Physics 131 Practical Test Example

Make a clear record of the results of your measurements, clearly identifying the method, instruments used and the relevant settings. Indicate *uncertainties of all measured and calculated quantities*.

~~**Optics**~~

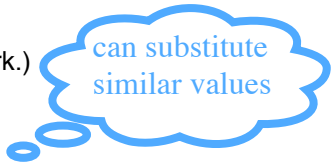
~~1. Of the lenses on your bench, choose the convex lens with the shortest positive focal length and measure its focal length using the following method: (any method may be asked for) Calculate the uncertainty of the focal length determination.~~

DC Measurements

2. (a) Connect resistors R1 and R2 in *series*. (Choose any two resistors for practice.)
   •Connect the DC power supply across the resistor pair with the power supply adjusted to approximately 10 V.
   •Use the DMM to measure the voltages across R1 and R2. Draw a schematic circuit diagram showing the circuit and how you connected the meter to measure the voltage across R1. (Use the correct electronic symbols for resistors, DC supply and meters.)
   •Calculate the total voltage across R1 and R2 from the previous measurements. (Show work.)

(b) Connect R1 and R2 in *parallel*.
   •Connect the DC power supply across the resistor pair and leave the voltage as in part (a).
   •Using the DMM, measure (i) the total current from the power supply and (ii) the current passing through R1. Draw a circuit diagram showing the circuit and how you connected the DMM.

(c) Measure the resistance of R1 using the DMM. Show a circuit diagram of how you connected the meter.
   •Calculate the resistance of R2 from the data of parts (a), (b) and (c). (Show your work.)



AC Measurements

3. Set up the circuit shown with the function generator set to give a sine wave of about 2250 Hz and peak voltage of about 1 V.
   •Display the function generator output on channel 1 and the voltage across the resistor on channel 2.
   •Adjust the oscilloscope controls so that you can measure the frequency and amplitude of the two signals and *sketch the display quantitatively*.
   •Use the oscilloscope display to determine the frequency of the function generator, the RMS voltages of channel 1 and channel 2.
   ~~Physics 131 only:~~ Measure the phase shift in degrees between channels 1 and 2.