ECE 3 HW 8

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At time $t = 0^-$, since the capcitor acts like a open circuit and the inductor acts as a short we have $v_C(0^-) = 200V$, and $i_L(0^-) = 2A$.

(a)

Therefore since the voltage across a capacitor cannot change instantiously we must have $v_C(0^+) = v_C(0^-) = \boxed{200V}$

(b)

Since the current across a inductor cannot change instantiously we must have $i_L(0^+) = i_L(0^-) = \boxed{2A}$

(c)

Since the resistor must drop $v_C(0^+) = 200V$ we must have $i_{50\Omega}(0^+) = \boxed{4A}$

(d)

Since when the switch changes, the inductor is now in parallel with the capacitor $v_L(0^+) = v_C(0^+) = \boxed{200V}$

(e)

From KCL the capacitor must have a current $i_{50\Omega}(0^+) + i_L(0^+) = \boxed{6A}$ flowing out

(f)

From the i-v relationship of a capacitor we have $i_c(0^+) = c\frac{dv_c(t)}{dt}\Big|_{t=0^+}$, therefore we have $\frac{dv_c(t)}{dt}\Big|_{t=0^+} = \frac{-6}{0.01} = \boxed{-600\frac{V}{s}}$

(g)

From the i-v relationship of a capacitor we have $v_l(0^+) = L\frac{di_L(t)}{dt}\Big|_{t=0^+}$, therefore we have $\frac{di_L(t)}{dt}\Big|_{t=0^+} = \frac{200}{5} = \boxed{40\frac{A}{s}}$