

## 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

### A. Standard experiments

1. To find the resistance of a wire by slide wire bridge
2. To find the resistance of a Galvanometer by half deflection method
3. To find the resistance of a voltmeter by drawing graph between R and I/V
4. Variation of resistance of thermister with temperature
5. Conversion of Galvanometer into Ammeter
6. Conversion of Galvanometer into Voltmeter
7. To find the internal resistance of a cell using a Potentiometer
8. To determine the e.m.f of a cell using Potentiometer
9. Relation between current passing through a tungsten filament lamp and the potential applied across it
10. Variation of magnetic field along the axis of a circular coil
11. Charging and discharging of a capacitor and to measure time constant
12. Relation between current and capacitance when different capacitors are used in A.C. circuit
13. Characteristics of a semi-conductor diode and calculation of forward and reverse current resistance
14. Characteristics of a N.P.N. transistor
15. Study of the variation of electric current with intensity of light using a photocell
16. To estimate the value of Plancks constant by using photo cell tube and coloured light filters
17. Measurement of D.C and A.C voltage by cathode Ray Oscilloscope
18. To verify truth table for logic gates
19. To make burglar alarm using NAND gate
20. To make a fire alarm using NOT gate
21. Characteristics of a G.M. tube
22. Determination of high resistance by Neon flash lamp
23. To determine the e/m of electrons by deflection method (teltron tube)

### B. Exercises

At least one exercise based on each of the above mentioned standard experiments making the total experiments equal to 46.

**N.B.** Pre-assembled circuits/experimental set up should be discouraged. The students must themselves assemble the electrical/electronic circuits from various components. Use of centimeter graph be made compulsory.