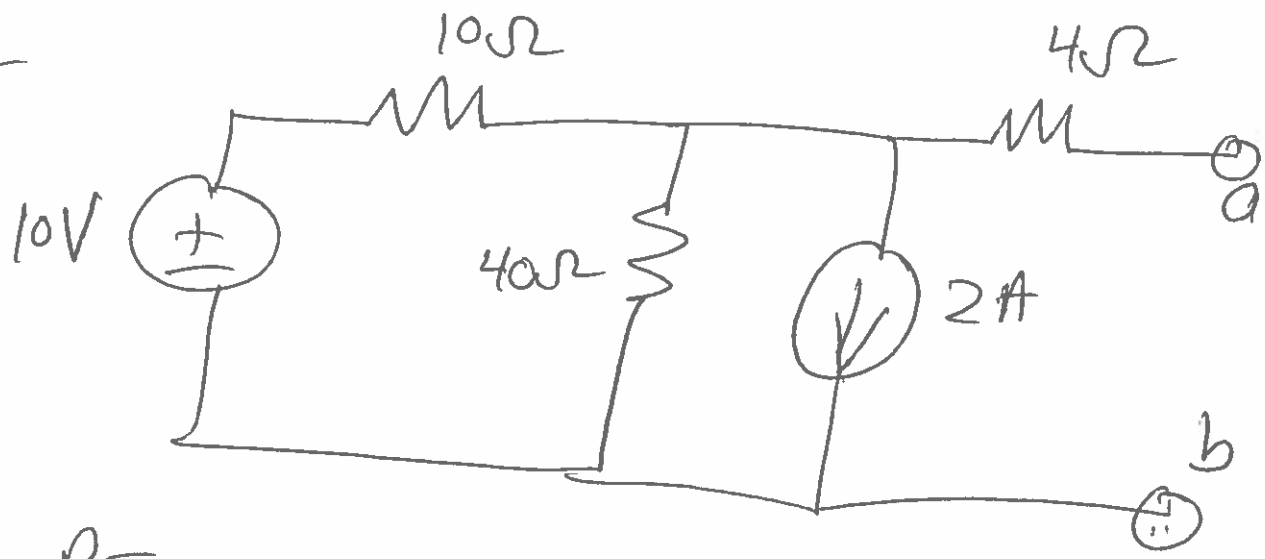
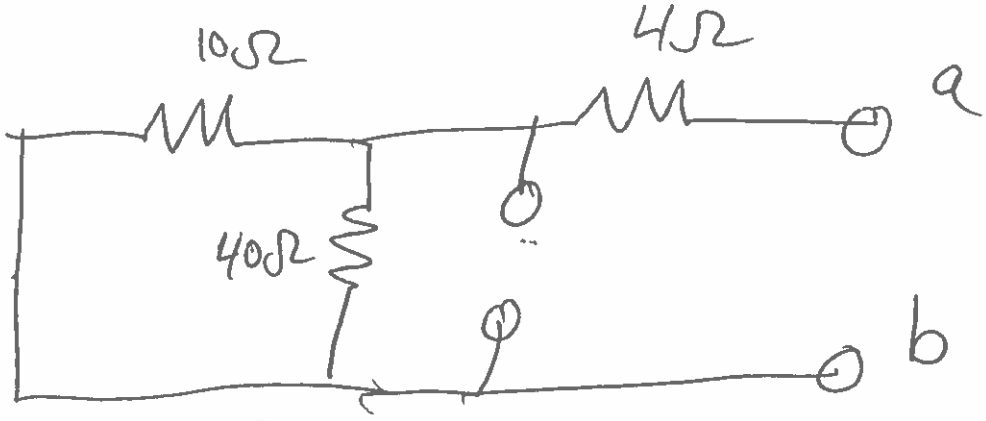
ex

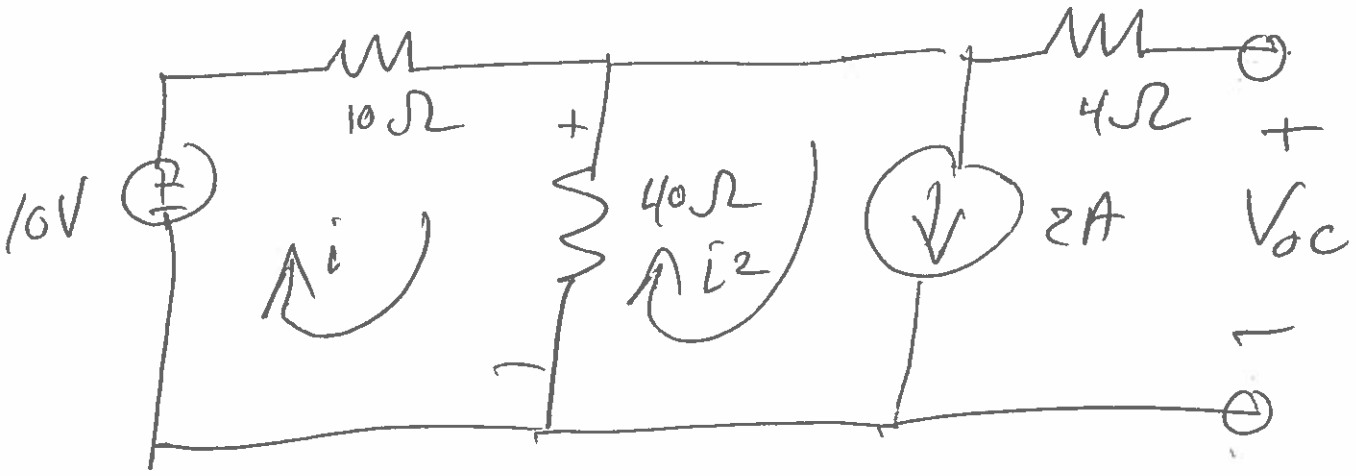


Find R_T



$$\frac{1}{10\Omega} + \frac{1}{40\Omega} = \frac{4+1}{40\Omega} = \frac{5}{40\Omega} = \frac{1}{8\Omega}$$

$$R_T = 8\Omega + 4\Omega = \boxed{12\Omega = R_T}$$



$$V_{oc} = V_{40\Omega} = (i_1 - i_2)\,40\Omega$$

$$i_2 = 2\,A$$

$$10V = i_1\,(10\Omega + 40\Omega) - i_2\,(40\Omega)$$

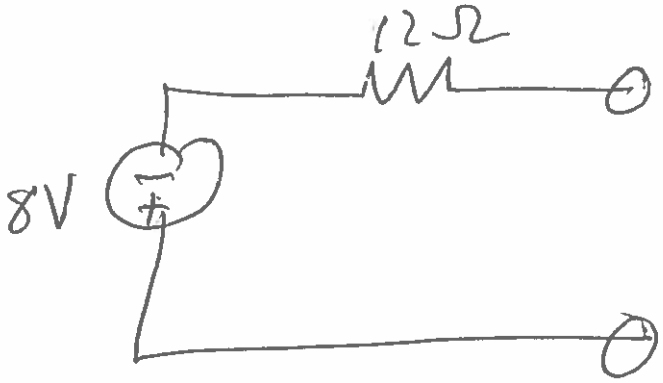
$$10V = i_1\,(50\Omega) - 80V$$

$$+90V = i_1\,(50\Omega) \Rightarrow i_1 = \frac{90}{50}\,V$$

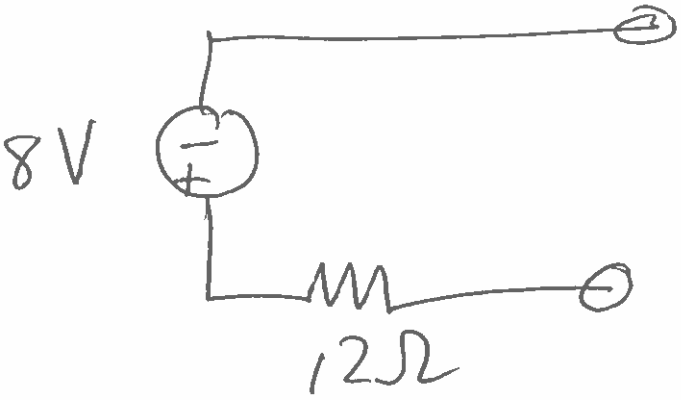
$$i_1 = 1.8\,A$$

$$V_{oc} = (1.8\,A - 2\,A)\,40\Omega = -1.2\,A\,(40\Omega)$$

$$V_{oc} = -8.0\,V$$

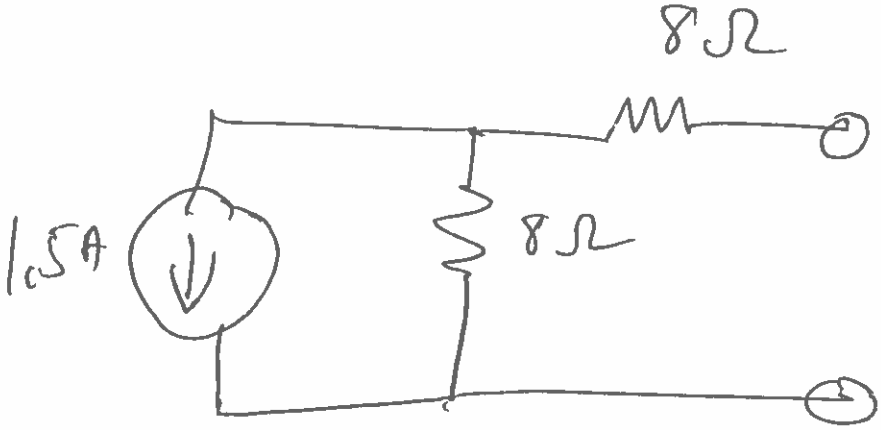


Thevenin
EQUIVALENT
CIRCUIT

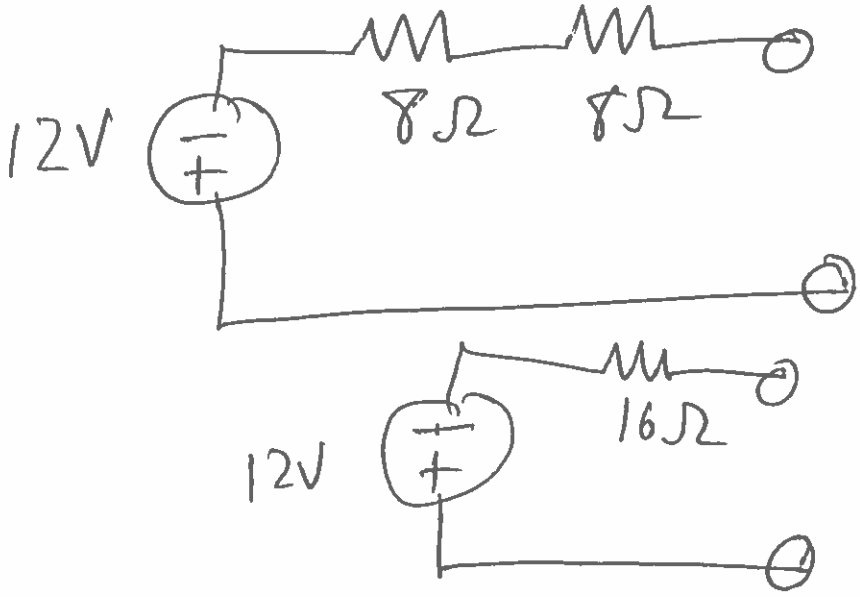


ex

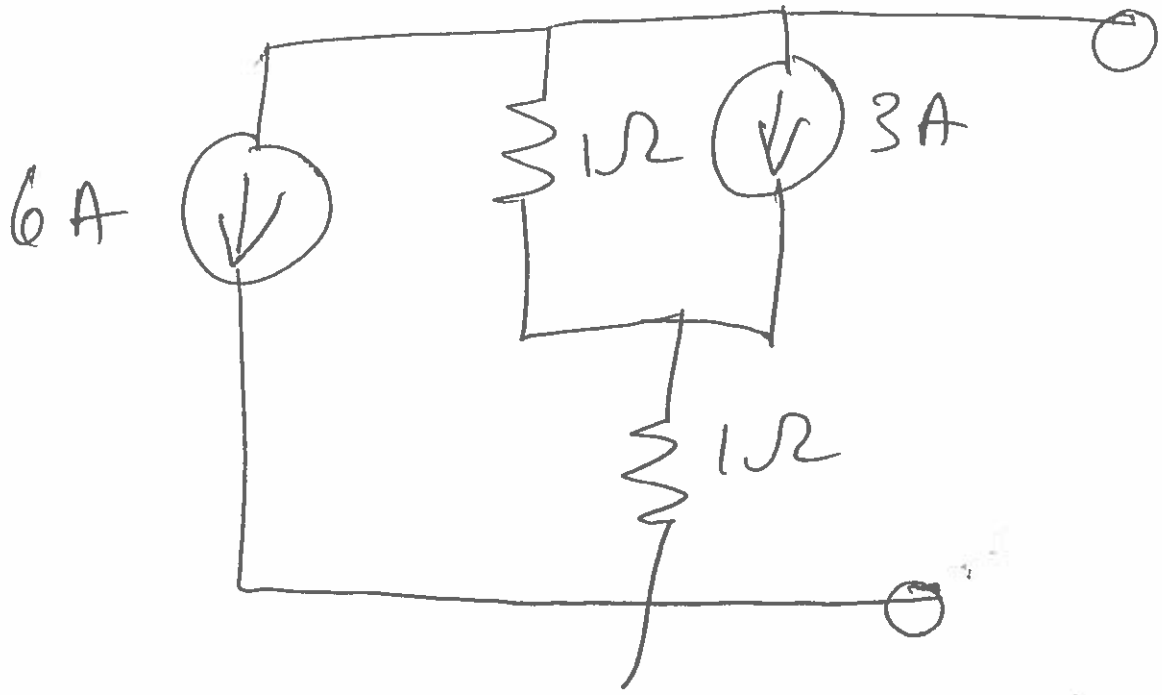
Thevenin EQ ?



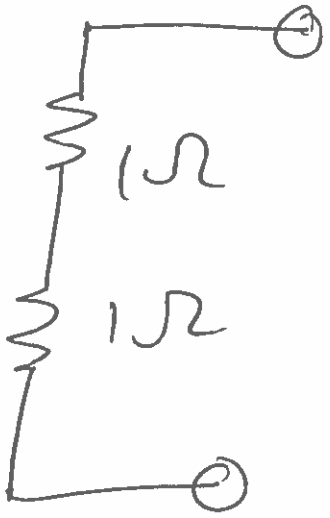
$$\frac{1}{10\Omega} + \frac{1}{40\Omega} = \frac{4+1}{40\Omega} = \frac{1}{8\Omega}$$



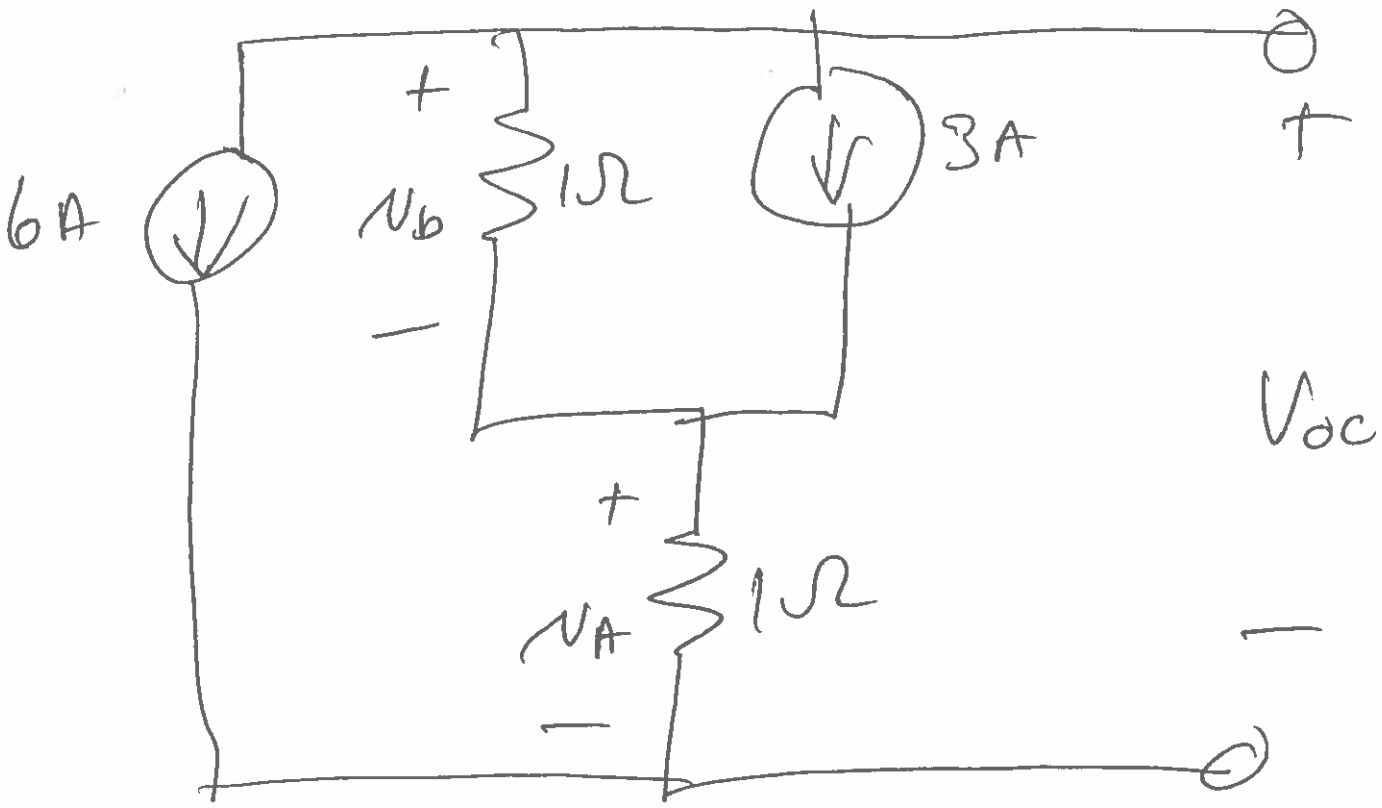
ex



Deactivate Sources



$\Rightarrow R_T = 2\Omega$

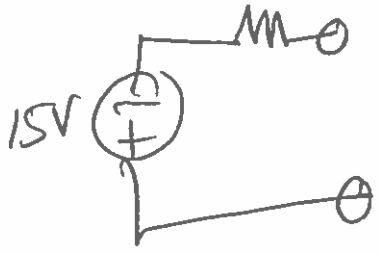


$$V_{oc} = V_b + V_a$$

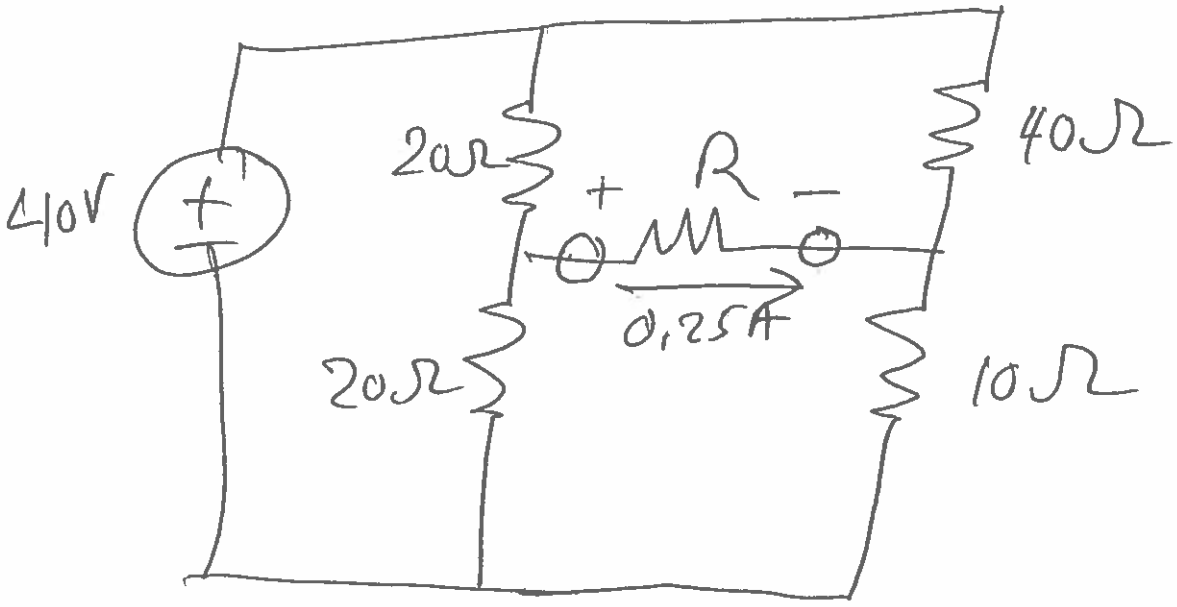
$$V_a = -6A(1\Omega) = -6V$$

$$V_b = -9A(1\Omega) = -9V$$

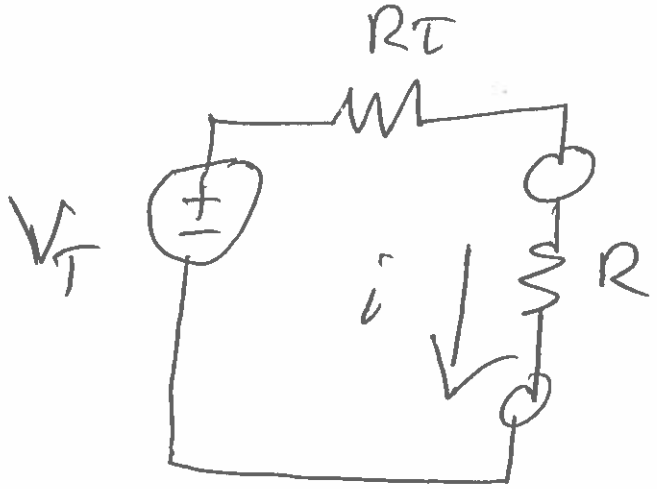
$$V_{oc} = -15V$$



⇐ Thevenin EQUIVALENT!

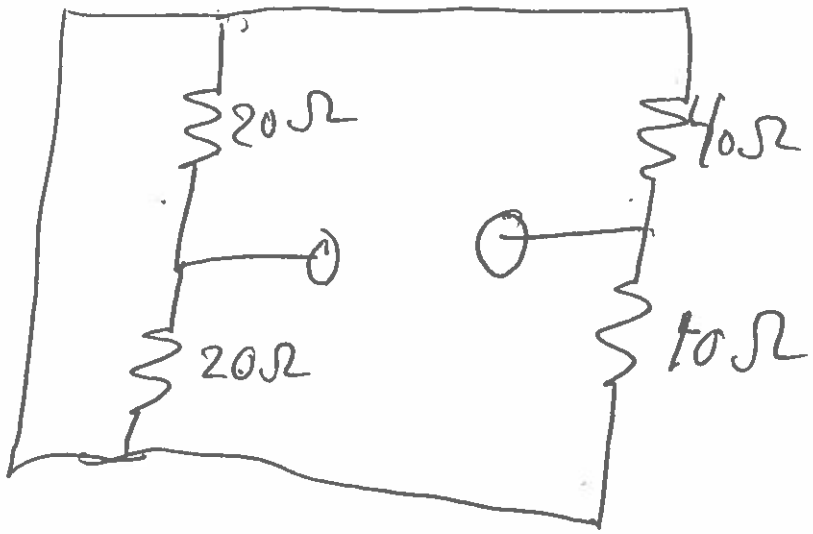


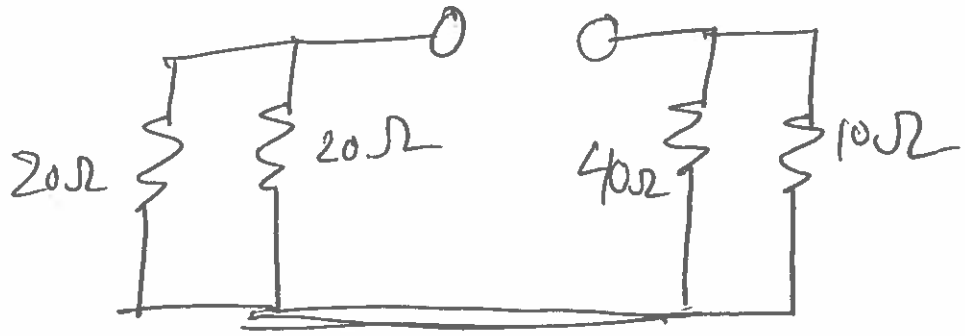
$R = ?$

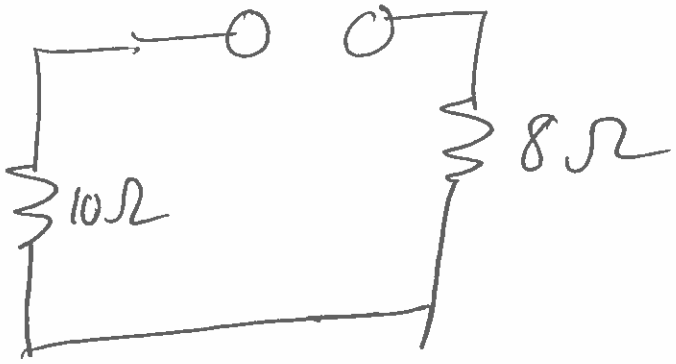


$i = 0.25A$

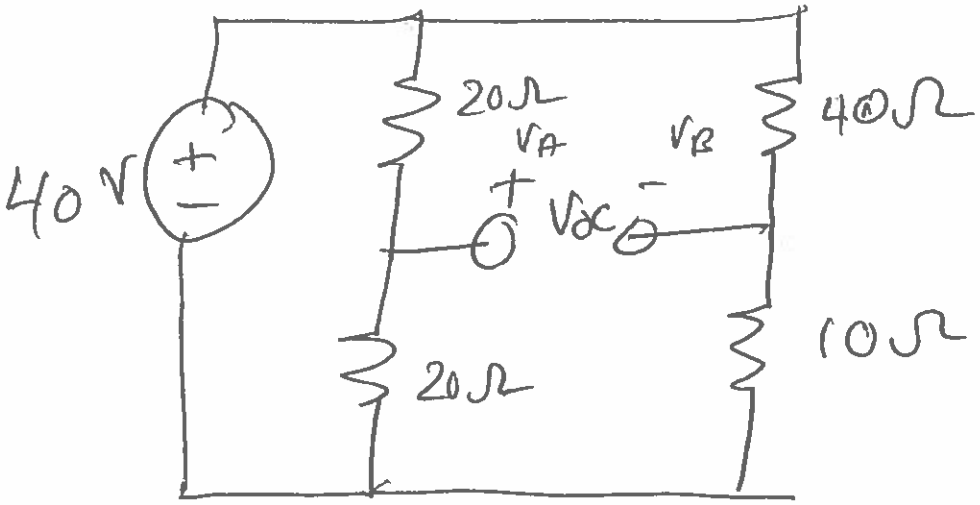
find R_T







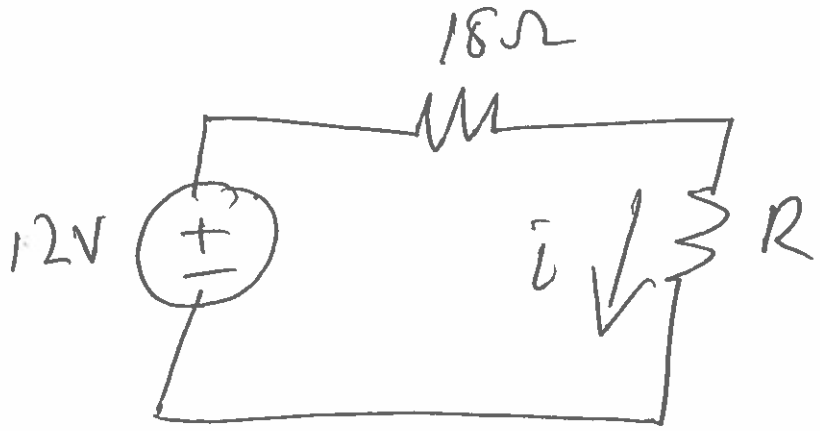
$R_T = 18\Omega$



$V_{OC} = V_A - V_B$ $\quad V_A = 40V\left(\frac{20\Omega}{20\Omega+20\Omega}\right) = 20V$

$V_B = 40V\left(\frac{10\Omega}{40\Omega+10\Omega}\right) = 8V$

$V_{OC} = 20V - 8V = 12V$

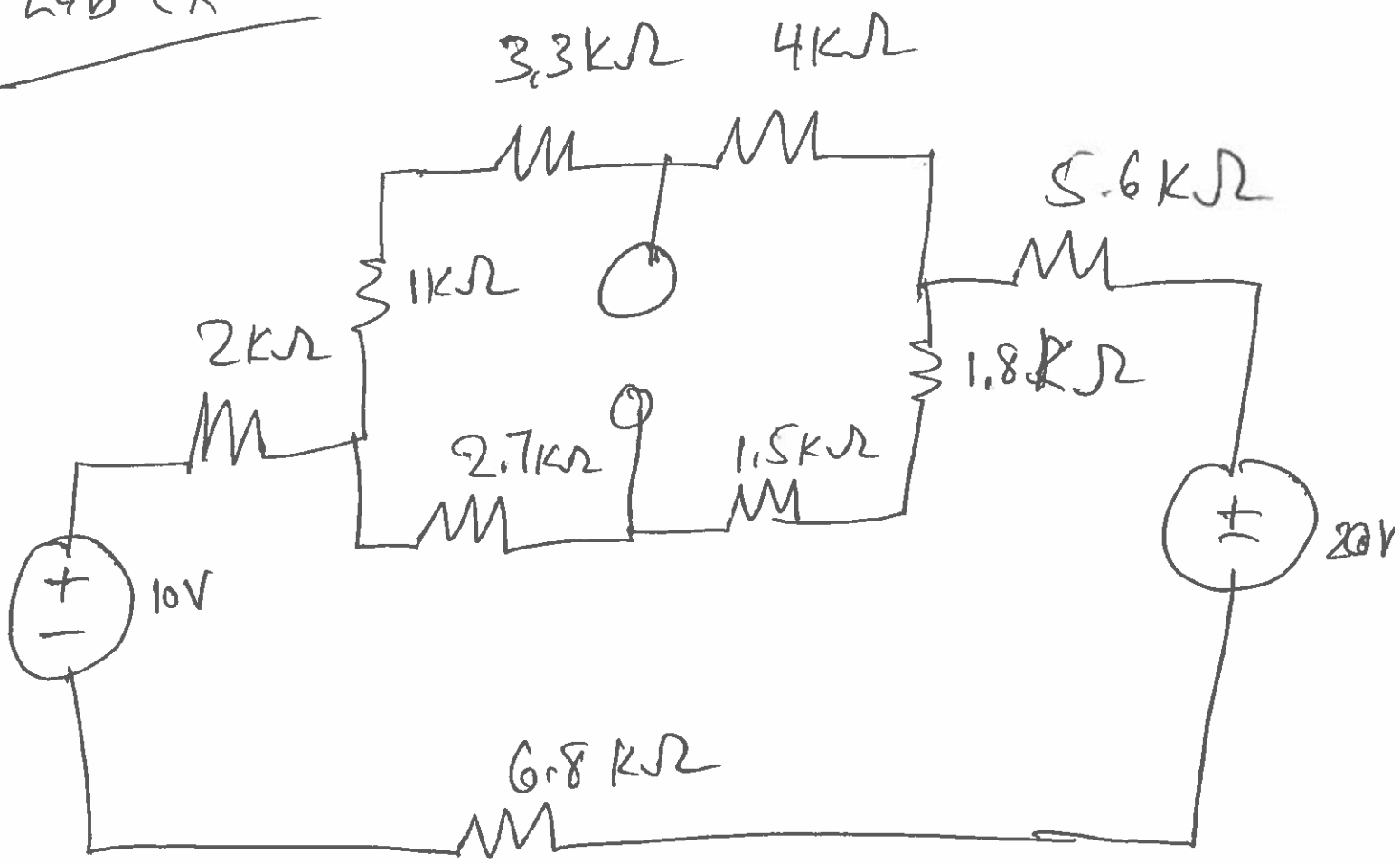


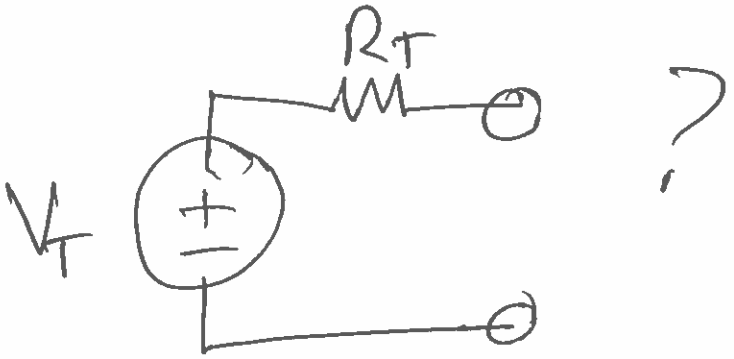
$$i = 0{,}25A = \frac{12V}{18\Omega + R}$$

$$18\Omega + R = \frac{12V}{0{,}25A} = 48\Omega$$

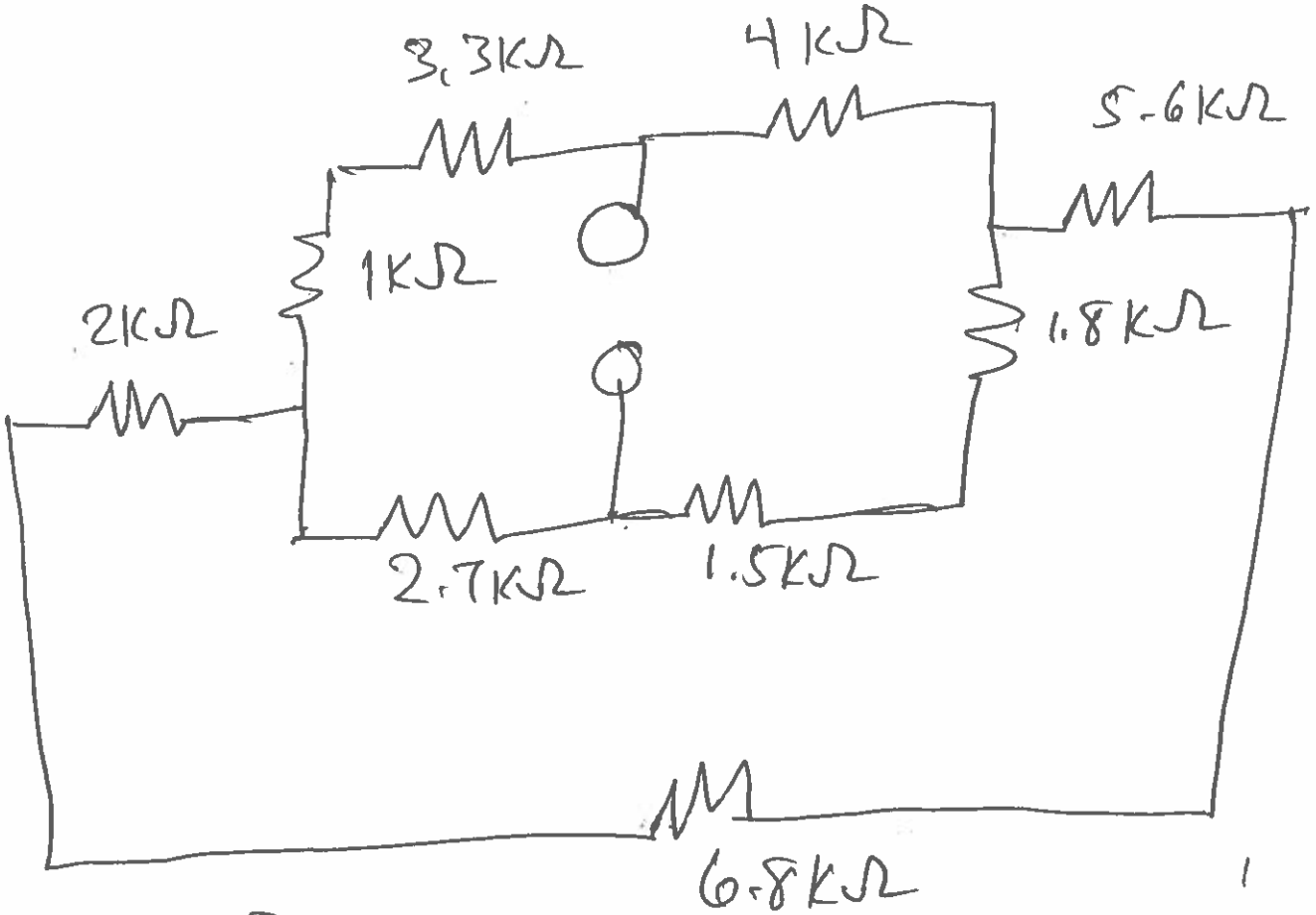
$$R = 48\Omega - 18\Omega = \boxed{30\Omega}$$

Lab ex



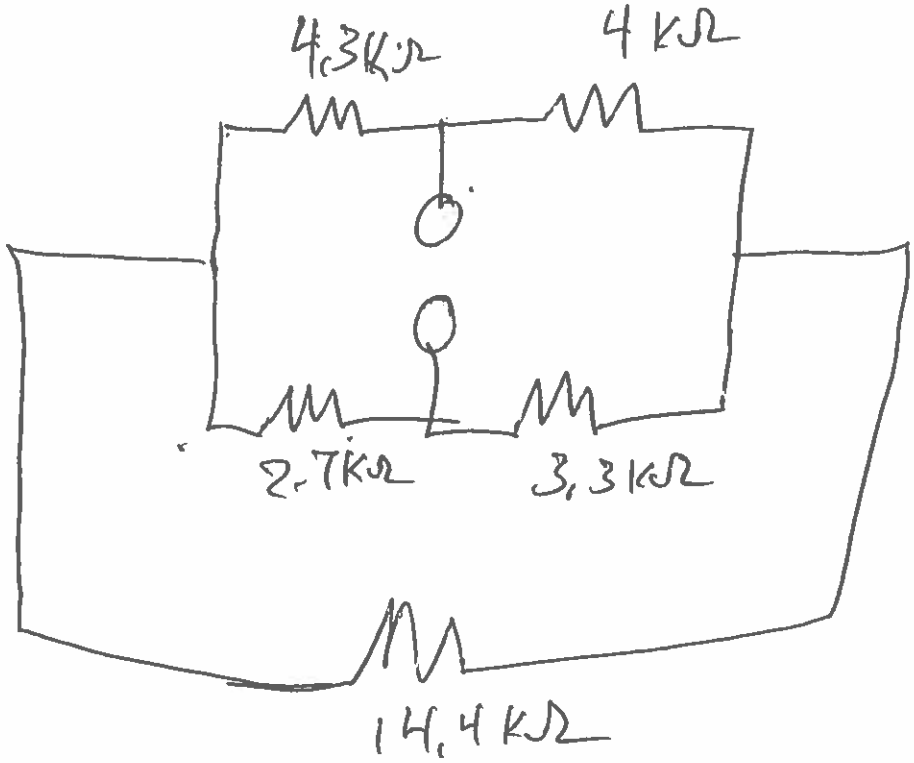


De activate Power Sources

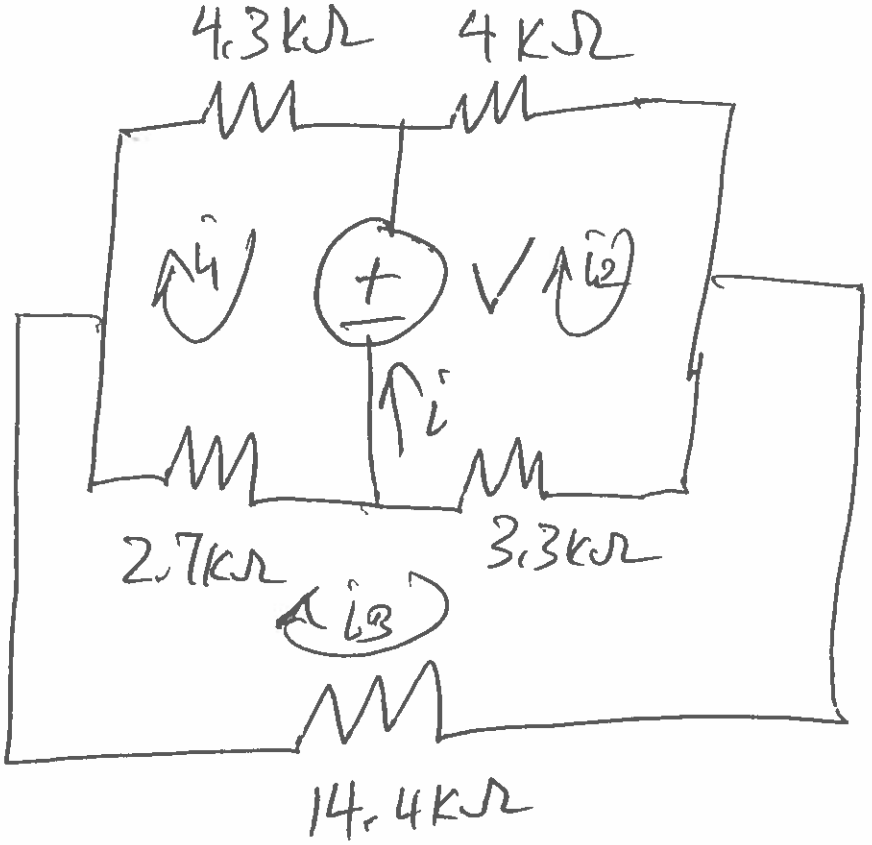


$R_T = ?$

1
7.6
6.8
14.4



From ohm's law $R = \frac{V}{i}$ so Place an arbitrary voltage source between terminals



Find $i \Rightarrow R_T = \frac{V}{i}$ $\quad i = i_2 - i_1$

Now write out Mesh equations

$$-V = i_1(4.3\text{K}\Omega + 2.7\text{K}\Omega) - i_3(2.7\text{K}\Omega)$$

$$+V = i_2(4\text{K}\Omega + 3.3\text{K}\Omega) - i_3(3.3\text{K}\Omega)$$

$$0 = i_3(2.7\text{K}\Omega + 3.3\text{K}\Omega + 14.4\text{K}\Omega) - i_1(2.7\text{K}\Omega) - i_2(3.3\text{K}\Omega)$$