GEOMETRIC OPTICS DAY 7: LAB L13.4: INDEX OF A MYSTERY LIQUID

CED 13.3 · Skill 3.A · FRQ: ED · open investigation

RETRIEVAL

Without notes, write one measurable ray quantity that could be used to determine a liquid's refractive index. Then name the equation that connects your measurement to n.

DESIGN QUESTION

Goal: determine the refractive index of one unknown clear liquid and report an uncertainty.
Your design must identify a measurable quantity that appears in the equation used to calculate n.

Safety: keep beams below eye level, clean spills, and do not taste the liquids.

NOTES / REASONING

PLAN BEFORE MEASURING

Design element	Group plan
method and governing equation	
independent variable and range	
measured dependent quantity	
controls	
number of trials / repeats	
uncertainty method	

Procedure: write numbered steps detailed enough for another group to repeat.

Approval checkpoint: obtain teacher approval before using a laser or filling the cell.

DATA RECORD

trial	chosen input	measured output	calculated n	notes
1				
2				
3				
4				
5				

Quality check: identify any trial that should be repeated and state the evidence.

Uncertainty: state the rule your group will use, such as half-range or instrument-resolution bounds.

RESULT AND EVALUATION

1. Show one complete calculation of n with measured values.

2. Report $n \pm \delta n$ and state how δn was obtained.

3. Compare your result with another group's method. Do the uncertainty intervals overlap?

4. Propose one change that would improve precision without changing the governing model.