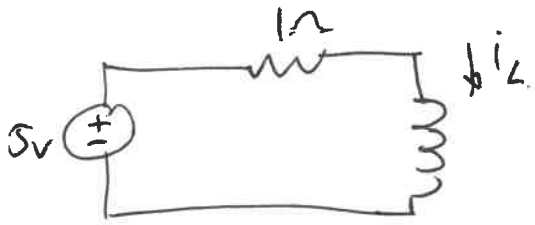
TUTORIAL 2A ENSC 3021

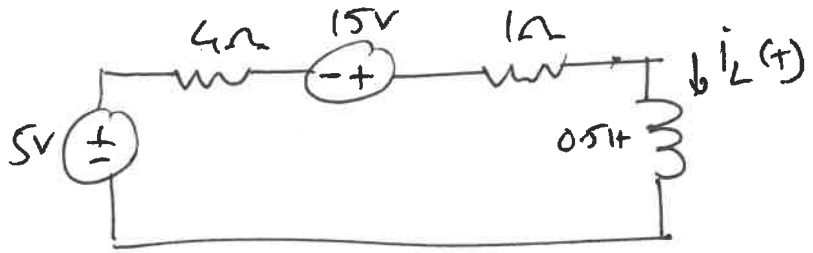
Q1.

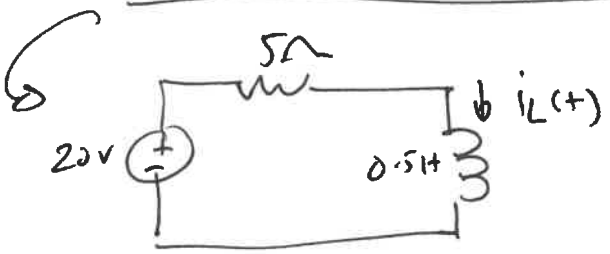
$t<0$



for $t<0$ $i_L(t) = \frac{5}{1} = \underline{\underline{5A}}$

$t>0$





$i_L(\infty) = 4A.$

$\tau = \frac{L}{R} = 0.1\,s$

for $t>0$ $\quad i_L(t) = 4 + (5-4)e^{-t/0.1}$ A.

$$\underline{i_L(t) = 4 + e^{-t/0.1}\ A}$$

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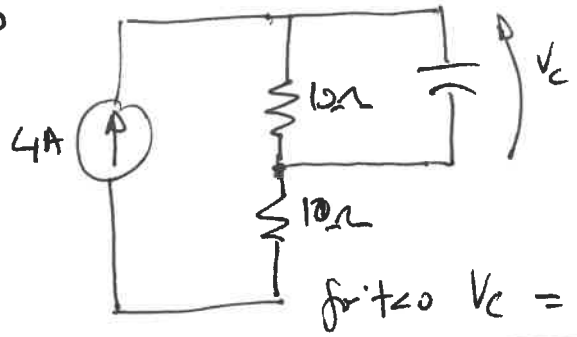
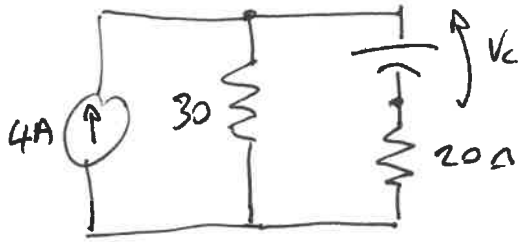
Q2

for $t<0$



for $t<0$ $V_c = 40V$

for $t>0$



for $t=\infty$ $V_c = 120V$

$\tau = RC$ $R_{TH} = 50$ $C = 1\times10^{-6}$

$\tau = 50\times10^{-6}$

for $t>0$

$$V_c(t) = 120 + (40-120)e^{-t/50\times10^{-6}} \quad V$$

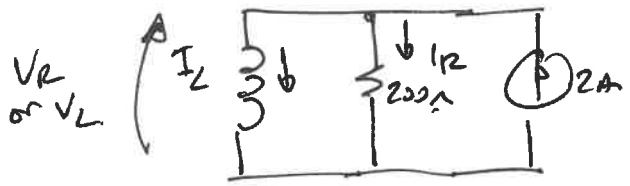
Tutorial 2A ENSC 3021

Q3 for RHS $I_L(0^+) = 0$

$I_L(\infty) = 2A.$

$\tau = \frac{0-1}{200} = 0.0005$

$t>0 \quad I_L(t) = 2(1-e^{-t/0.0005})$



$I_R = 2 - I_L = 2 - 2 + 2e^{-t/0.0005}$

$I_R = 2e^{-t/0.0005}$

$\Rightarrow V_R = V_L = 400e^{-t/0.0005}$

for LHS $V_C(0^+) = 0$

$V_C(\infty) = 200V$

$\tau = RC \quad R = 100 \quad C = 10\mu f$

$\tau = 1 \times 10^{-3}$

$t>0 \quad V_C(t) = 200 + (0-200)e^{-t/1\times10^{-3}}$

Combining LHS + RHS

for $t>0 \quad V(t) = 400e^{-t/0.0005} - 200(1-e^{-t/1\times10^{-3}})$