

UNIVERSITY OF TORONTO
Faculty of Arts and Science

FIRST YEAR PHYSICS LAB
PRACTICAL TEST

Calculators without stored data are permitted
No other aids are allowed.

All experimental observations must be recorded in PEN in the exam booklet and data must be plotted (using pen *or* pencil) on the graph paper provided. You are expected to record and analyze your data in the same manner as is normally expected in the lab.

LENS OPTICS

The focal length **f** of a thin lens is given by:

$$\frac{1}{f} = \frac{1}{o} + \frac{1}{i} \quad (1)$$

where **o** is the distance from the object to the center of the lens and **i** is the distance from the center of the lens to the image.

Determine the focal length of the supplied lens for the blue filter (maximum transmission at 420 nm), green filter (maximum transmission at 524 nm) and red filter (maximum transmission at 656 nm). Plot the focal length versus the wavelength of the light.

Be sure to choose values of **o** and **i** that give the best precision determination. Be sure to state that value of precision.

The length of the calibrating rod is (20.00 ± 0.01) cm.

TEST STRATEGY ADVICE: Remember to quote units throughout. You will be given credit for your estimate of errors; however it is more important that you have taken adequate data and produced a graph of the results, so leave your error calculations to the last. It is more important to have your results suitably plotted than to achieve the full set of points. If one of the points doesn't fit your line or curve, it is advisable to repeat that measurement.