

Experiment 6

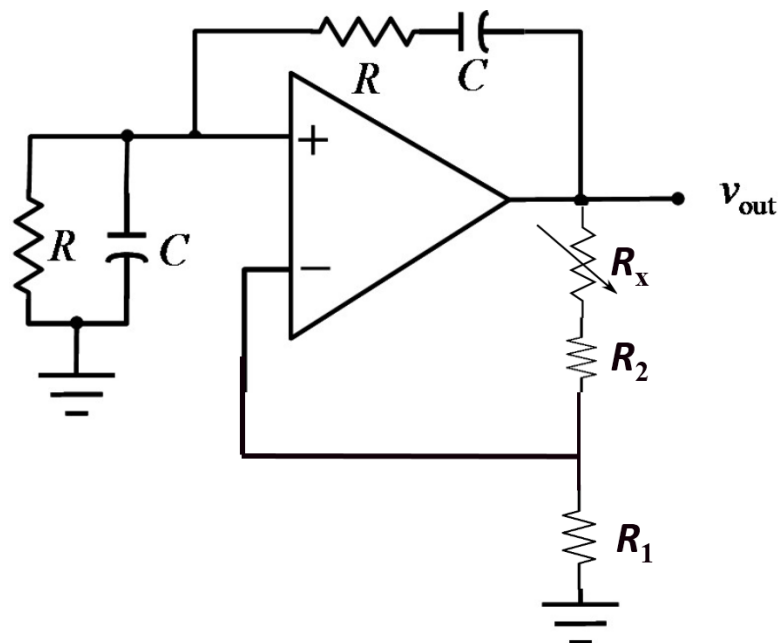
Objective: To build a Wein Bridge Oscillator.

Equipment required: Regulated Power Supply and CRO.

Components required: 741 Op-Amps, Resistances (1K Ω (2), 1.5K Ω , 2.2K Ω (2), and 1K Ω pot), Capacitors (0.1 μ F (2), 0.01 μ F (2)).

Theory: Oscillator are the circuit which consist of positive feedback, and has the capability to generate the output without applying any input. Every amplifier to become an oscillator must follow Barkhausen's Criteria

- **Wien Bridge Oscillator:**



Circuit Diagram

The **Wien Bridge Oscillator** is so called because the circuit is based on a frequency-selective form of the Wheatstone bridge circuit. The Wien Bridge Oscillator is a two-stage RC coupled amplifier circuit that has good stability at its resonant frequency, low distortion and is very easy to tune making it a popular circuit as an audio frequency oscillator.

The **Wien Bridge Oscillator** uses a feedback circuit consisting of a series RC circuit connected with a parallel RC of the same component values producing a phase delay or phase advance circuit depending upon the frequency.

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

Procedure to build Wein bridge oscillator:

1. Connect the circuit as shown above. Connect pin numbers 7 and 4 of IC to regulated power supply (+12V, -12V).
2. Observe the output voltage at pin-6 of op-amp with potentiometer resistance at minimum resistance.
3. Rotate the potentiometer knob (increase the effective resistance) until you observe a proper sinusoidal voltage at output pin (6) of op-amp.
4. Measure the time period of the output waveform and calculate the frequency of oscillation using formula ($1/T$).
5. Also, calculate the theoretical frequency using the formula ($f=1/2\pi RC$).
6. Repeat the experiment for different values of capacitor (C) and resistor (R) given in the table below.

Sr. No.	R	C	R ₁	R ₂	R _x	T (measured)	$f = 1/T$	f (theoretical)
1	1 K Ω	0.1 μ F	1 K Ω	1.5 K Ω	1 K Ω pot			
2	1 K Ω	0.01 μ F	1 K Ω	1.5 K Ω	1 K Ω pot			
3	2.2 K Ω	0.1 μ F	1 K Ω	1.5 K Ω	1 K Ω pot			
3	2.2 K Ω	0.01 μ F	1 K Ω	1.5 K Ω	1 K Ω pot			

Precautions to be taken:

1. Ensure that all the discrete components are working properly.
2. Make sure all the connections in the circuit are correct before giving supply to circuit.
3. Switch off the supply before changing any connections in circuit.