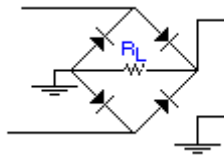


Homework #3
Diode Rectifiers

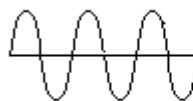
Due: Tuesday, 2 March (Can be turned in the studio during open shop times or by 5 PM at Prof. Connor's Office, JEC 6002) The solution will be posted the evening of 2 March.

Below are two diode circuit configurations and two figures showing the input and ideal output voltages for these circuits. Indicate which input/output voltage pairs go with which circuit. Also, one circuit is a half-wave rectifier and one is a full-wave rectifier. Label which is which.

Circuit One



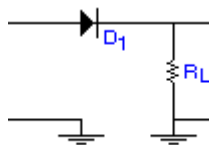
Input Voltage



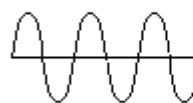
Output Voltage



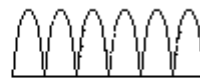
Circuit Two



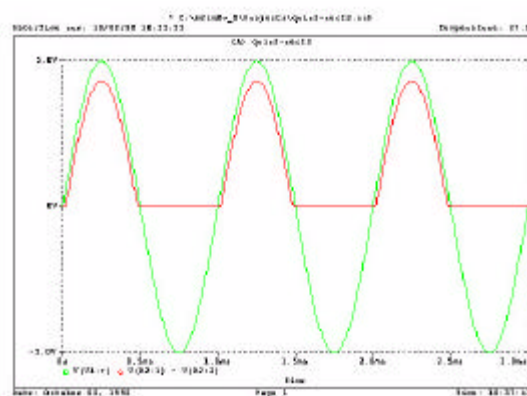
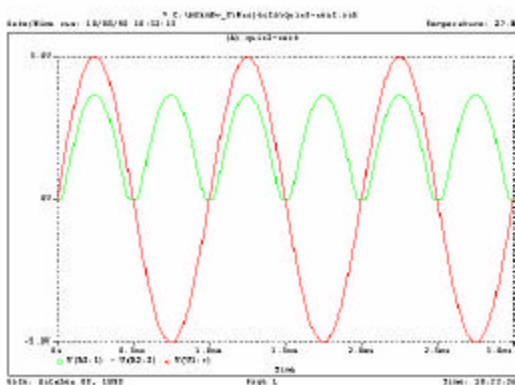
Input Voltage



Output Voltage



When we use PSpice to simulate the response of a real diode (1N4148, for example) we obtain a slightly different output response. Shown below are Probe plots for these two circuits configured with 1N4148 diodes and 1kΩ resistors. Again, label which goes with which circuit. Then note and explain any differences between the ideal and more realistic response obtained from PSpice. Just for reference purposes, the input voltage in the two cases below is 10 volts peak-to-peak.



If you wanted to add smoothing to these rectifiers, what would you do? Show your answer by modifying the circuit diagrams above. How will the output change when you add smoothing?