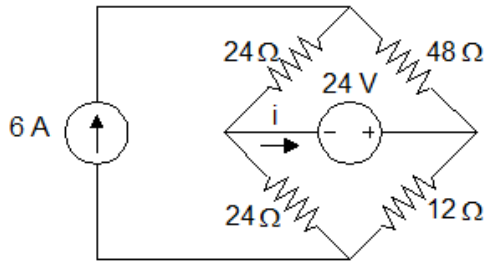
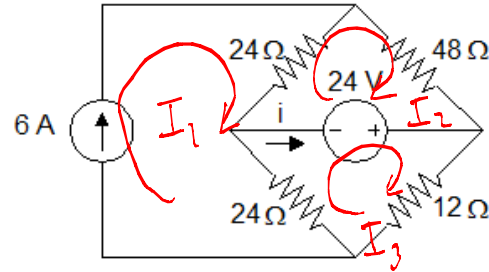


UTS SI 2002

11. Berapa nilai  $i$  dengan menggunakan analisis mesh!



11. Berapa nilai  $i$  dengan menggunakan analisis mesh!



Loop  $I_1$  :

$$I_1 = 6$$

Loop  $I_2$

$$+24 + 24(I_2 - I_1) + 48I_2 = 0$$

Loop  $I_3$

$$-24 + 24(I_3 - I_1) + 12I_3 = 0$$

$$+24 + 24I_2 - 24 \cdot 6 + 48I_2 = 0$$

$$-120 + 72I_2 = 0$$

$$I_2 = \frac{120}{72}$$

$$-24 + 24I_3 - 24 \cdot 6 + 12I_3 = 0$$

$$-168 + 36I_3 = 0$$

$$I_3 = \frac{168}{36}$$

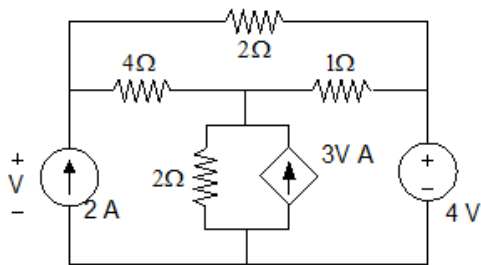
$$i = I_3 - I_2$$

$$= \frac{168}{36} - \frac{120}{72} = \frac{336 - 120}{72}$$

$$i = \boxed{3A}$$

UTS S1 2003

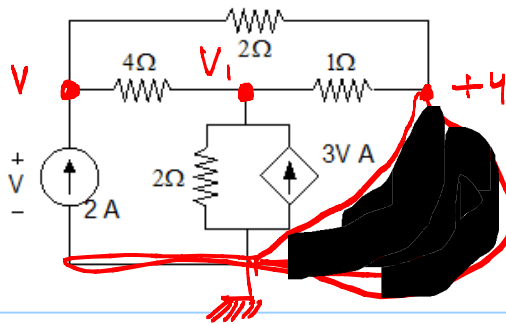
16. Tentukan tegangan V dengan analisis node!



$$\begin{array}{l}
 3V - V_1 = 16 \\
 -13V + 7V_1 = 16
 \end{array}
 \left| \begin{array}{l}
 \times 7 \Rightarrow \\
 \times 1
 \end{array} \right.
 \begin{array}{l}
 21V - 7V_1 = 112 \\
 -13V + 7V_1 = 16
 \end{array}
 +$$

$$\begin{array}{r}
 8V = 128 \\
 V = \boxed{16V}
 \end{array}$$

16. Tentukan tegangan V dengan analisis node!



Node V:

$$\frac{V - V_1}{4} + \frac{V - 4}{2} - 2 = 0$$

$$V - V_1 + 2V - 8 - 8 = 0$$

$$3V - V_1 = 16 \dots (1)$$

Node V1

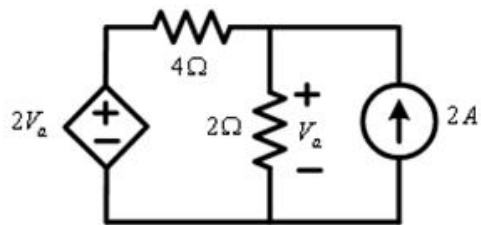
$$\frac{V_1 - V}{4} + \frac{V_1 - 4}{1} + \frac{V_1 - 0}{2} - 3V = 0$$

$$V_1 - V + 4V_1 - 16 + 2V_1 - 12V = 0$$

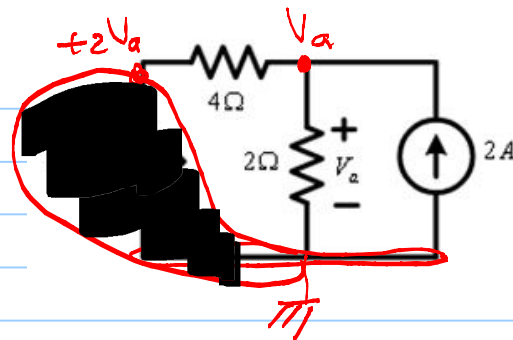
$$-13V + 7V_1 = 16 \dots (2)$$

UTS SI 2004

2. Tentukan nilai  $V_a$  dengan metoda Node



2. Tentukan nilai  $V_a$  dengan metoda Node



Node  $V_a$  :

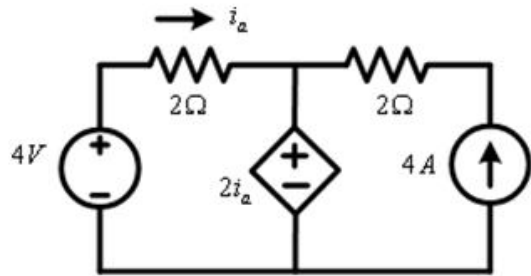
$$\frac{V_a - 2V_a}{4} + \frac{V_a - 0}{2} - 2 = 0$$

$$V_a - 2V_a + 2V_a - 8 = 0$$

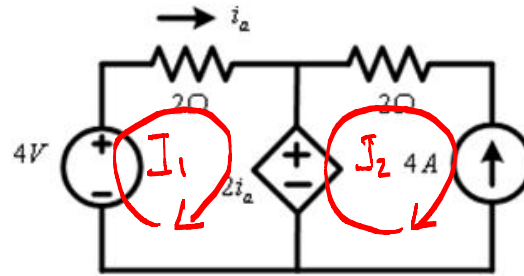
$$V_a = 8 \text{ Volt}$$

UTS SI 2004

5. Tentukan daya di sumber 4A dengan menggunakan metode Mesh



5. Tentukan daya di sumber 4A dengan menggunakan metode Mesh



$$-4 + 2i_a + 2i_a = 0$$

$$4i_a = 4$$

$$i_a = 1$$

Loop I<sub>1</sub>

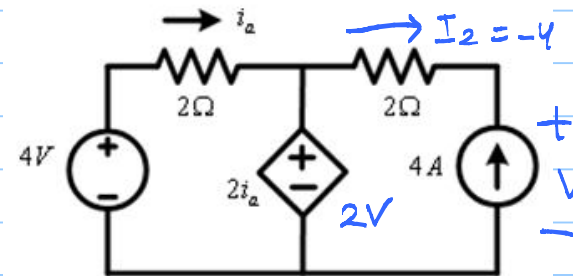
$$-4 + 2I_1 + 2i_a = 0 \dots (1)$$

Loop I<sub>2</sub>

$$I_2 = -4 \dots (2)$$

$$I_1 = i_a \dots (3)$$

5. Tentukan daya di sumber 4A dengan menggunakan metode Mesh



$$\sum V = 0$$

$$-V + 2 \cdot 4 + 2 = 0$$

$$V = 10 \text{ volt}$$

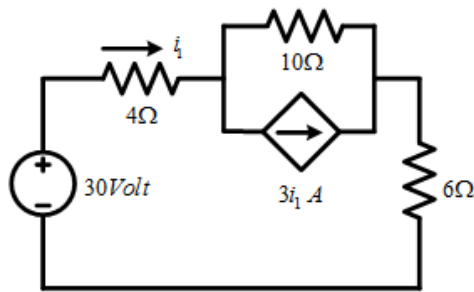
Mengirimkan

$$P = VI = 10 \times 4$$

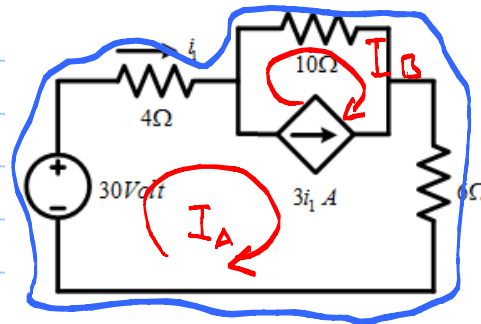
$$P = 40W$$

U9S S1 2005

2. Tentukan  $i_1$  dengan analisis mesh!



2. Tentukan  $i_1$  dengan analisis mesh!



$$3i_1 = I_A - I_B$$

$$I_B = I_A - 3i_1 = i_1 - 3i_1 = -2i_1$$

Loop  $I_A$

$$3i_1 = I_A - I_B \quad \dots (1)$$

Loop  $I_B$

$$3i_1 = I_A - I_B$$

$$I_A = i_1$$

Supermesh

$$-30 + 4I_A + 10I_B + 6I_A = 0$$

$$10I_A + 10I_B = 30$$

$$I_A + I_B = 3$$

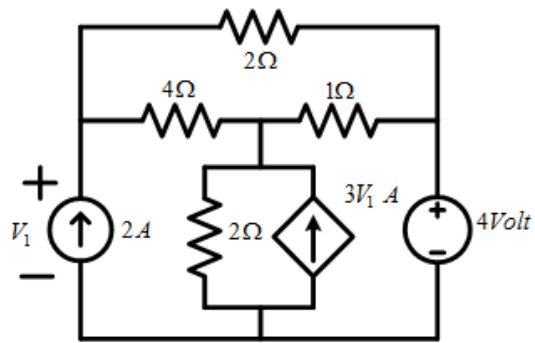
$$i_1 - 2i_1 = 3$$

$$i_1 = -3A$$

UTS SI 2015

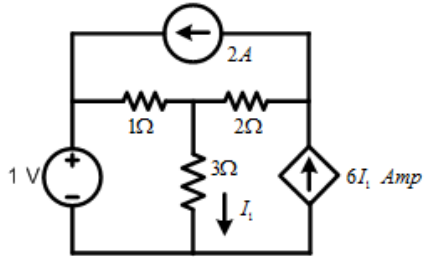
SAMA DENGAN NO. 2

4. Tentukan  $V$  dengan analisis node!

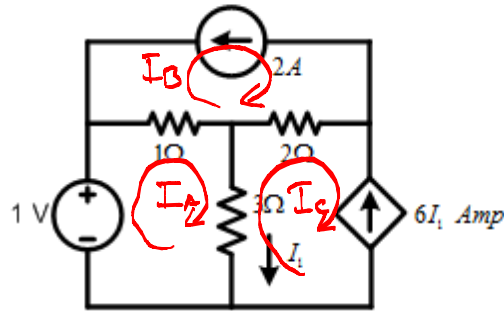


UTS 9/2007

2. Tentukan arus  $I_1$  dengan analisis mesh ! (mrm)



2. Tentukan arus  $I_1$  dengan analisis mesh ! (mrm)



$$I_1 = I_A - I_C = I_A + 6I_1$$

$$I_A = -5I_1$$

$$-1 + 1(I_A - I_B) + 3(I_A - I_C) = 0$$

$$-1 + (-5I_1 + 2) + 3(-5I_1 + 6I_1) = 0$$

$$-1 - 5I_1 + 2 + 3I_1 = 0$$

$$-2I_1 = -1$$

$$I_1 = \frac{1}{2} \text{ A}$$

Loop IA

$$-1 + 1(I_A - I_B) + 3(I_A - I_C) = 0$$

Loop IB

$$I_B = -2 \dots (2)$$

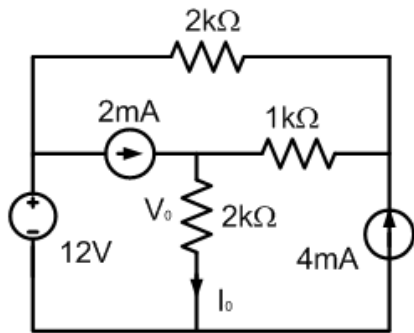
Loop IC

$$I_C = -6I_1 \dots (3)$$

$$I_1 = I_A - I_C \dots (4)$$

UTS 51 2018

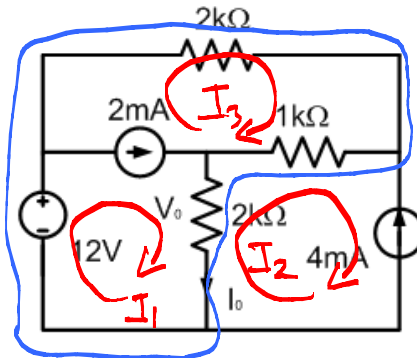
2. Tentukan Arus  $I_0$  dan Tegangan  $V_0$  dengan analisis Mesh !



$$I_0 = I_1 - I_2 = \frac{6}{5} \text{mA} + 4 \text{mA}$$

$$I_0 = 5.2 \text{mA}$$

2. Tentukan Arus  $I_0$  dan Tegangan  $V_0$  dengan analisis Mesh !



$$\begin{array}{l} I_1 - I_3 = 2 \text{ mA} \quad | \times 3 \\ 2I_1 + 3I_3 = 0 \text{ mA} \quad | \times 1 \end{array}$$

$$\begin{array}{l} 3I_1 - 3I_3 = 6 \text{ mA} \\ 2I_1 + 3I_3 = 0 \text{ mA} \quad + \\ \hline 5I_1 = 6 \text{ mA} \\ I_1 = \frac{6}{5} \text{ mA} \end{array}$$

Loop  $I_1$

$$2 \text{ mA} = I_1 - I_3 \quad \dots (1)$$

Loop  $I_2$

$$I_2 = -4 \text{ mA} \quad \dots (2)$$

Loop  $I_3$

$$2 \text{ mA} = I_1 - I_3$$

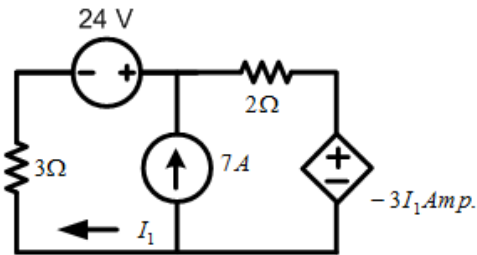
Supermesh

$$\begin{aligned} -12 + 2kI_3 + 1k(I_3 - I_2) + 2k(I_1 - I_2) &= 0 \\ -12 + 2kI_3 + 1kI_3 + 4 + 2kI_1 + 8 &= 0 \\ 2kI_1 + 3kI_3 &= 0 \\ 2I_1 + 3I_3 &= 0 \end{aligned}$$



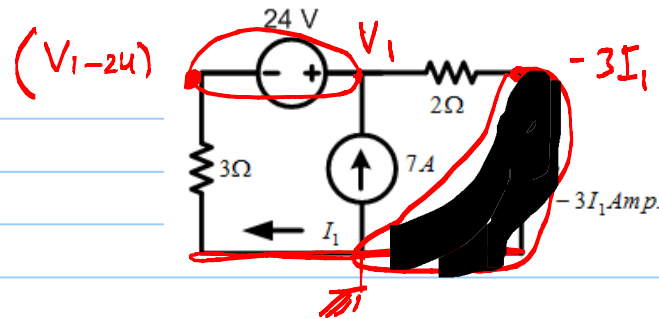
ITS 31 2008

3. Tentukan arus  $I_1$  dengan analisis Node!



$$\begin{array}{l|l} 5V_1 + 9I_1 = 90 & \times 1 \\ V_1 + 3I_1 = 24 & \times 5 \end{array} \Rightarrow \begin{array}{r} 5V_1 + 9I_1 = 90 \\ 5V_1 + 15I_1 = 120 \\ \hline -6I_1 = -30 \end{array}$$

3. Tentukan arus  $I_1$  dengan analisis Node!



Node  $V_1$ :

$$\frac{V_1 - (-3I_1)}{2} - 7 + \frac{(V_1 - 24) - 0}{3} = 0$$

$$\begin{aligned} 3V_1 + 9I_1 - 42 + 2V_1 - 48 &= 0 \\ 5V_1 + 9I_1 &= 90 \dots (1) \end{aligned}$$

$$I_1 = \frac{0 - (V_1 - 24)}{3}$$

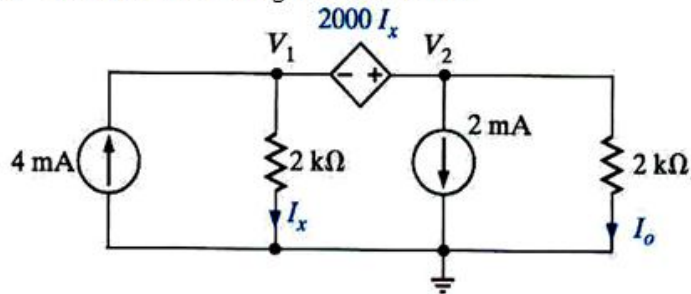
$$3I_1 = 24 - V_1$$

$$V_1 + 3I_1 = 24 \dots (2)$$

$$I_1 = \frac{30}{6} = 5A$$

MCS 01 2009

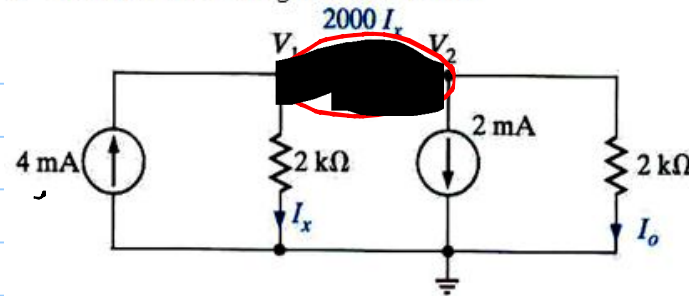
2. Tentukan arus  $I_o$  dengan analisis Node!



$$I_o = \frac{V_2 - 0}{2k} = \frac{2000 I_x + V_1}{2k} = \frac{2000 \frac{V_1}{2k} + V_1}{2k}$$

$$I_o = \frac{2V_1}{2k} = \frac{4}{3} \text{ mA}$$

2. Tentukan arus  $I_o$  dengan analisis Node!



Node  $V_1$ :

$$\frac{V_1 - 0}{2k} - 4 \text{ mA} + \frac{(V_1 + 2000 I_x) - 0}{2k} + 2 \text{ mA} = 0$$

$$\frac{V_1}{2k} + \frac{V_1}{2k} + I_x = 2 \text{ mA}$$

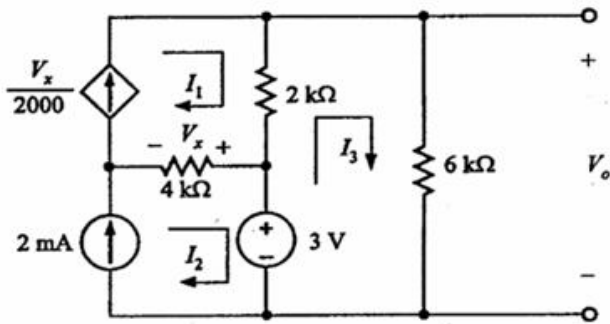
$$V_1 + I_x = 2 \text{ mA} \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} V_1 + \frac{V_1}{2k} = 2 \text{ mA} \\ \frac{3V_1}{2k} = 2 \text{ mA} \rightarrow V_1 = \frac{4}{3} \text{ Volt} \end{array}$$

$$I_x = \frac{V_1}{2k}$$

$$2000 I_x = V_2 - V_1$$

$$V_2 = 2000 I_x + V_1$$

3. Tentukan dengan  $V_o$  dengan analisis Mesh !



Loop  $I_1$

$$I_1 = \frac{V_x}{2000} \dots (1)$$

Loop  $I_2$

$$I_2 = 2 \text{ mA} \dots (2)$$

Loop  $I_3$

$$-3 + 2k(I_3 - I_1) + 6kI_3 = 0 \dots (3) \quad -3 + 2k(I_3 - 2I_2) + 6kI_3 = 0$$

$$V_x = 4k(I_1 - I_2) \dots (4)$$

$$-3 + 2k(I_3 - 4 \text{ mA}) + 6kI_3 = 0$$

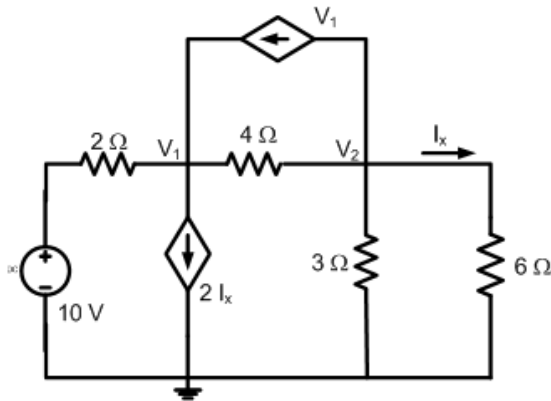
$$-3 + 2kI_3 - 8 + 6kI_3 = 0$$

$$I_3 = \frac{11}{8k}$$

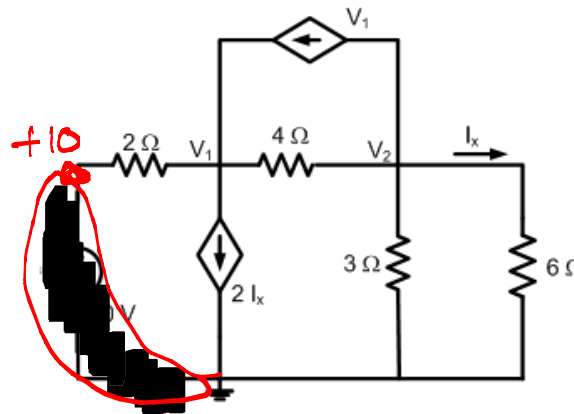
$$V_o = 6kI_3 = \frac{6k \times 11}{8k} = \frac{33}{4} \text{ Volt}$$

UTS 81 2010

2. Carilah tegangan node  $V_1$  dan  $V_2$  pada rangkaian berikut :



2. Carilah tegangan node  $V_1$  dan  $V_2$  pada rangkaian berikut :



$$-V_1 - V_2 + 8I_x = 0$$

$$-V_1 + V_2 + 8I_x = 0$$

$$I_x = 0$$

$$V_2 = 6I_x = 0$$

$$V_1 = 0$$

Node  $V_1$  :

$$\frac{V_1 - 10}{2} + \frac{V_1 - V_2}{4} - V_1 + 2I_x = 0$$

$$2V_1 - 20 + V_1 - V_2 - 4V_1 + 8I_x = 0$$

$$-V_1 - V_2 + 8I_x = 0 \quad \dots (1)$$

Node  $V_2$  :

$$\frac{V_2 - 0}{3} + \frac{V_2 - V_1}{4} + V_1 + \frac{V_2 - 0}{6} = 0$$

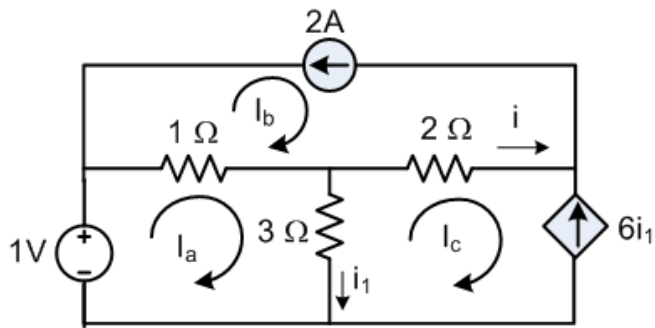
$$4V_2 + 3V_2 - 3V_1 + 12V_1 + 2V_2 = 0$$

$$9V_1 + 9V_2 = 0$$

$$V_1 = -V_2 \quad \dots (2)$$

$$I_x = \frac{V_2 - 0}{6}$$

3. Tentukan arus  $i$  dengan menggunakan analisis Mesh :



$$-1 + 4I_a - I_b - 3I_c = 0$$

$$-1 + 4(-5i_1) + 2 + 3(6i_1) = 0$$

$$+1 - 20i_1 + 18i_1 = 0$$

$$i_1 = \frac{1}{2} \text{ A}$$

Loop Ia

$$-1 + 1(I_a - I_b) + 3(I_a - I_c) = 0 \dots (1)$$

Loop Ib

$$I_b = -2 \dots (2)$$

Loop Ic

$$I_c = -6i_1 \dots (3)$$

$$i_1 = I_a - I_c \dots (4)$$

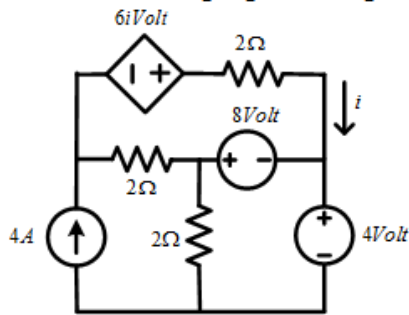
$$i_1 = I_a + 6i_1$$

$$I_a = -5i_1$$

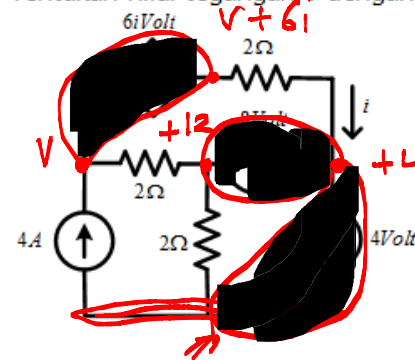
$$i = I_c - I_b = -6i_1 + 2 = -6\left(\frac{1}{2}\right) + 2 = -1 \text{ A}$$

UTS S1-2011

2. Tentukan nilai tegangan V dengan analisis node :



2. Tentukan nilai tegangan V dengan analisis node :



Node V :

$$\frac{V-12}{2} + \frac{(V+6i)-4}{2} - 4 = 0$$

$$V-12 + V+6i - 4 - 8 = 0$$

$$2V+6i = 24 \dots (1)$$

$$i = \frac{(V+6i)-4}{2}$$

$$2i = V+6i-4$$

$$V+4i = 4 \dots (2)$$

$$\begin{array}{l} 2V+6i=24 \quad | \times 1 \\ V+4i=4 \quad | \times 2 \end{array}$$

$$2V+6i=24$$

$$2V+8i=8 \quad -$$

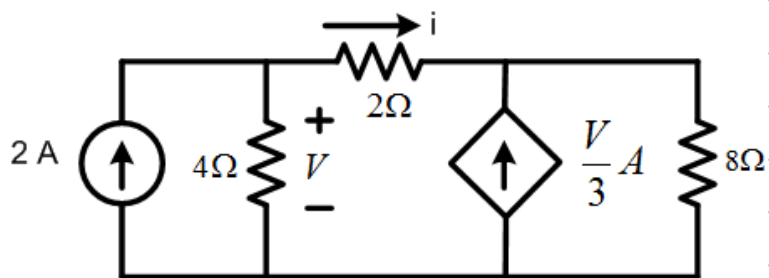
$$-2i=16$$

$$i = -8A$$

# UTS SI 2012

**Soal:**

2. Tentukan nilai  $i$  dengan analisis node !



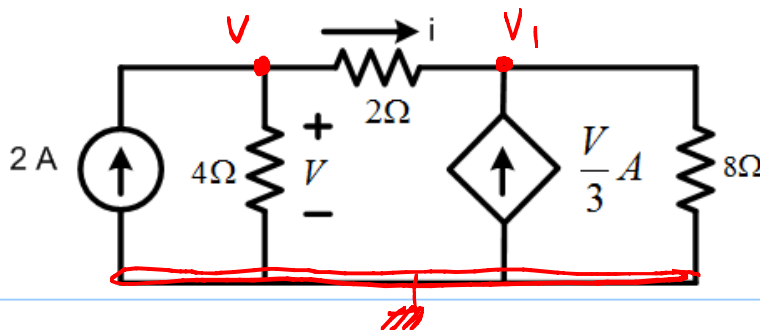
$$\begin{array}{l}
 3V - 2V_1 = 8 \\
 -4V + 3V_1 = 0
 \end{array}
 \begin{array}{l}
 \times 3 \\
 \times 2
 \end{array}
 \Rightarrow
 \begin{array}{l}
 9V - 6V_1 = 24 \\
 -8V + 6V_1 = 0
 \end{array}
 +$$

$$V = 24 \text{ Volt}$$

$$V_1 = \frac{4V}{3} = \frac{4 \cdot 24}{3} = 32 \text{ Volt} \Rightarrow i = \frac{V - V_1}{2} = \frac{24 - 32}{2} = -4 \text{ A}$$

**Soal:**

2. Tentukan nilai  $i$  dengan analisis node !



Node V

$$\frac{V-0}{4} + \frac{V-V_1}{2} - 2 = 0$$

$$V + 2V - 2V_1 - 8 = 0$$

$$3V - 2V_1 = 8$$

Node V1

$$\frac{V_1-V}{2} + \frac{V_1-0}{8} - \frac{V}{3} = 0$$

$$12V_1 - 12V + 3V_1 - 8V = 0$$

$$-20V + 15V_1 = 0$$

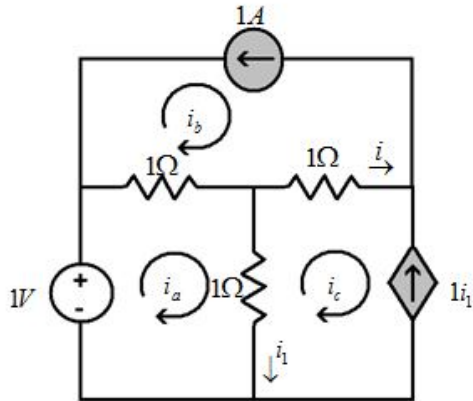
$$-4V + 3V_1 = 0$$

$$i = \frac{V - V_1}{2} = \frac{24 - 32}{2} = -4 \text{ A}$$

UTS SI 2013

Soal 2: {}

Tentukan arus  $I$  dengan menggunakan analisis Mesh :



loop  $i_a$   
 $-1 + 1(i_a - i_b) + 1(i_a - i_c) = 0$

loop  $i_b$   
 $i_b = -1$

loop  $i_c$   
 $i_c = -i_1$

$$i_1 = i_a - i_c$$

$$-1 + 2i_a - i_b - i_c = 0$$

$$-1 + 2i_a + 1 - i_c = 0$$

$$2i_a - i_c = 0$$

$$i_c = 2i_a = 0$$

$$i_1 = i_a - i_c$$

$$i_1 = i_a + i_1$$

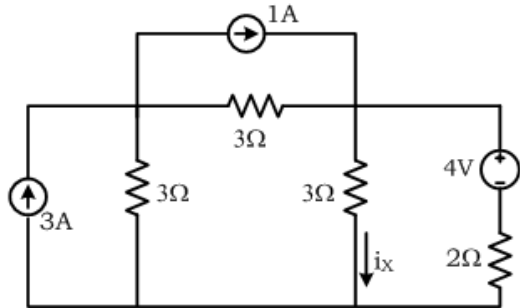
$$i_a = 0$$

$$i = i_c - i_b = 0 - (-1) = 1A$$



Soal 3 (I)

Tentukan nilai arus  $i_x$  pada rangkaian di bawah ini dengan menggunakan Analisis Node



Node  $V_1$

$$\frac{V_1 - 0}{3} + \frac{V_1 - V_2}{3} - 3 + 1 = 0$$

$$V_1 - V_1 - V_2 = 6$$

$$2V_1 - V_2 = 6$$

Node  $V_2$

$$\frac{V_2 - V_1}{3} + \frac{V_2 - 0}{3} + \frac{(V_2 - 4) - 0}{2} - 1 = 0$$

$$2V_2 - 2V_1 + 2V_2 + 3V_2 - 12 - 6 = 0$$

$$-2V_1 + 7V_2 = 18$$

$$2V_1 - V_2 = 6$$

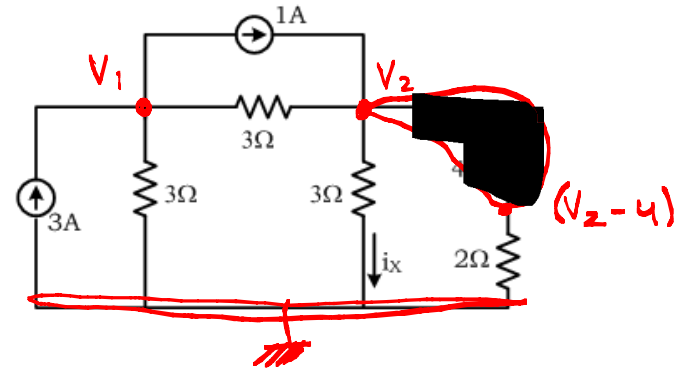
$$\frac{-2V_1 + 7V_2 = 18}{6V_2 = 24} +$$

$$\rightarrow V_2 = 4 \rightarrow$$

$$i_x = \frac{V_2 - 0}{3} = \frac{4}{3} \text{ A}$$

Soal 3 (I)

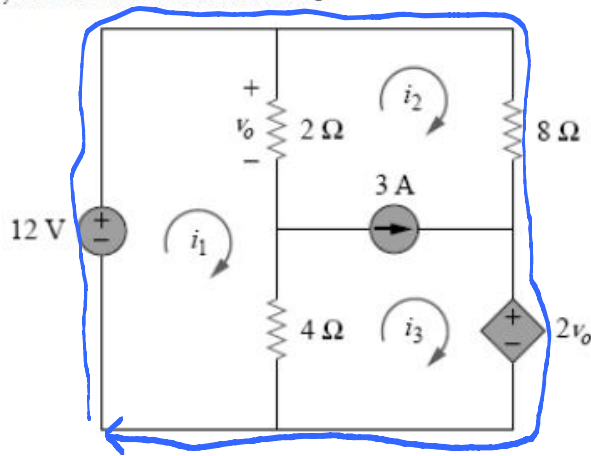
Tentukan nilai arus  $i_x$  pada rangkaian di bawah ini dengan menggunakan Analisis Node



U9 S 91 2014

**Soal 3 (AFD)**

a. Tentukan  $i_1$ ,  $i_2$  dan  $i_3$ , dan kemudian tentukan  $v_o$



Loop  $i_1$

$$-12 + 2(i_1 - i_2) + 4(i_1 - i_3) = 0$$

$$-12 + 6i_1 - 2i_2 - 4i_3 = 0 \quad \dots (1)$$

Loop  $i_2$

$$3 = i_3 - i_2 \quad \dots (2)$$

Loop  $i_3$

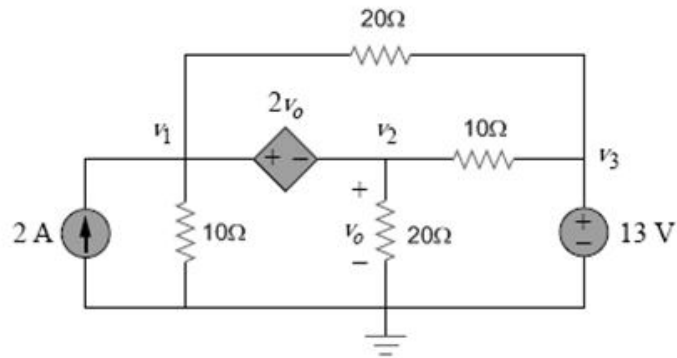
$$3 = i_3 - i_2$$

Supermesh

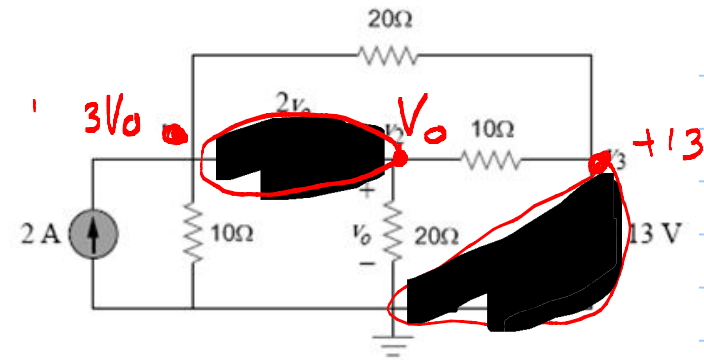
$$-12 + 8i_2 + 2v_o = 0 \quad \dots (3)$$

$$v_o = 2(i_1 - i_2) \quad \dots (4)$$

Soal 5 (AFD) Hitung berapa besarnya  $v_1$  dan  $v_2$ .



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Tinjau node  $V_o$ :

$$\frac{V_o - 13}{10} + \frac{V_o - 0}{20} + \frac{3V_o - 13}{20} + \frac{3V_o - 0}{10} - 2 = 0$$

$$2V_o - 26 + V_o + 3V_o - 13 + 6V_o - 40 = 0$$

$$12V_o - 79 = 0$$

$$V_o = 6,58 \text{ V}$$

$$V_2 = V_o = 6,58 \text{ V}$$

$$V_1 = 3V_o = 19,75 \text{ V}$$

