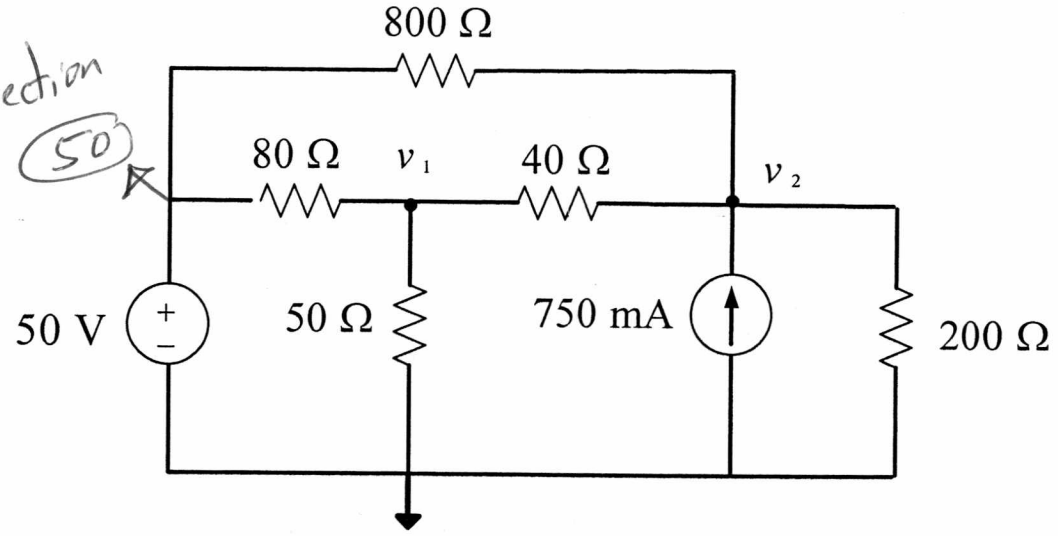
EE 202-02-Fall 2013(131)
QZ1

Sec	Ser	ID	Name	KEY



by inspection (50)

For the circuit shown above use the node voltage method to find the node voltages v_1, v_2 ?

KCL on node V_1

$$\frac{V_1 - 50}{80} + \frac{V_1}{50} + \frac{V_1 - V_2}{40} = 0$$

$$\Rightarrow 23V_1 - 10V_2 = 250 \quad \text{— (1)}$$

KCL on node V_2

$$\frac{V_2 - V_1}{40} - 0.75 + \frac{V_2}{200} + \frac{V_2 - 50}{800} = 0$$

$$\Rightarrow -20V_1 + 25V_2 = 650 \quad \text{— (2)}$$

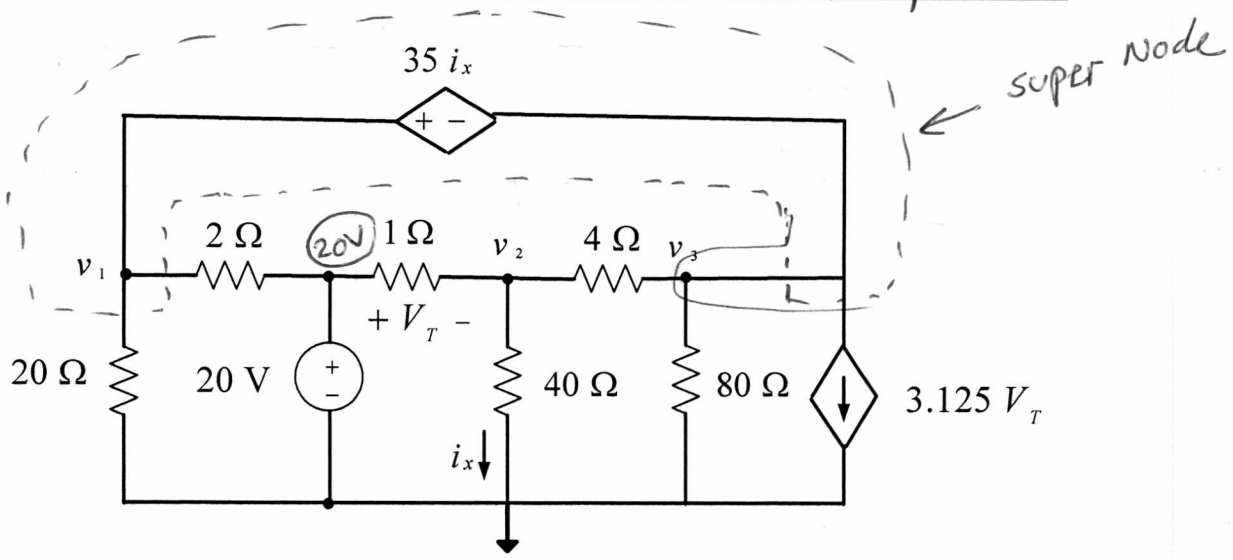
solving (1), (2)

$V_1 = 34$ V

$V_2 = 53.2$ V

EE 202-06-Fall 2013(131)
QZ1

Sec	Ser	ID	Name KEY



For the circuit shown above find the simplified nodal equations necessary to solve for the node voltages v_1, v_2, v_3 ? Do not solve the equations

KCL on supernode

$$\frac{V_1}{20} + \frac{V_1 - 20}{2} + \frac{V_3 - V_2}{4} + \frac{V_3}{80} + 3.125 V_T = 0$$

$$V_T = 20 - V_2$$

$$\Rightarrow 44 V_1 - 270 V_2 + 21 V_3 = -4200 \quad -(1)$$

KCL on node V_2

$$\frac{V_2 - 20}{1} + \frac{V_2 - V_3}{4} + \frac{V_2}{40} = 0$$

$$\Rightarrow 51 V_2 - 10 V_3 = 800 \quad -(2)$$

over $\Rightarrow$

KCL ~~on no~~ voltage source restriction $V_1 - V_3 = 35 i_x = 35 \frac{V_2}{40}$

$$\Rightarrow 8 V_1 - 7 V_2 - 8 V_3 = 0 \quad -(3)$$

$$\begin{bmatrix} 44 & -270 & 21 \\ 51 & 0 & -10 \\ 8 & -7 & 8 \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \\ V_3 \end{bmatrix} = \begin{bmatrix} -4200 \\ 800 \\ 0 \end{bmatrix}$$