After reading the assigned sections 3.1, 3.2, 3.3, and 3.4, you should be able to answer to the following questions.

Section 3.1
1. Define forward bias, reverse-bias and breakdown voltage for a diode.
2. What is the knee voltage (often called turn-on voltage) of a silicon diode and how it changes with temperature?
3. What is the typical reverse current of silicon diodes and how it changes with temperature?
4. What is the Zener diode and what are the two mechanisms responsible for the reverse breakdown?

Section 3.2
1. Why load-line technique is used to analyze diode circuits?
2. Go over Example 3.1 to see how load-line and operating point of the circuit are determined.

Section 3.3
1. When the ideal-diode model is used?
2. In the ideal model, the diode is either in the on-state or in the off-state. Explain what is the equivalent circuit for the diode in each state.
3. What are the three steps to analyze circuits containing ideal-diodes?

Section 3.4
1. Explain how the output voltage for the half-wave rectifier circuit is derived in Fig. 3.11. What is the difference between ideal-diode and real-diode behaviors?
2. How the smoothing capacitor reduces the ripple at the output (pay close attention to Fig. 3.12b)?
3. Derive Eq. 3.4 for the value of the smoothing capacitor.
4. What is the peak inverse voltage for the half-wave rectifier circuit with and without the smoothing capacitor?
5. Study the current path for both positive and negative half-cycles in the case of diode-bridge full-wave rectifier in Fig. 3.14.
6. Why the equation for the smoothing capacitor for full-wave rectifier (Eq. 3.6) is different from Eq. 3.4 by a factor of 2.

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http://www.soe.ucsc.edu/classes/ee171/Spring04/ReadingQuestions3a.html 4/7/2004