

LAB PARTNERS: _____, _____, _____, _____, _____

PURPOSE: To determine the wavelength of red light.

PROCEDURE: class discussion, plus Lab Notes on other side

DATA: (be consistent in use of units...all meters, or all centimeters)

d ()	x ()	n	L ()

OBSERVATION: Show sketch of spacing in nodal line pattern for red light vs. blue light.

CALCULATIONS (show units):

$$\lambda_{(\text{red})} = \frac{d x}{n L} =$$

NOTE: See p. 395 in text (Example: Wavelength of Light) for accepted value of $\lambda_{(\text{red})}$. Use consistent notation and units for $\lambda_{(\text{experimental})}$ and $\lambda_{(\text{accepted})}$ in this calculation (i.e., both decimals, or both scientific notation with same power of ten; both in cm or both in m). See Questions 1(a)-(d) below; you may wish to do these before doing the % Error calculation.

$$\% \text{ Error} = \frac{|\lambda_{(\text{experimental})} - \lambda_{(\text{accepted})}|}{\lambda_{(\text{accepted})}} \times 100 =$$

QUESTIONS:

1. Express the ACCEPTED value for $\lambda_{(\text{red})}$ in the following units (just numerical answer OK; complete sentences not necessary).

a. as a decimal in centimeters _____

b. as a decimal in meters _____

c. in scientific notation (as a number between 1 and 10 followed by the power of ten), in centimeters _____

d. in scientific notation as in (c), in meters _____

e. in nanometers (1M = 10⁻⁹ nM); show a UNIT ANALYSIS calculation from meters to nanometers

2. One-word answers are OK for (a) and (b), and for the first parts of (c) and (d), but **don't forget the EXPLANATIONS in (c) and (d).**

a. Consider your RIPPLE TANK experiment on nodal line number and spacing. For a given source separation, were the nodal lines spread farther apart when the wavelength was long or short?

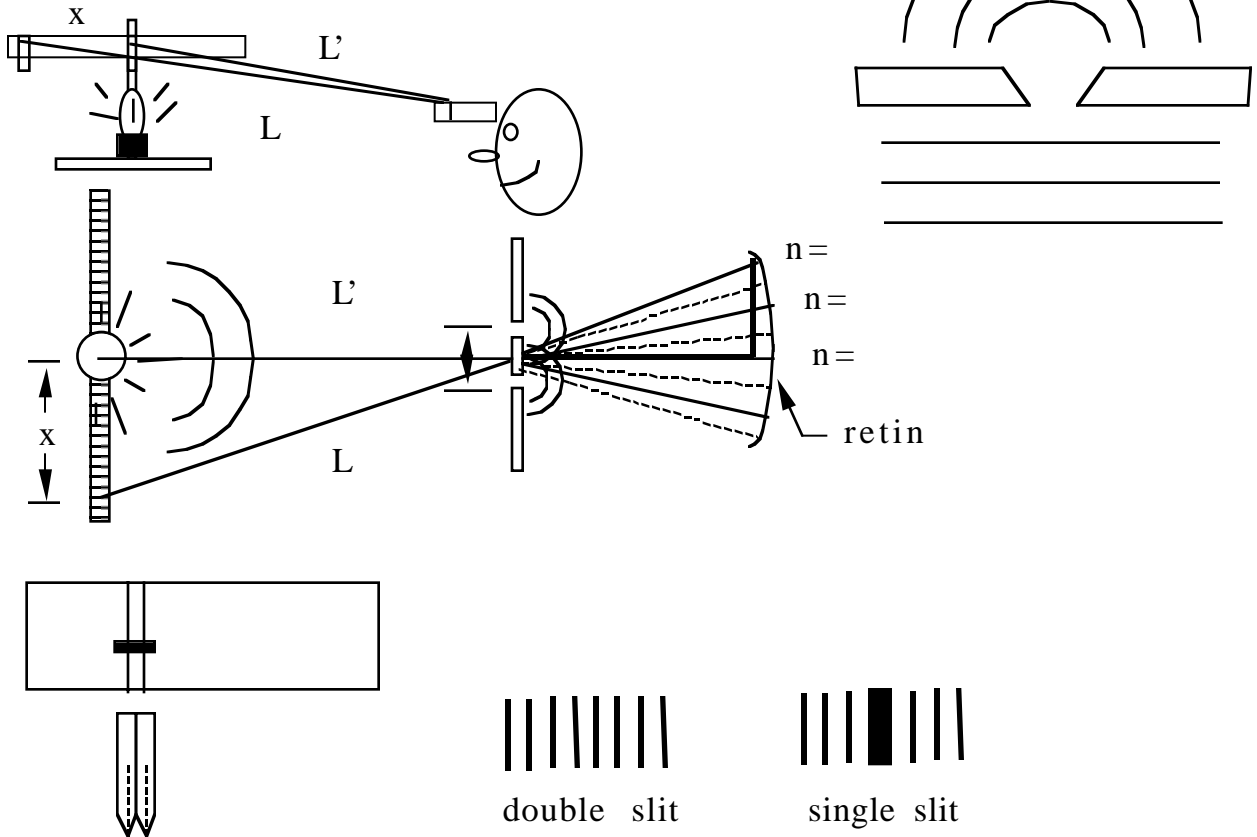
b. From the OBSERVATION section above, were the nodal lines spread farther apart for red light or blue light?

c. From your answers to (a) and (b), does red light have a longer or shorter wavelength than blue light? BRIEFLY EXPLAIN basis for answer.

d. From your answer to (c), does red light have a larger or smaller frequency than blue light? BRIEFLY EXPLAIN basis for answer.

CONCLUSION: USE COMPLETE SENTENCES. Cite EXPERIMENTAL and ACCEPTED values for wavelength of red light (use consistent notation and units, and watch significant figures). Cite % ERROR. Additional comments as desired.

LAB NOTES



double slit

single slit