ENEE 307: Lab 1 Upgrade: Due with Your Lab 1 Report

Perform the following upgrade project using CoolSPICE . Set up transformer circuit with the 10Ω Resistor shown below using the CoolSPICE Schematics Editor. All the passive components can be found in the Analog Library in the Schematics Editor

1. Transistor Characteristics:

   a. What do the parameters L1, L2 and K1 represent for the transformer?
   b. What are the values of L1, L2 and K1?
   c. What is the turns ratio of the transformer?

2. Plot the voltage and current at the primary and secondary using the transient analysis. What are the primary voltage and current? What are secondary voltage and current?

3. Add diode in series with resistor to form a Half-Wave Rectifier. Plot the voltages at the secondary before and after the diode. Use Diode 1N4007 found in the Discrete Parts Library in CoolSPICE.

4. Add capacitor parallel to resistor to obtain an AC ripple of 2V. Calculate the size of the capacitor you need using the approximate expression in the Lab manual. Does your calculated value agree with the simulated results given by CoolSPICE? By how much do they differ?

5. What size capacitors do you need to give a 0.5V ripple? How big does the ripple get if you use a 100uF capacitor?

6. Do you want a big ripple or a small ripple in order to make a DC power supply?

7. Calculate the power this DC supply delivers to the 10Ω load resistor R1.

