## 7.5.2: Passive RL Circuit Step Response (40 points total)

1. In the space below, provide (from your pre-lab results) the time constant for the circuit shown in Figure 1 if R=200 Ω and L = 1mH. Also provide your estimate steady state response of *vR*(t) if *vIN* is a step input with amplitude 5V. (3 pts)
2. Provide below a schematic of the circuit you implemented, including actual resistance value used in your circuit. (2 pts)
3. Attach to this worksheet an image of the oscilloscope window, showing the input voltage, the inductor voltage, and the resistor voltage. In the space below, provide your estimate of the time constant of the circuit. Briefly discuss differences between the measured data and your estimates from the pre-lab (as always, this should include a percent difference between the values). (5 pts)
4. **DEMO**: Have a teaching assistant initial this sheet, indicating that they have observed your circuits’ operation. (5 pts)

**TA Initials: \_\_\_\_\_\_\_**

1. In the space below, provide a circuit schematic for the “loaded” circuit with measured resistor values (both the RL circuit resistance and the load resistance). (3 pts)
2. Attach, to this worksheet, a plot of your measured input and output data (the output data for this circuit is the voltage across the load resistor) for the loaded circuit. Annotate the plot to show the time constant and steady-state response. (3 pts)
3. In the space below, provide the time constant and steady-state response of the loaded circuit. Comment below on the differences between the loaded and unloaded circuit responses. Do the results of the loaded circuit agree with your expectations based on analysis? (5 pts)
4. **DEMO**: Have a teaching assistant initial this sheet, indicating that they have observed your circuits’ operation. (4 pts)

**TA Initials: \_\_\_\_\_\_\_**

1. Attach to this worksheet, a plot overlaying the inductor voltage, the resistor voltage, and the sum of the two from part (a) of the post-lab exercises. In the space below, comment on the relationship between the sum of the inductor and resistor voltages and the waveform applied to the circuit. (5 pts)
2. Attach to this worksheet, the plot overlaying the resistor voltage for both the loaded and unloaded cases from part (b) of the post-lab exercises. In the space below, comment on differences between the two (you may refer to your quantitative results in items 3 and 7 above. (5 pts)