# Homework 1

Answers to exercises are already provided in the text.

7.7(a) $i_L(t) = I_0 e^{-t/\tau_C} = 5e^{-120000t}$ mA $\quad t \geq 0$

$v_O(t) = -i_L(t)R_{EQ} = -300e^{-120000t}$ V $\quad t \geq 0$

7.32 (a) $v_{C1}(t) = [0 - 31.3953]e^{-766.488t} + 31.3953 \text{ V} = 31.3953(1 - e^{-766.488t})$ V

$v_{C1}(3 \text{ ms})31.3953\left[1 - e^{(-766..488)(3 \text{ ms})}\right]$ V $= 28.246$ V

$v_C(t) = 31.3953(1 - e^{-766.488t})[u(t) - u(t - 3 \text{ ms})] + 28.246e^{-98.0392(t-3 \text{ ms})}u(t - 3 \text{ ms})$

7.42 Design

7.54 $v_c(t) = e^{-50t}[5\cos(1413t) + 0.17689\sin(1413t)]$ V

$i_L(t) = -3.5369e^{-50t}\sin(1413t)$ mA

7.57 $v_C(t) = e^{-412.5t}[12\cos(282.5664t) + 17.518\sin(282.5664t)$

$i_L(t) = -10.617e^{-412.5t}\sin(282.5664t)$ mA

7.55 $i_L(t) = 20te^{-1000t}$ A

$v_C(t) = e^{-1000t}[20 - 20000t]$ V

7.53 $i(t) = 4 - 4e^{-2t} - 8te^{-2t}$ A

7.64 $v_C(t) = 5 + 0.5858e^{-18585t} - 5.05858e^{-215.23t}$ V

$v_O(t) = 50586e^{-18585t} + 1.0888e^{-215.23t}$ mA

7.88 $C = 1.333$ µF; $\quad R = 215\ \Omega$