

A PRACTICAL FILE ON

Chemistry Practical File

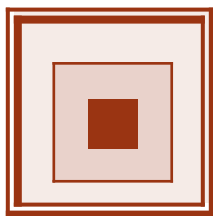
Class XII · CBSE practical record

Submitted in partial fulfilment of the practical examination requirements

CLASS XII (CBSE)

in

Class XII – B



SUBMITTED BY

Ananya Gupta

Roll No. 12B14

CLASS

Class XII – B

Department of Chemistry

GREENFIELD SENIOR SECONDARY SCHOOL, LUCKNOW

Session 2025–26

CERTIFICATE

This is to certify that Ananya Gupta, a student of Class XII – B, has satisfactorily completed the practical work in Chemistry prescribed by the Central Board of Secondary Education (CBSE) during the academic session 2025–26.

The experiments recorded in this file were performed by the student in the laboratory under my supervision, and the observations and results are the student's own.

Mrs. Sunita Verma
Subject Teacher

External Examiner
Date: _____

Mr. R. P. Singh
Principal

Acknowledgement

I would like to express my sincere gratitude to my subject teacher, Mrs. Sunita Verma, for guidance and encouragement throughout the practical sessions, and for patiently clearing my doubts in the laboratory.

I am also thankful to Mr. R. P. Singh, Principal, for providing a well-equipped laboratory, and to the laboratory staff for their help in arranging the apparatus for every experiment.

Finally, I thank my parents and classmates for their constant support while I completed this practical file.

Ananya Gupta

Index

S. No.	Name of the Experiment	Date	Remarks	Teacher's Sign
1	Titration of KMnO_4 against oxalic acid	08 Jul 2025		
2	Qualitative analysis of a simple salt	22 Jul 2025		
3	Preparation of a lyophilic sol	05 Aug 2025		
4	Paper chromatography of plant pigments	19 Aug 2025		
5	Effect of concentration on reaction rate	02 Sep 2025		

Write the page number of each experiment in the remarks column once the file is complete.

Laboratory Safety Rules

- Wear a lab coat and closed shoes
- Never taste or smell chemicals directly
- Report any breakage or spill to the teacher at once
- Switch off and unplug equipment after use
- Wash hands before leaving the laboratory

Experiment 1: Titration of KMnO_4 against oxalic acid

Date: 08 Jul 2025

Page No.: _____

Teacher's sign: _____

Aim

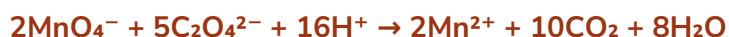
To prepare M/50 oxalic acid solution and use it to determine the molarity and strength of the given potassium permanganate solution.

Apparatus / Materials Required

- Burette, pipette (10 mL), conical flask
- Measuring flask (250 mL), funnel, weighing bottle
- Oxalic acid crystals, dilute H_2SO_4
- KMnO_4 solution, burner and wire gauze

Theory

Potassium permanganate is a strong oxidising agent in acidic medium. It oxidises oxalic acid to carbon dioxide and is itself reduced to colourless Mn^{2+} ions. KMnO_4 acts as a self-indicator: the end point is the appearance of a permanent light pink colour.



$$a_1M_1V_1 = a_2M_2V_2$$

Procedure

1. Weigh 0.63 g of oxalic acid and dissolve it to make 250 mL of M/50 solution.
2. Rinse and fill the burette with KMnO_4 solution and note the initial reading.
3. Pipette 10 mL of oxalic acid into a conical flask and add 10 mL of dilute H_2SO_4 .
4. Warm the flask to 60–70 °C and titrate until a permanent light pink colour appears.
5. Repeat until three concordant readings are obtained.

Observations

S. No.	Initial reading (mL)	Final reading (mL)	Volume of KMnO_4 (mL)
1	0.0	10.1	10.1
2	10.1	20.0	9.9
3	20.0	29.9	9.9

S. No.	Initial reading (mL)	Final reading (mL)	Volume of KMnO_4 (mL)
4	0.0	9.9	9.9

Observation table (sample readings — replace with your own)

Calculations

Concordant volume = 9.9 mL.

Using $2 \times M_1 \times 9.9 = 5 \times (1/50) \times 10$, $M_1 = 0.0081 \text{ M}$.

Strength = molarity $\times$ 158 = 1.28 g/L (sample).

Result

Result

Molarity of the given KMnO_4 solution = 0.0081 M; strength = 1.28 g/L (sample result).

Precautions

- Read the upper meniscus for KMnO_4 because it is dark coloured.
- Heat the oxalic acid solution before titrating, but do not boil it.
- Add KMnO_4 drop by drop near the end point.

Experiment 2: Qualitative analysis of a simple salt

Date: 22 Jul 2025

Page No.: _____

Teacher's sign: _____

Aim

To identify one cation and one anion present in the given salt.

Apparatus / Materials Required

- Test tubes, test-tube stand and holder
- Burner, spatula and glass rod
- Reagents: dil. HCl, conc. H₂SO₄, NaOH, NH₄OH, BaCl₂, etc.

Theory

Systematic qualitative analysis first identifies the anion through preliminary tests with dilute and concentrated acids, and then the cation by group separation using group reagents.

Procedure

6. Note the colour, smell and solubility of the salt.
7. Add dilute H₂SO₄ to the salt and observe any gas evolved.
8. Perform the confirmatory test for the anion indicated.
9. Prepare the original solution and add group reagents in order.
10. Perform the confirmatory test for the cation indicated.

Observations

Experiment	Observation	Inference
Salt + dil. H ₂ SO ₄	No gas evolved	CO ₃ ²⁻ , S ²⁻ , SO ₃ ²⁻ absent
Salt + conc. H ₂ SO ₄ , heat	Colourless pungent gas, white fumes with NH ₃	Cl ⁻ may be present
Salt solution + AgNO ₃	Curdy white precipitate soluble in NH ₄ OH	Cl ⁻ confirmed
Salt + NaOH, heat	Gas with ammonia smell	NH ₄ ⁺ may be present
Gas + Nessler's reagent	Brown precipitate	NH ₄ ⁺ confirmed

Observation table (sample readings — replace with your own)

Result

Result

The given salt contains NH_4^+ (cation) and Cl^- (anion); the salt is ammonium chloride (sample result).

Precautions

- Use small quantities of salt and reagents.
- Never smell gases directly; waft them towards your nose.
- Add reagents in the correct group order.

Experiment 3: Preparation of a lyophilic sol

Date: 05 Aug 2025

Page No.: _____

Teacher's sign: _____

Aim

To prepare a colloidal solution of starch (lyophilic sol).

Apparatus / Materials Required

- Beakers (250 mL), glass rod, tripod stand
- Burner, wire gauze, funnel and filter paper
- Soluble starch and distilled water

Theory

Lyophilic sols are colloids in which the dispersed phase has a strong affinity for the dispersion medium. They are prepared simply by warming the substance with the medium, and they are stable and reversible.

Procedure

11. Make a thin paste of 0.5 g of starch in a few mL of water.
12. Heat 100 mL of distilled water in a beaker until it boils.
13. Pour the paste into the boiling water with constant stirring.
14. Boil for about ten minutes and allow it to cool.
15. Filter the sol and store it in a labelled bottle.

Result

Result

A colloidal solution of starch (lyophilic sol) was prepared. It is translucent and shows the Tyndall effect.

Precautions

- Stir continuously while adding the paste.
- Use clean apparatus and distilled water.
- Do not boil for too long.

Experiment 4: Paper chromatography of plant pigments

Date: 19 Aug 2025

Page No.: _____

Teacher's sign: _____

Aim

To separate the pigments present in the extract of spinach leaves by paper chromatography and find their R_f values.

Apparatus / Materials Required

- Whatman filter paper strip, chromatography jar with lid
- Fresh spinach leaves, mortar and pestle
- Acetone, petroleum ether, capillary tube

Theory

Chromatography separates the components of a mixture based on their different affinity for a stationary phase (paper) and a mobile phase (solvent). The retardation factor R_f compares the distance moved by a component with the distance moved by the solvent.

$$R_f = \text{distance travelled by the component} / \text{distance travelled by the solvent}$$

Procedure

16. Grind the leaves with acetone and filter to obtain the pigment extract.
17. Draw a pencil line 2 cm from one end of the paper strip and put a small spot of extract on it.
18. Dry and repeat the spotting several times.
19. Suspend the strip in the jar with its lower end dipping in the solvent, keeping the spot above the solvent level.
20. Remove the strip when the solvent front has risen about 10 cm; mark the front and the bands.

Observations

Band (colour)	Distance moved (cm)	Solvent front (cm)	R_f
Carotene (yellow-orange)	9.4	10.0	0.94
Xanthophyll (yellow)	7.1	10.0	0.71
Chlorophyll a (blue-green)	4.8	10.0	0.48

Band (colour)	Distance moved (cm)	Solvent front (cm)	R _f
green)			
Chlorophyll b (yellow-green)	3.6	10.0	0.36

Observation table (sample readings — replace with your own)

Result

Result

Four pigments were separated; their R_f values are recorded above (sample result).

Precautions

- Use a pencil, not ink, to mark the paper.
- The spot should be small and concentrated.
- Keep the jar covered during the run.

Experiment 5: Effect of concentration on reaction rate

Date: 02 Sep 2025

Page No.: _____

Teacher's sign: _____

Aim

To study the effect of concentration on the rate of reaction between sodium thiosulphate and hydrochloric acid.

Apparatus / Materials Required

- Conical flasks (100 mL), measuring cylinders
- Stopwatch, white paper with a cross mark
- 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ solution, 1 M HCl, distilled water

Theory

Sodium thiosulphate reacts with hydrochloric acid to produce colloidal sulphur, which makes the solution turbid. The time taken for a cross under the flask to disappear is inversely proportional to the rate of reaction.



Procedure

- Place a flask on the paper marked with a cross.
- Add 50 mL of thiosulphate solution and then 10 mL of HCl, starting the stopwatch at once.
- Note the time when the cross just becomes invisible from above.
- Repeat with thiosulphate diluted to 40, 30, 20 and 10 mL (made up to 50 mL with water).
- Plot concentration against $1/t$.

Observations

Flask	Vol. of $\text{Na}_2\text{S}_2\text{O}_3$ (mL)	Vol. of water (mL)	Time t (s)	$1/t$ (s^{-1})
1	50	0	42	0.024
2	40	10	53	0.019
3	30	20	71	0.014
4	20	30	108	0.009

Flask	Vol. of $\text{Na}_2\text{S}_2\text{O}_3$ (mL)	Vol. of water (mL)	Time t (s)	$1/t$ (s^{-1})
5	10	40	215	0.005

Observation table (sample readings — replace with your own)

Result

Result

The rate of reaction increases with the concentration of sodium thiosulphate; the graph of concentration against $1/t$ is a straight line (sample result).

Precautions

- Use the same flask and cross for all readings.
- Start the stopwatch as soon as the acid is added.
- Keep the temperature constant.

Bibliography

- Laboratory manual issued by the department / school.
- Prescribed textbook for the subject (latest edition).
- Class notes and practical demonstrations by the subject teacher.