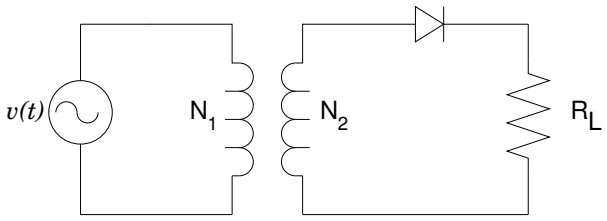
Physics 536 - Assignment #4

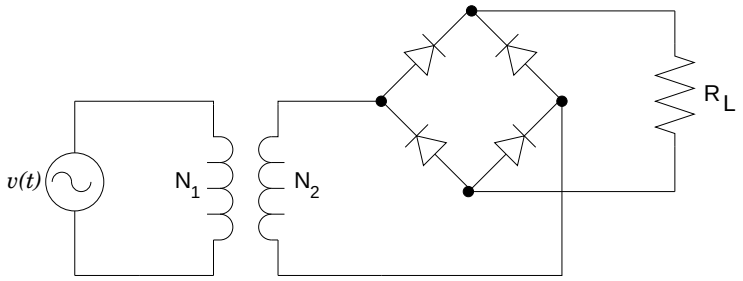
1. In the following, treat the diodes as idealized devices that allow current to flow in one direction only, ignoring any voltage drop across them.

(a) Consider a transformer being driven by an AC voltage source with RMS amplitude V_0. Calculate the peak amplitude of this voltage source and sketch its waveform.

(b) If the transformer in the circuit shown below has a turns ratio of $n = N_2/N_1$, sketch the waveform of the voltage across the load R_L, comparing it with the waveform in (a). Calculate the RMS voltage, V_L, across the load.



(c) The diodes in the circuit shown below are in a configuration referred to as a bridge rectifier. Sketch the waveform of the voltage across the load, R_L, and calculate the RMS voltage of this waveform.



(d) Suppose the transformer has a center tap that is held at ground potential and is connected in the configuration shown below. Sketch the waveform for the voltage across R_L in this configuration and calculate RMS voltage.