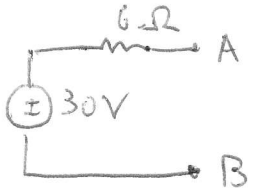
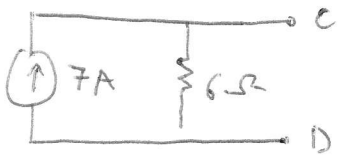
▼

1. (a) 4A
   (b) 14V
   (c) 5A
   (d) $(-e^{-5/2} + 5)$ A
2. (a)

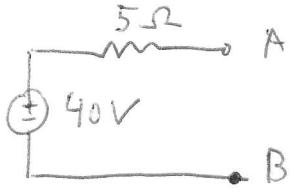


   (b) 7Ω
   (c)

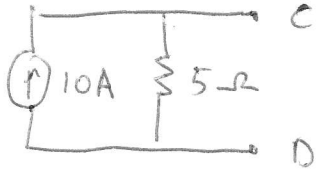


▲

1. (a) 5A
   (b) 16V
   (c) 6A
   (d) $(-e^{-3/2} + 6)$ A
2. (a)

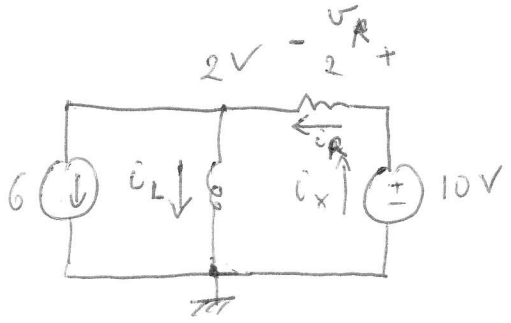


   (b) 6Ω
   (c)



(1)

(a) $t = 1^+$:

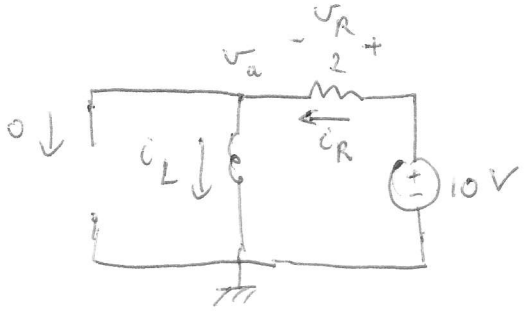


$v_R = 10 - 2 = 8$

$i_R = \frac{8}{2} = 4 \Rightarrow \boxed{i_x = 4A}$

KCL: $i_L + 6 = i_R \Rightarrow i_L = i_R - 6 = -2A$

(b) $t = 1^-$:



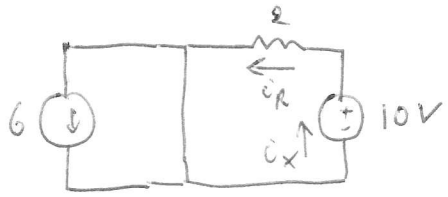
$i_L(1^-) = i_L(1^+) = -2A$

$i_R = i_L = -2A$

$v_R = 2 \cdot i_R = -4V$

$v_a = 10 - v_R = 14$ $\quad \boxed{v_a = 14V}$

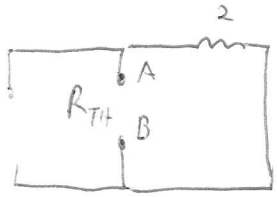
(c) $t = \infty$:



$i_x = i_R = \frac{10}{2} = 5A$

$\boxed{i_x(\infty) = 5A}$

(d) τ:



$R_{TH} = 2$ $\qquad \tau = \frac{L}{R_{TH}} = \frac{4}{2} = 2s$

$i_x(t) = A\,e^{-\frac{(t-1)}{\tau}} + B$

$\begin{cases} i_x(\infty) = A \cdot 0 + B = 5 \Rightarrow B = 5 \\ i_x(1^+) = A \cdot 1 + B = 4 \Rightarrow A = -1 \end{cases}$

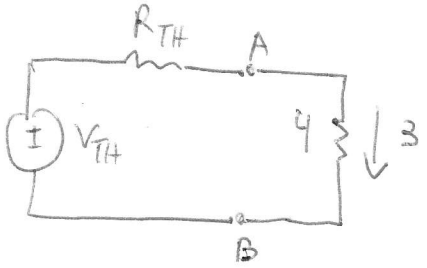
$i_x(t) = -e^{-\frac{(t-1)}{2}} + 5$

$\boxed{i_x(t) = \left(-e^{-\frac{t-1}{2}} + 5\right) A}$

(2)

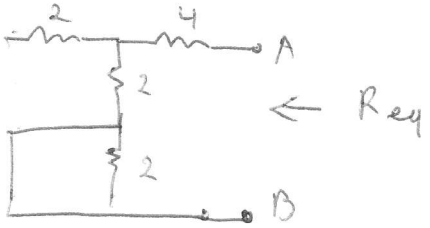
(a)

(*)



$$\frac{V_{TH}}{R_{TH}+4} = 3 \qquad (1)$$

(*) SET INDEP. SOURCES TO ZERO

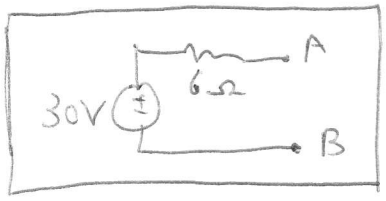


$\leftarrow R_{eq}$

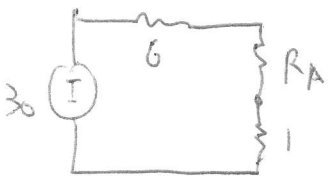
$$R_{eq} = 2+4 = R_{TH} \qquad (2)$$

(2) $R_{TH} = 6\,\Omega$

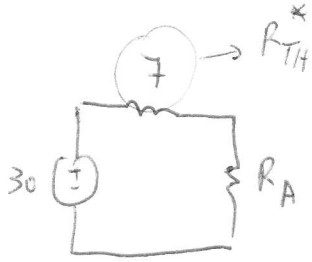
(1) $V_{TH} = 3(R_{TH}+4) = 30\,V$



(b)



NEW THEV. MODEL

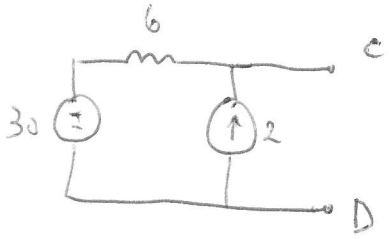


MAX POWER

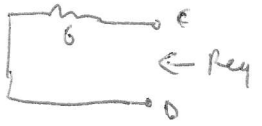
$R_A = R_{TH}^*$

$\boxed{R_A = 7\,\Omega}$

(c)

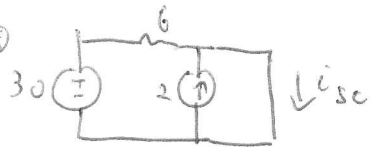


(*) SET INDEP. SOURCES TO ZERO



$R_{eq} = 6 = R_N$

(*)



$i_{sc} = \frac{30}{6} + 2 = 7$