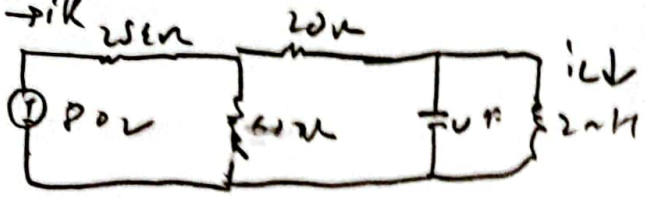
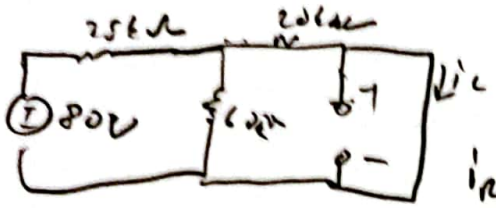
8.2



$t=0$ equivalent



$\frac{80-0}{60} + \frac{0}{20} = \frac{0}{60} \Rightarrow R_{eq} = 60\,k\Omega$

$i_{R_0} = 80/(25+75) = 2\,mA$

$$i_L(0^-) = \frac{60\cdot(2mA)}{60+20} = 1.5\,mA$$

$$V_L(0^-) = 0$$

$t=0^+$

$$V_L(0^+) = V_L(0^-) = 0$$

$$i_L(0^+) = i(0^-) = 1.5\,mA$$

$$80 = i_R(0)\cdot(25+20) + V_L(0^-)$$

$$i_R(0) = \frac{80}{45} = 1.778\,mA = i_R(0)$$

$i_R = i_L + i_C$

$$1.778\,mA = i_C(0^+) + 1.5 \qquad i_C(0^+) = 0.278\,mA$$

$$V_L(0^+) = V_L(0^-) = 0$$

$V_L = L\,di_L/dt$ $\qquad di_L(0^+)/dt = V_L(0^+)/L = 0$

$\frac{V_L}{L} = \frac{dI}{dt}$ $\qquad \frac{V_L}{L} = 0$

$V_L(0)/L = 0 \Rightarrow$ $\boxed{\frac{di_L}{dt} = 0}$

$di_L(0)/dt = 0$ $\qquad 80 = 45R + V_L$

✓ derivative for line

$0 = 1.5\,dR/dt + dV_L/dt$

$$\frac{dv_c}{dt} = \frac{i_c(0^+)}{C} = 0.2A = 2A\frac{V}{s}$$

$$\frac{di_R}{dt} = \frac{-1}{L_{1S}} \int v_c(0^+)\,dt = -2A/1S$$

$$di_R(0^+)/dt = -6.7A\ A/S$$

i_R 는 i_c 와 i_L

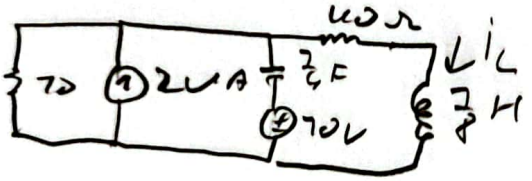
$$di_R(0^+)/dt = di_c(0^+)/dt - di_L(0^+)/dt$$

$$-6.7A = \frac{dv_c(0^+)}{dt} + 0 \qquad dv_c(0^+)/dt = -6.7V/s$$

$$i_R(0^-) - i_L(0^-) = 3A - 0A = 3A$$

$$i_R(0^+) = 7.3A \qquad i_c(0^+) = 7.3A$$

8강



$$\frac{v_L}{L} = \frac{di_L}{dt} \qquad v_L(0^+) = 0 \Rightarrow \frac{di_L(0^+)}{dt} = 0$$

$$i_L(0^+) = 2A \qquad \frac{dv_c(0^+)}{dt} = \frac{2}{C} = 4V/s$$

$$\frac{dv_R(0^+)}{dt} = 8V/s$$

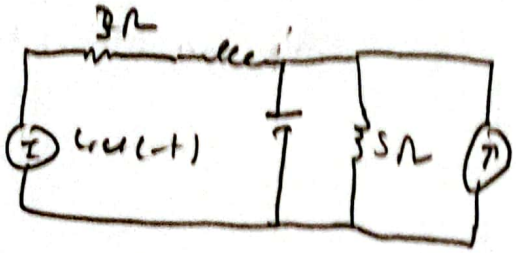
$$i_L(\infty) = \frac{10.200\Omega}{40+10} = 400mA$$

$$v_c(\infty) = 2.R_{eq} - 10 \qquad = 2.8 - 10 = -6 = v_c(\infty)$$

$$R_{eq} = 10\|40 = 8\Omega$$

$$v_R(\infty) = 2.R_{eq} = 16 = v_R(\infty)$$

5.4

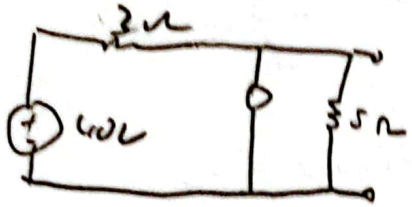


a)

$i(0^-) = \frac{40}{5+5} = 4A$ $\quad v(0^-) = -5i(0^-) = -25V$

$i(0^+) = i(0^-) = 4A$

$v(0^+) = v(0^-) = -25V$



b)

$\frac{i_c}{C} = \frac{dv_c}{dt}$

$i(0^+) + i_R(0^+) = i_c(0^+) + 4$

$i_R = \frac{v}{5} = \frac{25}{5} = 5$

$i_c(0^+) = i(0^+) - 5 = 4 - 5 = -1$

$dv_c/dt = -1/0.05 = -20 V/s$

$\frac{dv_c}{dt} = \frac{i_c}{C} = \frac{-1}{0.05} = -20 V/s$

v_L

$\frac{v_L}{L} = \frac{di}{dt}$

$-v_L(0^+) + 5i(0^+) + v_c(0^+) = 0$

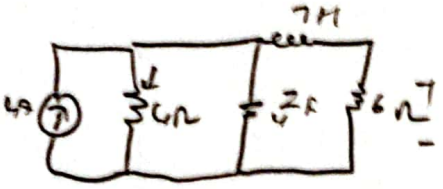
$-v_L(0^+) + 20 - 25 = 0$

$v_L(0^+) = -5V$

$di(0^+)/dt = -5/0.25 = -20 A/s$

$\frac{-5.4}{5+5} = -0.5A$ $\quad 5(0.5) = 2.5V$

P5



a)

$t<0$ $\quad i_L(t)=0 \rightarrow i_L(0^-)=0 \quad v_L(0^-)=0$

$t=0^+ \quad i_L(t)=4$ $\quad v(0^+)=6\,i_L(0^+)=0V$

$i(0^+)=\frac{v_L(t)}{4}=\frac{0}{4}=0A$

b) $\frac{di(0^+)}{dt}=\frac{d(v_R(0^+)/R)}{dt}=\frac{7R\,dv_L(0^+)/dt}{R}=7\,\frac{dv_L(0^+)}{dt}$

$\frac{di(0^+)}{dt}=(7H)/0.1s\ A/s=0A/s=\frac{di(0^+)}{dt}$

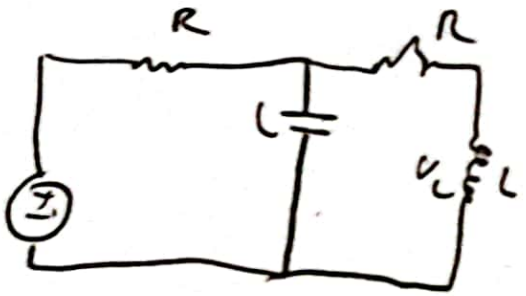
$v_L=6i_L \quad dv_L/dt=6\,di_L/dt \quad dv_L(0^+)/dt=6\,di_L(0^+)/dt=6\,v_L(0^+)=0$

$=\frac{dv(0)}{dt}=\frac{0V}{s}$

c) $i(\infty)=\frac{6.4}{5}=2.4$

$v(\infty)=6(4-2.4)=9.6V$

8.6



$t<0$ $i(0)$ $v_C(0)=0$

a)

$v_R(0^+) = R\,i(0^+) = 0$

$v_L(0^+) = 0$

b)

c)

$$v_R(\infty) = \frac{R}{R+R}\, I_s$$

$$v_L(\infty) = 0$$