

Physics (5054) Paper 4 (ATP)



IMPORTANT POINTS

- General
 - Repeat and average
 - Measure N lengths / intervals together and then divide by N
 - To put objects together, put them in a groove or between two rulers
 - Parallax error DESCRIBED (e.g., line of sight should be perpendicular to scale / thread)
 - Keep together to observe / handle simultaneously (or get a friend to help)
 - Measure to the same point...
 - Scale should be close (or brought close) to object being measured (a set-square may help if the distance is more)
- Check horizontal / vertical
 - DESCRIBE use of spirit-level or
 - plumb-line and / or
 - set-square
- Graphs
 - Calculate gradient using more than half the line drawn
- Relationships (examples and explanations)
 - X increases as Y increases
 - X increases at a decreasing rate as Y increases
 - Linear
 - Directly proportional
 - line that touches origin
 - doubling X doubles Y
 - Inversely proportional
 - doubling X halves Y
- Measuring instruments
 - Range
 - Sensitivity
 - Range versus sensitivity
 - Check for zero-error
 - Check for dead-space
 - Measuring tape should be taut when measuring length.
 - Tape / ruler TOUCHING one end and used REPEATEDLY to measure longer distances

- Experimental
 - A fair comparison / experiment
 - Experimental value close (e.g., $\pm 10\%$) to theoretical value so within experimental error or relationship holds (or vice versa)
- Newton spring balance
 - Pull slowly (to note max. reading or to avoid accelerating force)
 - Pull horizontally if dealing with friction
- Round objects
 - When measuring thickness or diameter of round object(s) put it (or them) between two blocks and put a ruler above.
 - Diameter of marble measured more than once in different directions and then average
- Human reaction time / error
 - Human reaction time a small / large fraction of the total time
- Measuring volume
 - View level with bottom of meniscus
 - Put it on a horizontal surface
 - Immerse object completely
- Light
 - Use darkened room
 - Use longer lines when measuring angles
 - Use sharp pencil
 - Pins should be far apart
 - View bottom of pins
 - Measure distance from optical center (not surface of lens)
- Temperature
 - Thermometer's bulb should not touch bottom / sides
 - Half the thermometer (including part of stem) immersed
 - Stir for uniform distribution of heat
 - Let thread rise / fall completely before reading thermometer.
- Magnetism
 - Suspend magnet using string stirrup
 - Use small compass for more dots and hence smoother lines
- Electricity
 - Connect red (+ve) terminal of ammeter or voltmeter to positive terminal of cell and the black terminal to the negative terminal of cell, otherwise deflection will be in the wrong direction.
 - Check for zero-error in ammeter / voltmeter
 - Keep current low
 - Tight connections (e.g., use crocodile clips or wrap wire and then tape)
 - Clean wire with sand paper
 - Cells / batteries can run down