

Notes: SPA Skills 2

In preparation for the Physics Practical Test of Term 3 Week 2.

Tabular Data

- Present all observations and derived values in one table, do not split tables.
- Only table headings should have units – boxes should just consist of numerical values:
 - o Example: f/Hz or t/s or D/cm
 - o Example: D_1/cm , D_2/cm , D_{ave}/cm
- Listing of independent/dependent variables:
 - o For the independent variable, list them as it is given,
 - o For the dependent variable, take at least 2 readings, then average them out.
 - o When averaging them out, **follow the precision of the instrument** (same as the recorded raw data)!
- Not required to show working for tabular calculations.
- SF & DP of instruments:
 - o Instruments that require intervals – precision of smallest markings
 - Example: Ruler to 1dp in cm
 - Example: Ruler to 3dp in m
 - o Instruments that do not require intervals – precision of $\frac{1}{2}$ of smallest marking
 - Example: Balance (of 1g markings) to 1dp in g
 - o Digital instruments – copy-paste exactly
 - o Hint: **Everything in the same column must be to the same number of DP!**

Graphical Data

- Title: “Graph of Y/units against X/units”
- Draw in pencil (except for table of values)
- Range of values:
 - o Cover the entire range given (if 3 readings from 0.5m to 1.0m, then: 0.50m, 0.75m, 1.00m)
 - o Cover the entire range of values with **equal** distribution
- Any value read off the graph (be it y intercept, or a specific value), should be given to the same SF as shown on the graph
- Axes:
 - o Draw X and Y axes on the thickest graph paper lines
 - o Mark the values on the X and Y axes at every thick graph paper line
 - To find out how many SF/DP to mark the axes with:
 1. Take the interval (difference between two markings on the big graph paper square)
 2. Divide it by 20
 3. Follow SF/DP of results
 - o Label axes with “quantity/unit”
 - o Need not start from “0” – and in the event they don’t, do not put the squiggly line to represent a false origin

- Scale:
 - The plotted points must occupy more than half of the graph paper both horizontally and vertically
 - Scale ratio must be – 1:1, 1:2, or 1:5 – no other ratio is accepted
- Plotted points:
 - All plotted points must be to the accuracy of **half the smallest square**
- Line of best fit:
 - As many points as possible must lie on or very close to the line
 - An equal number of points lie above and below the points
 - Points that do not lie on the line are roughly equidistant (except for anomaly)
 - Hint: If top half of line has points all on one side, and bottom half of line has points all on the other, rotate the line

Calculations

- Always (to the most accurate definition of the word) follow SF/DP rule:
 - Gradient
 - Y-Intercept
- Give all calculations to their appropriate units
 - X/Y intercepts to their units as per X and Y axis
 - Gradient to unit as per Y/X axis
- Gradient:
 - When taking arbitrary points to calculate gradient, don't use the points from the table, choose 2 new points of your own
 - Keep points as far apart as possible
 - **Draw gradient triangle (and label the length of the sides)!**
- For all calculations, show the intermediate workings (marks are awarded)

Rubric (for Prac Test 2 only)

- Table headings (correct labels and units)
- Calculations all correct to appropriate dp/sf
- Axes:
 - Correct labelling
 - Appropriate scale
 - Number of DP/SF on axes
- Line of best fit
- Data points
- Calculations
- Gradient:
 - Gradient triangle
 - Coordinates
 - Units