

EC LAB 1

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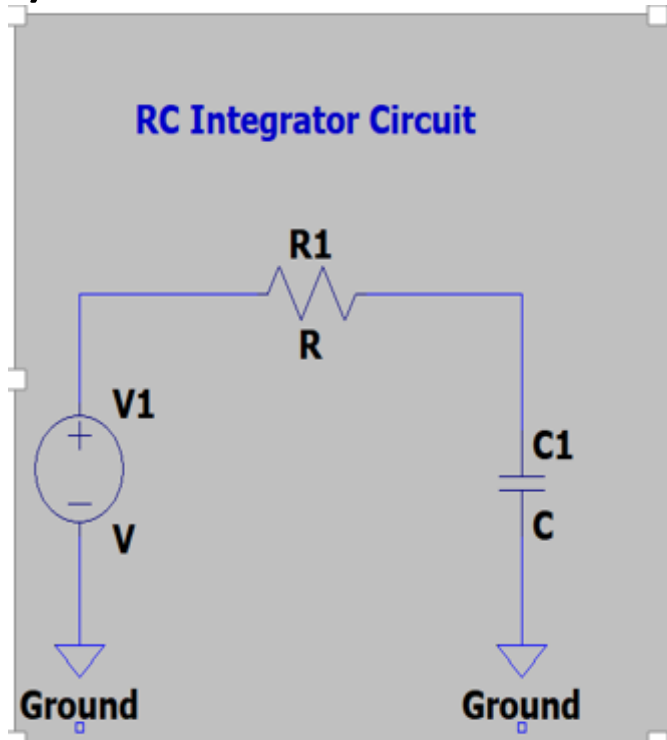
Roll No. : 202151160

Date : 24/01/2022

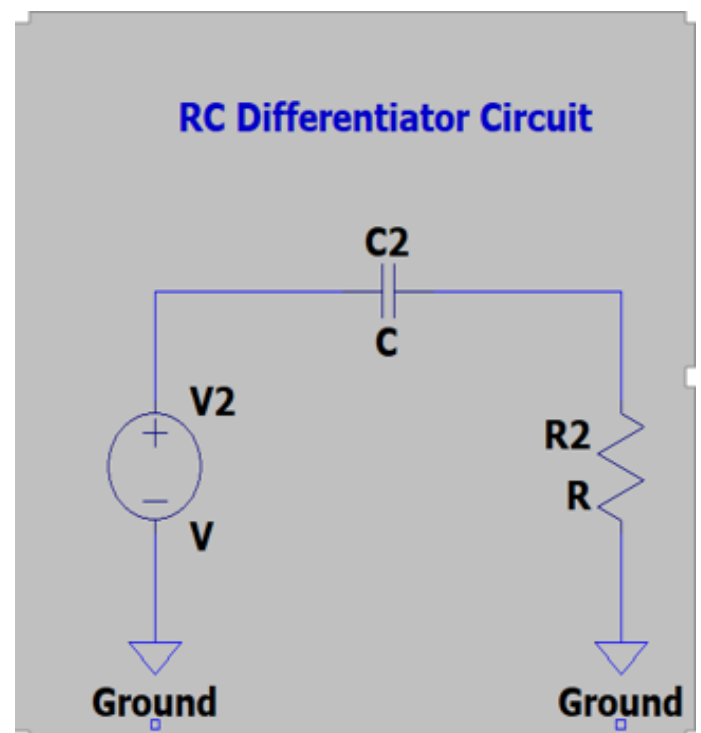
Objective : To Study the Time and Frequency response of RC circuits.

1) Circuit Diagrams :

a)



b)



2)

The value of R and C is varied in various cases of the experiment, so that different relations between time constant and time period(T) is achieved.

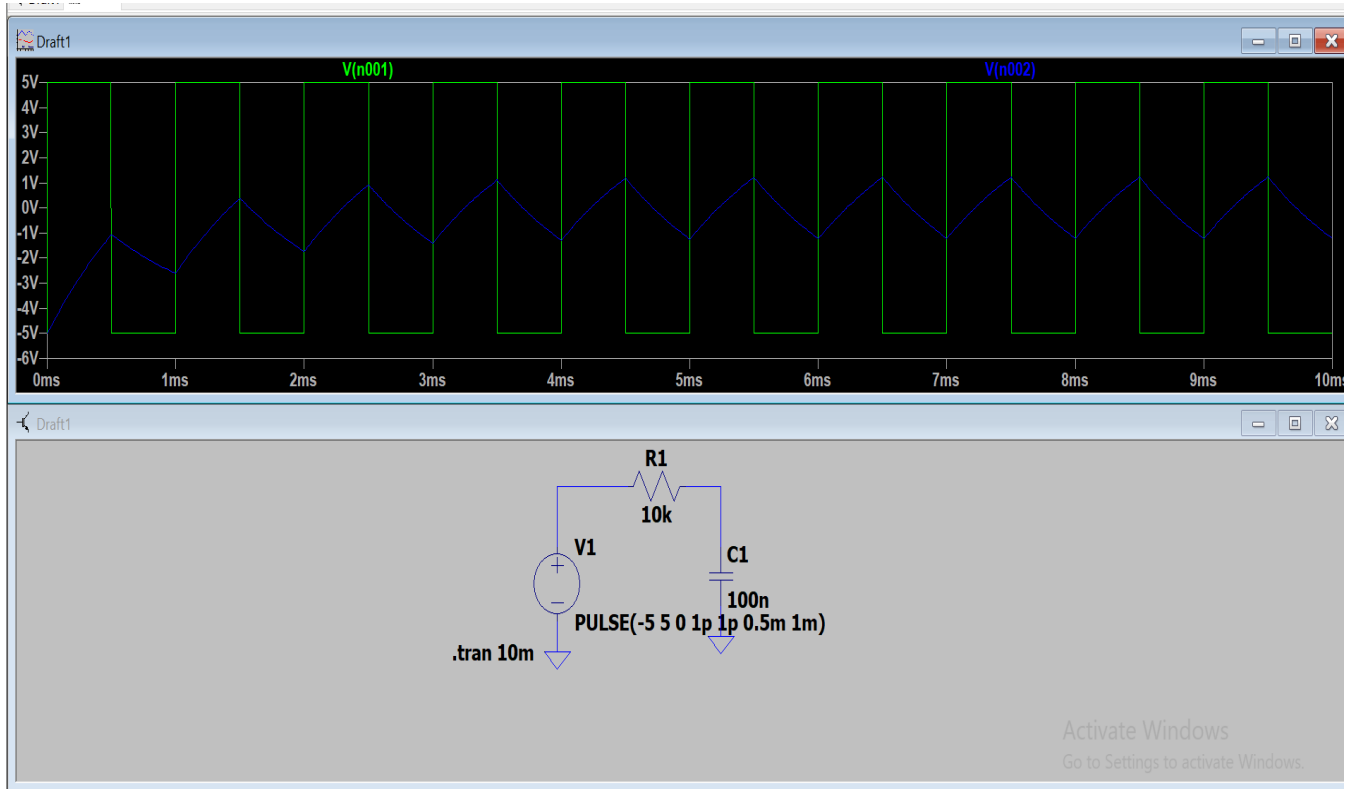
Time constant (τ) = RC

Transient response (time required by the capacitor to charge fully) = $5RC$ (approximately).

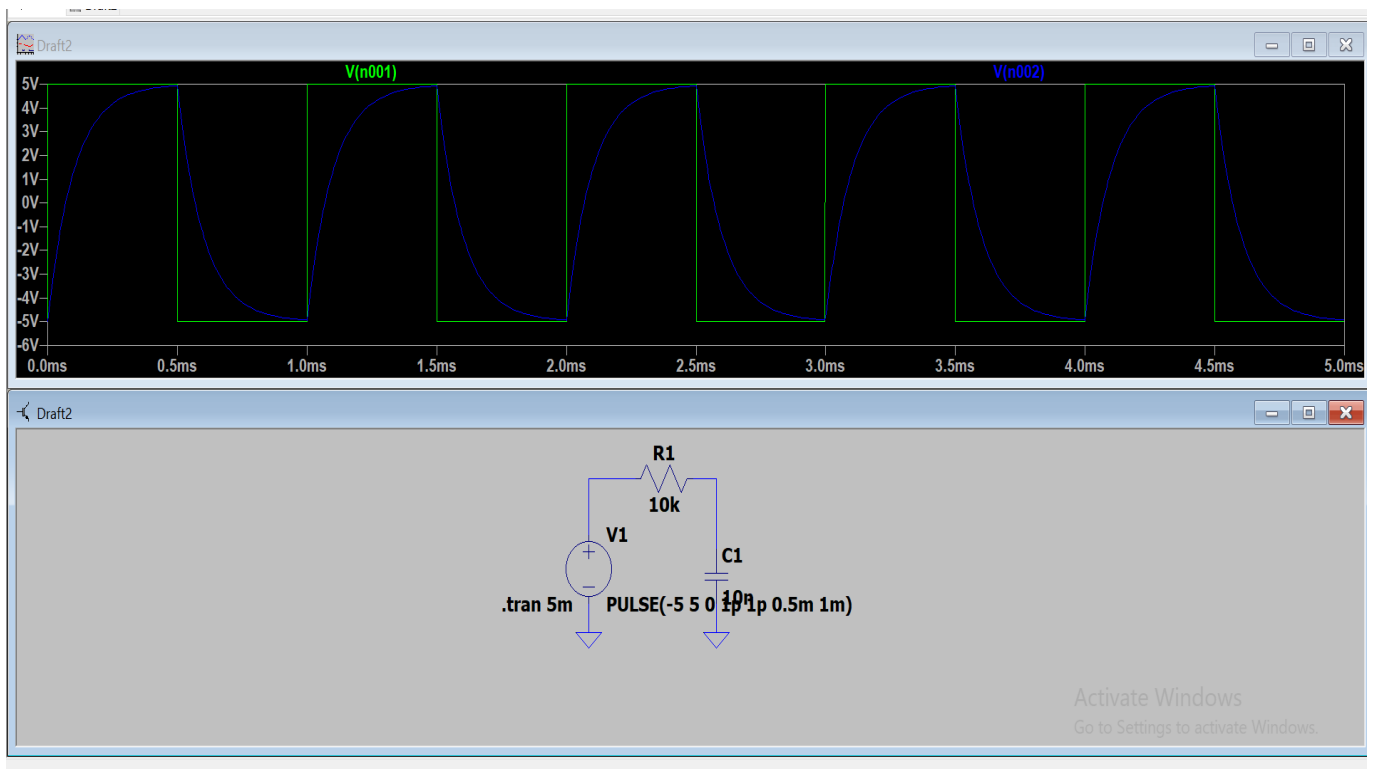
3) Time response :

RC Integrator Circuit :

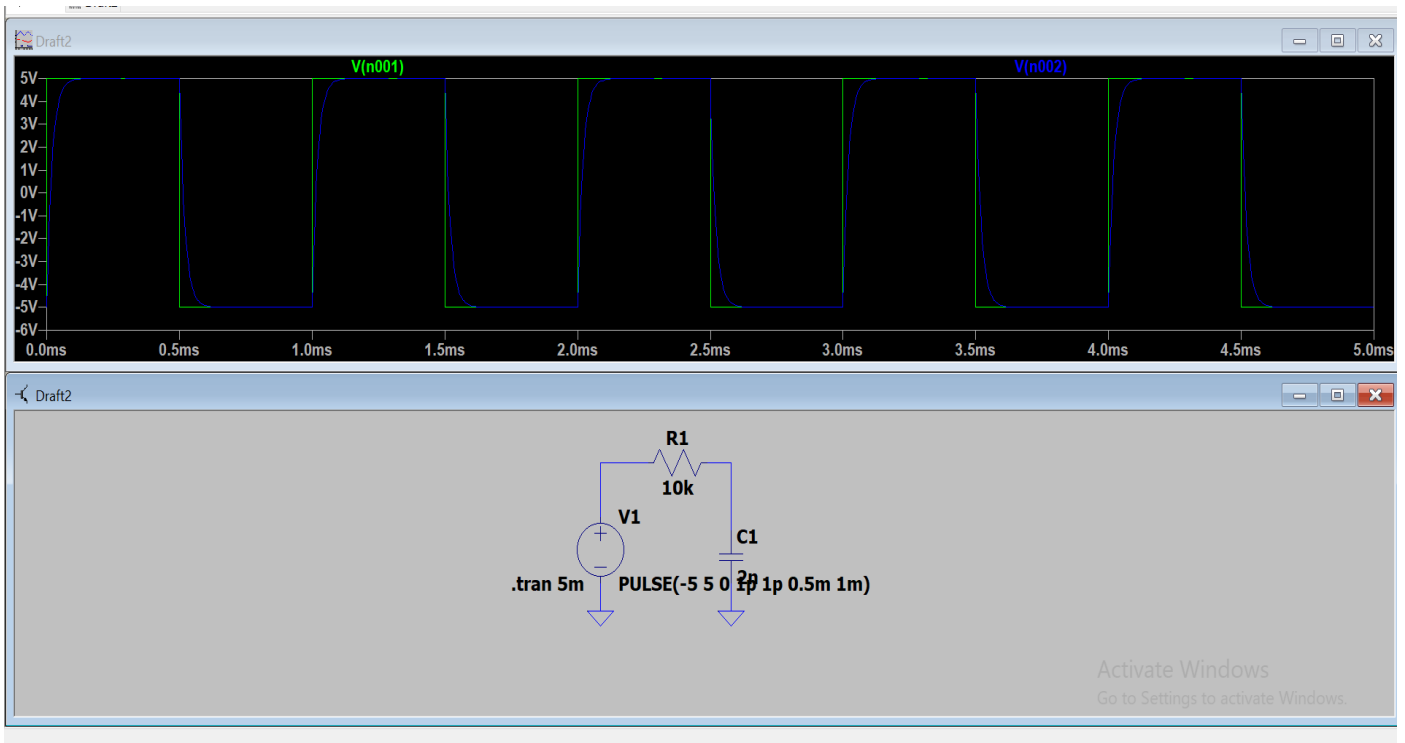
1.) $T \ll RC$



2.) $T = RC$

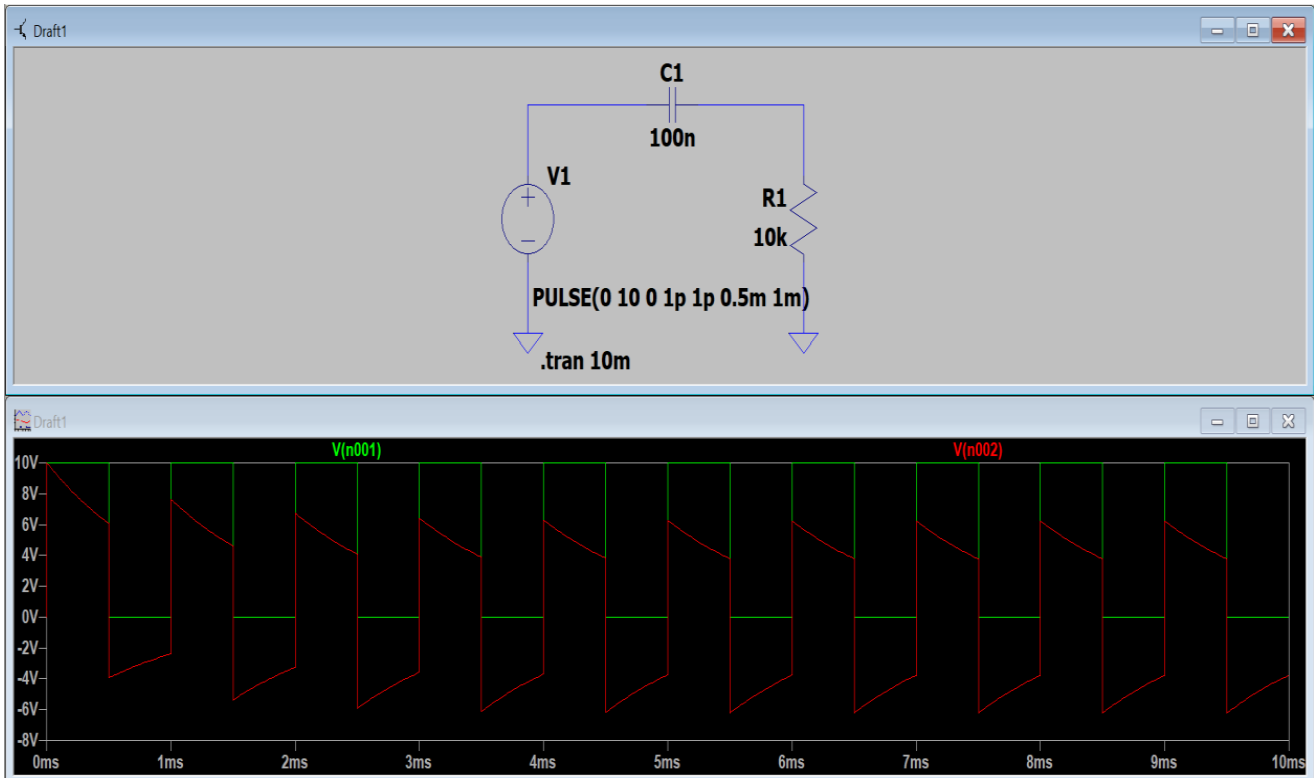


3.) $T \gg RC$

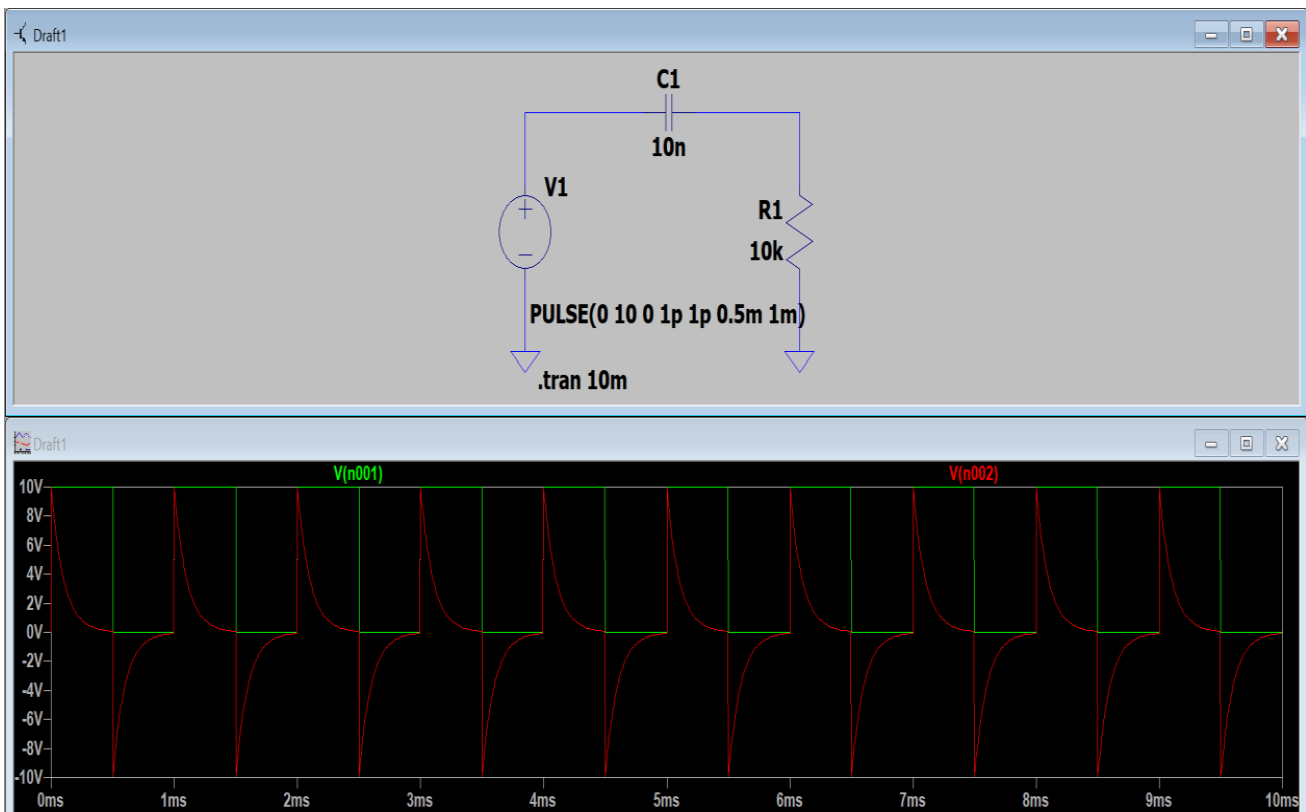


RC Differentiator Circuit :

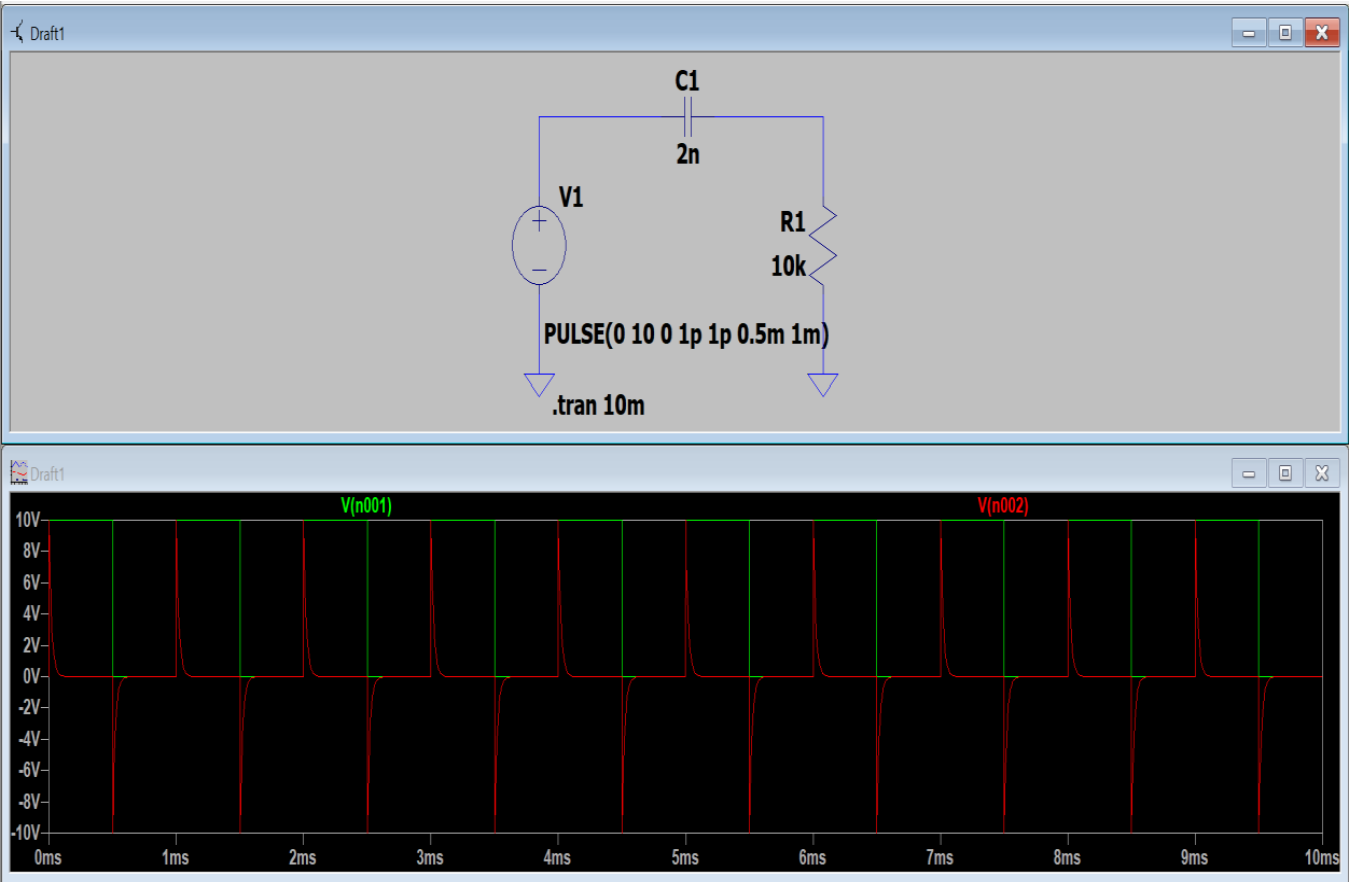
1.) $T \ll RC$



2.) $T = RC$



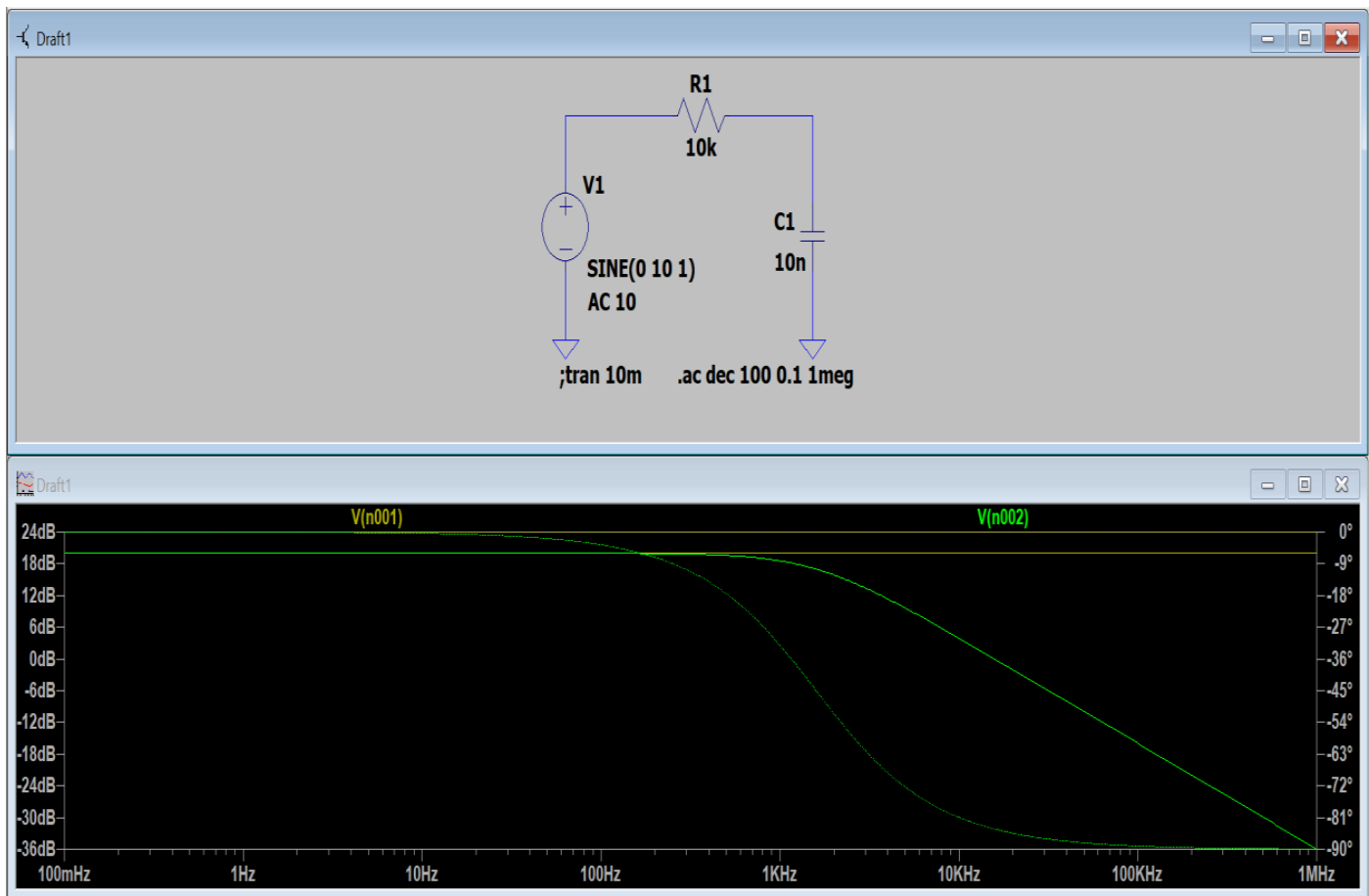
3.) $T \gg RC$



4) Frequency Response of Low Pass filter :

	frequency (Hz)	V_{in}	V_{out}	Voltage gain (dB)
1.	1	10	9.97	-0.03
2.	5	10	9.46	-0.48
3.	10	10	8.45	-1.46
4.	50	10	3.05	-10.31
5.	100	10	1.70	-15.39
6.	200	10	1.17	-18.63
7.	500	10	0.51	-25.85
8.	1000	10	0.31	-30.17
9.	5000	10	0.062	-44.15
10.	100000	10	0.002	-73.98

5) Voltage gain(in dB) vs Frequency graph :



6) Results : The experiment demonstrates how the relation between T and RC affects both, the Integrator as well as the differentiator circuit. This Experiment also shows that an RC Integrator circuit acts as a Low pass filter.

Thank you