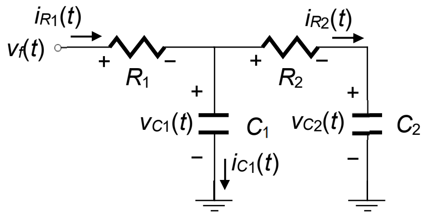
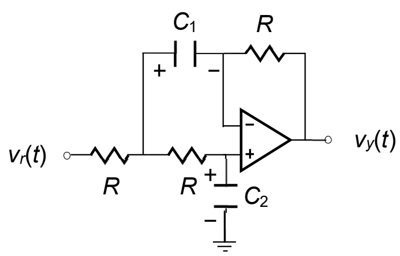
Third Test, Circuits III, May 12, 2023, Danilo Rairán

Name: ____ Code: _______________

1. **a**) Compute a state space model of the following circuit. Consider $v_{C2}(t)$ as the output.
b) Plot the block diagram.
c) Draw an equivalent circuit using Operational Amplifiers (OpAmp)



2. **a**) Compute the transfer function of the following circuit.
b) Compute the initial conditions, given R = 10 kΩ, C1 = C2 = 10 µF, $v_r(t) = \mu(-t)\ (V)$.
c) Compute $v_y(t)$ if $v_r(t) = \mu(-t) + 2\mu(t)\ (V)$.



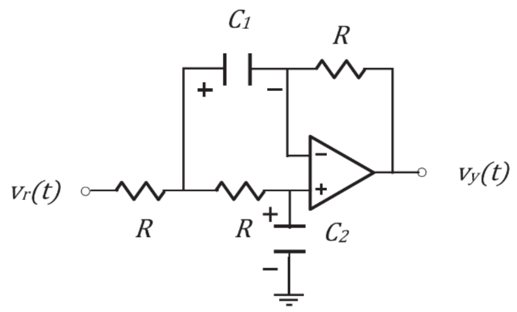
1.	**a**)	/0.8	**2.**	**a**)	/0.8
	b)	/0.8		**b**)	/0.9
	c)	/0.9		**c**)	/0.8

Third Test, Circuits III, November 13th, 2023, Danilo Rairán

Name: ____Code: ____________

1.

a) Compute the transfer function of the following circuit.

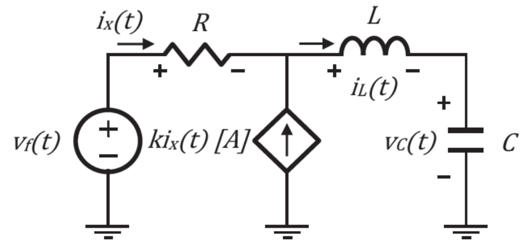


b) If $R = 2\,\Omega, C_1 = 1\,F,\ C_2 = 2\,F, v_r(t) = 2 + 3\mu(t)$, compute the $v_y(t)$.

c) Divide the answer in natural response, forced response, zero input response, zero states response, as equations and plot each of them.

2.

a) If $x_1(t) = i_L(t)$ and $x_2(t) = v_C(t)$, compute a model in state space for $i_x(t)$ as output.



b) If $R = 2\,\Omega, L = \frac{1}{2}H, C = \frac{1}{2}F, v_F(t) = u(-t) + 3u(t)[V]$, compute $i_x(t)$, equation and plot.

c) separate $i_x(t)$ in natural response, forced response, zero input response, zero states response, present each equation and plot them.

1.	2.
a) 0.8	a) 0.9
b) 0.8	b) 0.8
c) 0.9	c) 0.8