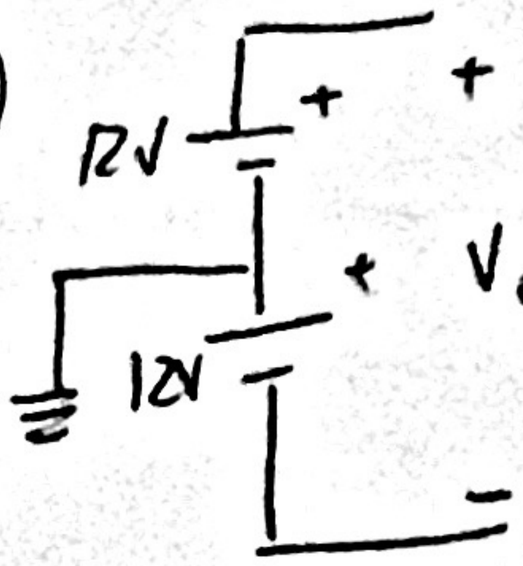
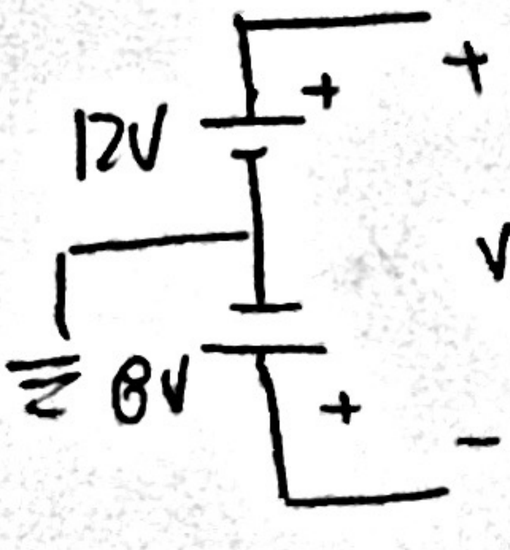
ATV 1

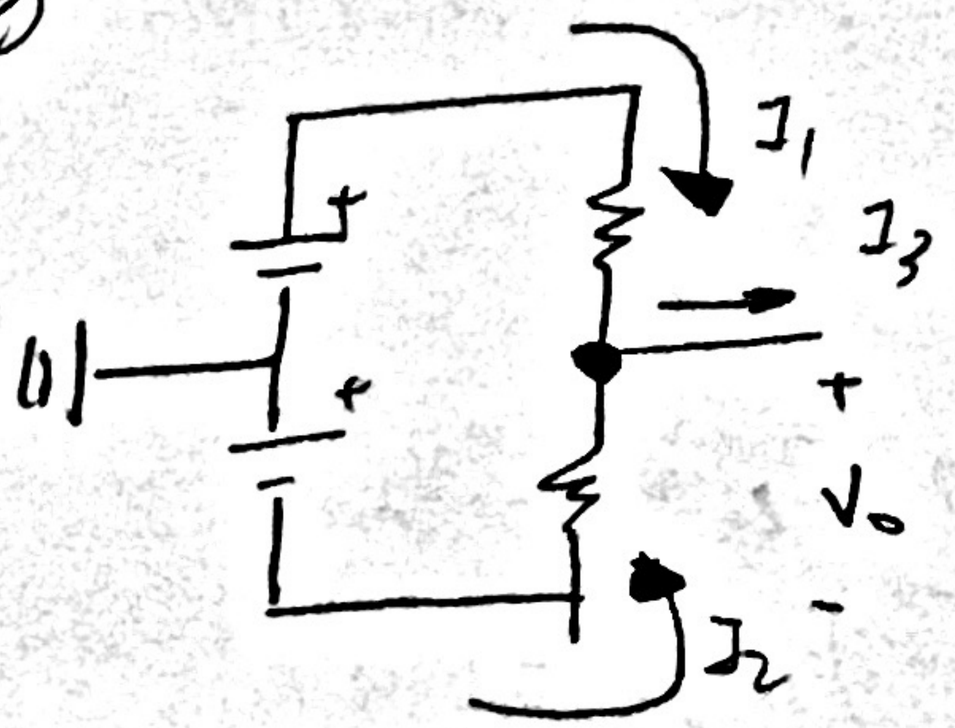
① 

$12 + 12 = \boxed{24V}$



$12 - 8 = \boxed{4V}$

②

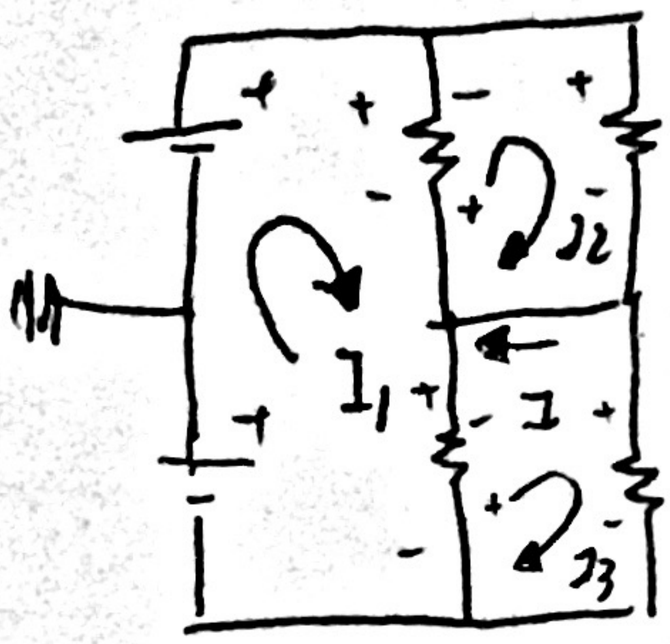


$I_3 = 0 \;//\; I_1 + I_2 = I_3$

$$\frac{5 - V_0}{5K} = -\left(\frac{-10 - V_0}{10K}\right)$$

$\boxed{V_0 = 5V}$

(3)



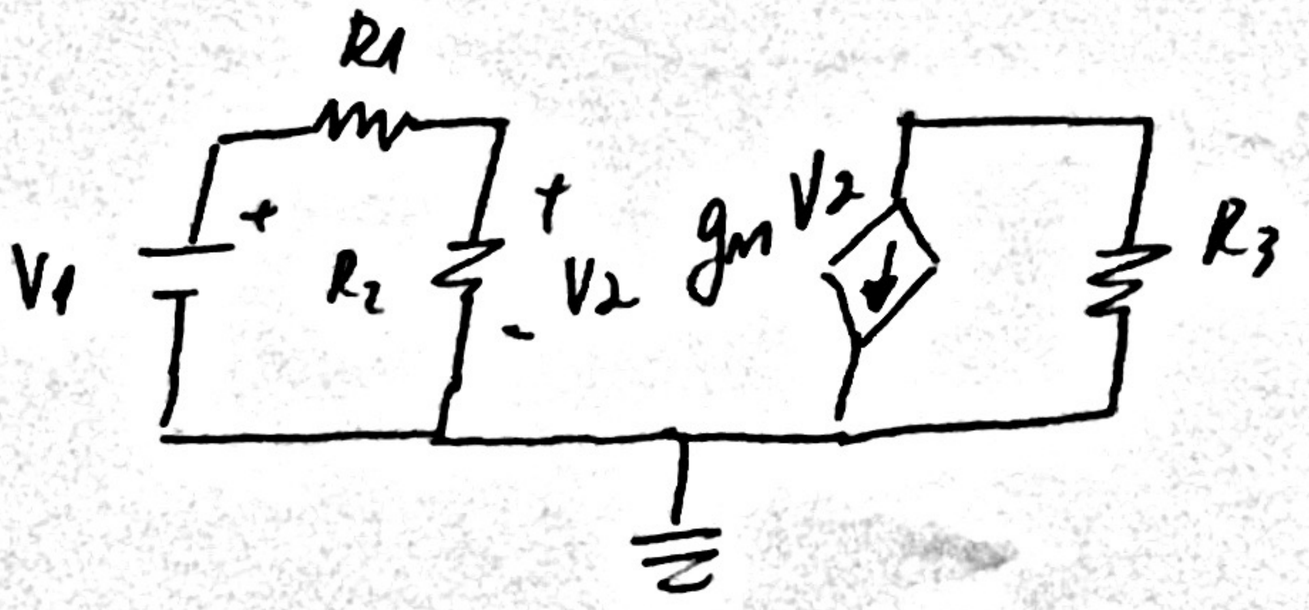
$$\begin{cases} V_2 + V_1 - R_1(I_1 - I_2) - R_2(I_1 - I_3) = 0 \\ R_1(I_2 - I_1) + R_3 \cdot I_2 = 0 \\ R_1(I_3 - I_1) + R_4 \cdot I_3 = 0 \end{cases}$$

$$I = I_2 - I_3$$

$\boxed{I_1 = 3,32\ mA}$ $\boxed{I_2 = 2,50\ mA}$ $\boxed{I_3 = 0,163\ mA}$

Logo, $I = I_2 - I_3 \Rightarrow \boxed{I = 1,87\ mA}$ //.

(4)



i) $V_2 = V_1 \cdot \left(\frac{R_2}{R_1 + R_2}\right)$

$V_2 = 9 \cdot \left(\frac{1200}{1200 + 3300}\right)$

$\boxed{V_2 = 2,4\ V}$

ii) $V_{R_3} = V_2 \cdot g_m \cdot R_3$

$V_{R_3} = 2,4 \cdot 0,01 \cdot 10\,000$

$\boxed{V_{R_3} = 240\ V}$ //.

iii) $I_{R_3} = g_m \cdot V_2$

$\boxed{I_{R_3} = 0,024\ A}$ //.