



2023 Sec 3 Physics Practical 02

Reflection of Light (method of no parallax)

Marking Scheme

Record of i and r [Record in ink!]

- Neat table drawn with the headings and units (i /° and r /°)
- At least 6 sets of evenly spread readings of i taken from 20° (inclusive of 20°) to 80° with minimum range of 50° .
- i and r tabulated to zero d.p (whole numbers)
- *Extend graph to cut axes.*

Ray Diagram

- Pins separation of P_1 and P_2 (or P_3 and P_4) must be at least 5.0 cm
- Reflected ray drawn must be through the centre of the pinholes of P_3 and P_4 .
- *Label all angles of incidence & reflection!*

Graph

- **S:** Suitable scale used.
- **P:** All points correctly plotted.
- **L:** Line of best fit passing through the origin (or close to origin).
- **A:** Axes correct (i on y-axis and r on x-axis); correctly labelled (with or without units) from origin with values labelled at regular intervals on both axes.
- *Label intersection of axes!*

Calculation of gradient

- On the graph
 - **C:** Coordinates of two suitable points clearly indicated.
 - **T:** Large triangle drawn using the two chosen points along line of best fit.
- Calculation of gradient using the coordinates on the graph
 - $\text{gradient} = (y_2 - y_1) / (x_2 - x_1)$ *(show working)*
 - $= 1.0 \pm 0.1$ (2 s.f.) *(in decimals!)*

Conclusion

$i = r$. OR i is directly proportional to r

OR angle of incidence is directly proportional to angle of reflection

Questions

- 1 State **one** precaution *[To ensure accuracy/reliability of results]*
 - The optical pins must be vertically upright to ensure the correct alignment of the pins P_3 and P_4 with the images of P_1 and P_2 .
 - The pins P_3 and P_4 must be as far apart as possible (at least 5.0 cm apart) to ensure the accuracy of the reflected ray drawn through these pinholes.
 - The mirror was checked to be at the same location when taking every set of measurements.