EXPERIMENT NO.11

WIEN BRIDGE OSCILLATOR USING OP AMP

Aim: To design and construct a Wien bridge oscillator using Op-Amp 741 and

(i) Plot the output waveform (ii) Measure the frequency of oscillation

Objectives: After completion of this experiment the students are able to design and set up the Wien oscillator for desired frequency

Equipments/Components

Sl. No.	Name and specification	Quantity
1	Dual Power Supply +/-15V	1
2	Resistors	4
3	Capacitor 0.1μF	2
4	IC μA 741	1
5	Oscilloscope	1
6	Bread board	1
7	Connecting wires and probes	As required

Theory:

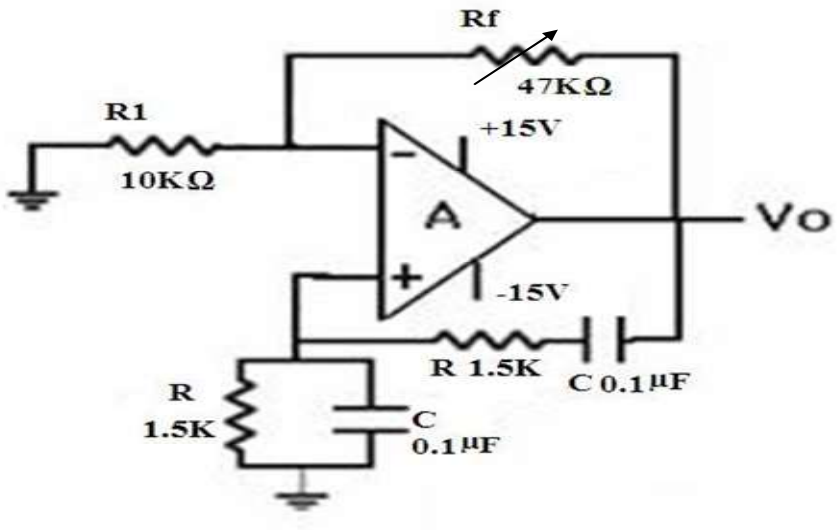
It is the commonly used audio frequency oscillator which employs both positive and negative feedback. The feedback signal is connected in the non-inverting input terminal so that the amplifier is working in non-inverting mode. The Wien bridge circuit is connected between amplifier input terminal and output terminal. The bridge has a series RC network in one arm and a parallel RC network in the adjoining arm. In the remaining two arms of the bridge, resistor R1 and Rf are connected. The phase angle criterion for oscillation is that the total phase shift around the circuit must be zero. This condition occurs when bridge is balanced. At resonance, the frequency of oscillation is exactly the resonance frequency of balanced Wien bridge and is given by $f_0 = 1/ (2\pi RC)$. At this frequency, the gain required for sustained oscillation is 3

Procedure:

1. Check the components.
2. Setup the Wien bridge oscillator circuit on the breadboard and check the connections.
3. Switch on the power supply.

4. Observe output voltage on oscilloscope.
5. Draw the waveforms on the graph.
6. Measure the frequency of oscillation .

Circuit Diagram:



Design:

$$f = \frac{1}{2\pi RC}$$

Let f = 1KHz , and C= 0.1μF

R=1.5KΩ

Gain=3

$1+ (R_f/R_{1)} =3$

If R_1 = 10KΩ ,R_f = 20KΩ Use 47KΩ pot

Observations:

Measured frequency of oscillation is =?

RESULT