

OBJECTIVES OF PRACTICAL WORK

Through experimental work the students are expected to develop the following skills:

- A. Planning B. Implementing C. Interpreting and concluding

Students are required to carry out practical work as an integral part of the course. They are advised to maintain a laboratory record book in which they record, for all their practical work, the experimental arrangements used, the observations made and the analysis of these observations. Particular attention should be placed on the following:

1. Techniques:

- i. Reading to the maximum accuracy of linear and angular scales; use of vernier scales; timing by stop-watch or stop-clock.
- ii. Accurate focusing and location of images.
- iii. Connecting up and checking electrical circuits from a circuit diagram, drawing a circuit diagram for a given simple circuit already connected up.

2. Graphical Methods

- i. Display of results in tabular and graphical form.
- ii. Translate information between graphical, numerical, algebraic and verbal forms.
- iii. Accurate plotting with suitable choice of scales.
- iv. For linear graph, determine the slope, intercept and intersection.
- v. Choose, by inspection, a straight line which will serve as the best straight line through a set of data points presented graphically.
- vi. Recall standard line form $y = mx + c$ and rearrange relationships into linear form where appropriate.
- vii. Understand and use of area below a curve where the area has physical significance.

Note: Use of centimeter graph be made compulsory.

3. Procedures:

- i. Making rough preliminary measurements and calculations where appropriate, e.g. to assess the best range for accurate measurements.
- ii. Careful recording of all actual measurements made.

4. Order of Accuracy

- i. Significant figures and decimal places.
- ii. Meaning of absolute and relative (or percentage) error.
- iii. Estimates of maximum error in simple cases.
- iv. Common-sense appreciation of orders of accuracy of common measurements (not merely of scale readings) and ability to quote results to a number of significant figures reasonably in keeping with their estimated accuracy.

5. Error Estimates

Rules for combination of maximum errors in the simple cases:

$X + y$, xy , x/y , x^n .

PHYSICS PRACTICALS

For Class –XI

A. Standard experiments

1. To find the volume of a cylinder using Vernier Calliper.
2. To find the area of cross section of a wire or volume of small sphere using micrometer screw gauge.
3. To find the unknown weight of a body by the method of vector addition of forces.
4. Determination of value of 'g' by free fall using an electronic timer / ticker timer.
5. Verification of following relations of the simple pendulum:
 - i. Time period is independent of the amplitude.
 - ii. Time period is independent of its mass or density of the bob.
 - iii. Time period is directly proportional to the square root of its length.
6. To find the acceleration due to gravity by oscillating mass spring system.
7. To study the laws of conservation of momentum by colliding trolleys and ticker timer for elastic and inelastic collisions.
8. Verify the second condition of equilibrium using a suspended meter rod.
9. To study the fall of a body through a viscous medium and hence to deduce the coefficient of viscosity of the medium.
10. To determine Young's modulus of wire by Searle's apparatus.
11. To find the moment of inertia of a fly- wheel.
12. Determination of frequency of A.C. by Melde's apparatus/electric sonometer.
13. Investigation of the laws of vibration of stretched strings by sonometer or electromagnetic method.
14. To determine the wave length of sound in air using stationary waves and to calculate the speed of sound.
15. To determine the focal length of a convex lens by displacement method.
16. To determine the focal length of a concave lens using
 - i. Concave mirror
 - ii. Convex lens
17. To find the refractive index of the material of a prism, using a laser or spectrometer.
18. To find the refractive index of the material of a prism by critical angle method.

19. To find the refractive index of a liquid using a concave mirror.
20. To determine the wave length of sodium light by Newton's Rings.
21. To determine the wave length of light by diffraction grating using spectrometer or laser.
22. To measure the diameter of a wire or hair using laser.
23. Setting up a telescope and determination of its magnifying power and length.
24. To find the coefficient of linear expansion of the material of a rod by Pullinger's apparatus.
25. To measure the mechanical equivalent of heat by electrical method.

B. Exercises

At least one exercise based on each of the above mentioned standard experiments making the total experiments equal to 50