ECE 2201 – CIRCUIT ANALYSIS I

HOMEWORK #9

1. a) Find the Norton equivalent as seen by the 1[k] resistor.

b) Find *vQ* for the circuit shown in Figure 1.



2. In the circuit below, the resistor *R3* models a light bulb.

1. Use superposition to find *iX*.
2. Find the Norton equivalent as seen by the independent current source, *iS2*.
3. Find the power delivered by the independent current source, *iS2*, in the circuit below.



3. Use the circuit shown below to solve this problem.

1. Find the Norton equivalent as seen by the *iS2* current source.
2. Find the power delivered by the *iS2* current source to this circuit.



4. Use the circuit shown to solve this problem.

1. Use superposition to find the voltage *vX*.
2. Find the Thévenin equivalent as seen by the 5[mA] current source.
3. Find the power delivered by the 5[mA] current source.



5.  The circuit below has an independent current source with a value of *iS2*.

1. Find the Thévenin equivalent of this circuit as seen by the independent current source.
2. Find the power absorbed by the independent current source in this circuit, as a function of *iS2*.



6. For the speaker in this circuit, the voltage across it is always proportional to the current through it. Find the maximum amount of power that the circuit can deliver to the speaker.



7. Use the circuit below to solve. The power absorbed by *RL* is the largest possible, when *RL* is 2.7[]. Find the value of *X* that makes this statement valid. Include any appropriate units in your solution.



Selected Numerical Solutions:

1. *vQ* = -8.53[V]

2. *pDEL.BY.ICS* = 8[mW]

3. *pDEL.BY.iS2* = -302.5[mW]

4. *pDEL.BY.5[mA]CS* = -16.7[mW]

5. a) omitted

5. b) 

6. 

7. *X* = -5.147[]