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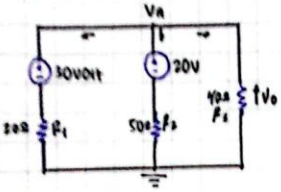
Tugas-ke : 3

Mata Kuliah : Tgl : Hal. : /

Hitung nilai tegangan Vo!



Dik : $R_1 = 20\,\Omega$ $V_1 = 30V$ $\Sigma I = 0$ $I_1 + I_2 + I_4 = 0$
$R_3 = 50\,\Omega$ $V_2 = 20V$ $\frac{VA-30}{20} + \frac{VA-20}{50} + \frac{VA}{40} = 0$
$R_4 = 40\,\Omega$ $Vo = ?$

$\frac{10VA - 300 + 4VA - 80 + 5VA}{200} = 0$

$19VA - 380 = 0$ $VA = \frac{380}{19}$

$19VA = 380$

$= 20V$

maka: $Vo = I_3 \cdot R_4$

$Vo = 0{,}5 \cdot 40$

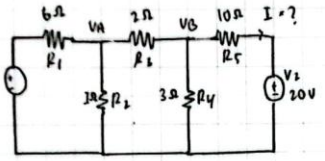
$Vo = 20V$

$\hookrightarrow Vo = -20V$ (berlawanan arah)

$\rightarrow I_3$

$I_3 = \frac{VA}{R_3} \rightarrow I_3 = \frac{20}{40} = 0{,}5A$

(4)



$\Sigma I = 0$ $\frac{VA-10}{6} + \frac{VA}{1} + \frac{VA-VB}{2} = 0$

Tinjau VA $\frac{VA-10+6VA+3VA-3VB}{6} = 0$

$\rightarrow 10VA - 3Vb - 10 = 0$ $\rightarrow 10VA - 3Vb = 10 \ldots (1)$

Tinjau VB :

$\Sigma I = 0$

$\frac{VB-20}{10} + \frac{VB}{3} + \frac{VB-VA}{2} = 0$

$\frac{3VB - 60 + 10VB + 15VB - 15VA}{30} = 0$

$\rightarrow 28VB - 15VA - 60 = 0$

$\rightarrow 28VB - 15VA = 60 \ldots (2)$

$10VA - 3VB = 10 \mid \times 3$

$56VB - 15VA = 60 \mid \times 2$

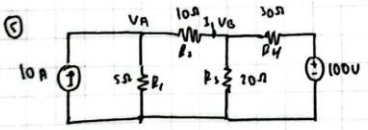
$30VA - 9VB = 30$

$-30VA + 56VB = 120$

$47VB = 150$

$VB = \frac{150}{47}$ $VB = 3{,}19A$

(5)



VA : $\Sigma I = 0$ $\frac{VA-VB}{10} + \frac{VA}{5} + (-10A) = 0$

$\frac{VA-VB}{10} + \frac{VA}{5} - 10 = 0$

$VA - VB + 2VA = 100$ $\rightarrow 3VA - VB = 100 \ldots (1)$

VB: $\Sigma I = 0$

$\frac{VB-100}{30} + \frac{VB}{20} + \frac{VB-VA}{10} = 0$

$\frac{2VB - 200 + 3VB + 6VB - 6VA}{60} = 0$

$11VB - 6VA - 200 = 0$

$11VB - 6VA = 200 \ldots (2)$

$3VA - VB = 100 \mid \times 2$

$11VB - 6VA = 200 \mid \times 1$

$6VA - 2VB = 200$

$-6VA + 11VB = 200$

$9VB = 400$

$VB = 44{,}44V$

Mencari VA

$3VA - VB = 100$

$3VA - 44{,}44 = 100$

$3VA = 100 + 44{,}44$

$3VA = 144{,}44$

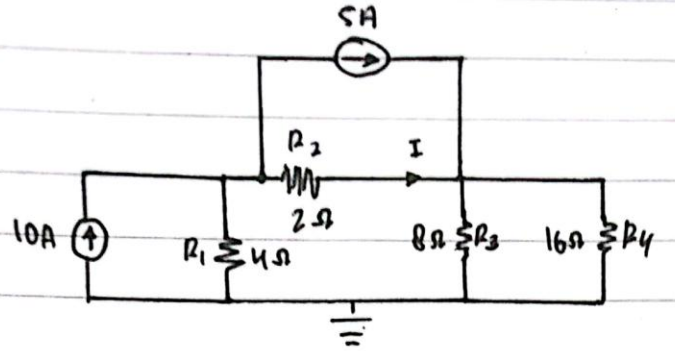
$VA = 48{,}15V$

Mencari nilai I

$I = I_2 = \frac{VA-VB}{R_2}$ $\frac{48{,}15 - 44{,}44}{10} = \frac{3{,}71}{10}$

$I_2 = 0{,}371A$

5. Hitung nilai I !



mencari VA: $\varepsilon_1 = 0$

$$-10 + \frac{V_A}{4} + 5 + \frac{V_A - V_B}{2} = 0$$

$$\rightarrow \frac{V_A - V_B}{2} + \frac{V_A}{4} - 5 = 0$$

$$\rightarrow \frac{2V_A - 2V_B + V_A}{4} = 5$$

$$\rightarrow 3V_A - 2V_B = 20 \quad \cdots (1)$$

$3V_A - 2V_B = 20$	$\times 8$
$-8V_A + 11V_B = 80$	$\times 3$

$$24V_A - 16V_B = 160$$

$$-24V_A + 33V_B = 240 +$$

$$17V_B = 400$$

$$V_B = 400/17$$

$$= 23,52V$$

mencari VB: $\varepsilon_2 = 0$

$$\rightarrow \frac{V_B}{16} + \frac{V_B}{8} + \frac{V_B - V_A}{2} - 5 = 0$$

$$\rightarrow \frac{V_B + 2V_B + 8V_B - 8V_A}{16} = 5$$

$$\rightarrow 11V_B - 8V_A = 80 \quad \cdots (2)$$

-> mencari VA

=> $3V_A - 2V_B = 20$

=> $3V_A - 2(23,52) = 20$

=> $3V_A - 47,04 = 20$

=> $3V_A = 20 + 47,04$

$3V_A = 67,04$

$V_A = 67,04/3$

$V_A = 22,34V$

Mencari nilai I

$$I = I_2 = \frac{V_A - V_B}{2} = \frac{22,34 - 23,52}{2}$$

$$= \frac{-1,18}{2} = -0,59A \simeq -0,6A$$