ECE 301
Fall Semester, 2006
HW Set #3

Due: Sept 19, 2006 Name _____
wlg Print(last, first)

circle: 2:10 section 3:40 section

Use Engineering Paper. Work only on one side of the paper. Use this sheet as your cover sheet, placed on top of your work and stapled in the top left-hand corner. Number the problems at the top of the page, in the center of the sheet. **Do neat work**. **Underline your answers. Show how you got your equations**. **Be sure to show how you got your answers. Each problem counts 10 points.**

1. Work problem 3.53 from the text with the following instructions.

   (a) Find the short circuit current, I_{sc}, by replacing the 2 Ω load resistor with a short. Use Node analysis to solve for this current. Ans: $I_{sc} = -0.42$ A.

   (b) Find the open circuit voltage, $V_{sc} = V_{TH}$. To do this, remove the 2 Ω resistor and calculate the voltage where the resistor is removed. Call this voltage V_{oc} and assume V_{os} is positive at the top terminal. Use mesh analysis to find this voltage. Ans: $V_{os} = -2$ V.

   (c) Find the Norton equivalent circuit: That is,

$$I_{Norton} = I_{sc}; \qquad R_{Norton} = R_{TH} = \frac{V_{oc}}{I_{sc}}$$

   Ans: $R_{TH} = 4.75\ \Omega$

   Draw the Norton equivalent circuit.

(2) Consider the circuit of Figure P 3.55.

   (a) Find the Thevenin equivalent circuit that the resistor R_L sees. Ans: $V_{TH} = 0.01$ V, $R_{TH} = 504\ \Omega$
   (b) If $R_L = 300\ \Omega$, use the Thevenin equivalent circuit to find V_{ab}, Ans: $V_{ab} = 0.00373$ V.

(3) Work problem 3.57 from the text. Include: Draw the Thevenin equivalent circuit.

   Ans: $V_{TH} = 2$ V, $R_{TH} = 10\ \Omega$

(4) Work problem 3.66 from the text. Include: Draw the Thevenin equivalent circuit.

Ans: $V_{TH} = 2.44$ V, $I_{sc} = I_{Norton} = 198.8$ mA

(5) You are given the circuit of Figure 5.

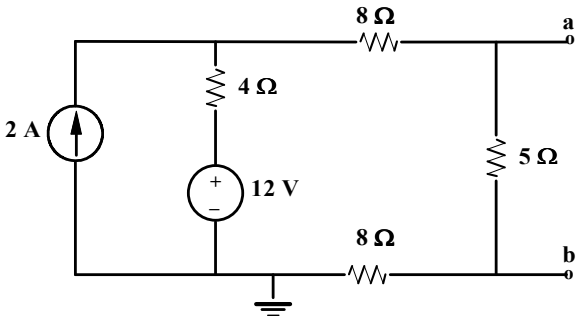

Figure 5: Circuit for problem 5.

(a) Develop and draw the Thevenin equivalent circuit. Ans: $V_{TH} = 4$ V, $R_{TH} = 4\ \Omega$

(b) Develop and draw the Norton equivalent circuit. Actually find the short circuit current in Doing this. Ans: $I_{sc} = I_{norton} = 1$ A.