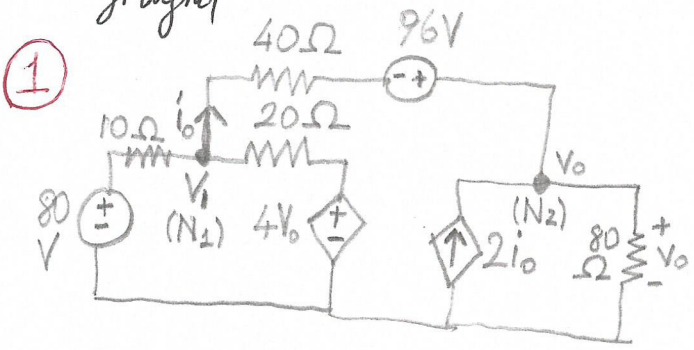
Ertuğrul KANTAR
0519000000086
Ertuğrul

(1)



$$i_o = \frac{V_1 + 96 - V_o}{40} \quad (I)$$

$$\text{Node-I}: \frac{V_1 - 80}{10} + i_o + \frac{V_1 - 4V_o}{20} = 0 \quad (II)$$

$$\text{Node-II}: -i_o - 2i_o + \frac{V_o}{80} = 0$$

$$\hookrightarrow \frac{V_o}{80} = 3i_o \quad (III)$$

$$40i_o = V_1 + 96 - V_o \quad (I)$$

$$2V_1 - 160 + 20i_o + V_1 - 4V_o = 3V_1 - 4V_o + 20i_o - 160 = 0$$

$$20i_o = 4V_o - 3V_1 + 160 \quad (II)$$

$$240i_o = V_o \quad (III)$$

(I) ve (II) den $\rightarrow V_1 - V_o + 96 = 8V_o - 6V_1 + 320$

$$7V_1 - 9V_o = 224 \quad (IV)$$

(I) ve (III) den $\rightarrow 6V_1 - 6V_o + 576 = V_o$

$$6V_1 - 7V_o = -576 \quad (V)$$

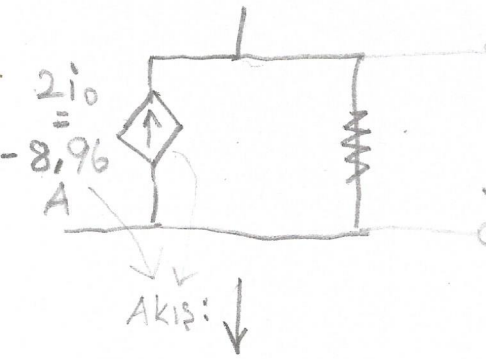
(IV) ve (V) den $\rightarrow 42V_1 - 54V_o = 1344$

$\hookrightarrow 42V_1 - 49V_o = -4032$

$$-5V_o = 5376 V$$

$$V_o = -1075,2 V$$

(III) ten $\rightarrow i_o = \frac{V_o}{240} = \frac{-1075,2}{240} = -4,48 A$



$P = (1075,2).(8,96) W$

* Gerilimin (+) kutbu buna gidiyor, o sebeple pozitif.

$P = 9633,792 W$ (Güç Üretiyor)

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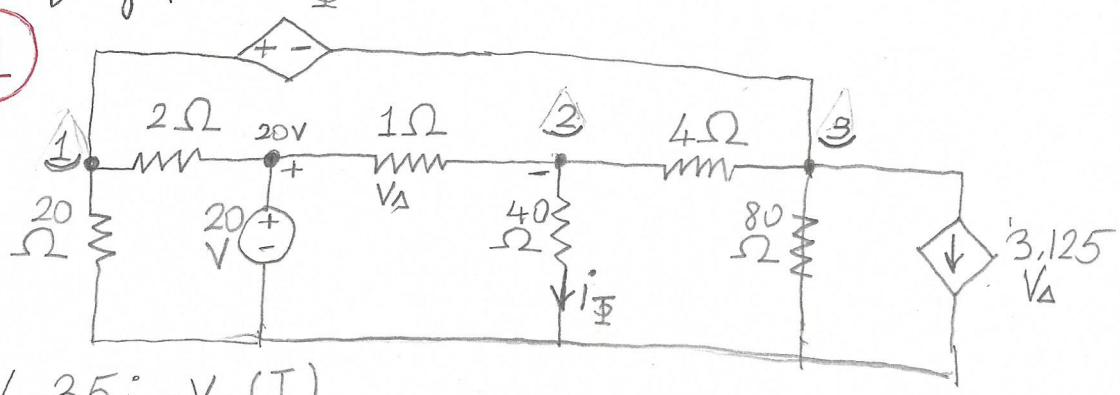
(2)



$V_1 - 35 i_\Phi = V_3$ (I)

$V_\Delta = 20 - V_2$ (II)

$i_\Phi = \frac{V_2}{40}$ (III)

$\frac{V_1}{20} + \frac{V_1 - 20}{2} + \frac{V_3 - V_2}{4} + \frac{V_3}{80} + 3{,}125 V_\Delta = 0$ (IV) → Super Node (1 ve 3)

$\frac{11V_1}{20} + \frac{21V_3}{80} - \frac{27V_2}{8} = -52{,}5$ (a)

Node 2: $\frac{V_2 - 20}{1} + \frac{V_2}{40} + \frac{V_2 - V_3}{4} = 0$ (V)

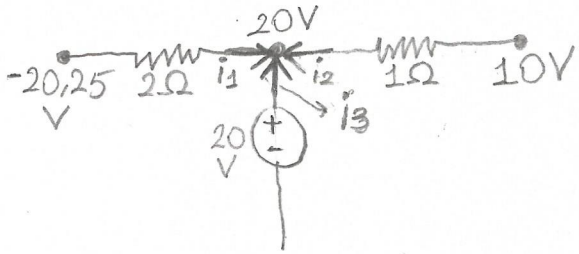
$\frac{51V_2}{40} - \frac{V_3}{4} = 20$ (b)

$V_1 - \frac{35V_2}{40} - V_3 = 0$ (c)

(I) ve (III) 'ten:

(a), (b), (c) denklemleri çözülürse

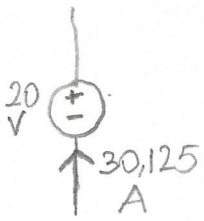
→ $V_1 = -20{,}25V$ $V_2 = 10V$ $V_3 = -29V$



$i_1 + i_2 + i_3 = 0$

$\frac{-20{,}25 - 20}{2} + \frac{10 - 20}{1} + i_3 = 0$

$i_3 = 30{,}125A$



$P_{source} = -(20 \cdot 30{,}125) = -602{,}5W$

→ Kaynak 602,5 W güç sağlar.