**Experiment 5**

**Basic Electronics Circuits, IIIT Chittoor.**

# Design of waveform generators using Operational Amplifier

Aim: To design Sinusoidal, Triangular and Square waveform generators using op-amps for different frequencies and amplitudes and compare the experimental values with theoretical values.

## A. Wein Bridge RC (Sinusoidal) Oscillator

1. The Wein bridge RC oscillator is shown in Fig. 6.1. Connect the circuit as shown in the Fig. 6.1 to generate a sinusoidal waveform with a frequency depends on the values. The expression for the frequency of the oscillator is given by Eqn. (6.1).

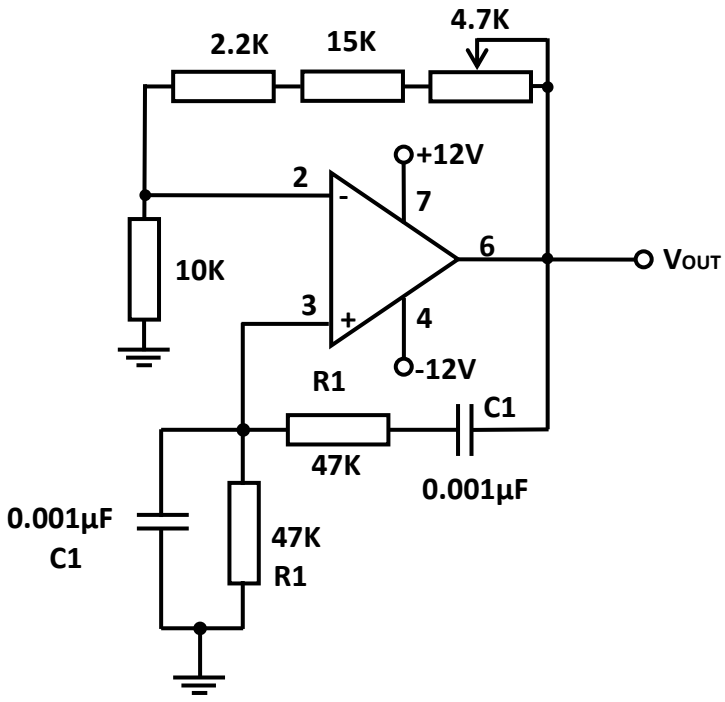


**Fig 6.1 : Wein Bridge Oscillator**

$$f = \frac{1}{2\pi R1C1} \qquad \text{Eqn. (6.1)}$$

## B. Square Waveform Generator

1. The square wave generator is shown in Fig. 6.2. Connect the circuit as shown in the Fig. 6.2 to generate a square waveform with a frequency depends on the RC values. The expression for the frequency of the square waveform is given by Eqn. (6.2).

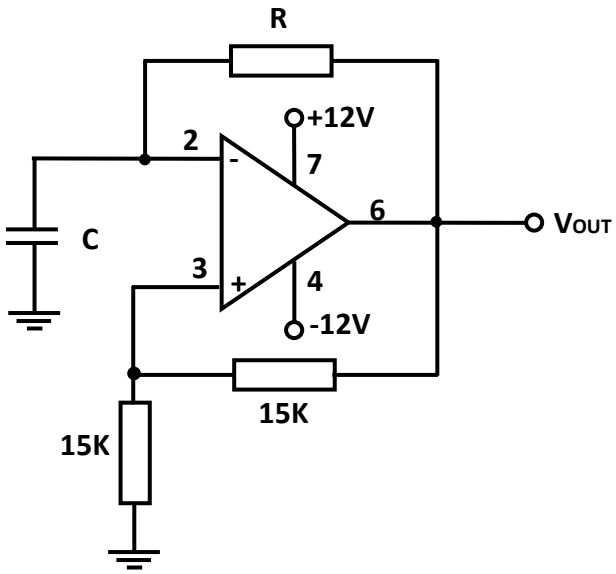


**Fig 6.2 : Square Wave Generator**

$$f = \frac{1}{2.19RC} \qquad \textbf{Eqn. (6.2)}$$

## C. Triangular Waveform Generator

1. The triangular wave generator is shown in Fig. 6.3. Connect the circuit as shown in the Fig. 6.3 to generate a triangular waveform with a frequency depends on the values. The expression for the frequency of the triangular waveform is given by Eqn. (6.3).

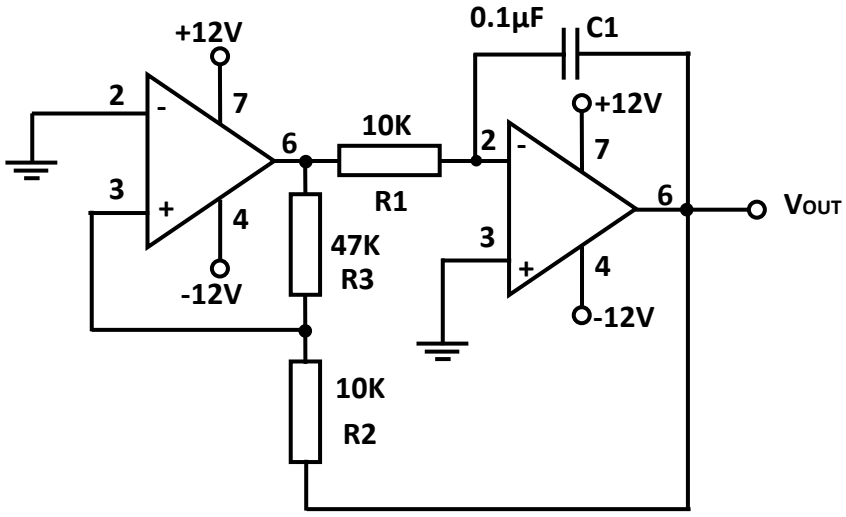


**Fig 6.3 : Triangular Wave Generator**

$$f = \frac{R3}{4R1C1R2}$$ **Eqn. (6.3)**

**Note: Plot all the waveforms on a graph sheet**