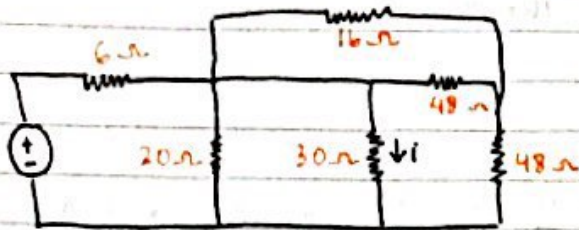


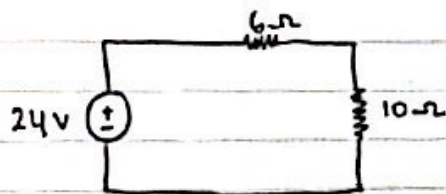
1. a. Tent. nilai arus i
 b. — tegangan
 c. — tegangan & arus di 16Ω



$$\rightarrow R_{p1} = \frac{16 \times 48}{16 + 48} = 12\Omega$$

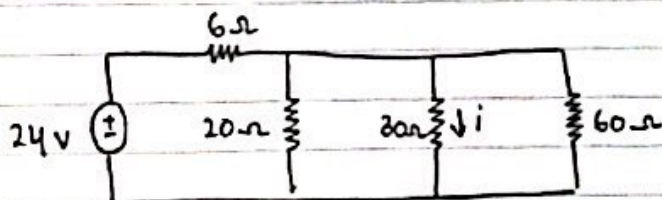
$$\rightarrow R_{s1} = R_{p1} + 48 = 12 + 48 = 60\Omega$$

$$\begin{aligned} \rightarrow R_{p2} &= R_{s1} \parallel 30\Omega \parallel 20\Omega \\ &= \frac{60 \times 30 \times 20}{60 \times 30 + 60 \times 20 + 30 \times 20} \\ &= 10\Omega \end{aligned}$$

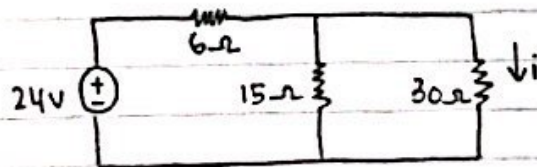


$$\rightarrow R_{s2} = 10 + 6 = 16$$

$$I = \frac{V}{R} = \frac{24}{16} = \frac{3}{2} \text{ A}$$

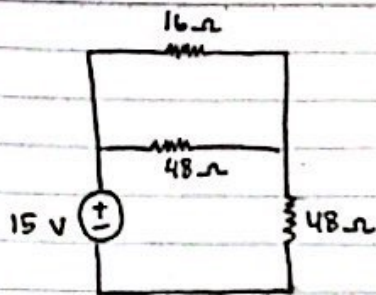


$$\begin{aligned} R_p &= 20 \parallel 60 \\ &= \frac{20 \times 60}{20 + 60} = 15\Omega \end{aligned}$$



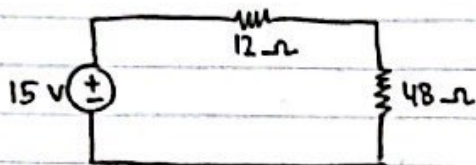
$$i = \frac{15}{15 + 30} \cdot i_{tot} = \frac{15}{45} \cdot \frac{3}{2} = \frac{1}{2} \text{ A}$$

$$V = i \cdot R = \frac{1}{2} \cdot 30 = 15 \text{ V}$$



$$R_p = 16 \parallel 48$$

$$= \frac{16 \times 48}{16 + 48} = 12 \Omega$$



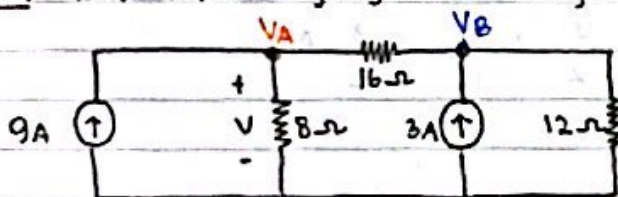
$$i = \frac{V}{R} = \frac{15}{12 + 48} = \frac{15}{60} = \frac{1}{4} \text{ A}$$

$$V_{12 \Omega} = i \cdot R$$

$$= \frac{1}{4} \cdot 12 = 3 \text{ V}$$

$$i_{16} = \frac{V}{R} = \frac{3}{16} \text{ A}$$

[2] Tent. nilai tegangan V dengan analisis node



$$\rightarrow V_A =$$

$$\sum i = 0$$

$$\frac{V_A - V_B}{16} + \frac{V_A - V_0}{8} - 9 = 0$$

$$\frac{V_A - V_B}{16} + \frac{V_A}{8} - 9 = 0$$

$\times 16$

$$V_A - V_B + 2V_A - 144 = 0$$

$$3V_A - V_B = 144 \quad (1)$$

→ V_b

$$\sum i = 0$$

$$\frac{V_b - V_a}{16} + \frac{V_b - V_o}{12} - 3 = 0$$

$$\frac{V_b - V_a}{16} + \frac{V_b}{12} - 3 = 0$$

$\times 48$

$$3(V_b - V_a) + 4V_b - 144 = 0$$

$$-3V_a + 7V_b = 144 \quad (2)$$

$$\rightarrow 3V_a - V_b = 144$$

$$-3V_a + 7V_b = 144$$

$$6V_b = 288$$

$$V_b = 48 \text{ V}$$

$$\rightarrow 3V_a - V_b = 144$$

$$3V_a - 48 = 144$$

$$3V_a = 192$$

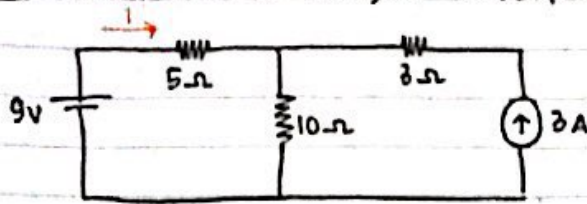
$$V_a = 64 \text{ V}$$

$$\rightarrow i = \frac{V_a - V_o}{8} = \frac{64 - 0}{8} = 8 \text{ A}$$

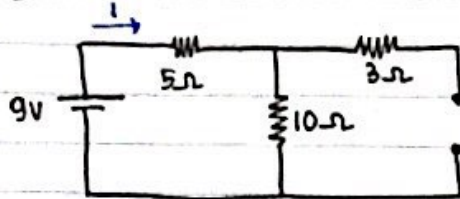
$$\rightarrow V = I \cdot R$$

$$= 8 \cdot 8 = 64 \text{ V}$$

3. Tent. arus I dengan superposisi

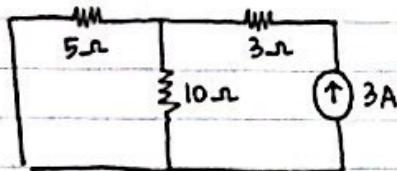


a) Ketika 9V on, maka 3A off



$$I_1 = \frac{V}{R} = \frac{9}{5+10} = \frac{9}{15} = \frac{3}{5} \text{ A}$$

b) Ketika 3A on, maka 9V off



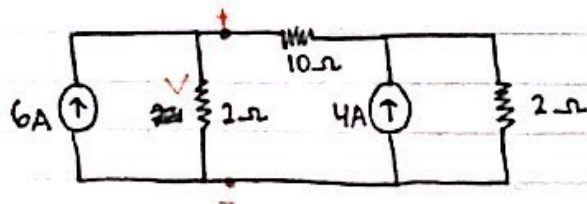
$$I_2 = - \frac{10}{10+5} \cdot 3$$

$$= - \frac{10}{15} \cdot 3 = -2 \text{ A}$$

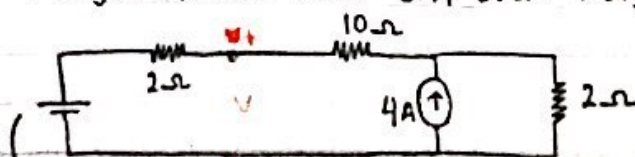
$$\Rightarrow I = I_1 + I_2 = \frac{3}{5} + \left(-\frac{10}{5}\right) = -\frac{7}{5} \text{ A}$$

~~4. Tent. menggunakan X~~

4. Tent. tegangan V dengan transformasi sumber !

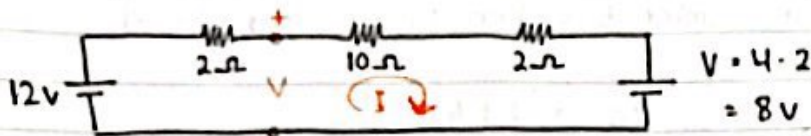


→ Tinjau sumber arus 6A, ubah menjadi sumber tegangan



$$\begin{aligned} V &= 6 \cdot 2 \\ &= 12 \text{ V} \end{aligned}$$

→ Tinjau ~~arus~~ sumber arus 4A, uban menjadi sumber tegangan



→ KVL

$$\sum V = 0$$

$$-12 + 2I + 10I + 2I + 8 = 0$$

$$-4 + 14I = 0$$

$$14I = 4$$

$$I = \frac{2}{7} \text{ A}$$

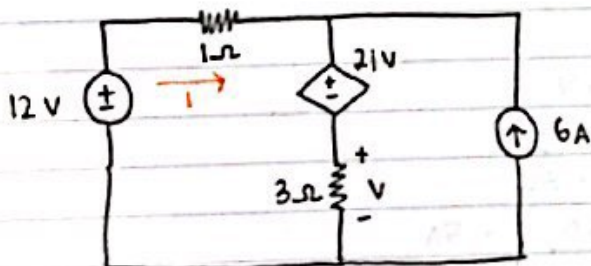
Sehingga,

$$V = -2I + 12$$

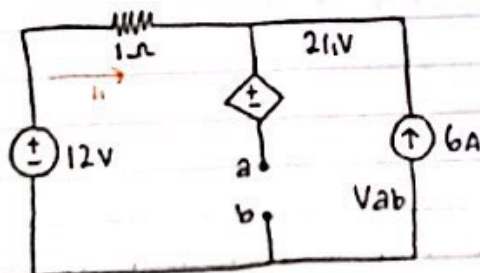
$$= -2 \cdot \frac{2}{7} + 12$$

$$= -\frac{4}{7} + \frac{84}{7} = \frac{80}{7} \text{ V} //$$

5. Tent. nilai V dengan teorema thevenin !



→ Lepaskan komponen R beban lalu hubungannya menjadi open circuit



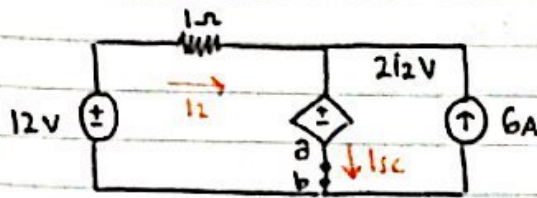
$$i_1 = -6 \text{ A}$$

$$V_{ab} = V_{oc}$$

$$-2i_1 + (-i_1 \times 1) + 12 = -3i_1 + 12$$

$$-3(-6) + 12 = 30 \text{ V} //$$

→ Mencari R_{TH} tidak bisa langsung dengan mematikan semua sumber karena terdapat sumber tak bebas, sehingga dicari nilai I_{sc} terlebih dahulu.



$$i_{sc} = i_2 + 6$$

$$\rightarrow -12 + i_2 + 2i_2 = 0$$

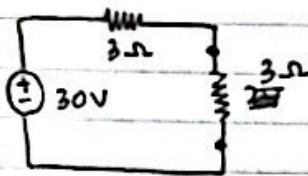
$$-12 + 3i_2 = 0$$

$$i_2 = 4A$$

$$\rightarrow i_{sc} = 4 + 6 = 10A$$

$$\rightarrow R_{TH} = \frac{V_{oc}}{I_{sc}} = \frac{30}{10} = 3\Omega$$

→ Rangkaian pengganti thevenin

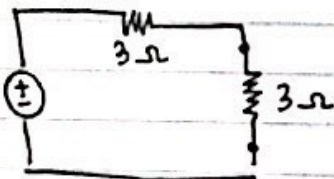


$$V = \frac{R_{beban}}{R_{TH} + R_{beban}} \cdot V_{TH}$$

$$V = \frac{3}{3+3} \cdot 30$$

$$= 15V$$

→ Tent. daya maks. yg diserap R_L !



$$P_{max} = I \cdot V$$

$$\rightarrow I = \frac{V}{R_{TH} + R_L}$$

$$= \frac{30}{3+3} = 5A$$

$$R_L = R_{TH}$$

$$\rightarrow P_{max} = I \cdot V_{TH}$$

$$= 5 \cdot 15 = 45W$$