ECE 2300 – CIRCUIT ANALYSIS

HOMEWORK #6

1. For the circuit shown, calculate the Thévenin equivalent resistance with respect to terminals a and b.

Next slide



PEQWS Module 4 Problem 1

2. For the circuit shown, find the Thévenin equivalent circuit with respect to terminals a and b. Draw the Thévenin equivalent circuit. On the drawing, clearly show the terminals a and b, the value of the circuit elements, and the reference voltage for the Thévenin voltage source.



PEQWS Module 4 Problem 2

3. a) Find the Norton equivalent as seen by the 22[k] resistor.

1. Attach the Norton equivalent that you found, to the 22[k] resistor. Use this circuit to solve for *iQ*.



PEQWS Module 4 Problem 3

4. The device in Figure 1 can be modeled with a voltage source in series with a resistance. The current and voltage for the device are related as shown in the plot in Figure 2. The device has been connected in a circuit shown in Figure 3. Find *iX*. PEQWS Module 4 Problem 4



5. For the circuit shown, find the Thévenin equivalent circuit as seen with respect to terminals a and b.

Draw the equivalent circuit that you found.

On this equivalent circuit you have drawn, show the values for the circuit components, and label terminals a and b.



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

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



7. 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.



8. 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.



9. 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.



10.  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*.



11. A man goes to visit a prisoner at a jail. When he arrives at the jail, one of the jailers asks him whom he is there to visit. The man replies,

“Brothers and sisters I have none,

This man’s father is my father’s son.”

Who is the man coming to visit?

Selected Numerical Solutions:

1-4. Solutions omitted here.

5. *vTH* = -2000[V] (sign depends on polarity of source with respect to terminals), *RTH* = -200[]

6. *vQ* = -8.53[V]

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

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

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

10. 

11. Solution omitted.