Ex: No:2

Name:-Aadi Mahajan

Registration number:-19BEE0032

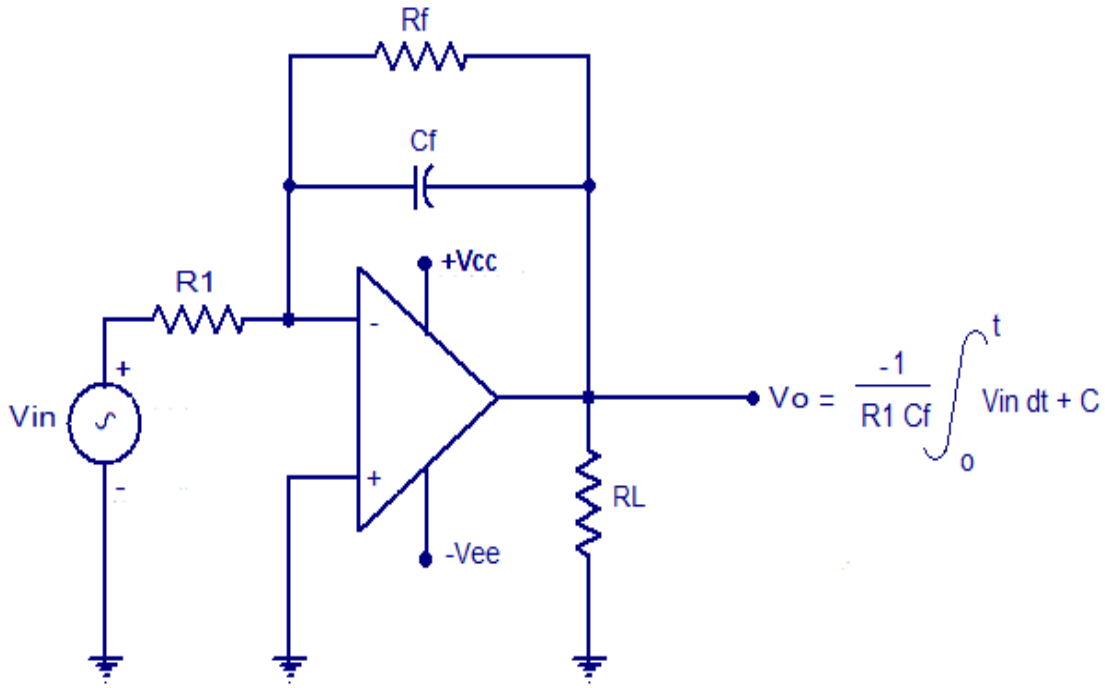
Aim: **Design of integrator and differentiator using op-amp**

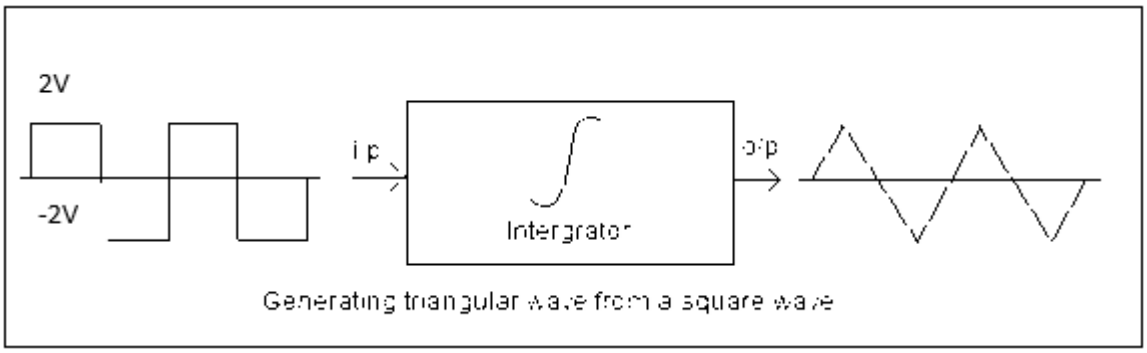
Apparatus required:

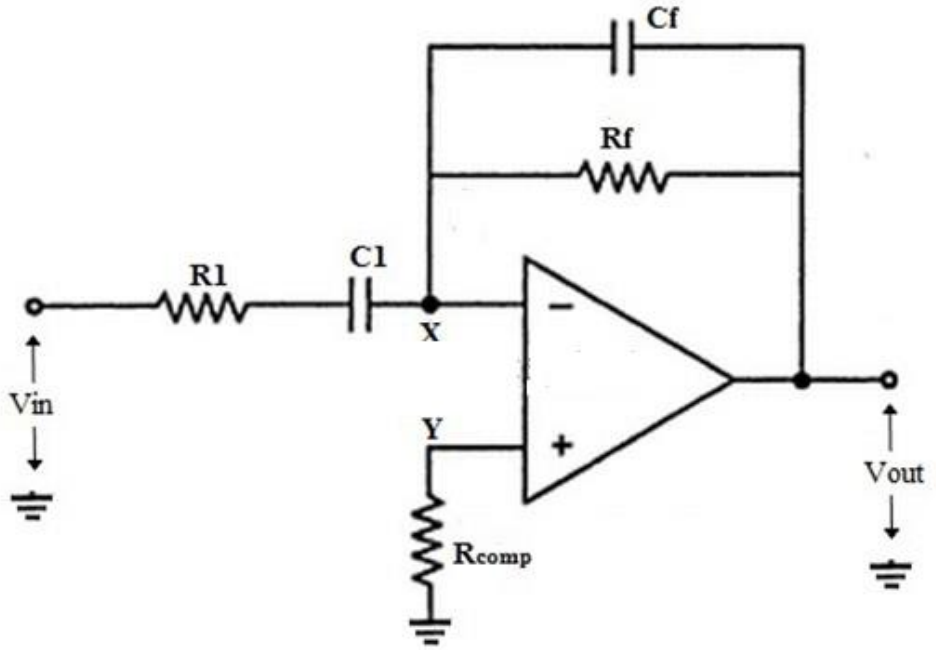
Name	Specialization	Quantity
Resistor	1)100k 2)10k 3)1.6k 4)75.7 5)79.5 6)9.09k	One each of them
capacitor	1)16nF 2)5nF 3)0.1mF	One each of them
Op-amp	LM-741	2
V-pulse	V1=1 V2=-1 TD=0 TR=1n TF=1n PW=0.5m PER=1m	2
V-DC	15V	4

Circuit diagram/ Calculation/equation:

Practical op-amp integrator







A Practical Op-amp Differentiator Circuit

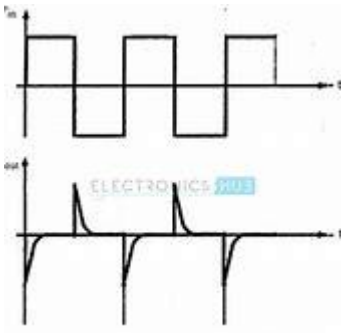
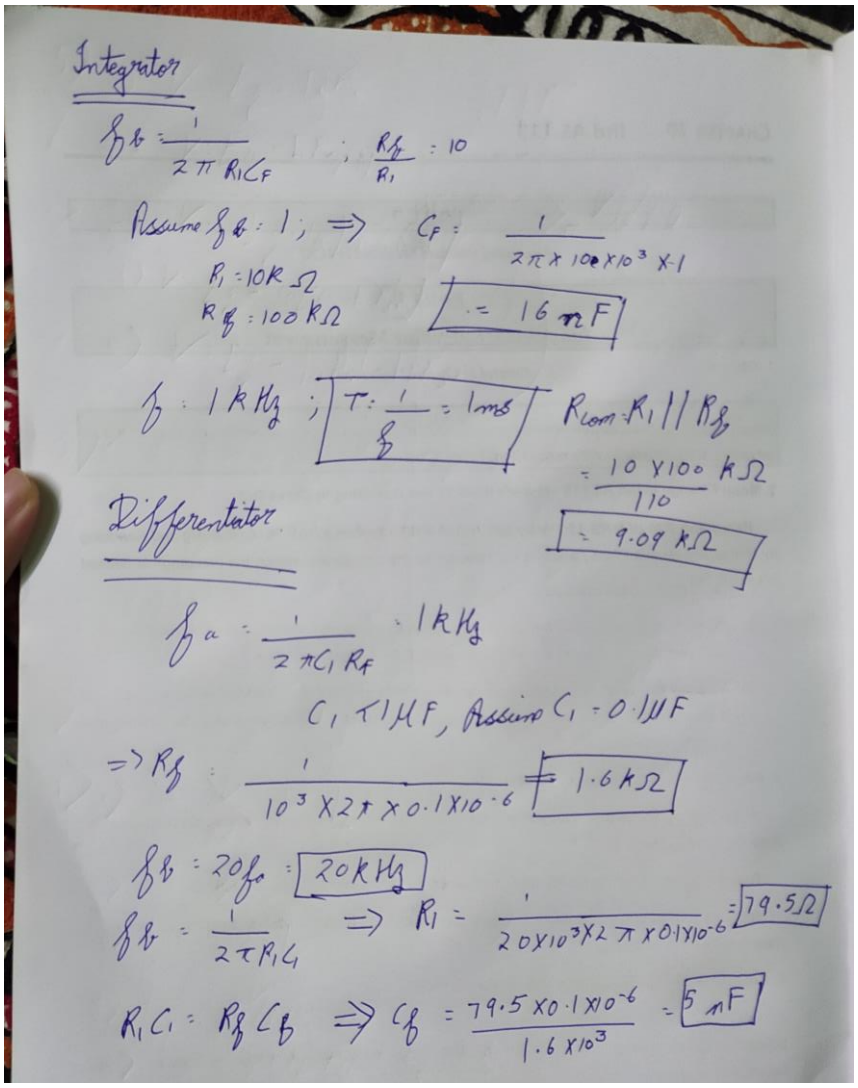


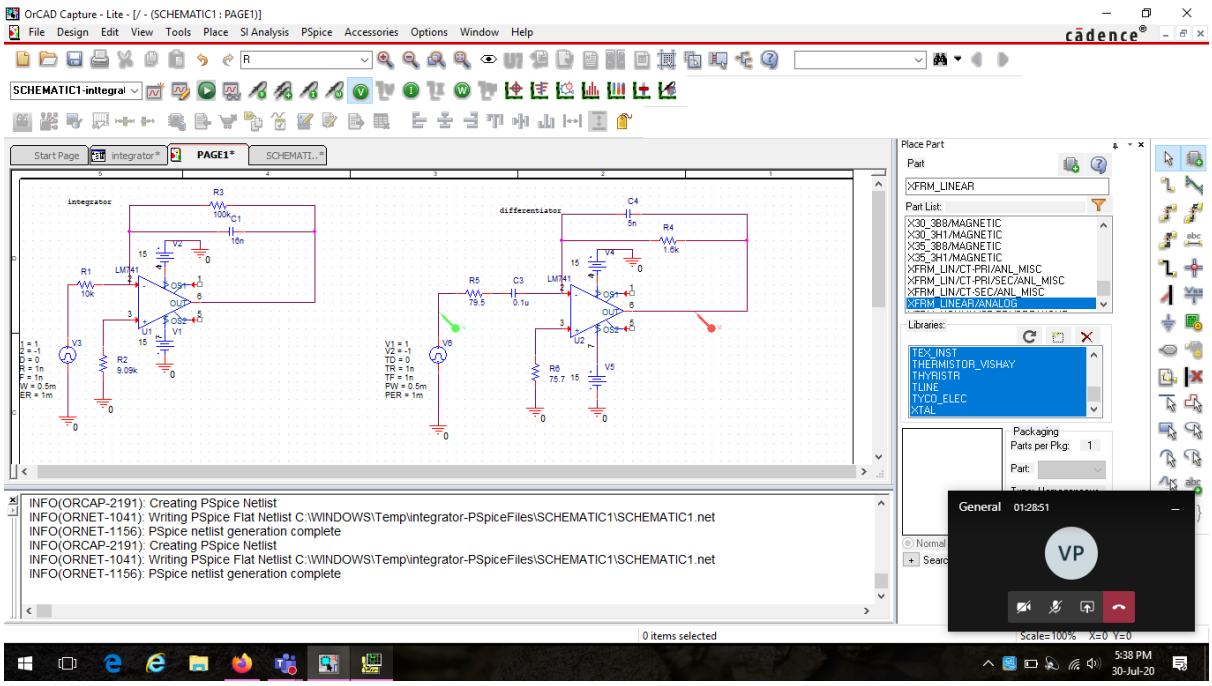
Fig. Input and Output waveforms for Square wave

$$v_0 = -R_F C_1 \frac{dv_{in}}{dt}$$

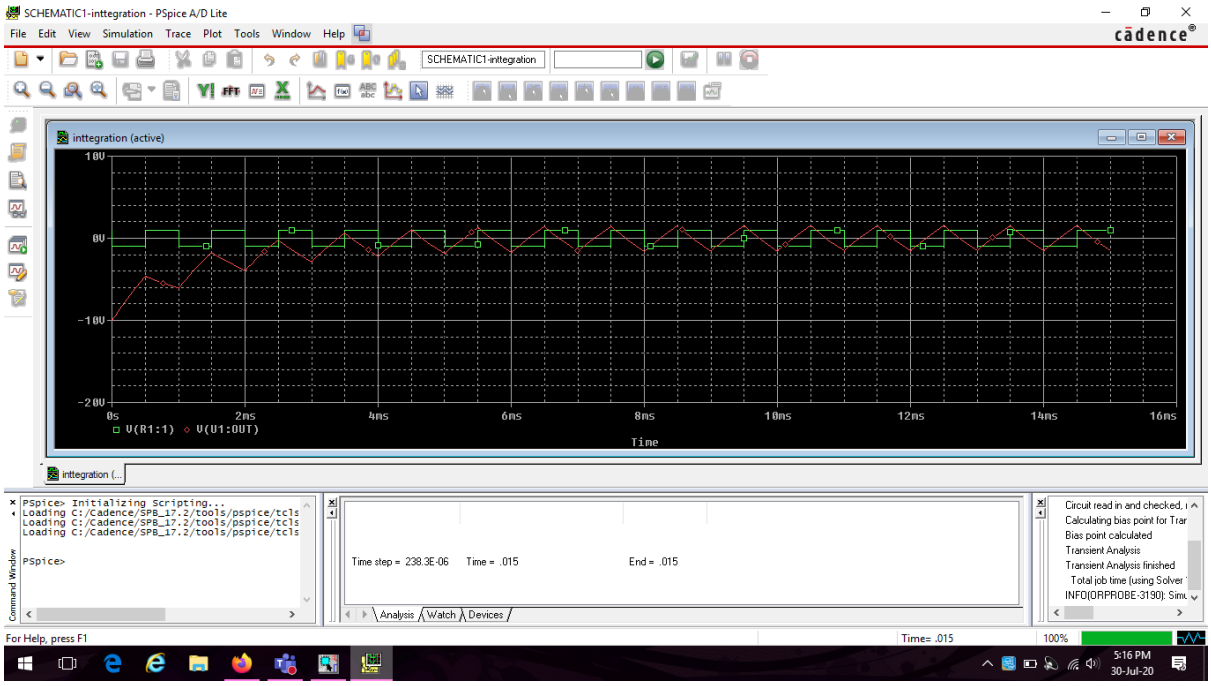


Simulation diagram:

Output graph:



INTEGERATOR:-



DIFFERENTIATOR:-

Result and inference: The integrator changes square wave to triangular wave while a differentiator gives a spike waveform.