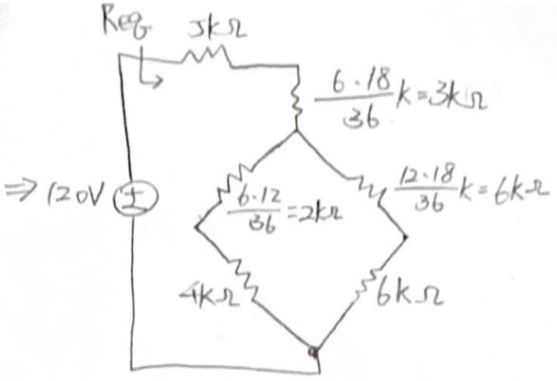
1.



$\therefore Req = 6k + 3k + (2k+4k) // (6k+6k)$

$= 5k + 3k + 4k = 12k(\Omega)$ #

$P_{120V} = \frac{120^2}{12k} = 1.2\,(W)$ #

2. $I_{2\Omega} = \frac{V_x}{2}\,(A)\downarrow$

$\therefore \frac{V_x}{2} + \frac{V_x}{4} + 3 = 0$

$\Rightarrow V_x = -4$

$\because \bar{n}_x = \frac{29 - V_o}{10}$

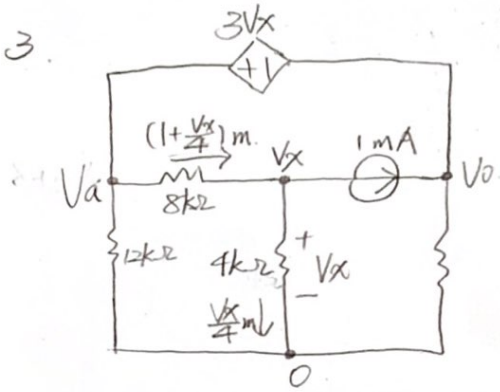
$\therefore \frac{29 - V_o}{10} + 3 + \frac{-4}{4} = \frac{V_o - 4\bar{n}_x}{5}$

$\Rightarrow 5\bar{n}_x + 10 = V_o - 4\bar{n}_x \Rightarrow V_o = 9\bar{n}_x + 10$

$\Rightarrow V_o = 26.1 - 0.9V_o + 10 \Rightarrow 1.9V_o = 36.1$

$\Rightarrow V_o = \frac{36.1}{1.9} = 19\,(V)$ #

3.

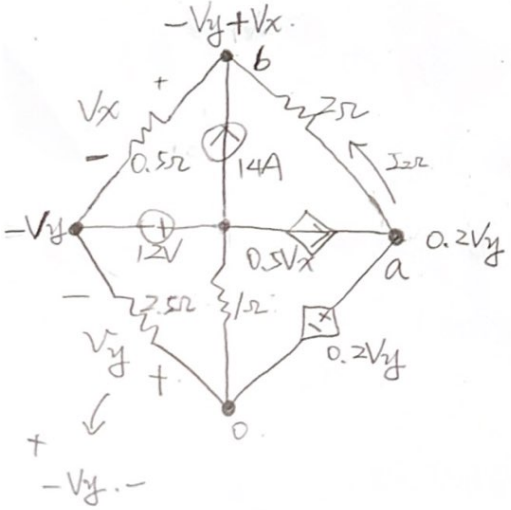


$I_{4k\Omega} = \frac{V_x}{4k}m$

$\Rightarrow I_{8k\Omega} = \frac{V_a - V_x}{8k} = (1 + \frac{V_x}{4})m$

$\Rightarrow V_a = 8 + 3V_x \Rightarrow V_o = V_a - 3V_x = 8\,(V)$ #

4.



$I_{2\Omega} = \frac{V_x}{0.5} - 14 = 2V_x - 14$

Node a-0:

$(2V_x - 14) + \frac{V_y}{2.5} = 0.5V_x + \frac{(-V_y + 12) - 0}{1}$

$\Rightarrow 20V_x - 140 + 4V_y = 5V_x - 10V_y + 120$

$\Rightarrow 15V_x + 14V_y = 260$ — ①

Node b-0:

$(-V_y + V_x) - 0 = [0.2V_y - 2(2V_x - 14)] - 0$

$\Rightarrow 5V_x - 1.2V_y = 28$ — ②

由 ①、② 可知

$V_x = \frac{\begin{vmatrix} 260 & 14 \\ 28 & -1.2 \end{vmatrix}}{\begin{vmatrix} 15 & 14 \\ 5 & -1.2 \end{vmatrix}} = \frac{-704}{-88} = 8\,(V)$ #

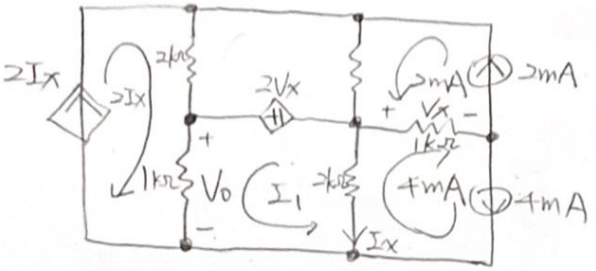
$V_y = \frac{\begin{vmatrix} 15 & 260 \\ 5 & 28 \end{vmatrix}}{\begin{vmatrix} 15 & 14 \\ 5 & -1.2 \end{vmatrix}} = \frac{-880}{-88} = 10\,(V)$ #

$\pm V_{14A} = (-V_y + V_x) - (-V_y + 12) = V_x - 12 = -4$

$\therefore P_{14A} = -4 \times 14 = -56(W)$ #

$I_{12V} \rightarrow = \frac{8}{0.5} + \frac{10}{2.5} = 20$ $\quad \therefore P_{12V} = 20 \times 12 = 240(W)$ #

5.



Loop I_1:

$2V_x = 3kI_1 + 2kI_x + 4m \cdot 2k$ — ①

$I_1 + 4m + I_x = 0 \Rightarrow I_1 = -I_x - 4m$ — ②

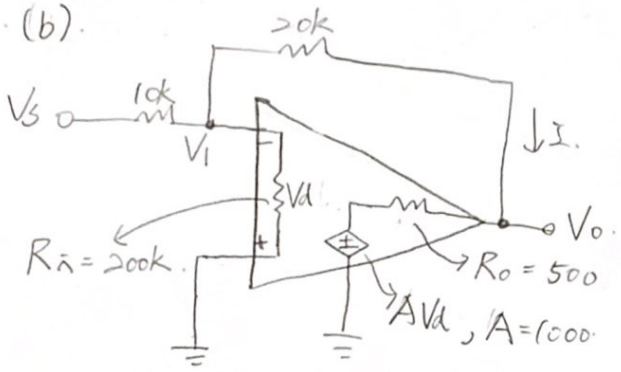
$V_x = 1k \times (2m + 4m) = 6$ — ③

②·③代入① $\Rightarrow 12 = -1kI_x - 4$

$\Rightarrow I_x = -16m(A) \Rightarrow I_1 = 12m(A)$

$\therefore V_o = (2I_x + I_1) \times 1k = -20(V)$ #

6. (b).



$\frac{V_s - V_1}{10k} = \frac{V_1}{200k} + \frac{V_1 - V_o}{20k}$

$\Rightarrow 20V_s = 31V_1 - 10V_o$ — ①

$\frac{V_1 - V_o}{20k} = \frac{V_o - AV_d}{500} = \frac{V_o + 1000V_1}{500}$

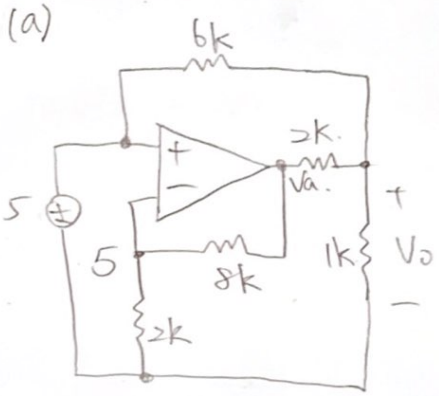
$\Rightarrow V_1 - V_o = 40(V_o + 1000V_1)$

$\Rightarrow V_1 = -\frac{41}{39999}V_o \approx -\frac{40}{40000}V_o = \frac{-V_o}{1000}$ — ②

由②代入① $\Rightarrow 20V_s = -10.031V_o$

$\Rightarrow \frac{V_o}{V_s} = -\frac{20}{10.031} = -1.994$ #

(a)



$\frac{5-0}{2k} = \frac{V_a - 5}{8k} \Rightarrow V_a = 25$

$\frac{5 - V_o}{6} + \frac{25 - V_o}{2k} = \frac{V_o}{1k}$

$\Rightarrow 5 - V_o + 25 - 3V_o = 6V_o$

$\Rightarrow V_o = 8(V)$ #