In acidic solution,

$$MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O$$

Solution containing MnO_4^- ions are purple in colour and the solution containing Mn^{2+} ions are colourless and hence permanganate solution is decolourised when added to a solution of a reducing agent. The moment there is an excess of potassium permanganate present the solution becomes purple.
Thus, **$KMnO_4$ serves as self indicator** in acidic solution.

Potassium permanganate is standardized against pure oxalic acid. It involves a redox reaction. Oxalic acid is oxidised to carbon dioxide by $KMnO_4$, which itself gets reduced to $MnSO_4$. Oxalic acid reacts with potassium permanganate in the following way.

The chemical reaction at room temperature is given below.

Reduction Half reaction:- $2KMnO_4 + 3H_2SO_4 \rightarrow K_2SO_4 + 2MnSO_4 + 3H_2O +$

$5[O]$ Oxidation Half reaction:- $5(COOH)_2 + 5[O] \rightarrow 5H_2O + 10CO_2\uparrow$

The overall reaction takes place in the process is

Overall reaction:- $2KMnO_4 + 3H_2SO_4 + 5(COOH)_2 \rightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + 10CO_2\uparrow$

The **ionic equation** involved in the process is given below. **Reduction**

Half reaction:- $[MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O] \times 2$

Oxidation Half reaction:- $[C_2O_4^{2-} \rightarrow 2CO_2 + 2e^-] \times 5$

Overall Ionic reaction:- $2MnO_4^- + 16H^+ + 5C_2O_4^{2-} \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$

This titration cannot be carried out in the presence of acids like nitric acid or hydrochloric acid because itself is an oxidising agent. So hydrochloric acid chemically reacts with KMnO4 solution forming chlorine which is also an oxidising agent.

Materials Required:

1. Oxalic acid
2. Potassium permanganate solution
3. 1.0M sulfuric acid
4. Chemical balance
5. Burette
6. Burette stand
7. Pipette
8. Conical flask
9. Funnel
10. Measuring flask
11. Weighing bottle
12. White tile
13. Burnet
14. Wire gauze

Apparatus Setup:

1. In burette – KMnO4 solution
2. In Conical flask – 10ml of oxalic acid + Sulfuric acid
3. Indicator – Self indicator (KMnO4)
4. End Point – Appearance of permanent pale pink colour.

Procedure:

(a) Preparation of 0.1M standard solution of oxalic acid:

To begin the experiment, we will first calculate the amount required for 0.1 M of oxalic acid.

The molecular mass of oxalic acid is 126 g. To prepare a M/10 oxalic acid solution, we need to dissolve 12.6 g of oxalic acid per litre of solution.

Alternatively, we can dissolve 3.15 g of oxalic acid crystals in water and make the solution exactly 250 ml.

For the preparation of 1 litre of M/10 oxalic acid solution, the amount of oxalic acid required is 3.15g.

1. Weigh an empty watch glass using a chemical balance.
2. Weigh 3.15g of oxalic acid accurately in the watch glass.
3. With the help of a funnel, transfer the oxalic acid into the measuring flask.
4. Now wash the funnel with distilled water without removing the funnel from the flask.
5. Make the solution up to the marked point with distilled water and make sure the oxalic acid is fully dissolved.
6. This solution is a 0.1M standard solution of oxalic acid.

(a) Titration of potassium permanganate solution against standard oxalic acid solution:

1. Rinse the burette with the potassium permanganate solution andfill the burette with potassium permanganate solution.
2. Fix the burette in the burette stand and place the white tile below the burette in order to find theend point correctly.
3. Pipette out 10ml of 0.1N standard oxalic acid solution in a conical flask.

4. Add a test tube full of sulfuric acid in order to prevent oxidation of manganese toform manganese dioxide.
5. Heat the mixture upto 60^{o}C before titrating with potassium permanganate.
6. Note down the initial reading in the burette before starting thetitration.
7. The hot solution is titrated against potassium permanganate solution and simultaneouslyswirl the solution in the flask gently.
8. Initially the purple colour of KMnO4 is discharged with oxalic acid. The appearance of permanent pink colour reveals the end point.
9. Repeat the titration until concordant values are obtained.
10. Note down the upper meniscus on the burette readings. Record the reading in the observation table given below in order to calculate the molarity of KMnO4 given.

Observation:

S.No	Volume of oxalic acid in ml	Burette Reading		Volume(V) of KMnO4 used V = (y-x)ml
		Initial(x)	Final(y)	
1	10 ml	0 ml	18.5 ml	18.5 ml
2	10 ml	0 ml	18.5 ml	
3	10 ml	0 ml	19 ml	

Calculations:

To calculate the strength of given KMnO4 in terms of molarity the following formula is used

$a_1M_1V_1 = a_2M_2V_2$

Where a_1 and a_2 are stoichiometric coefficient of oxalic acid and KMnO4 in a balanced chemical equation.

$a_1 = 2$

$a_2 = 5$

Where

M_2 and M_1 are molarities of potassium permanganate and oxalic acid solutions used in the titration. V_2 and V_1 are the volume of potassium permanganate and oxalic acid solutions used in the titration.

Therefore,

KMnO4 = Oxalic acid $5M_2V_2$

$= 2M_1V_1$

$M_2 = (2M_1V_1/5M_2V_2)$

The strength of KMnO4 is calculated by using the molarity.

Strength = Molarity x Molar mass

Results and Discussion:

1. Molarity of KMnO4 is 0.02 M
2. The Strength of KMnO4 is 0.316 g/l.

Precautions:

1. Clean all the apparatus with distilled water before starting the experiment and then rise with the solution to be taken in them.
2. Rinse the pipette and burette before use.
3. Potassium permanganate is dark in colour, so always read the upper meniscus.
4. Use dilute sulfuric acid for acidifying the potassium permanganate.
5. Take accurate readings once it reaches the end point and don't go with average readings.
6. Use antiparallex card or autoparallex card while taking the burette readings.
7. Do not use rubber cork burette as it is can be attacked by $KMnO_4$.
8. The strength of the unknown solution should be taken upto two decimal places only.

EXPERIMENT-3

Aim: To prepare M/20 solution of Mohr's salt and, using this solution find out the molarity and strength of the given potassium permanganate ($KMnO_4$) solution.

Theory:

Potassium permanganate is a strong oxidant in the presence of sulfuric acid. Mohr salt is a double salt forming a single crystalline structure having the formula (NH4)2. FeSO4. 6H2O. The chemical name forMohr's salt is ferrous ammonium sulfate.

In this titration Mohr salt acts as a reducing agent and potassium permanganate acts as an oxidising agent.So, the reaction between Mohr's salt and potassium permanganate is a redox reaction. In this redox reaction, ferrous ion from Mohr's salt gets oxidised and pink coloured of manganese present in potassium permanganate, which is in the +7 oxidation state gets reduced to colourless Mn^{2+} state.

The chemical reaction and the molecular chemical equation is given below.Reduction half

reaction –

2KMnO4 + 3H2SO4 → K2SO4 + 2MnSO4 + 3H2O + 5[O]

Oxidation half reaction –

[2FeSO4(NH4)2SO4.6H2O + H2SO4 + [O] → Fe2(SO4)3 + 2(NH4)2SO4 + 13H2O] x 5

Overall reaction –

2KMnO4 + 10FeSO4(NH4)2SO4.6H2O+ 8H2SO4 → K2SO4+ 2MnSO4+ 5Fe2(SO4)3+ 10(NH4)2SO4+ 68H2O

The ionic equation involved in the process is given below.Oxidation half

reaction – **$[Fe^{2+} \rightarrow Fe^{3+} - e^{-}]$ x 5**

Reduction half reaction – **$MnO4^{-} + 8H^{+} + 5e^{-} \rightarrow Mn^{2+} + 4H2O$**

Overall ionic equation – **$MnO4^{-} + 8H^{+} + 5Fe^{2+} \rightarrow Mn^{2+} + 5Fe^{3+} + 4H2O$**

This titration is based upon oxidation-reduction titrations. When ferrous ammonium sulfate solution is titrated against potassium permanganate in the presence of acidic medium by sulfuric acid. Acidic mediumis necessary in order to prevent precipitation of manganese oxide. Here KMnO4 acts as a self indicator and this titration is called permanganate titration.

Materials Required:

1. Mohr's salt (ferrous ammonium sulfate)
2. Potassium permanganate solution
3. Dilute sulfuric acid
4. Chemical balance
5. Burette
6. Burette stand
7. Pipette
8. Conical flask
9. Funnel
10. Measuring flask
11. Weighing bottle
12. White tile
13. Burnet
14. Wire gauze15.

Apparatus Setup:

1. In burette – KMnO4 solution
2. In Conical flask – 10ml of Ferrous Ammonium Sulfate (Mohr's salt) + Sulfuric acid
3. Indicator – Self indicator (KMnO4)

4. End Point – Colourless to permanent pale pink colour.

Procedure:

A. Preparation of 250ml of M/20 solution of Mohr's salt –

(a) The molar mass of Mohr's salt is 392gmol^{-1}. It is a primary standard. Since 1000cm^3 of 1M potassium permanganate require Mohr's salt of =392g So, 250cm^3 of M/20 potassium permanganate require Mohr's salt of = (392 / 20) / 1000 × 250 = 4.9g

(b) Accurately weigh 4.9g of Mohr's salt using a chemical balance and watch glass.

(c) Now put weighed Mohr's salt in a volumetric flask using a funnel.

(d) Now add 5ml of dilute sulfuric acid and distilled water in the same flask and dissolve Mohr's salt.

(e) Now fill the volumetric flask with distilled water according to the required volume.

(f) Thus, a standard solution is prepared for the titration.

B. The procedure of Titration -

1. **Fill the burette with potassium permanganate solution.**
2. **Take a conical flask and add 5ml of dilute sulfuric acid to it.**
3. **Pipette out 10 ml of prepared standard Mohr's salt solution in the same conical flask.**
4. **Place a white tile under the burette and place the conical flask containing Mohr's salt solution and H_2SO_4 on it.**
5. **Note down the initial reading of the burette.**
6. **Start running potassium permanganate solution into the conical flask and keep shaking the conical flask slowly.**
7. **Stop titration when you obtain permanent pink colour in the conical flask as it indicates the endpoint.**
8. **Note down the final reading from the burette.**
9. **Repeat the procedure of titration until you get three concordant readings or values.**

C.Titration of potassium permanganate solution against standard ferrous ammonium sulfate (Mohr's salt) solution:

1. Wash and rinse the burette and pipette with distilled water and then rinse withthe corresponding solution to be filled in them.
2. Rinse the burette with the potassium permanganate solution and fill the burette with potassium permanganate solution.
3. Fix the burette in the burette stand and place the white tile below the burette in order to find the endpoint correctly.
4. Rinse the pipette and conical flask with standard ferrous sulfate solution.
5. Pipette out 10ml of 0.05N standard Mohr's salt solution into the conical flask.
6. Add a test tube full of sulfuric acid in order to prevent oxidation of manganese to form manganese dioxide.
7. Note down the initial reading in the burette before starting thetitration.
8. Now start the titration, titrate against potassium permanganate solution and simultaneously swirlthe solution in the flask gently.
9. Initially, the purple colour of KMnO4 is discharged with ferrous ammonium sulfate. The appearance of a permanent pink colour reveals the endpoint.
10. Repeat the titration until concordant values are obtained.
11. Note down the upper meniscus on the burette readings.
12. Record the reading in the observation table given below in order to calculate the molarityof KMnO4 given.

Observations:

S.No	Volume of ferrous ammonium sulfate(Mohr's salt) used	Burette Reading		Volume(V) of $KMnO_4$ used V = (y-x)ml
		Initial(x)	Final(y)	

Calculations:

To calculate the strength of given $KMnO_4$ in terms of molarity the following formula is used

$a_1M_1V_1 = a_2M_2V_2$

Where a_1 and a_2 are stoichiometric coefficient of **ferrous ammonium sulfate** and $KMnO_4$ in a balanced chemical equation.

$a_1 = 1$

$a_2 = 5$

Where

M_2 and M_1 are molarities of potassium permanganate and **ferrous ammonium sulfate** solutions used in the titration.

V_2 and V_1 are the volume of potassium permanganate and **ferrous ammonium sulfate** solutions used in the titration.

Therefore,

$KMnO_4$ = **ferrous ammonium sulfate**

$5M_2V_2 = 1M_1V_1$

$M_2 = (1M_1V_1/5M_2V_2)$

The strength of $KMnO_4$ is calculated by using the molarity.

Strength = Molarity x Molar mass

Results and Discussion:

1. Molarity of $KMnO_4$ is 0.00245 M
2. The Strength of $KMnO_4$ is 0.3871 g/l.

Precautions:

1. Clean all the apparatus with distilled water before starting the experiment and then rise with thesolution to be taken in them.
2. Rinse the pipette and burette before use.
3. Potassium permanganate is dark in colour, so always read the upper meniscus.
4. Use dilute sulfuric acid for acidifying the potassium permanganate.
5. Take accurate readings once it reaches the end point and don't go with average readings.
6. Use antiparallex card or autoparallex card while taking the burette readings.
7. Do not use rubber cork burette as it is can be attacked by $KMnO_4$.
8. The strength of the unknown solution should be taken upto two decimal places only.

EXPERIMENT-4

Aim: To analyse the given salt for acidic and basic radicals.

Experiment	Observations	Inference
1. **Physical examination :** (a) Noted the colour of thegivensalt. (b) Noted the smell of the salt.	White No specific odour	Cu^{2+}, Fe^{2+}, Fe^{3+}, Ni^{2+}, Mn^{2+} Co^{2+} absent. NH_4^+, S^{2-} and CH_3COO^- may be absent.
2. **Dry heating test** Heated a pinch of the salt in a dry test tube and noted the following observations : (a) Gas evolved	A reddish brown gas evolved which turned freshly prepared FeSO4 solution black.	NO_3^- may be present.
(b) Sublimation	No sublimate formed.	Ammonium halides, aluminium chloride, iodide maybeabsent.
(c) Decrepitation	No crackling sound observed.	Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent.
(d) Fusion	Salt does not	Alkali (sodium, potassium) salts may be absent.
(e) Colour of the residue	fuse. White	Zn^{2+}, Pb^{2+} may be absent.

Experiment	Observations	Inference
5. Flame test Prepared a paste of the salt in conc. HCl and performed flame test.	Persistent grassy green flameon prolonged heating.	Ba^{2+} present.
6. Borax bead test Did not perform this test since the given salt was white.	—	Cu^{2+}, Ni^{2+}, Fe^{3+}, Mn^{2+}, Co^{2+} may be absent.
7. Dil. sulphuric acid test Treated a pinch of the saltwith dil. H_2SO_4 and warmed.	No gas evolved.	CO^{2-}, S^{2-}, NO_2^-, SO_3^{2-} may be absent.
8. KMnO4 test To a pinch of the salt added dil. H_2SO_4 warm and then a drop of KMnO4 solution.	Pink colour of KMnO4 was not discharged.	Cl^-, Br^-, I^-, CO_3^{2-}, Fe^{2+} may be absent.
9. Conc. sulphuric acidtest Heated a pinch of the salt with conc. sulphuric acid and added to it a paper pellet.	A reddish brown gas evolved which turned FeSO4 solution black. Reddish brown gas evolved.	NO_3^- may be present.
10. Confirmatory test for nitrate (a) Copper chips test. Heated a pinch of the salt with conc. sulphuric acid and a few copper chips.	A dark brown ring formed at the junction of the two liquids.	NO_3^- confirmed.
(b) Ring test. To 2–3 ml of the salt solution, added freshly pre- pared FeSO4 solution. Now added conc. sulphuric acid along the sides of the test tube.	No ammonia gasevolved.	NO_3^- confirmed.
11. Heated a pinch of salt with conc. NaOH solution	Solution	NH_4^+ absent.
12. Preparation of OriginalSolution (O.S.) Shook a pinch of the salt with water.	obtainedNo ppt. formed.	Labelled it as Original Solution (O.S.)
13. To a part of the O.S. added 1–2 mls of dilute hydrochloric acid.	No ppt. formed.	Group I absent. (Pb^{2+} absent)
14. Through a part of the above solution, passed H2S gas.	No ppt. formed.	Group II absent (Pb^{2+}, Cu^{2+}, As^{3+}, absent)
15. To the remaining solution, added a pinch of solid ammonium chloride. Boiled the solution, cooled it and added excess of am- monium hydroxide solution.		Group III absent. (Fe^{3+}, Al^{3+} absent)

Experiment	Observations	Inference
16. Through a part of this so-lution, passed H_2S gas.	No ppt. formed.	Group IV absent. (Zn^{2+}, Mn^{2+}, Ni^{2+}, Co^{2+}, absent)
17. To the remaining ammonical solution added am- monium carbonate solution.	White ppt. formed.	Group V present. (Ca^{2+}, Ba^{2+}, Sr^{2+} may bepresent)
18. **Confirmatory test forBarium**		
Filtered the above white ppt. Dissolved the ppt. in hot dilute acetic acid.	Yellow ppt.	Ba^{2+} confirmed.
(a) Pot. chromate test. To one part of the above solution, added a few drops of pot. chromate solution.	Persistent grassy green flameon prolonged heating.	Ba^{2+} confirmed.
(b) Flame test. Performed flametest with the salt.		

Result. Acid radical: NO_3^-

Basic radical: Ba^{2+}.

Experiment- 5

To analyse the given salt for acidic and basic radicals.

Experiment	Observations	Inference
1. Physical examination (a) Noted the colour of thegiven salt.	White	Cu^{2+}, Fe^{3+}, Ni^{2+}, Mn^{2+}, Co^{2+} absent.
(b) Noted the smell of the salt.	No specific odour	NH_4^+, S^{2-} and CH_3COO^- may be absent.
2. Dry heating test Heated a pinch of the salt in a dry test tube and noted the following : (a) Gas evolved	A colourless, odourless gas evolved which turned lime wa-ter milky. No sublimate formed.	CO_3^{2-} may be present.
(b) Sublimation	No crackling sound observed.	
(c) Decrepitation		Ammonium halides, iodidemaybe absent.
(d) Colour of the residue	Yellow when hot and white when cold.	Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodidemay be absent.
3. Flame test Prepared a paste of the salt in conc. HCl and performed flame test.	Green flashes seen with naked eye.	Zn^{2+} may be present.
4. Borax bead test Did not perform this test since the given salt was white.	—	Zn^{2+} may be present.
5. Dil. Sulphuric acid test Treated a pinch of the salt with dil. H_2SO_4 and warmed.	Colourless, odourless gas evolved with brisk efferves- cence, turnedlime water milky. Salt did not dissolve.	Cu^{2+}, Ni^{2+}, Fe^{2+}, Fe^{3+}, Mn^{2+}, Co^{2+} may be absent. CO_3^{2-} present
Shook a pinch of salt with water taken in test tube. **6. KMnO4 test** To a pinch of the salt added dilute H_2SO_4 warm and then adrop of KMnO4 solution.	Pink colour of KMnO4 was not discharged.	Insoluble CO_3^{2-} indicated.
7. Conc. Sulphuric acid test Did not perform this test because the salt reacted with dil. H_2SO_4.	—	Cl^-, Br^-, I^-, Fe^{2+}, $C_2O_4^{2-}$ are absent.
8. Confirmatory tests **forcarbonate**	Salt did not dissolve. Brisk effervescence with evolu- tion of colourless, odourless gas which turned lime water milky.	Cl^-, Br^-, I^-, NO_3^-, $CHCOO^-$, $C_2O_4^{2-}$ are absent. CO_3^{2-}

(a) Shook a pinch of the saltwith water. (b) To the salt added dil. HCl. 11. **Heated a pinch of saltwith conc. NaOH solution**	No ammonia gas evolved.	Insoluble carbonate indi-cated. Insoluble carbonate con-firmed. $NH4^+$ absent.

Experiment	Observations	Inference
12. **Preparation of Originalsolution (O.S.)**		
(a) Shook a pinch of the saltwith water.	Insoluble	Labelled it as O.S.
(b) Shook a pinch of the saltin dil. HCl.	Clear solution obtained.	
13. As the O.S. is prepared indil. HCl.		Group I absent.(Pb^{2+} absent)
14. Through a part of O.S.passed H_2S gas.	No ppt. formed.	Group II absent (Pb^{2+}, Hg^{2+}, Cu^{2+}, As^{3+} absent).
15. To the remaining solution, added a pinch of solid ammonium chloride. Boiled the solution, cooled it and added excess of ammonium hydroxide solution.	No ppt. formed	Group III absent. (Fe^{3+}, Al^{3+} absent).
16. Through a part of thissolution, passed H_2S gas.	Dull white ppt. formed.	Group IV present.(Zn^{2+} present)
17. **Confirmatory tests forZn^{2+} ion**		
Dissolved the above dull whiteppt. in dil HCl. Boiled off H_2S.		
Divided the solution into twoparts.		
(a) To one part added NaOHsolution dropwise.	White ppt. soluble in excess ofNaOH.	Zn^{2+} confirmed.
(b) To another part, added potassium ferrocyanide solution.	Bluish white ppt.	Zn^{2+} confirmed.

Result. Acid Radical : CO_3^{2-}

Basic Radical : Zn^{2+}.

EXPERIMENT-6

Aim:To analyse the given salt for acidic and basic radicals.

Experiment	Observations	Inference
1. **Physical examination :** (c) Noted the colour of thegivensalt. (d) Noted the smell of the salt.	White No specific odour	Cu^{2+}, Fe^{2+}, Fe^{3+}, Ni^{2+}, Mn^{2+} Co^{2+} absent. NH_4^+, S^{2-} and CH_3COO^- may be absent.
2. **Dry heating test** Heated a pinch of the salt in a dry test tube and noted the following observations : (f) Gas evolved	A reddish brown gas evolved which turned freshly prepared FeSO4 solution black.	NO_3^- may be present.
(g) Sublimation	No sublimate formed.	Ammonium halides, aluminium chloride, iodide maybeabsent.
(h) Decrepitation	No crackling sound observed.	Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent.
(i) Fusion	Salt does not	Alkali (sodium, potassium) salts may be absent.
(j) Colour of the residue	fuse. White	Zn^{2+}, Pb^{2+} may be absent.

Experiment	Observations	Inference
11. Flame test Prepared a paste of the salt in conc. HCl and performed flame test.	Persistent grassy green flameon prolonged heating.	Ba^{2+} present.
12. Borax bead test Did not perform this test since the given salt was white.	—	Cu^{2+}, Ni^{2+}, Fe^{3+}, Mn^{2+}, Co^{2+} may be absent.
13. Dil. sulphuric acid test Treated a pinch of the saltwith dil. H_2SO_4 and warmed.	No gas evolved.	CO^{2-}, S^{2-}, NO_2^-, SO_3^{2-} may be absent.
14. KMnO4 test To a pinch of the salt added dil. H_2SO_4 warm and then a drop of KMnO4 solution.	Pink colour of KMnO4 was not discharged.	Cl^-, Br^-, I^-, $C_2O_4^{2-}$, Fe^{2+} may be absent.
15. Conc. sulphuric acid test Heated a pinch of the salt with conc. sulphuric acid and added to it a paper pellet.	A reddish brown gas evolved which turned FeSO4 solution black. Reddish brown gas evolved.	NO_3^- may be present.
16. Confirmatory test for nitrate (c) Copper chips test. Heated a pinch of the salt with conc. sulphuric acid and a few copper chips.	A dark brown ring formed at the junction of the two liquids.	NO_3^- confirmed.
(d) Ring test. To 2–3 ml of the salt solution, added freshly pre- pared FeSO4 solution. Now added conc. sulphuric acid along the sides of the test tube.	No ammonia gasevolved.	NO_3^- confirmed.
16. Heated a pinch of salt with conc. NaOH solution	Solution	NH_4^+ absent.
17. Preparation of OriginalSolution (O.S.) Shook a pinch of the salt with water.	obtainedppt. formed.	Labelled it as Original Solution (O.S.)
18. Confirmatory test forBarium 1Add KI in original Solution 2.Add K_2CrO_4 in original solution	Yellow ppt formed Yellow ppt formed	Group I absent. (Pb^{2+} present) Pb2+ conformed

Result. Acid radical: NO_3^-

Basic radical: Pb^{2+}.

Experiment- 7

To analyse the given salt for acidic and basic radicals.

Experiment	Observations	Inference
1. Physical examination (a) Noted the colour of thegiven salt.	White	Cu^{2+}, Fe^{3+}, Ni^{2+}, Mn^{2+}, Co^{2+} absent.
(b) Noted the smell of the salt.	No specific odour	NH_4^+, S^{2-} and CH_3COO^- may be absent.
2. Dry heating test Heated a pinch of the salt in a dry test tube and noted the following : (a) Gas evolved	A colourless, odourless gas evolved No sublimate formed.	Cl^- may be present.
(b) Sublimation	No crackling sound observed.	Ammonium halides, iodidemaybe absent.
(c) Decrepitation		Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodidemay be absent.
(d) Colour of the residue	Yellow when hot and white when cold.	Zn^{2+} may bepresent.
3. Flame test Prepared a paste of the salt in conc. HCl and performed flame test.	White Flame observed withnakedeye.	Pb^{2+} may be present.
4. Borax bead test Did not perform this test since the given salt was white.	—	
5. Dil. Sulphuric acid test Treated a pinch of the salt with dil. H_2SO_4 and warmed.	Colourless, odourless gas evolved	Cu^{2+}, Ni^{2+}, Fe^{2+}, Fe^{3+}, Mn^{2+}, Co^{2+} may be absent. Cl^-
6. Conc. Sulphuric acid test Did not perform this test because the salt reacted with dil. H_2SO_4.	—	present
7. Confirmatory tests forcarbonate **8. Silver nitrate test** Acidify a portion of	A **white ppt.** is formed which is soluble in ammonium hydroxide.	Cl^-, Br^-, I^-, NO^-, $CHCOO^-$, $C_2O_4^{2-}$ are absent.

aqueous solution (orsodium carbonate extract) with dil. HNO_3. Boil forsome time, cool and addsilver nitratesolution. **9. Manganese dioxide test** Heat a pinch of the salt with a small quantity of manganese dioxide and	Evolution of **greenish yellow gas** having a pungent irritating smell. It turns moist starch-	Cl^- is Conformed Cl^- is Conformed

conc. H_2SO_4.	iodide paper blue.	
10. Heated a pinch ofsaltwith conc. NaOH solution	No ammonia gas evolved.	$NH4^+$ absent

Experiment	Observations	Inference
12. **Preparation of Originalsolution (O.S.)**		
(a) Shook a pinch of the saltwith water.	Insoluble	Labelled it as O.S.
(b) Shook a pinch of the saltin dil. HCl.	Clear solution obtained.	
13. As the O.S. is prepared indil. HCl.	ppt. formed.	Group I present.(Pb^{2+} present)
17. **Confirmatory tests forPb^{2+} ion**		
Add KI in original Solution	Yellow ppt formed	$Pb2+$ conformed

Result. Acid Radical : Cl^-

Basic Radical : Pb^{2+}.

Experiment- 8

Aim To analyses the given salt for one anion and one cation present in it.

Sl. No.	Experiment	Observation	Inference
1.	Noted the colour of the salt.	White	Cu^{2+}, Fe^{2+}, Ni^{2+}, Co^{2+}, Mn^{2+} are absent.
2.	Noted the smell of the salt.	No specific smell.	S^{2-}, SO_3^{2-}, CH_3COO^- may be absent.
3.	Heated 0.5 g of the salt in a dry test tube and noted the colour of the gas evolved and change in the colour of the residue on heating and cooling.	(i) No gas was evolved. (ii) No particular change in colour of the residue is observed when heated and when cooled.	(i) CO_3^{2-} may be present, NO_2^-, NO_3^-, Br^- may be absent. (ii) Zn^{2+} may be absent.
4.	Prepared a paste of the salt with conc. HCl and performed the flame test.	No distinct colour of the flame seen.	Ca^{2+}, Sr^{2+}, Ba^{2+}, Cu^{2+} may be absent.
5.	Borax bead test was not performed as the salt was white in colour.	—	—
6.	Treated 0.1 g of salt with 1mL dil. H_2SO_4 and warmed.	No effervescence and evolution of vapours.	CO_3^{2-}, SO_3^{2-}, S^{2-}, NO_2^-, CH_3COO^- absent.
7.	Heated 0.1 g of salt with 1mL conc. H_2SO_4.	No gas evolved.	Cl^-, Br^-, I^-, NO_3^-, CH_3COO^- are absent.
8.	Acidified 1mL of aqueous salt solution with conc. HNO_3. Warmed the contents	No yellow precipitate	PO_4^{3-} absent.

9.	Acidified water extract of the salt with dil. HCl and then added 2mL of $BaCl_2$ solution.	A white ppt. is obtainedwhich is insoluble in conc. $HNO_3$and conc. HCl.	SO_4^{2-} present.
10.	Heated 0.1 g of salt with 2mLNaOH solution.	Ammonia gas is notevolved.	NH_4 absent.
11.	Attempted to prepare original solution of the salt by dissolving 1g of it in 20 mL water.	Clear solution formed	Water soluble salt ispresent.
12.	To a small part of the above salt solution added 2 mL of dil. HCl.	No white precipitate formed.	Group–I absent.
13.	Passed H_2S gas through one portion of the solution of step 12.	No precipitate formed.	Group–II absent.
14.	Since salt is white, heating with conc. HNO_3 is not required. Added about 0.2 gof solid ammonium chlorideand then added excess of ammonium hydroxide to thesolution of step 12.	No precipitate formed.	Group–III absent.
15.	Passed H_2S gas through theabove solution.	No precipitate formed.	Group–IV absent.
16.	Added excess of ammonium hydroxide solution to the original solution and then added 0.5 g of ammonium carbonate.	No precipitate formed.	Group–V absent.
17.	To the original solution of salt added ammonium hydroxide solution, followed by disodium hydrogen phosphate solution. Heated and scratched the sides of the test tu.	White precipitate.	Mg^{2+} confirmed.

Result

The given salt contains:

Result. Acid Radical : SO_4^{2-}

Basic Radical : Mg^{2+}.

Experiment- 9

Aim To analyses the given salt for one anion and one cation present in it.

Sl. No.	Experiment	Observation	Inference
1.	Noted the colour of the salt.	White	Cu^{2+}, Fe^{2+}, Ni^{2+}, Co^{2+}, Mn^{2+} are absent.
2.	Noted the smell of the salt.	No specific smell.	S^{2-}, SO_3^{2-}, CH_3COO^- may be absent.
3.	Heated 0.5 g of the salt in a dry test tube and noted the colour of the gas evolved and change in the colour of the residue on heating and cooling.	(i) No gas was evolved. (ii) No particular change in colour of the residue is observed when heated and when cooled.	(iii) CO_3^{2-} may be present, NO_3^-, NO_2^-, Br^- may be absent. (iv) Zn^{2+} may be absent.
4.	Prepared a paste of the salt with conc. HCl and performed the flame test.	Green colour of the flame seen.	Ba^{2+} may be present.
5.	Borax bead test was not performed as the salt was white in colour.	—	—
6.	Treated 0.1 g of salt with 1mL dil. H_2SO_4 and warmed.	No effervescence and evolution of vapours.	CO_3^{2-}, SO_3^{2-}, S^{2-}, NO_2^-, CH_3COO^- absent.
7.	Heated 0.1 g of salt with 1mL conc. H_2SO_4.	No gas evolved.	Cl^-, Br^-, I^-, NO_3^-, $C_2O_4^{2-}$ are absent.
8.	Acidified 1mL of aqueous salt solution with conc. HNO_3. Warmed the contents	No yellow precipitate	PO_4^{3-} absent.

9.	Acidified water extract of the salt with dil. HCl and then added 2mL of $BaCl_2$ solution.	A white ppt. is obtainedwhich is insoluble in conc. HNO_3 and conc. HCl.	SO_4^{2-} present.
10.	Heated 0.1 g of salt with 2 mLNaOH solution.	Ammonia gas is notevolved.	NH_4 absent.
11.	Attempted to prepare original solution of the salt by dissolving 1g of it in 20 mLwater.	Clear solution formed	Water soluble salt ispresent.
12.	To a small part of the above salt solution added 2 mL ofdil. HCl.	No white precipitate formed.	Group–I absent.
13.	Passed H_2S gas through one portion of the solution of step 12.	No precipitate formed.	Group–II absent.
14.	Since salt is white, heating with conc. HNO_3 is not required. Added about 0.2 gof solid ammonium chloride and then added excess of ammonium hydroxide to the solution of step 12.	No precipitate formed.	Group–III absent.
15.	Passed H_2S gas through theabove solution.	No precipitate formed.	Group–IV absent.
16.	Added excess of ammonium hydroxide solution to the original solution and then added 0.5 g of ammonium carbonate.	No precipitate formed.	Group–V present.
17.	**Confirmatory test forBarium**		
	(a) Pot. chromate test. To one part of the above solution, added a few drops of pot. chromate solution.	Yellow ppt.	Ba^{2+} conformed
	(b) Flame test. Performed flametest with the salt.	Persistent grassy green flameon prolonged heating.	Ba^{2+} conformed

Result

The given salt contains:

Acid Radical : SO_4^{2-} Basic Radical

: Ba^{2+}.

EXPERIMENT-10

Aim: To analyse the given salt for acidic and basic radicals.

Experiment	Observations	Inference
1. **Physical examination :** (e) Noted the colour of thegivensalt. (f) Noted the smell of the salt.	White No specific odour	Cu^{2+}, Fe^{2+}, Fe^{3+}, Ni^{2+}, Mn^{2+} Co^{2+} absent. NH_4^+, S^{2-} and CH_3COO^- may be absent.
2. **Dry heating test** Heated a pinch of the salt in a dry test tube and noted the fol- lowing observations : (k) Gas evolved	A reddish brown gas evolved which turned freshly prepared FeSO4 solution black.	NO_3^- may be present.
(l) Sublimation	No sublimate formed.	Ammonium halides, aluminium chloride, iodide maybeabsent.
(m) Decrepitation	No crackling sound observed.	Lead nitrate, barium nitrate, sodium chloride, potassium chloride and potassium iodide may be absent.
(n) Fusion	Salt does not	Alkali (sodium, potassium) salts may be absent.
(o) Colour of the residue	fuse. White	Zn^{2+}, Pb^{2+} may be absent.

Experiment	Observations	Inference
17. Flame test Prepared a paste of the salt in conc. HCl and performed flame test.	Red flame on prolonged heating.	Sr^{2+} present.
18. Borax bead test Did not perform this test since the given salt was white.	—	Cu^{2+}, Ni^{2+}, Fe^{3+}, Mn^{2+}, Co^{2+} may be absent.
19. Dil. sulphuric acid test Treated a pinch of the saltwith dil. H_2SO_4 and warmed.	No gas evolved.	CO^{2-}, S^{2-}, NO_2^-, SO_3^{2-} may be absent.
20. KMnO4 test To a pinch of the salt added dil. H_2SO_4 warm and then a drop of KMnO4 solution.	Pink colour of KMnO4 was not discharged.	Cl^-, Br^-, I^-, CO_3^{2-}, Fe^{2+} may be absent.
21. Conc. sulphuric acid test Heated a pinch of the salt with conc. sulphuric acid and added to it a paper pellet.	A reddish brown gas evolved which turned FeSO4 solution black. Reddish brown gas evolved.	NO_3^- may be present.
22. Confirmatory test for nitrate (e) Copper chips test. Heated a pinch of the salt with conc. sulphuric acid and a few copper chips.	A dark brown ring formed at the junction of the two liquids.	NO_3^- confirmed.
(f) Ring test. To 2–3 ml of the salt solution, added freshly pre- pared FeSO4 solution. Now added conc. sulphuric acid along the sides of the test tube.	No ammonia gasevolved.	NO_3^- confirmed.
18. Heated a pinch of salt with conc. NaOH solution	Solution	
19. Preparation of OriginalSolution (O.S.) Shook a pinch of the salt with water.	obtainedNo ppt. formed.	NH_4^+ absent. Labelled it as Original Solution (O.S.)
20. To a part of the O.S. added 1–2 mls of dilute hydrochloric acid.	No ppt. formed.	Group I absent. (Pb^{2+} absent)
21. Through a part of the above solution, passed H2S gas.	No ppt. formed.	Group II absent (Pb^{2+}, Cu^{2+}, As^{3+}, absent)
22. To the remaining solution, added a pinch of solid ammonium chloride. Boiled the solution, cooled it and added excess of am- monium hydroxide solution.		Group III absent. (Fe^{3+}, Al^{3+} absent)

Experiment	Observations	Inference
16. Through a part of this so-lution, passed H_2S gas.	No ppt. formed.	Group IV absent. (Zn^{2+}, Mn^{2+}, Ni^{2+}, Co^{2+}, absent)
17. To the remaining ammonical solution added am- monium carbonate solution.	White ppt. formed.	Group V present. (Ca^{2+}, Ba^{2+}, Sr^{2+} may bepresent)
18. **Confirmatory test for**		
1. Amm. sulphate test To the second part of the solu- tion, add 1 ml of amm. sulphate solution and warm.	**White ppt.**	Sr^{2+} confirmed.
2. Flame test Perform the flame test with theoriginal salt.	**Crimson red flame.**	Sr^{2+} confirmed.

Result. Acid radical: NO_3^-

Basic radical: Sr^{2+}.

EXPERIMENT- 11A

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

Experiment	Observations	Inference
1. **Test for unsaturation** Dissolved 0.2 ml of organic com- pound in2 ml $CCl_4$4. Then added bromine-water dropwise.	Brown colour of bromine notdischarged.	No unsaturation is present.
2. **Test for carboxylic group** Added a pinch of $NaHCO_3$ to 0.2 ml oforganic compound in a test tube.	No effervescence.	Carboxylic group is
3. Test for phenolic group Added 0.2 ml of organic compound to 2–3 ml neutral $FeCl_3$ solutionin a test tube.	No green or violet colourobtained.	absent.Phenolic group is absent. Alcoholic
4. **Test for alcoholic group** Added a small piece of sodium to 1ml of the given liquid in a dry test tube.	No effervescence.	group is absent.
5. Test for carbonyl group Shook 0.2 ml of organic compound with 2–3 ml of 2, 3-dinitrophenylhydrazine in a test tube.	Orange-yellow ppt. formed.	Carbonyl group is present. Maybe an aldehyde or a ketone.
6. **Test for aldehydic group** Warmed 1 ml of organic compoundwith 1 ml of Tollen's reagent in a test tube over a water bath.	Silver mirror formed on innerside of the test tube.	Aldehyde is present.
7. Test for amine group To a small amount of organic liq- uid in test tube, added 1 ml conc. of HCl and a few drops of $CHCl_3$. Then, added 2 ml of alc. KOH so- lution and warmed test tube.	No offensive smelling gasevolved.	Amino group absent.

RESULT : - Aldehyde group (—CHO).

EXPERIMENT - 11B

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

Experiment	Observations	Inference
1. Test for unsaturation Dissolved 0.2 ml of organic com- pound in 2ml CCl_4. Then added bromine-water dropwise.	Brown colour of bromine notdischarged.	No unsaturation is present.
2. Test for carboxylic group Added a pinch of $NaHCO_3$ to 0.2 ml of organic compound in a test tube.	No effervescence.	Carboxylic group is absent.Phenolic group is absent. Alcoholic group is absent.
3. Test for phenolic group Added 0.2 ml of organic compound to 2–3 ml neutral $FeCl_3$ solution in a test tube.	No green or violet colourobtained.	
4. Test for alcoholic group Added a small piece of sodium to 1 ml ofthe given liquid in a dry test tube.	No effervescence.	
5. Test for carbonyl group Shook 0.2 ml of organic compound with 2–3 ml of 2, 3-dinitrophenylhydrazine in a test tube.	Orange-yellow ppt. formed.	Carbonyl group is present. May be an aldehyde or aketone.
6. Test for aldehydic group Warmed 1 ml of organic compound with 1ml of Tollen's reagent in a test tube over a water bath.	Silver mirror formed on innerside of the test tube.	Aldehyde is present.
7. Test for amine group To a small amount of organic liq- uid in test tube, added 1 ml conc. of HCl and a few drops of $CHCl_3$. Then, added 2 ml of alc. KOH so- lution and warmed test tube.	No offensive smelling gasevolved.	Amino group absent.
8. TESTS FOR KETONES Place 0.5 ml of the given liquid (or 0.5 g of solid) in a clean testtube and add about 0.1 g of finely powdered m-dinitrobenzene. Now add about 1 ml of dilute sodium hydroxide solution and shake.	**Appearance of violet colour which slowly fades**	**confirms ketonic group.**

RESULT : - Ketone (-CO-)

EXPERIMENT-11 C

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

Experiment	Observations	Inference
4. **Test for unsaturation** Dissolved 0.2 ml of organic com- pound in 2ml CCl_4. Then added bromine-water dropwise.	Brown colour of brominenot discharged.	No unsaturation is present.
5. **Test for carboxylic group** Added a pinch of $NaHCO_3$ to 0.2 ml of organic compound in a test tube.	No effervescence.	Carboxylic group is
6. Test for phenolic group Added 0.2 ml of organic compound to 2–3 ml neutral $FeCl_3$ solution in a test tube.	No green or violet colourobtained.	absent.Phenolic group is absent. Alcoholic
6. **Test for alcoholic group** Added a small piece of sodium to 1ml of the given liquid in a dry test tube.	Brisk effervescence.	group is present.
7. Test for carbonyl group Shook 0.2 ml of organic compound with 2–3 ml of 2, 3-dinitrophenylhydrazine in a test tube.	Orange-yellow ppt. formed.No	Carbonyl group is present. Maybe an aldehyde or a ketone.
8. **Test for aldehydic group** Warmed 1 ml of organic compoundwith 1 ml of Tollen's reagent in a test tube over a water bath.	observation	Aldehyde is absent.
9. Test for amine group To a small amount of organic liq- uid in test tube, added 1 ml conc. of HCl and a few drops of $CHCl_3$. Then, added 2 ml of alc. KOH so- lution and warmed test tube.	No offensive smelling gasevolved.	Amino group absent.

RESULT : - Alcohol (-OH)

EXPERIMENT-11 D

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

Experiment	Observations	Inference
1. **Test for unsaturation** Dissolved 0.2 ml of organic com- pound in 2ml CCl_4. Then added bromine-water dropwise.	Brown color of brominenot discharged.	No unsaturation is present.
2. **Test for carboxylic group** Added a pinch of $NaHCO_3$ to 0.2 ml of organic compound in a test tube.	Brisk effervescence.	Carboxylic group is present.Phenolic group is absent.
3. **Test for phenolic group** Added 0.2 ml of organic compound to 2–3 ml neutral $FeCl_3$ solutionin a test tube.	No green or violet colourobtained.	Alcoholic group is absent.
4. **Test for alcoholic group** Added a small piece of sodium to 1 ml ofthe given liquid in a dry test tube.	No effervescence.	Carbonyl group is present. Maybe an aldehyde or a ketone.
5. **Test for carbonyl group** Shook 0.2 ml of organic compound with 2–3 ml of 2, 3-dinitrophenylhydrazine in a test tube.	Orange-yellow ppt. formed.No observation	Aldehyde is absent.
6. **Test for aldehydic group** Warmed 1 ml of organic compound with 1ml of Tollen's reagent in a test tube over a water bath.		
7. **Test for amine group** To a small amount of organic liquid in test tube, added 1 ml conc. of HCl and a few drops of $CHCl_3$. Then, added 2 ml of alc. KOH solution and warmed test tube.	No offensive smelling gasevolved.	Amino group absent.

RESULT : - Carboxylic acid (-COOH)

EXPERIMENT-11 E

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

Experiment	Observations	Inference
1. **Test for unsaturation** Dissolved 0.2 ml of organic compound in 2 ml CCl_4. Then added bromine-water dropwise.	Brown color of brominenot discharged.	No unsaturation is present.
2. **Test for carboxylic group** Added a pinch of $NaHCO_3$ to 0.2 ml of organic compound in a test tube.	No observation	Carboxylic group absent
3. **Test for phenolic group** Added 0.2 ml of organic compound to 2–3 ml neutral $FeCl_3$ solution in a test tube.	green or violet colourobtained.	Phenolic group is present Alcoholic
4. **Test for alcoholic group** Added a small piece of sodium to 1 ml ofthe given liquid in a dry test tube.	No effervescence.	group is absent.
5. **Test for carbonyl group** Shook 0.2 ml of organic compound with 2–3 ml of 2, 3-dinitrophenylhydrazine in a test tube.	Orange-yellow ppt. formed.No	Carbonyl group is present. Maybe an aldehyde or a ketone.
6. **Test for aldehydic group** Warmed 1 ml of organic compound with 1ml of Tollen's reagent in a test tube over a water bath.	observation	Aldehyde is absent.
7. **Test for amine group** To a small amount of organic liquid in test tube, added 1 ml conc. of HCl and a few drops of $CHCl_3$. Then, added 2 ml of alc. KOH solution and warmed test tube.	No offensive smelling gasevolved.	Amino group absent.

RESULT : - Phenol(-OH)

EXPERIMENT-11 F

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

Experiment	Observations	Inference
1. **Test for unsaturation** Dissolved 0.2 ml of organic compound in 2 ml CCl_4. Then added bromine-water dropwise.	Brown color of brominenot discharged.	No unsaturation is present.
2. **Test for carboxylic group** Added a pinch of $NaHCO_3$ to 0.2 ml of organic compound in a test tube.	No observation	Carboxylic group absent
3. **Test for phenolic group** Added 0.2 ml of organic compound to 2–3 ml neutral $FeCl_3$ solution in a test tube.	No green or violet colourobtained.	Phenolic group is absent Alcoholic
4. **Test for alcoholic group** Added a small piece of sodium to 1 ml ofthe given liquid in a dry test tube.	No effervescence.	group is absent.
5. **Test for carbonyl group** Shook 0.2 ml of organic compound with 2–3 ml of 2, 3-dinitrophenylhydrazine in a test tube.	Orange-yellow ppt. formed.	Carbonyl group is absent. May bean aldehyde or a ketone.
6. **Test for aldehydic group** Warmed 1 ml of organic compound with 1 ml of Tollen's reagent in a test tube over a water bath.	No observation	Aldehyde is absent.
7. **Test for amine group** To a small amount of organic liquid in test tube, added 1 ml conc. of HCl and a few drops of $CHCl_3$. Then, added 2 ml of alc. KOH solution and warmed test tube.	offensive smelling gasevolved.	Amino group present.

RESULT : - Amine($-NH_2$)

EXPERIMENT-12

Aim:

Preparation of pure sample of Ferrous ammonium sulphate (Mohr's salt) [$FeSO_4.(NH_4)_2SO_4.6H_2O$]

Materials Required

- Ferrous sulphate
- Ammonium sulphate
- Dil. Sulphuric acid
- Ethyl alcohol
- Distilled water
- Beakers
- China dish
- Funnel
- Glass rod
- Tripod stand
- Wire gauze
- Burner
- Wash bottle
- Measuring jar
- Electronic balance

Procedure

1. We'll first take 7g ferrous sulphate 3.5g ammonium sulphate in a clean 250ml beaker.
2. To this add about 2-3ml of dil.sulphuric acid to prevent the hydrolysis of ferrous sulphate.
3. In another beaker, boil about 20ml of water for 5 minutes.
4. Add the boiling hot water to the contents in the first beaker in small quantities at a time.
5. Stir the contents of the beaker with a glass rod until the salts have completely dissolved.
6. Filter the solution into a china dish.
7. Now heat the solution in the china dish until its crystallization point is reached. Then transferthe solution into a crystallising dish and keep it undisturbed.
8. On cooling, crystals of Mohr's salt separate.
9. Decant the mother liquor and wash the crystals with a small quantity of alcohol and then dry thecrystals by placing them between filter paper pads.
10. Find the weight of the crystals.

Observations

1. Weight of the crystals obtained =3.5 g
2. Colour of the crystals = light green
3. Shape of the crystals = octahedral