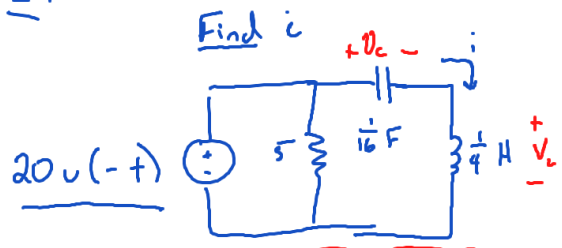
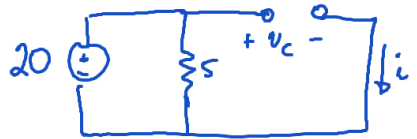


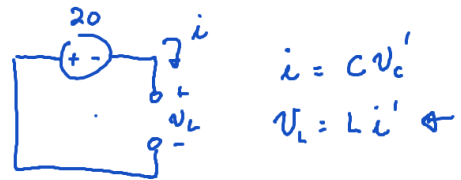
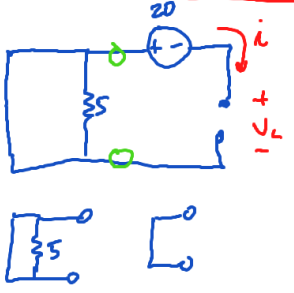
Find i



① I.C. $t < 0$ $\begin{cases} v_c = 20V \\ i = 0A \end{cases}$



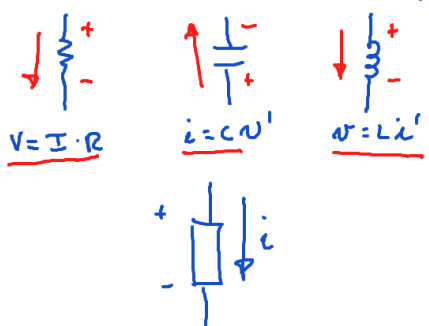
$t = 0^+$ $\begin{cases} i(0^+) = 0A \\ i'(0^+) = -80A \end{cases}$



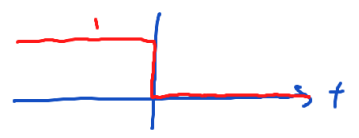
$i = C v_c'$
 $v_L = L i'$

$i'(0^+) = \frac{1}{L} v_L(0^+)$
 $= \frac{1}{4} (-20)$
 $= -80 A/s$

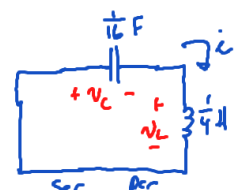
Side Passive Sign Conv



$v(-t)$



② i_n $t > 0$



$\alpha = \frac{R}{2L} = \frac{0}{2 \cdot \frac{1}{4}} = 0$

$\omega_0 = \frac{1}{\sqrt{LC}} = \frac{1}{\sqrt{\frac{1}{4} \cdot \frac{1}{16}}} = \frac{1}{\frac{1}{4}} = 8$

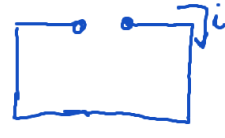
$S = -\alpha \pm \sqrt{\alpha^2 - \omega_0^2}$
 $= \pm \sqrt{-64}$
 $= \pm j8$

$i_n = e^{-\alpha t} [C_1 \cos(\omega_d t) + C_2 \sin(\omega_d t)]$
 $i_n = C_1 \cos(8t) + C_2 \sin(8t)$

Side: series or parallel

series $i =$
parallel $v =$

③ i_f $t = \infty$



$i_f = 0A$

④ $i = i_n + i_f$
 $= C_1 \cos(8t) + C_2 \sin(8t)$

$i(0^+) = 0 = C_1 + 0 \Rightarrow C_1 = 0$

$i(t) = C_2 \sin(8t)$
 $i'(0^+) = -80 = 8 C_2 \cos(8t)$
 $-80 = 8 C_2$
 $C_2 = -10$

$i = \begin{cases} 0 \\ -10 \sin(8t) A \end{cases}, t \geq 0$

$i = -10 \sin(8t) u(t) A$ all time

DSC

$\sin' = + \cos$
 $\cos' = - \sin$
ICS
 $\cos = + \sin$

Find v_c

$i = C v_c'$
 $v_L = L i'$

① $v_c = \frac{1}{C} \int_0^+ i dt + 20$

② $v_L = L i'$
 $v_c = -v_L$

$v_c = -L i'$, $t > 0$