Name: _____ Section: _____

EE241: Electronics I
Problem Set 5
(Due 2/09/09)

These problems are based on Hambley, sections 3.4, 3.5, and 3.7. Please complete the problems in pencil on engineering paper and attach them by staple to this cover sheet.

1. Problem 3.20
2. Problem 3.21 (Assume ideal diodes (i.e. no 0.6V offset))
3. Problem D3.26 (You may assume ideal diodes)
4. Problem D3.28
5. Problem 3.35
6. Problem 3.36
7. Problem D3.47

Now let's continue our consideration of the design process for multistage circuits, following the "Anatomy of a Circuit Design" analysis of a function generator that follows Chapter 3 in your book. Read pages 203-210. Then do the following:

8. Referring to Figure AD1.5 on p. 205:
   - In the region defined by $-0.6V < v_s < 0.6V$, which diodes are conducting?
   - In the region defined by $0.6V < v_s < 1.2$ V, which diodes are conducting?
   - In the region defined by $v_s >= 1.2$ V, which diodes are conducting?
   - In the region defined by $-1.2V < v_s < -0.6$ V, which diodes are conducting?
   - In the region defined by $v_s <= -1.2$ V, which diodes are conducting?
   - What is the purpose of R6 and R7 in the circuit shown in Figure AD1.10?
   - What is the purpose of the non-inverting amplifier before the output in the circuit shown in Figure AD1.10?

9. Redesign the triangle-to-sine-wave converter portion of the circuit for 10V peak signals.

10. Simulate the complete circuit in Multisim, first with the 5V output magnitude, and then with the 10V output. Include printouts of your simulation waveforms with your homework. (The sine waves for the 10V generator should have as pretty a shape as those of the 5 V—if they are more triangular or square, then examine carefully your choices for resistors $R_6 - R_{10}$.)