

EE3204 D2015
HW Set 1

Due in class Friday March 20.

All text problems from Sedra and Smith, *Microelectronic Circuits*, 6th edition.

To make life easier on the graders:

- Be sure your NAME and ECE MAILBOX NUMBER are prominently displayed on the upper right corner of what you hand in.
- When appropriate, indicate answers with a box or underline
- Work as neatly as possible

1) Text 1.3 (p. 42) [Ohm's Law refresher]

2) Text 1.5 (p. 42) [Resistor combination refresher]

The technique described in this problem is often used to quickly change resistor values (without having to break connections) to try different design options in an already-built circuit.

3) Text 1.6 (p. 42) [Voltage divider refresher]

4) Text 1.16 (p. 43) [Circuit analysis refresher]

The "Which method do you prefer" question is really the most important part! One skill you need to develop to become a good circuit designer is knowing which analysis technique provides the quickest and easiest path to the desired result.

5) Text 1.23 (p. 45) [Signal source refresher]

6) Text 1.45 (p. 46) [Amplifier modeling refresher]

7) Text 2.9 (p. 109) [Op-amp refresher]

The allowable variation in gain for a particular application directly determines the allowable variation in component values (tolerance).

MORE ON THE NEXT PAGE!!!

8, 9) (Weight = 2 problems) [Superposition, Thevenin, pSpice refresher]

For the circuit shown in Figure 8 below,

- Use nodal analysis to find the open circuit voltage V_{OC} (which will be the Thevenin equivalent voltage V_T for the circuit inside the dotted box).
- Confirm your answer from (a) by using superposition to find the open circuit voltage V_{OC} .

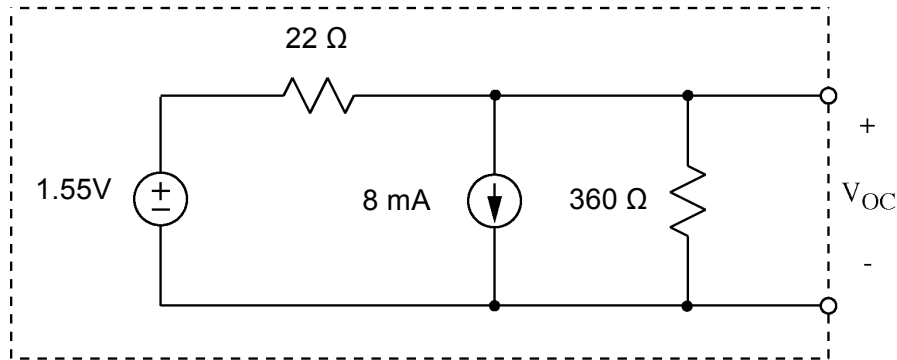


Figure 8.

- Determine the Thevenin equivalent for the circuit inside the dotted box. Sketch the Thevenin equivalent circuit, indicating numerical values for V_T and R_T .
- Using a DC sweep in pSpice, simulate the V-I characteristic of both the circuit in Figure 8 and your Thevenin equivalent from (c) and verify that they have the same V-I characteristic.

10) [Thevenin refresher]

A load resistor is attached to the circuit of Figure 8, as shown in Figure 10 below.

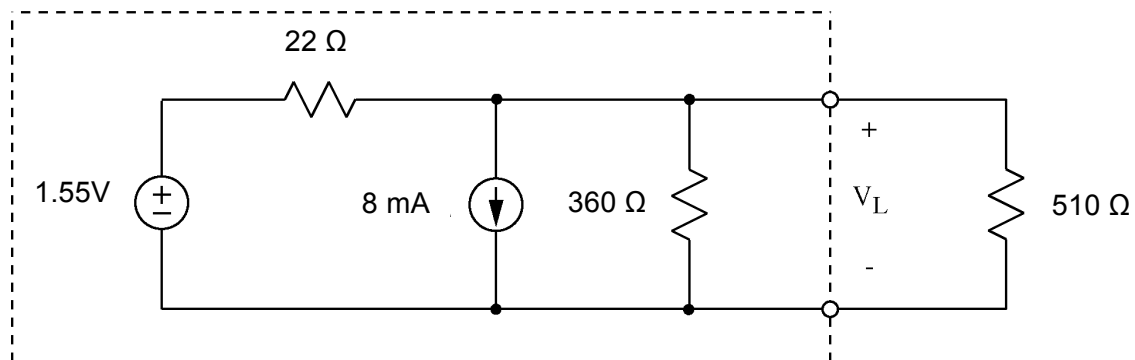


Figure 10.

- Using the Thevenin equivalent from problem 8, determine voltage v_L .
- Confirm your result from (a) using nodal analysis or superposition.