

Name: _____ (Print)

Signature _____

Date: _____

ECE 2300 -- Quiz #3
S.R. Brankovic Section – TuTh 8:30 AM
Feb. 28th, 2006

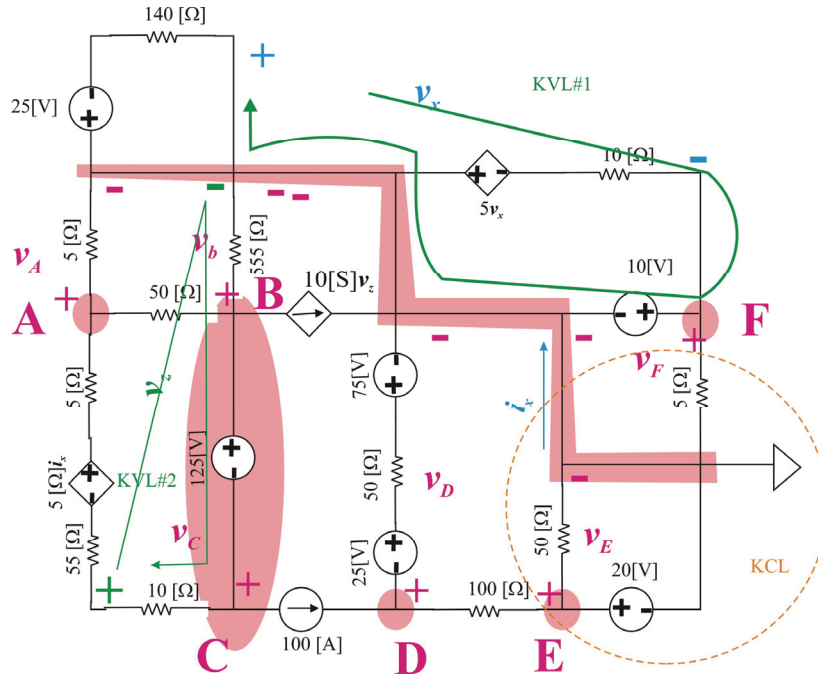
**KEEP THIS QUIZ CLOSED AND FACE UP
UNTIL YOU ARE TOLD TO BEGIN.**

1. This quiz is closed book, closed notes.
2. Show all work on these pages. Show all work necessary to complete the problem. A solution without the appropriate work shown will receive no credit. A solution which is not given in a reasonable order will lose credit.
If your work continues on to another page, indicate clearly where your work can be found. Failure to indicate this clearly will result in a loss of credit.
4. Show all units in solutions, intermediate results, and figures. Units in the quiz will be included between square brackets.
5. Do not use red ink. Do not use red pencil.
6. You will have 25 minutes to work on this quiz.

_____ /100 %

Solution:

After labeling our essential nodes voltages and our reference node we are ready to start:



$$\text{A: } \frac{v_A}{5[\Omega]} + \frac{v_A - v_B}{50[\Omega]} + \frac{v_A - v_C - 5[\Omega]i_x}{5[\Omega] + 55[\Omega] + 10[\Omega]} = 0$$

Super node B+C

$$\text{B+C: } \frac{v_B}{555[\Omega]} + \frac{v_B - v_A}{50[\Omega]} + 10[S]v_z + \frac{v_C - v_A + 5[\Omega]i_x}{10[\Omega] + 55[\Omega] + 5[\Omega]} + 100[A] = 0$$

$$\text{B+C: Const. Eq.: } v_B - v_C = 125[V]$$

$$\text{D: } -100[A] + \frac{v_D - v_E}{100[\Omega]} + \frac{v_D - 75[V] + 25[V]}{50[\Omega]} = 0$$

$$\text{E: } v_E = 20[V] \quad \text{-voltage source between node and the reference node situation}$$

$$\text{F: } v_F = 10[V] \quad \text{-voltage source between node and the reference node situation}$$

$$i_x: i_x = \frac{v_D - v_E}{100[\Omega]} + \frac{v_F}{5[\Omega]} \quad \text{-KCL for closed surface}$$

$$v_x: v_x = -v_F \quad \text{- KVL\#1}$$

$$v_z: v_z = v_C + \frac{v_C - v_A + 5[\Omega]i_x}{55[\Omega] + 5[\Omega] + 10[\Omega]} \cdot 10[\Omega] = v_C + \frac{v_C - v_A + \left(\frac{v_D - v_E}{20} - v_F\right)}{7}$$

KVL#2