EGR 271 Due date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Circuit Theory I

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**MATLAB Assignment #1**

Work each problem below and submit the assignment to the instructor. You can ask other students questions, but you work should essentially be your own. Copying others files is strictly prohibited. Evidence of copying will result in grades of 0 for all parties involved.

In general submit the following items:

* All required hand calculations
* All MATLAB programs
  + Be sure to begin with a block of comments including name, course number, assignment number, problem, and a brief description of the problem.
  + Include comments throughout each program. Use comments to indicate units for variables.
* All required MATLAB outputs

1. ***Voltage division program***: Write a MATLAB program to analyze using voltage division. Assume that the circuit is a series circuit containing a voltage source and 4 resistors.

* Prompt the user to enter the value of each resistor in ohms and the voltage source in volts.
* Use MATLAB to calculate the voltage across each resistor using voltage division. Display the voltage across each resistor with 1 digit after the dp. Identify the variable and units (e.g.: VR1 = 26.2 V)
* Test the program for the following cases:

1. R1 = 120 Ω, R2 = 240 Ω, R3 = 60 Ω, R4 = 180 Ω, V = 100V
2. Values that you select

* Work the first test case by hand to verify that the results are correct.

1. ***Delta-to-Wye conversion program***: Write a MATLAB program to convert a delta resistive circuit to a wye circuit.

* Prompt the user to enter the delta circuit values of RA, RB, and RC.
* Use MATLAB to calculate the resulting wye circuit values (R1, R2, and R3). Display the resistance values with 2 digits after the dp. Identify the variable and units (e.g.: R1 = 25.35 ohms)
* Test the program for the following cases:

1. RA = 180 Ω, RB = 240 Ω, RC = 120 Ω
2. Values that you select

* Work the first test case by hand to verify that the results are correct.

1. ***Symbolic relationships***: Write a MATLAB program to find the quantities indicated below using symbolic calculations:

* If q(t) = 25e-2t mC, find and expression for i(t) (remember to use q, not q(t) for the variable name and to avoid using i)
* If i(t) = 10e-2t A, find q(t) over the range (0,2)
* If w(t) = 100cos(40t) J, find an expression for p(t)
* If p(t) = 50sin(10t) mW, find w(t) over the range (0, 0.1)
* Verify the results for each part by hand.

1. ***Work problem 1-18(a,b) symbolically using MATLAB***: Write a MATLAB program to complete problem 1-18(a,b) as follows:

* Enter symbolic expressions for v and i
* Calculate symbolic expression for p
* Complete part a of the problem by evaluating p using subs ( ) at the value of t indicated. Nicely display the results.
* Complete part b by integrating p over the limits indicated. Nicely display the results.