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Engineering 210
Quiz #6
Post-Mortem

Class,

Quiz #6 is done and finalized. All papers have been graded and returned to the Glennan labs. Please check blackboard for errors and contact me if there are any.

Solutions for quiz #6 are up on the website.
IMPORTANT – The original solution had an error on both problems. In the original solution, problem #1 part A and part B were incorrectly listed as 8 ohms and 18 watts. The correct answers are 0 ohms and 72 watts. This is explained in further detail below. Also in the original solution, problem #2 had a sign error that resulted in small deviations from the right answer. The correct answer for part C for node Va in problem #2 is 15.8V, not 16.2V. This is also explained below.

The average for quiz #6 was 10.98. The high was 19. The low was 4 out of those that took the quiz. This is not a good average and many of you have some work to do. Node voltage analysis especially is where many of you faltered. This concept and many others like it is not going to go away. It will appear on subsequent quizzes, on subsequent homewors and on the final exam,; I can guarantee it. Please see me or one of the other TA's if you need help with node voltage analysis or dependent source analysis. It is best to take care of any fundamental concept problems like node voltage now because fundamental concepts like node voltage are the basis for more difficult concepts in the class down the road.

Right off the bat I want to point out something. There were 35 students who came to my quiz recitation on Thursday night before the quiz. Of those 35 students, their average on quiz 6 was 12.5, a full point and a half higher than the rest of the class. This is a big difference. I suggest all students who are not completely confident with the material to attend the quiz recitation and other offered recitations.

Problem 1:

As I said above, the original solution was incorrect. The original solution had part A as 8 ohms and part B as 18 watts. This was wrong. Many people, including me at first, incorrectly assumed that the maximum power occurred when the source resistance was equal to the load resistor of 8 ohms. For a fixed source resistance, the maximum power in the load resistance occurs when the load resistance is equal to the source resistance. However, for a fixed load resistance the maximum power in the load resistance occurs when the source resistance is 0 ohms. Because the variable resistor in this case is the source resistor the maximum power dissipated in the 8 ohm resistor occurs when the source resistance is 0 ohms. Subsequently, this will make the maximum power in part B equal to 72 watts through a simple ohm's law equation. Part C is decrease. For the most part, people did well with this problem. Many

people wrote down 8 ohms for part A and 18 watts for part B. If you did this, I only took off two points total.

Problem 2:

- PART A: As I said above, the original solution had a sign error. The new solution is correct and should be posted by the time you read this. This is the problem everyone had the most trouble with. Most scores on this problem were quite low due mainly to not understanding how to write node voltage equations. The biggest problem for most people was associated with the 16V, 2 ohm resistor connection on the left side of the circuit. The current ix is simply the current flowing through the 2 ohm resistor. Va DOES NOT equal 16 volts in this case because of the 2 ohm resistor. Instead, and because of the orientation of ix in the problem (And this is where I initially made the sign error in the original solution), the current ix is equal to -(Va – 16)/2. This is the answer we were looking for. In writing down the equation, you first look to ground, because the current ix starts from ground, and you traverse through the resistor, through the voltage source, and finally to the node Va.
- Part B: Most people did better on the Vb equation. However, many people wrote down ix in terms of a KCL equation at node A. This, although correct, lost you points because the problem specifically asked for ix in TERMS OF Va and Vb. Therefore, writing down a KCL equation for part B only got you partial credit.
- Part C is just math. You got points depending on your work and previous equations.