

Name _____

EE 2240

Exam #1

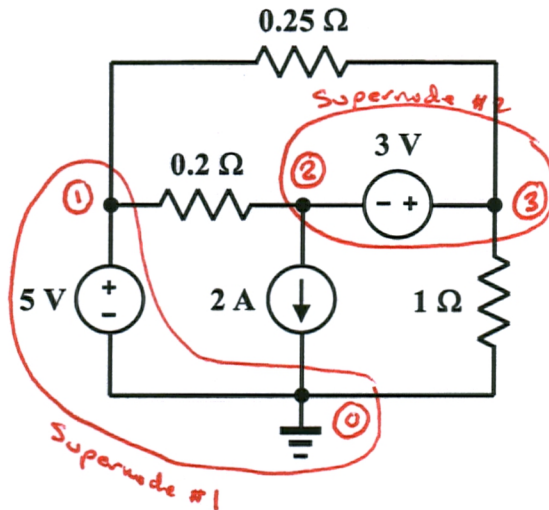
Thursday, September 21, 2017

LIBR B32 and TAB 115, 9:30AM – 10:45AM

[closed book – one two-sided 8½"×11" page of notes and calculator allowed, nothing else]

**Work must be shown in a neat and orderly fashion if you expect to receive partial credit.
Clearly define any and all new variables you use in your solutions.**

1. Use the nodal analysis method to formulate a system of simultaneous linear equations representing the circuit shown below. Express the equations in the standard matrix form discussed in class.



$V_1 = 5V$ (constraint equation for supernode #1)

$V_3 - V_2 = 3V$ (constraint equation for supernode #2)

$5(V_2 - V_1) + 2 + 1(V_3) + 4(V_3 - V_1) = 0$ (KCL for supernode #2)

In matrix form:

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 1 \\ -9 & 5 & 5 \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \\ V_3 \end{bmatrix} = \begin{bmatrix} 5 \\ 3 \\ -2 \end{bmatrix}$$