ECE 311 - Fundamentals of Electronics Lab

Department of Electrical and Computer Engineering
University of Idaho

Title: Rectifiers

Goal: To design and verify the operation of a "half-wave" and "full-wave bridge" rectifier.

Preliminary: (Follow preliminary requirements. Due at the beginning of the laboratory period)

1. Select a value for RL for a half-wave rectifier (depicted in Figure 1) so $i_{L,peak} \approx 1mA$ when vs = $10V_{peak}$. Choose a standard 5% resistor value. Check the circuit solution using LTSpice. Let the frequency of vs be 60Hz. Show plots of vs, vo, and i_{D1}.
2. Using the same values for RL, vs, and the frequency of vs from 1), determine the expected value of $i_{L,peak}$ for a full-wave rectifier depicted in Figure 2. Simulate the circuit in LTSpice. Show plots of vs, vo, and i_{D1}.

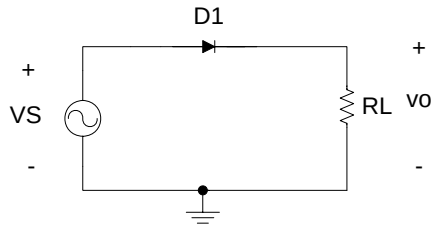

Figure 1 Schematic for a half-wave rectifier

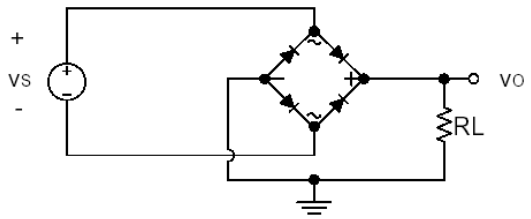

Figure 2 Schematic for a full-wave rectifier

Laboratory Procedure:

1) Select, measure, and record the value of a resistor based on your calculation in the preliminary.
2) Build the half-wave rectifier depicted in Figure 1. Sketch the waveform at vs and vo. Calculate $i_{d,peak}$.
3) Repeat 2) using the resistor from 1) with the full-wave rectifier depicted in Figure 2.