

## Homework 1

1.

- (1) Determine whether each silicon diode in Figure 1 is forward-biased or reverse-biased.
- (2) Determine the voltage across each diode in Figure 1, assuming the practical model.
- (3) Determine the voltage across each diode in Figure 1, assuming an ideal diode.
- (4) Determine the voltage across each diode in Figure 1, using the complete diode model with  $r'_d = 10\ \Omega$  and  $r'_R = 100\ \text{M}\Omega$ .

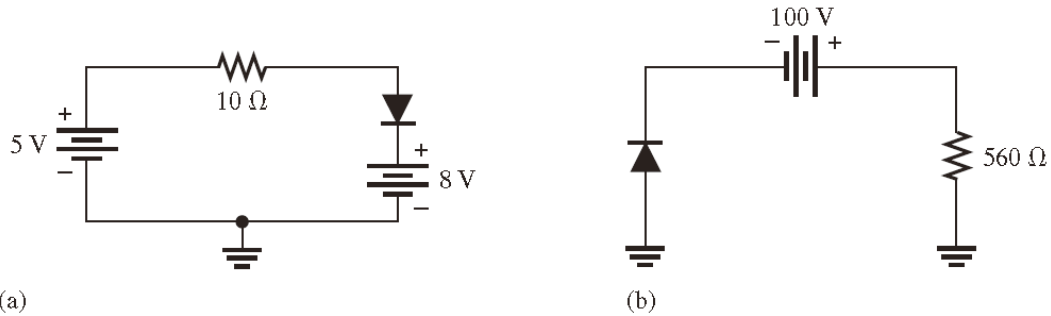


Figure. 1

2.

- (1) Draw the output voltage waveform for each circuit in Figure 2 and include the voltage values (diode is ideal).
- (2) What is the peak inverse voltage across each diode in Figure 2 (diode is ideal).
- (3) What is the peak forward current through each diode in Figure 2 (diode is ideal).

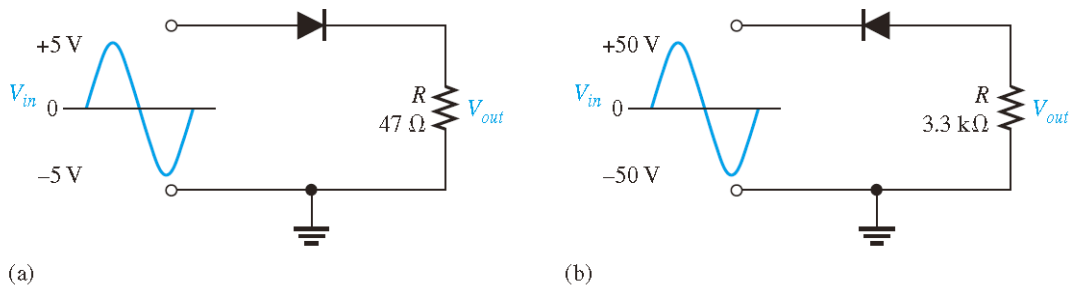


Figure. 2

3.

- (1) Determine the peak and average voltage delivered to  $R_L$  in Figure 3 for both ideal diode and non-ideal diode.
- (2) Determine the peak and average power delivered to  $R_L$  in Figure 3 for both ideal diode and non-ideal diode.

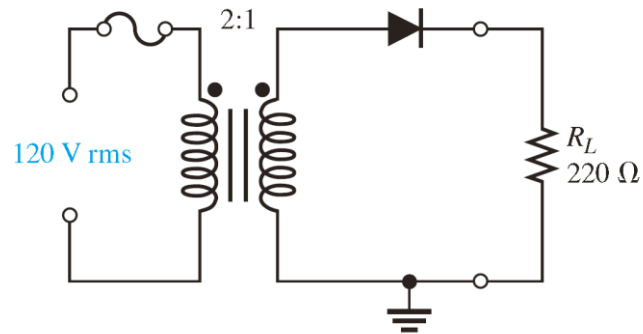


Figure. 3

4. Consider the circuit in Figure 4 (diode is non-ideal)

- (a) What type of circuit is this?
- (b) What is the total peak secondary voltage?
- (c) Find the peak voltage across each half of the secondary.
- (d) Sketch the voltage waveform across  $R_L$ .
- (e) What is the peak current through each diode?
- (f) What is the PIV for each diode?

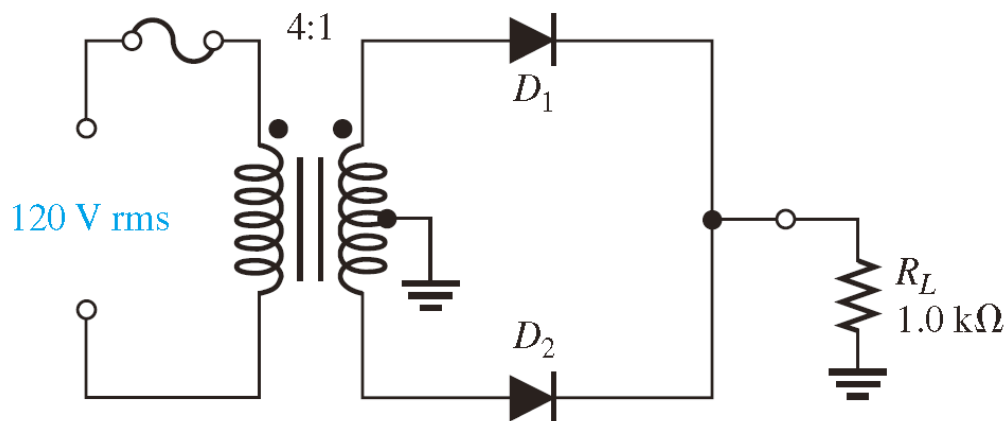


Figure. 4

5. Draw the output voltage waveform for the bridge rectifier in Figure 5 for both ideal diode and non-ideal diode cases.

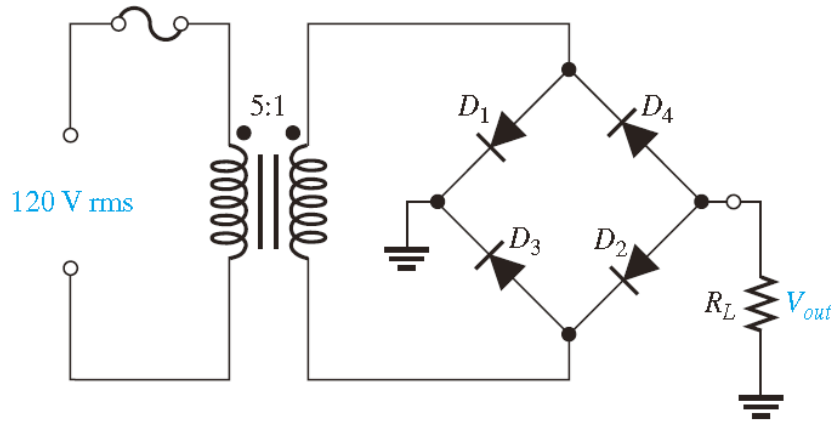


Figure. 5