PHYSICS PRACTICAL (232/3)

While using the apparatus, students should note the following areas:

- Accuracy and sensitivity of instruments.
- Errors made by candidates while using measuring instruments
- Interpretation of the scale
- Parallax
- Zero error
- Recording measurements in correct units
- Note that when converting from one metric unit to another all digits in the original metric units must be

retained.

Areas of frequent Practical question

- Heat
- Mechanics – Q 1 part A 2015
- Optics – Q 1 part B 2016
- Electricity – Q 2 2017 before exam time,

candidates should have had a chance to practice with apparatus that cover the topics above

Teachers are expected to emphasis the area identified below when preparing students for the practical paper.

All calculations should be exact or as specified in the question paper in regard to the expected,

- Significant figures
- Decimal places
- Standard form
- Use of 4 significant figures(when the setter has not specified)
- Collection and recording of data followed by completion of the table of results.
- Graphical work

- Heading or title of graph that has units if any.

- Labelling of axes with units if any
- Choosing a simple and uniform scale-accommodates all points in the table of results and takes care of any intercept.
- Exact plotting of points(possible penalties)
- Curve or line of best fit(how they are drawn and penalties)
- calculation of slope
- Positive slope
- Negative slope
- Slope on a curve
- Penalty of no mark for the line which results into the slope not being marked.

- Drawing of tangent line on a curve
- Scales with powers of 10
- Hanging graphs
- Reciprocals(powers of 10)
- Reading a point on a graph
- Cartesian graphs/graphs of logarithms
- . Application of the equation of a straight line.
- The following are the equations if handled from a practical approach will enhance understanding of the equation for a straight line
- The two photoelectric equations and graphs
- The graph of V against I as used to obtain E and r/significance of the slope.
- Tackling substitution questions- whatever is substituted must

have appeared at an early stage.

- The simple pendulum equation

The paper tests the ability to:

1. Following laid down instructions.

   (Paper rubrics are a must)

2. Set up the apparatus as shown in the given figures.

2009- Q2

x z



3. Use of measuring instruments to measure respective quantities.

- **length**-metre rule, vernier calipers, micrometer

screw gauge.

- **Time-** stop clock/ stop watch
- **Potential difference-** voltmeter
- **Current**-Ammeter
- **Mass**- Beam balance
- **Weight**- spring balance
- **Angles-** protractor
- **Temperature**-thermometer

4. Use calculators to perform mathematical operations e.g addition, subtraction,

multiplication , squares, reciprocals, square roots, logarithms, Trigonometric ratios etc

5. Choose suitable scales (uniform and simple) and plot graphs
6. Interpret graphs- slope, read intercepts(x and y)
7. Speed and accuracy

- **<u>Measuring instruments and accuracy</u>**
- **Metre rule**- 1 d.p in cm e.g. 6.0, 5.5, 10.0

- **Vernier calipers**- 2 d.p in cm e.g 2.50, 3.44, 6.00
- **Micrometer screw gauge**- 2 d.p in mm e.g. 2.50, 3.44.
- **Stopwatch/Stockclock**- 2d.p in seconds e.g. 15.00, 18.45
- **Voltmeter**- 2 d.p
- **Ammeter**- 2 d.p
- **Protractor**- 1 d.p
- **Beam balance**- 2 d.p
- **Spring balance**-2 d.p
- **Thermometer**- 1 d.p

- Spend at most 15 minutes going through the whole paper.
- Set up the apparatus.
- Record the observations as soon as they are made.
- 1 hr per question
- Use the last 15 minutes to review of the work

- **PARTS OF THE PAPER**

TABLE

- Fill the values read from various instruments as per the accuracy of each instrument.
- Any mathematical operations e.g. squares,

  -square roots, reciprocals, logarithms etc should be written to 4 significant figures.

D (cm)	20	25	30	35	40	45	50
Time t of 10 osc (s)	72.54	63.34	55.66	46.42	37.27	28.68	19.44
T (s)	7.254	6.334	5.566	4.642	3.727	2.868	1.944
f = (s^{-1})	0.1379	0.1579	0.1797	0.2154	0.2683	0.3487	0.5144

GRAPH

1. **Labeling of axes-** indicate **quantity** and **unit** (except where there are no units)

R(Ω)

$1\ (V^{-1})$
V

$\text{Log}_{10} R_A$

$\text{Log}_{10} T$

2. <u>Scale</u>

should be **uniform, simple, accommodate** all values and **covering** more than a half the

grid.

EXAMPLES OF SIMPLE SCALES (125)

- 0, 10, 20, 30……
- 0, 2.5, 5.0, 7.5, 10……
- 1.55, 1.60, 1.65, 1.70……

EXAMPLES OF COMPLEX SCALES

- 0, 3, 6, 9, 12, ……
- 0, 0.7, 1.4, 2.1, ……
- 50.0, 51.5, 53.0, 54.5, ……

3. **Plotting**: plot the exact values or if not possible round off to at least 2 d.p e.g.

4. 5 6 7≈ 4.5 7, 0.5432≈ 0.54

   ⫤A point is exact within a small square

4. **Line or curve** should pass at least 4 correctly plotted points

- **LINE**
- (i) Determine the slope of the graph.
- (ii) Given the equation of the graph which can be related to the general equation of a straight

line Y= M x + C

- **CURVE**
- (i) Determine the slope of the graph at a point.
- (ii) Determine the value of one quantity when given the other
-

- (a) Slope: Pick the points that are on the line and evaluate to at least four significant figures .
- (b) Y and X - Intercepts should be read from

the graph.

- (c) Determination of constants given the formulae; Ensure correct substitution and evaluation to at least 4 significant figures.

THE END