EEL1010 Introduction to Electrical Engineering

Lab Report

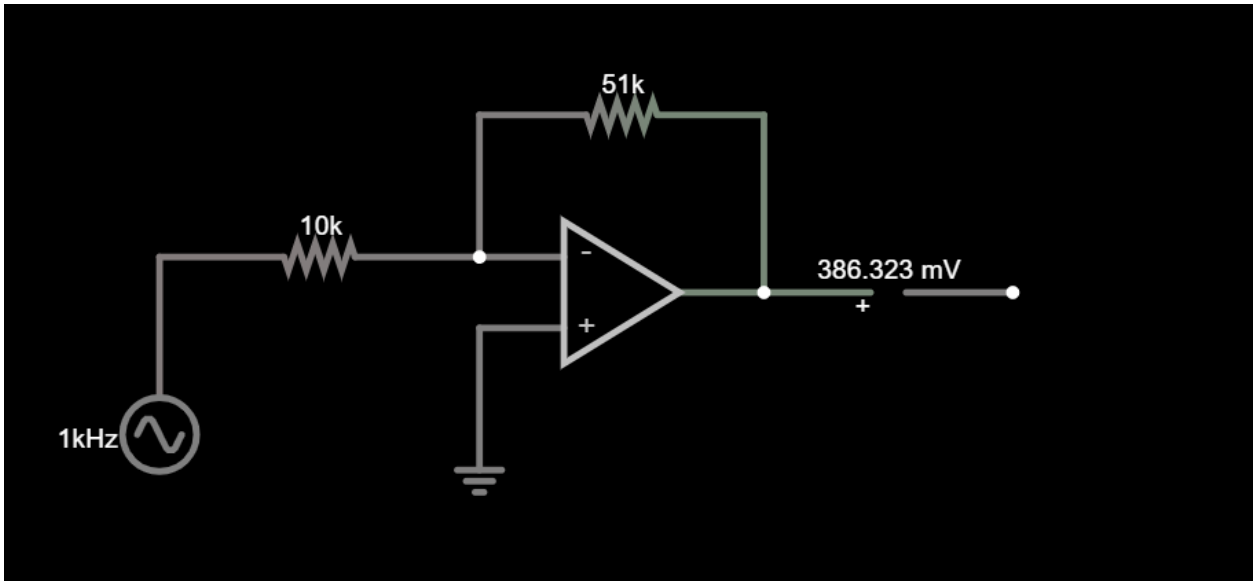
Name	Lokesh Tanwar
Roll Number	B21EE035
Experiment No	07
Experiment Title	Operational Amplifier

Objective:-

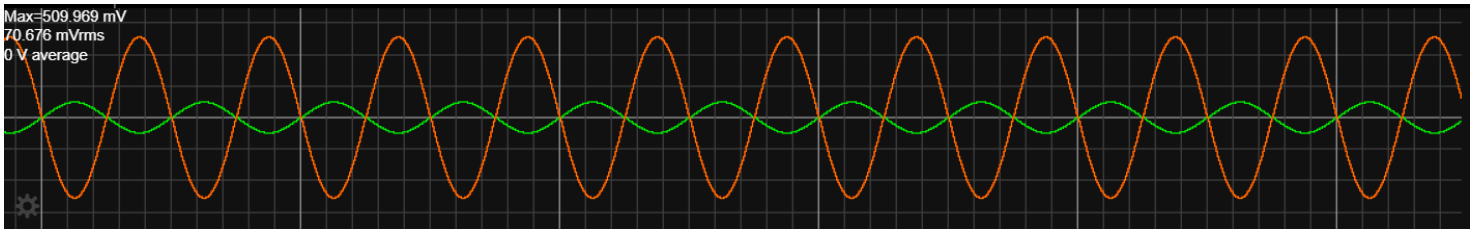
To Study the inverting, Non-inverting, and Summing amplifier.

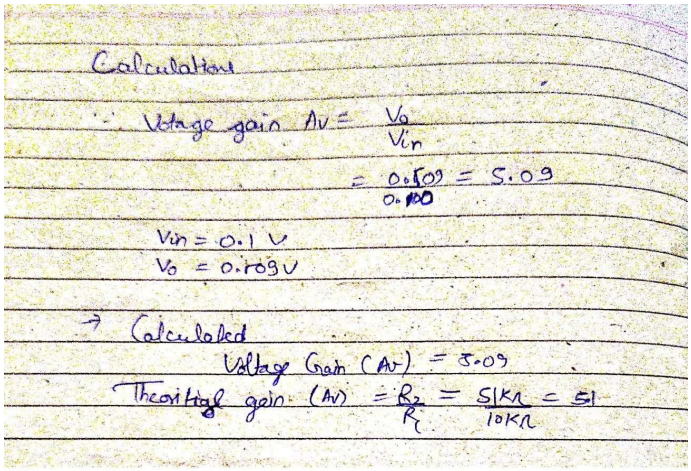
Experiment(i):-

Circuit Diagram:-

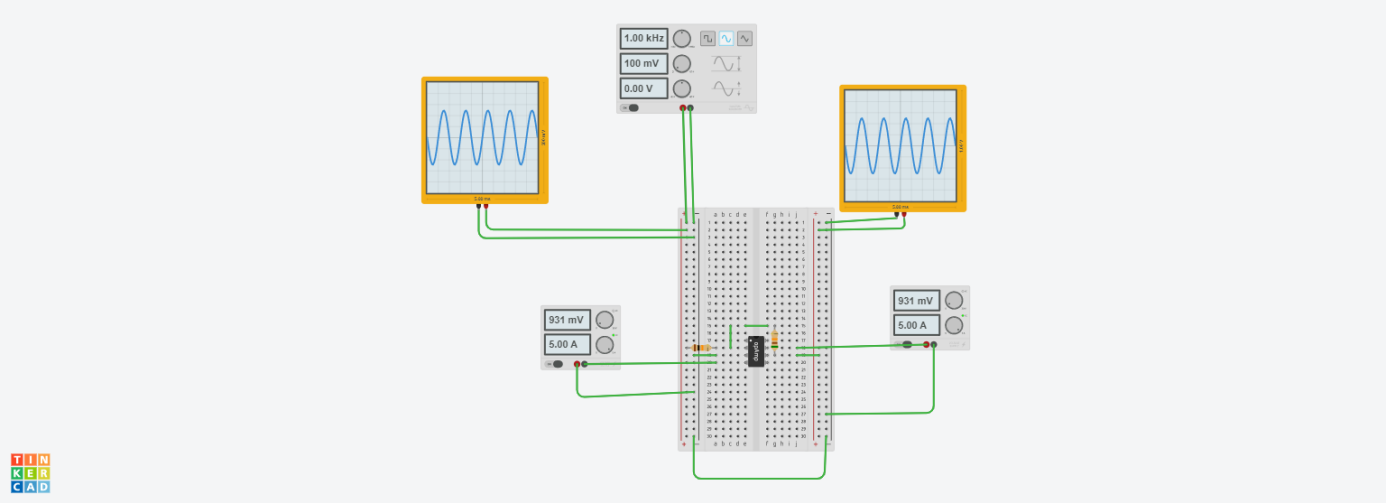


Falstad Simulation Screenshot of waveform:-





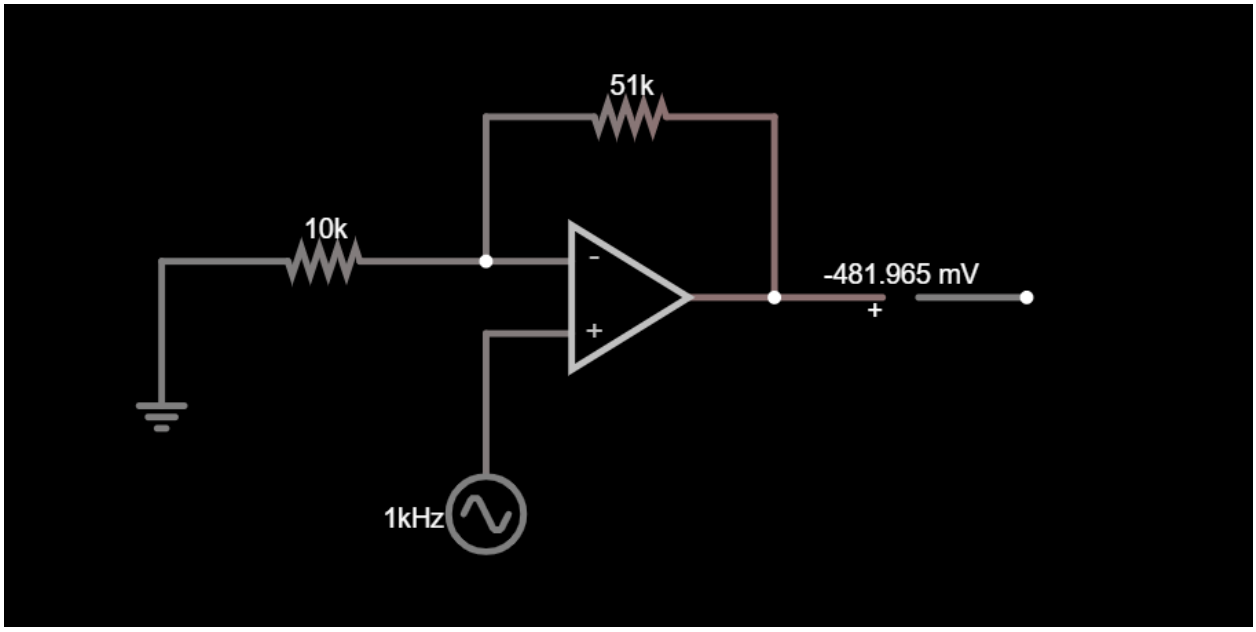
Tinkercad connection schematic:-



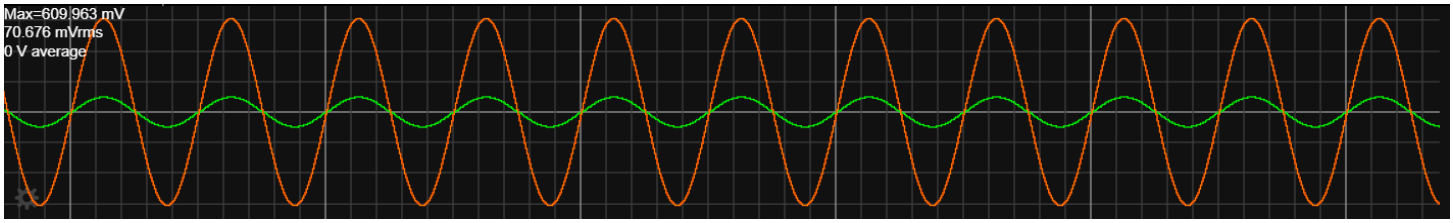
Observation:- The Theoretical value of gain is equal to -R2/R1. The output is inverted and amplified.
Also, the value of gain can be controlled by R2 and R1

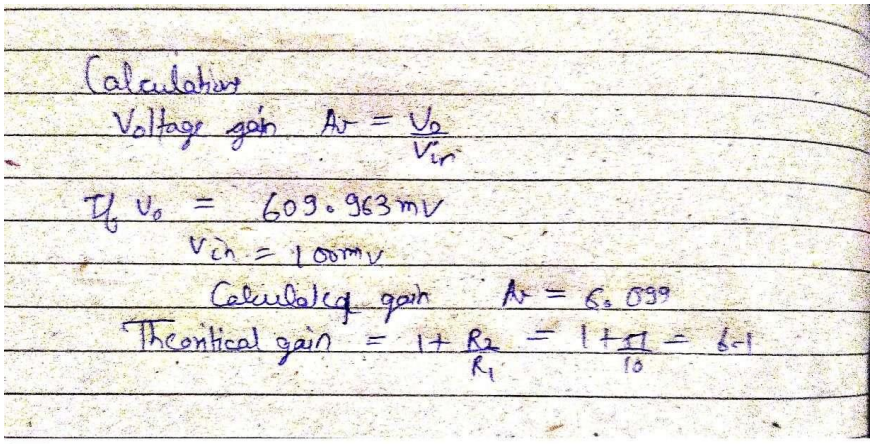
Experiment(ii):-

Circuit Diagram:-

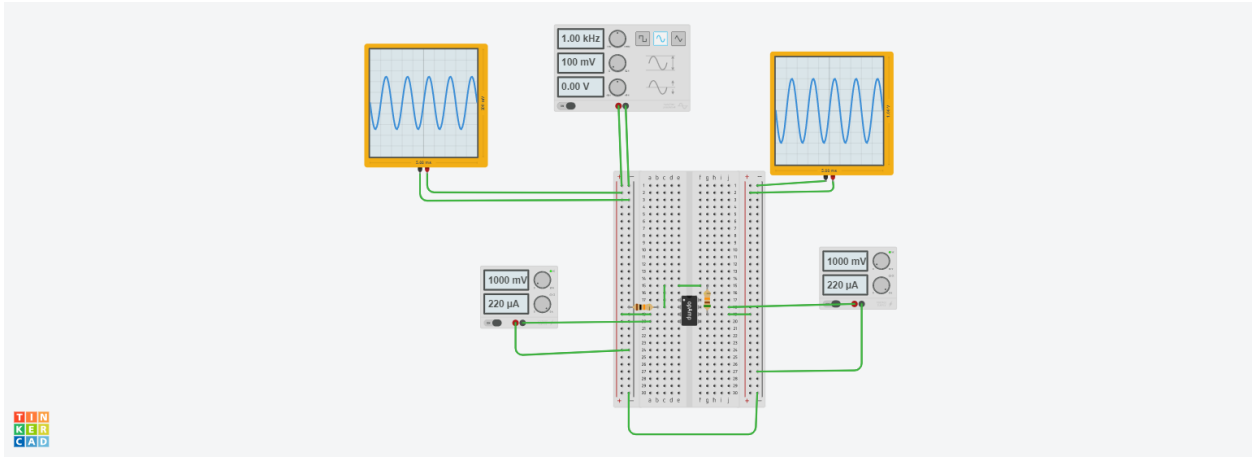


Falstad Simulation Screenshot of waveform:-



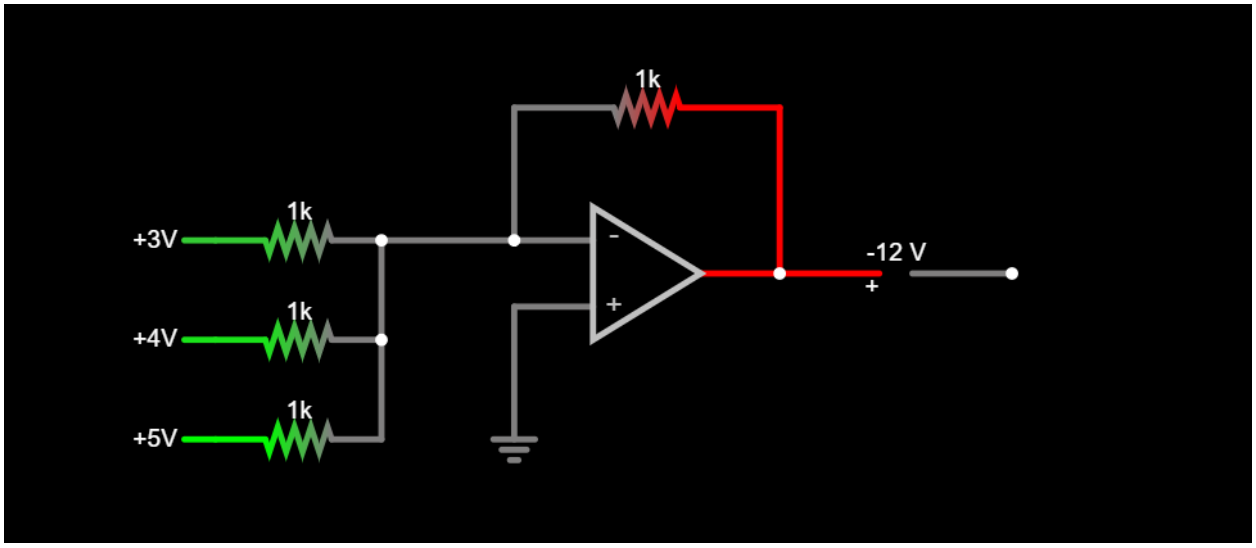


Tinkercad connection schematic:-



Observation:- The Theoretical value of gain is equal to 1+R2/R1. The output is non-inverted and amplified. Also, the value of gain can be controlled by R2 and R1

Experiment(iii):-



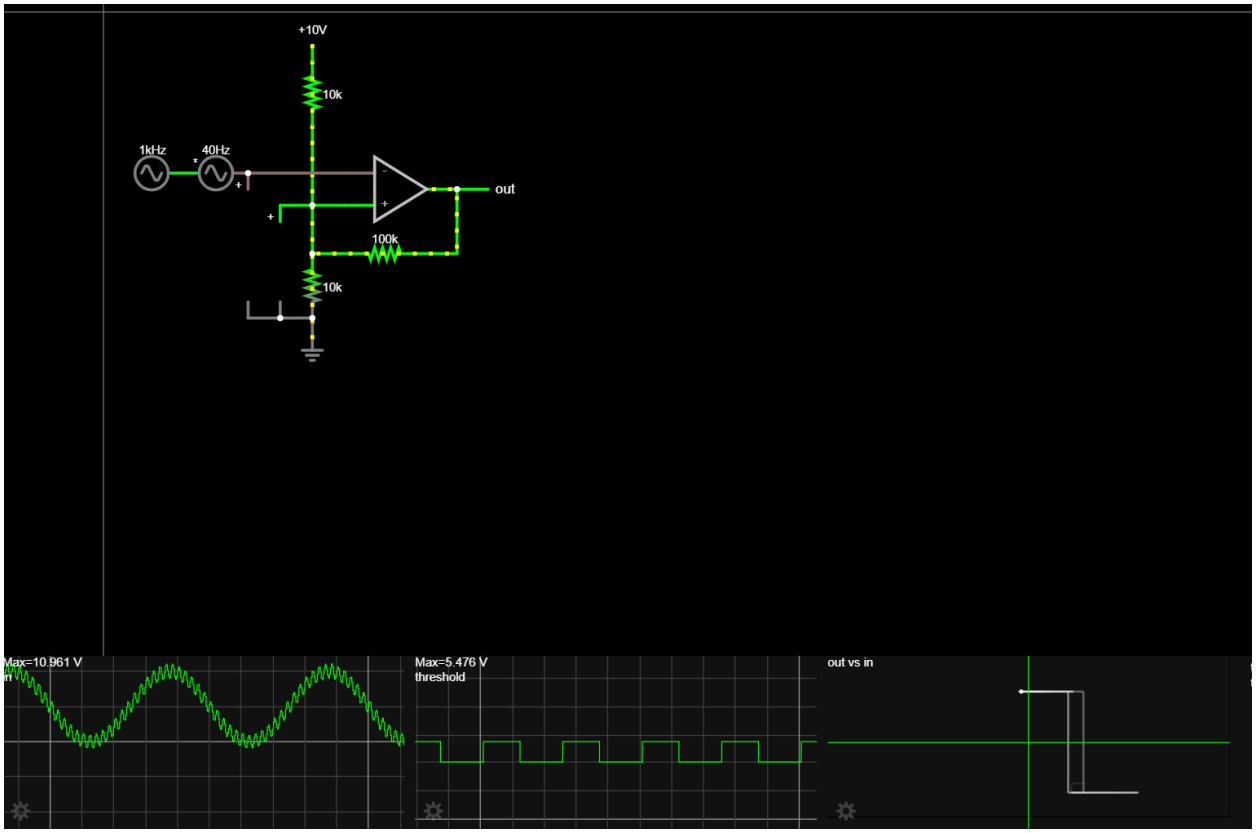
Observation:-

The circuit is an inverting summing amplifier that adds all the input voltages to give the output using an Opamp which has the feedback resistance (-V_e) and all three resistances are equal

Experiment(iv):-

Schmitt trigger

Circuit diagram with Falstad simulations:-



Observations:-
This is a Schmitt trigger circuit with positive feedback and it is a inverting circuit. It adds hysteresis to the input-output transition threshold. It provides 2 different threshold voltage levels for rising and falling edge. So its output remains in either of the stable states. So to change the output the input signal has to be changed. A noisy sine input is sent. When input voltage is slightly higher than reference voltage then the output becomes –V saturation and when input voltage is slightly less than reference voltage then the output voltage is V saturation. The reference voltage is nothing but the threshold voltages (upper and lower) which are 5.476 and 4.048V respectively.