ELECTRONICS CIRCUIT 2

PROJECT REPORT

Submitted by:

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AIM: Design and develop an experimental prototype of a circuit that generates a sinewave with adjustable frequency in the range of 100Hz-10kHz, adjustable amplitude in the range of 1-15V.

1. Introduction

The objective of this project is to design and develop an experimental prototype of a sinewave generator with user-adjustable frequency and amplitude. The required specifications are:

- Frequency Range: 100Hz to 10kHz
- Amplitude Range: 1v to 15v
- The chosen circuit topology is the Wien Bridge Oscillator, a classic configuration known for producing a low-distortion sinewave output. This design utilizes an Operational Amplifier (Op-Amp) and a frequency-selective RC network to achieve the desired oscillations.

2.**Components Required:**

TL084

Potentiometers:100k

Resistors : 10k, 20k

Capacitors : 0.01 micro farad

3. Working Principle (Wien Bridge Oscillator):

A Wien Bridge Oscillator uses an RC lead–lag network that gives zero phase shift and 1/3 feedback at one frequency. An op-amp is set to a gain of 3 so that the Barkhausen condition is satisfied. When this happens, the circuit produces a stable sine wave. The RC network sets the frequency, and the amplifier gain controls the amplitude.

4. Calculations:

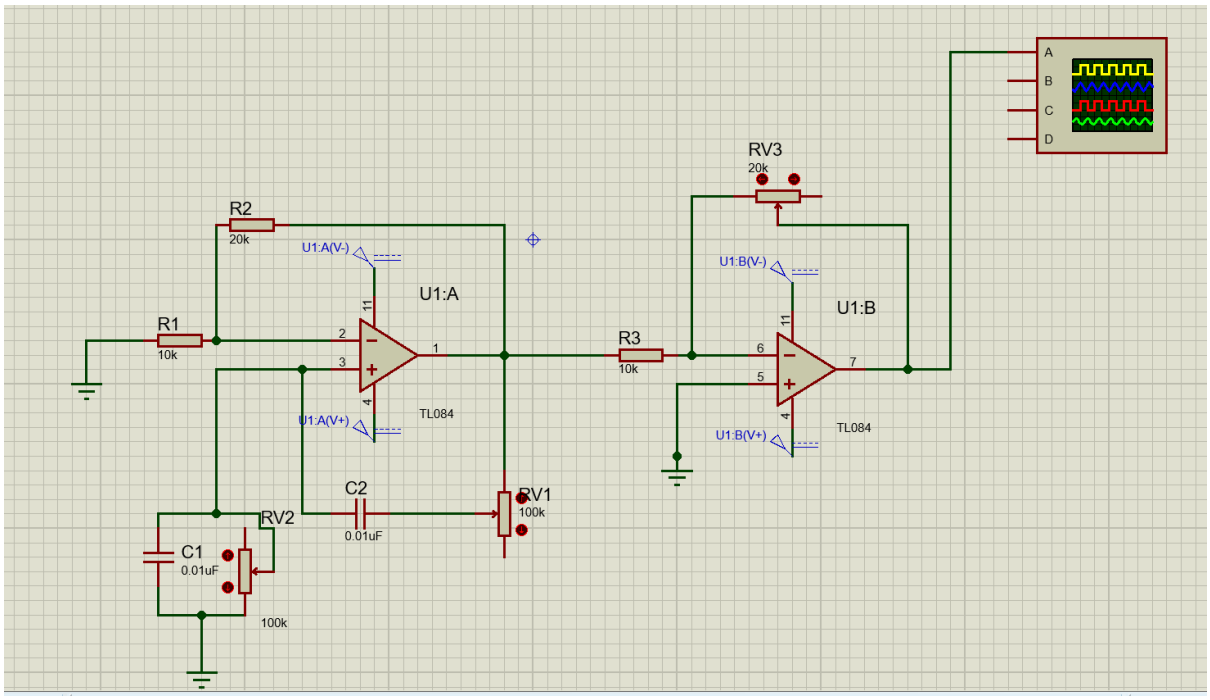
A. Oscillation Frequency (f_r):

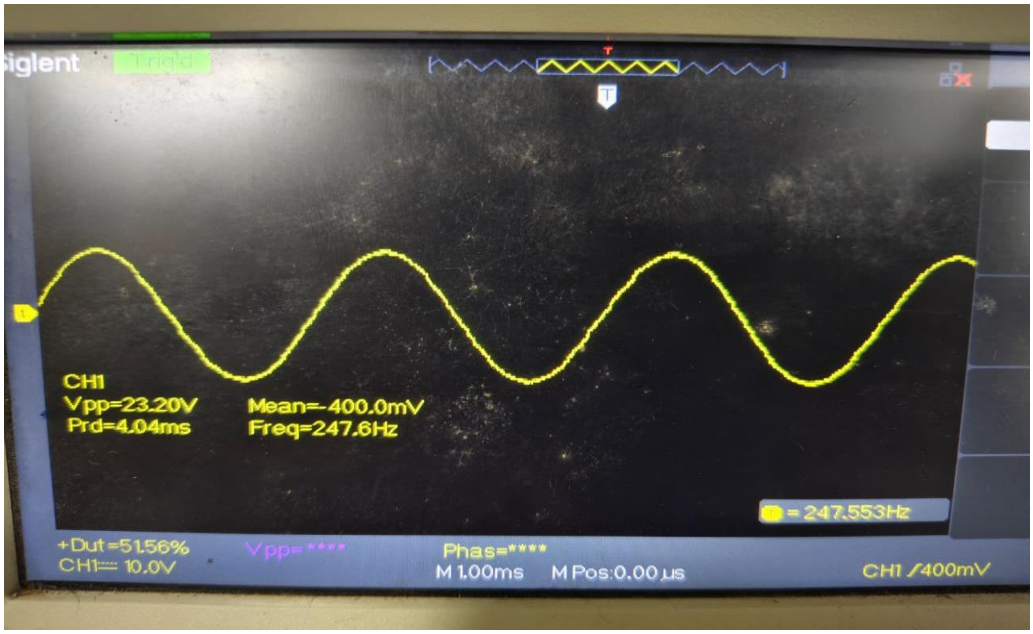
$f=1/2\pi RC$

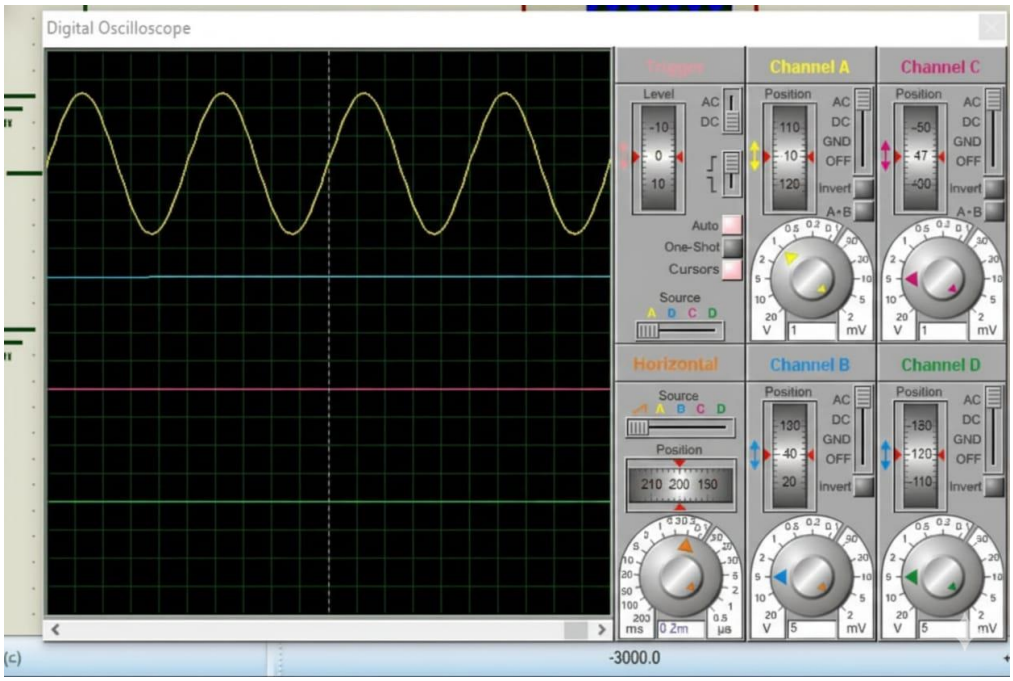
B.Amplifier Gain(Av):

$A = 1+Rf/Rg$

5.Circuit Design:







6. Conclusion

The project successfully designed and developed a prototype based on the Wien Bridge Oscillator circuit, which generates a sinewave output.

The circuit utilizes:

- RV2 (Variable Resistor) for Frequency Adjustment.
- RV3 (Variable Resistor) for Amplitude Adjustment by controlling the Op-Amp's gain.