Hw #6

#1

$$E_T = \int P_T = \int I v \, dt \qquad q_{c\infty} = CV$$

$$= v \int_0^\infty I \, dt$$

$$= V q_{c\infty}$$

$$E_T = \underline{\underline{CV^2}}$$

$$E_c = \int P_c = \int C V_c \frac{dV_c}{dt} dt \qquad P_c = I_c V_c = \left(C \frac{dV_c}{dt}\right) V_c$$

$$= C \int_0^\infty V_c \frac{dV_c}{\cancel{dt}} \cancel{dt}$$

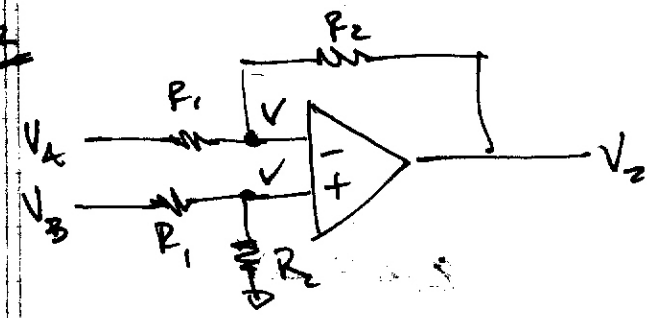
$$= C \int_0^V V_c \, dV_c$$

$$E_c = \frac{C}{2} V_c^2 \Big|_0^V = \underline{\underline{\frac{1}{2} C V^2}}$$

$$E_R = E_T - E_c = CV^2 - \frac{1}{2}CV^2 = \boxed{\underline{\underline{\frac{1}{2}CV^2}}}$$

→ NOTICE THIS ENERGY IS NOT DEPENDANT ON R.

#2



Assuming Ideal Amp

(1) $$\frac{V_a - V}{R_1} = \frac{V - V_2}{R_2} \Rightarrow V = \frac{R_2 V_a + R_1 V_2}{R_1 + R_2}$$

(2) $$\frac{V_b - V}{R_1} = \frac{V}{R_1} \Rightarrow V = \frac{R_2}{R_1 + R_2} V_b$$

$$\frac{R_2}{\cancel{R_1 + R_2}} V_b = \frac{R_2 V_a + R_1 V_2}{\cancel{R_1 + R_2}}$$

$$\Rightarrow \frac{R_2}{R_1}(V_b - V_a) = V_2 \Rightarrow \boxed{K = \frac{R_2}{R_1}}$$

#3

$$A + B = \overline{(\bar{A} \cdot \bar{B})}$$

A	B	$A+B$	$\bar{A}$	$\bar{B}$	$\bar{A}\bar{B}$	$\overline{(\bar{A} \cdot \bar{B})}$
0	0	0	1	1	1	0
0	1	1	1	0	0	1
1	0	1	0	1	0	1
1	1	1	0	0	0	1

#4

D	K	w_1	w_2	w_3	A
0	0	0	0	0	1
	0	0	0	1	1
	0	0	1	0	1
	0	0	1	1	1
	0	1	0	0	1
	0	1	0	1	1
	0	1	1	0	1
	0	1	1	1	1
	1	0	0	0	0
	1	0	0	1	0
	1	0	1	0	0
	1	0	1	1	0
	1	1	0	0	0
	1	1	0	1	0
	1	1	1	0	0
	1	1	1	1	0
1	0	0	0	0	1
	0	0	0	1	1
	0	0	1	0	1
	0	0	1	1	1
	0	1	0	0	1
	0	1	0	1	1
	0	1	1	0	1
	0	1	1	1	0
	1	0	0	0	0
	1	0	0	1	0
	1	0	1	0	0
	1	0	1	1	0
	1	1	0	0	0
	1	1	0	1	0
	1	1	1	0	0
	1	1	1	1	0

$$A = \bar{K}(\bar{D} + \bar{w}_1 + \bar{w}_2 + \bar{w}_3)$$