# 1 Coaxial Cable Lab Circuit Diagram

(a) Draw a schematic diagram that shows the circuit you studied in the "coaxial cable lab" on Tuesday.

(b) Create a good caption that shows the lessons learned from the previous lab. The caption is descriptive, succinct and allows the figure and caption to stand alone.

(c) Write a short paragraph that describes what you measured and how you measured it, referring to the diagram.

# 2 Speed of Wave Propagation in a Cable

(a) Explain how you measured the speed of wave propagation in the coaxial cable.

(b) What is the speed of propagation in $m/s$? As a fraction of the speed of light?

(c) Are the electrons in the wires traveling at this speed? Or is their material velocity smaller? Larger?

# 3 Coaxial Cable Lab: Data Table

(a) Create a well-organized table with a caption that records the measurements you obtained in the "coaxial cable lab".

(b) List the features you paid attention to when you created the table.

# 4 Coaxial Cable Lab: Graph of Voltage Ratios

(a) Plot on the same graph: (i) the height of the voltage pulse after it has propagated to the end of cable as a function of the terminating resistance and (ii) the height of the voltage pulse after it returns to the beginning of the cable as a function of the terminating resistance. Both voltages should be measured relative to the height of the pulse at the start.

(b) Add to the plot the model for the reflection and transmission coefficients derived in class, with $k_2 \rightarrow Z_2$ representing the varying terminating resistor ("impedance of cable 2") and $k_1 \rightarrow Z_1$, representing the fixed impedance of the coax cable to be determined from your data.

(c) There is a further element of the model still missing... what do your data suggest that the missing element is?)

# 5 Reflection from the End of a Coaxial Cable

Regarding the coaxial cable we investigated:

(a) What is the impedance of your cable as measured by the matching terminating resistance?

(b) What is the total measured resistance of your cable (Be sure to include the center wire AND the shield resistances)?

(c) What is the damping parameter for your system?

(d) Now add to your data plot the results (use a line to indicate a model) expected from a model (i) in which resistance in the cable is neglected and (ii) resistance in the cable is incorporated and assumed to be relatively small compared to the impedance of the cable ("light damping").

Make sure axes are properly labeled, color is nicely used to convey maximum information, and legends etc. are arranged so the reader is given the information in the clearest and most direct way.