Basic Semiconductors Module Writeup

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Purpose:

 To practice AC/DC Conversion, using diodes, power supply filtering, and to build a useful circuit(variable power supply).

Procedure:

  1) Measure the I-V characteristics of a 1N914 diode.

  2) Build a half-wave rectifier

  3) Build a full-wave rectifier

  4) Build a regulated power supply using an LM317 variable voltage regulator.

Data/Analysis:

  1)   Based on the I-V graph the diode turns on at 0.7 V, and is non-ohmic.

  2)   A simple half-wave rectifier gets rid of the negative voltage values within the output signal (Fig. 1), adding a capacitor to filter the

         output closes the gap between min and max voltages on the output signal (Fig. 2), and further increasing the load resistance

        from 1k Ohms to 10k Ohms, smoothes out the output signal even more (Fig. 3).

   3)   The same tests were performed as in step 2), except this time with a full-wave rectifier. Its clear that the output signal gets even

        smoother with higher load resistances, but also the frequency of the capacitor's charge and discharge appear to double (more

         smoothness) (Fig. 4).

  4)   The regulated power supply circuit was built just as the schematic provided, except with an LM317 rather than an LM317LZ

         (Fig. 5). Interchanging the load resistance with either the 1k Ohm or 10k Ohm resistor made no change in the output voltage.
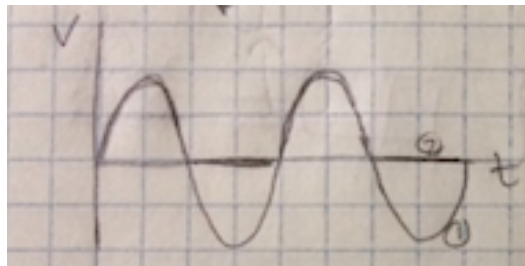
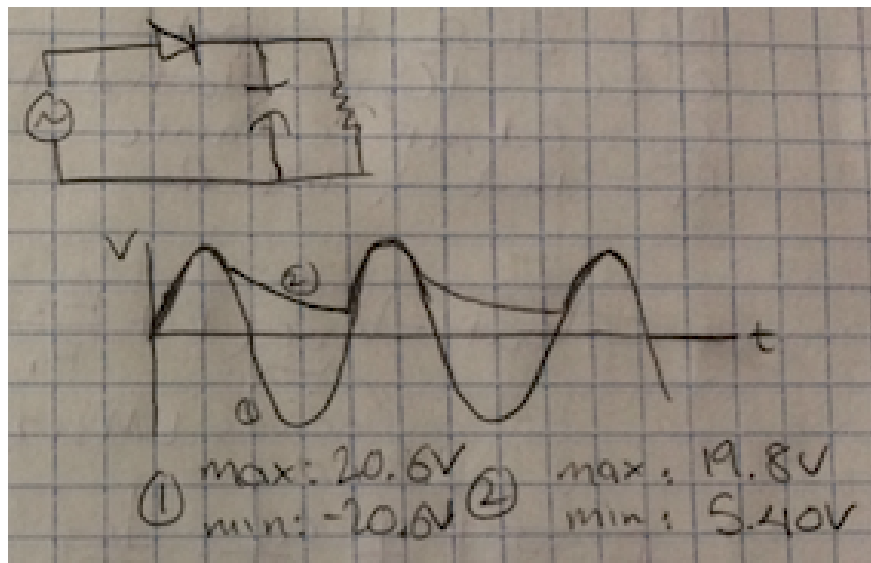Figure 1: This is a caption

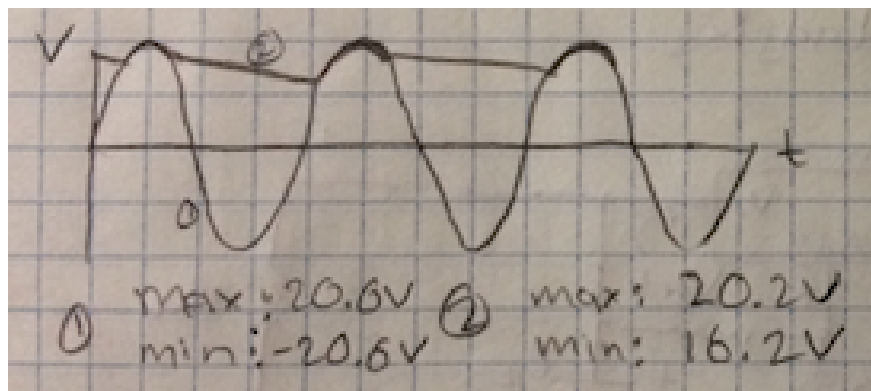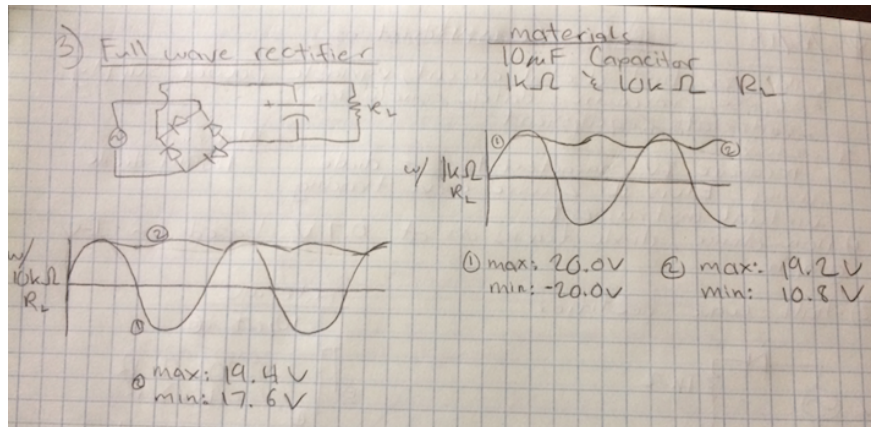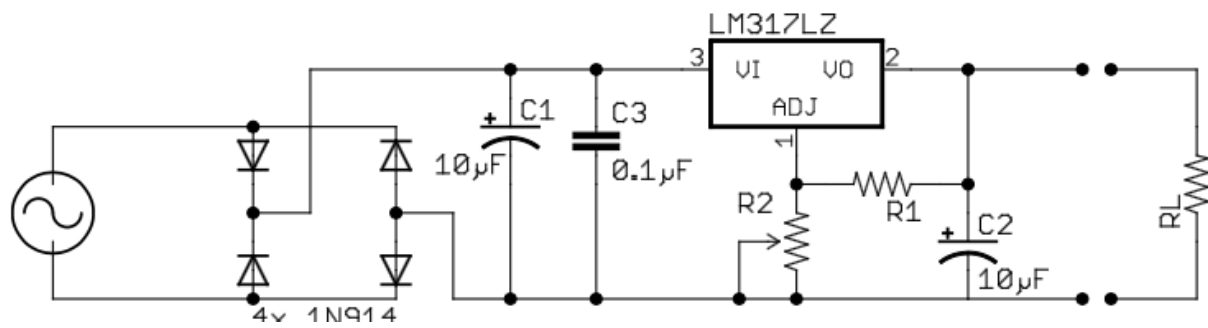Figure 2: This is a caption

Figure 3: This is a caption

Figure 4: This is a caption

Figure 5: This is a caption