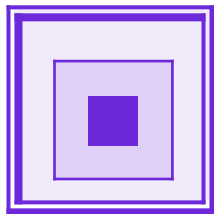


SUNRISE PUBLIC SCHOOL, JAIPUR

Department of Physics



A Practical File on

Physics Practical File

Class XII · CBSE practical record

Submitted in partial fulfilment of the practical examination requirements

SUBMITTED BY	CLASS	SUBMITTED TO
Aarav Mehta Roll No. 12A07	Class XII – A	Mr. Vikram Joshi

Session 2025–26

CERTIFICATE

This is to certify that Aarav Mehta, a student of Class XII – A, has satisfactorily completed the practical work in Physics 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.

Mr. Vikram Joshi

Subject Teacher

External Examiner

Date: _____

Dr. Anita Rao

Principal

Acknowledgement

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

I am also thankful to Dr. Anita Rao, 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.

Aarav Mehta

Index

S. No.	Name of the Experiment	Date	Remarks	Teacher's Sign
1	Ohm's law and resistance of a wire	08 Jul 2025		
2	Specific resistance using a metre bridge	22 Jul 2025		
3	Focal length of a concave mirror	05 Aug 2025		
4	Angle of minimum deviation of a prism	19 Aug 2025		

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

Laboratory Safety Rules

- Check connections before switching on the supply
- Never touch live terminals
- Use the correct range on meters
- Switch off the supply before changing connections
- Keep the work bench dry and tidy

Experiment 1: Ohm's law and resistance of a wire

Date: 08 Jul 2025

Page No.: _____

Teacher's sign: _____

Aim

To verify Ohm's law and determine the resistance per unit length of a given wire by plotting a graph between potential difference and current.

Apparatus / Materials Required

- Battery eliminator (0–6 V)
- Ammeter (0–1 A) and voltmeter (0–3 V)
- Rheostat, plug key and connecting wires
- Resistance wire about 50 cm long
- Metre scale and sandpaper

Theory

Ohm's law states that the current flowing through a conductor is directly proportional to the potential difference across its ends, provided its temperature and other physical conditions remain unchanged. The graph between V and I is therefore a straight line through the origin, and its slope gives the resistance R .

$$V = I R$$

$$\text{Resistance per unit length, } k = R / l$$

Procedure

1. Clean the ends of the connecting wires with sandpaper and draw the circuit diagram.
2. Connect the battery, key, rheostat, ammeter and wire in series, and the voltmeter in parallel with the wire.
3. Insert the key and adjust the rheostat so that a small current flows. Note the ammeter and voltmeter readings.
4. Change the rheostat setting in steps to obtain at least six sets of readings.
5. Remove the key between readings so that the wire does not heat up.
6. Measure the length of the wire between the voltmeter terminals and plot V against I .

Observations

S. No.	Current I (A)	Potential difference V (V)	$R = V/I (\Omega)$
1	0.10	0.42	4.20
2	0.15	0.62	4.13
3	0.20	0.83	4.15
4	0.25	1.05	4.20
5	0.30	1.25	4.17
6	0.35	1.46	4.17

Observation table (sample readings — replace with your own)

Calculations

Mean resistance $R = 4.17 \Omega$ (sample value).

Length of wire $l = 50.0 \text{ cm} = 0.50 \text{ m}$, so $k = R / l = 8.34 \Omega \text{ m}^{-1}$.

Result

Result

The V–I graph is a straight line through the origin, which verifies Ohm's law. Resistance of the wire = 4.17Ω ; resistance per unit length = $8.34 \Omega/\text{m}$ (sample result).

Precautions

- Connections should be neat, clean and tight.
- Current should be passed only while taking readings.
- The voltmeter must be connected in parallel and the ammeter in series.

Experiment 2: Specific resistance using a metre bridge

Date: 22 Jul 2025

Page No.: _____

Teacher's sign: _____

Aim

To find the resistance of a given wire using a metre bridge and hence determine the resistivity of its material.

Apparatus / Materials Required

- Metre bridge
- Galvanometer and jockey
- Resistance box
- Leclanché cell, plug key and connecting wires
- Screw gauge and metre scale

Theory

A metre bridge works on the principle of the Wheatstone bridge. When the bridge is balanced, no current flows through the galvanometer and the ratio of the unknown resistance to the known resistance equals the ratio of the balancing lengths of the bridge wire.

$$X = R (100 - l) / l$$

$$\rho = \pi r^2 X / L$$

Procedure

- Set up the circuit with the wire in the right gap and the resistance box in the left gap.
- Take out a suitable resistance R from the resistance box.
- Touch the jockey gently along the bridge wire to find the null point and note the balancing length l.
- Repeat for four different values of R.
- Interchange the positions of the wire and resistance box and repeat to remove end errors.
- Measure the diameter of the wire with a screw gauge at several places and the length L of the wire.

Observations

S. No.	R (Ω)	l (cm)	100 – l (cm)	X (Ω)
1	2	58.5	41.5	1.42
2	3	67.8	32.2	1.42

S. No.	R (Ω)	l (cm)	100 – l (cm)	X (Ω)
3	4	73.6	26.4	1.43
4	5	77.9	22.1	1.42

Observation table (sample readings – replace with your own)

Calculations

Mean X = 1.42 Ω ; radius r = 0.25 mm; L = 100 cm (sample values).

$$\rho = \pi r^2 X / L = 2.79 \times 10^{-7} \Omega \text{ m.}$$

Result

Result

Resistance of the given wire = 1.42 Ω and resistivity of its material = $2.79 \times 10^{-7} \Omega \text{ m}$ (sample result).

Precautions

- The jockey should not be slid along the wire; touch it gently.
- The null point should lie between 30 cm and 70 cm.
- All plugs of the resistance box should be tight.

Experiment 3: Focal length of a concave mirror

Date: 05 Aug 2025

Page No.: _____

Teacher's sign: _____

Aim

To find the focal length of a concave mirror by plotting a graph between u and v , and between $1/u$ and $1/v$.

Apparatus / Materials Required

- Concave mirror with holder
- Optical bench with uprights
- Two optical needles
- Index needle and metre scale

Theory

For a concave mirror, the object distance u , image distance v and focal length f are related by the mirror formula. Using the new Cartesian sign convention, distances measured against the direction of incident light are negative.

$$1/f = 1/v + 1/u$$

Procedure

- Find the rough focal length by forming the image of a distant object on a wall.
- Mount the mirror and the object needle on the optical bench, keeping the object beyond the focus.
- Locate the inverted image with the image needle and remove parallax tip to tip.
- Note the positions of the mirror, object needle and image needle.
- Repeat for five more positions of the object.
- Apply the index correction and plot the graphs.

Observations

S. No.	u (cm)	v (cm)	$f = uv/(u+v)$ (cm)
1	-25.0	-37.6	-15.0
2	-30.0	-30.2	-15.0
3	-35.0	-26.3	-15.0
4	-40.0	-24.1	-15.0

S. No.	u (cm)	v (cm)	f = uv/(u+v) (cm)
5	-45.0	-22.4	-15.0

Observation table (sample readings – replace with your own)

Result

Result

Focal length of the given concave mirror is 15.0 cm, from both the calculation and the graphs (sample result).

Precautions

- The tips of the needles should be at the same height as the pole of the mirror.
- Parallax should be removed tip to tip.
- The mirror should be clean.

Experiment 4: Angle of minimum deviation of a prism

Date: 19 Aug 2025

Page No.: _____

Teacher's sign: _____

Aim

To determine the angle of minimum deviation for a given glass prism by plotting a graph between the angle of incidence and the angle of deviation, and to find the refractive index.

Apparatus / Materials Required

- Glass prism (equilateral)
- Drawing board, white sheet and drawing pins
- Alpins
- Protractor, scale and pencil

Theory

As the angle of incidence increases, the angle of deviation first decreases, reaches a minimum value δ_m and then increases. At minimum deviation the ray passes symmetrically through the prism.

$$\mu = \sin[(A + \delta_m)/2] / \sin(A/2)$$

Procedure

19. Fix the white sheet on the drawing board and trace the outline of the prism.
20. Draw a normal on one face and an incident ray at 35° .
21. Fix two pins on the incident ray and view their images through the other face; fix two more pins in line.
22. Join the emergent pins and measure the angle of deviation.
23. Repeat for angles of incidence from 35° to 60° in steps of 5° .
24. Plot i against δ and read off δ_m .

Observations

S. No.	Angle of incidence i ($^\circ$)	Angle of deviation δ ($^\circ$)
1	35	44
2	40	40
3	45	38
4	50	38.5

S. No.	Angle of incidence i ($^\circ$)	Angle of deviation δ ($^\circ$)
5	55	40
6	60	43

Observation table (sample readings — replace with your own)

Calculations

$A = 60^\circ$, $\delta_m = 38^\circ$ (from the graph, sample).

$\mu = \sin 49^\circ / \sin 30^\circ = 1.51$.

Result

Result

Angle of minimum deviation = 38° ; refractive index of glass = 1.51 (sample result).

Precautions

- Pins should be fixed vertically and at least 8 cm apart.
- The angle of incidence should be between 30° and 60° .
- Use a sharp pencil to draw fine lines.

Bibliography

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