NITTE (Deemed to be University) | NMAM INSTITUTE OF TECHNOLOGY

PROJECT REPORT

"Demonstrate the working of frequency -selective circuit in a single input and has two LED's at the output.LED-1 will be turned ON if input signal frequency is greater than 2kHz. LED-2 will be ON, if input signal is 6kHz."

TEAM

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CIRCUIT DESIGN:

- The Resistor voltages are

  R1=Q/Wo*C*Af=270k ohm

  R2=Q/Wo*C(AQ^2-Af)=340 ohm

  R3=2Q/Wo*C=150k ohm

- Assuming quality factor Q=500

- The gain can be computed as

  Af= Ao= R3/2R1=1

- The capacitor values are

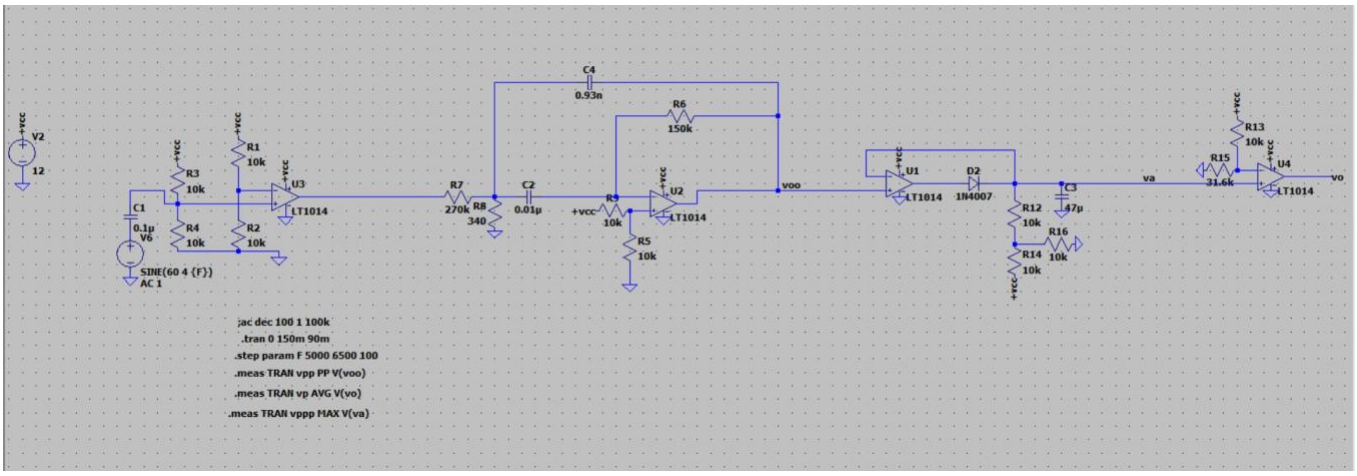
  C1=0.01uF

  C2=0.93Nf

  - Wo=2*pi*f

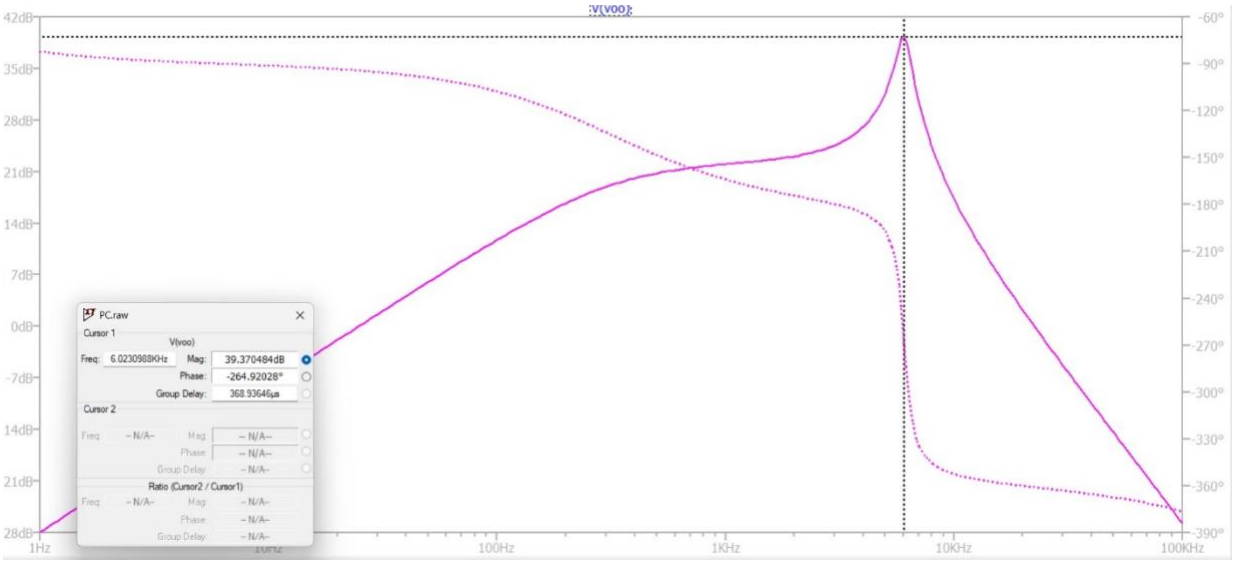
.

CIRCUIT SCHEMATIC:



WAVEFORMS:

output waveform of narrow band filter (voo):



```
.step f=5000
.step f=5100
.step f=5200
.step f=5300
.step f=5400
.step f=5500
.step f=5600
.step f=5700
.step f=5800
.step f=5900
.step f=6000
.step f=6100
.step f=6200
.step f=6300
.step f=6400
.step f=6500
```

```
Measurement: vp
  step            AVG(v(vo))
     1            0.0142541
     2            0.0142541
     3            0.0142541
     4            0.0142541
     5            0.0142541
     6            0.0142541
     7            0.0142541
     8            0.0142541
     9            0.014265
    10            0.0232784
    11            11.3341
    12            0.0172203
    13            0.0142564
    14            0.0142541
    15            0.0142541
    16            0.0142541
```

INFERENCE:

A frequency-selective circuit was implemented and verified, featuring a LEDs at the output. One LED illuminates when the input signal is at 6 kHz, providing a clear indication of the circuit's frequency-selective behavior.

CIRCUIT DESIGN:

• The frequency of the circuit

Fh=1/2*pi*R*C

• w=2*pi*Fh

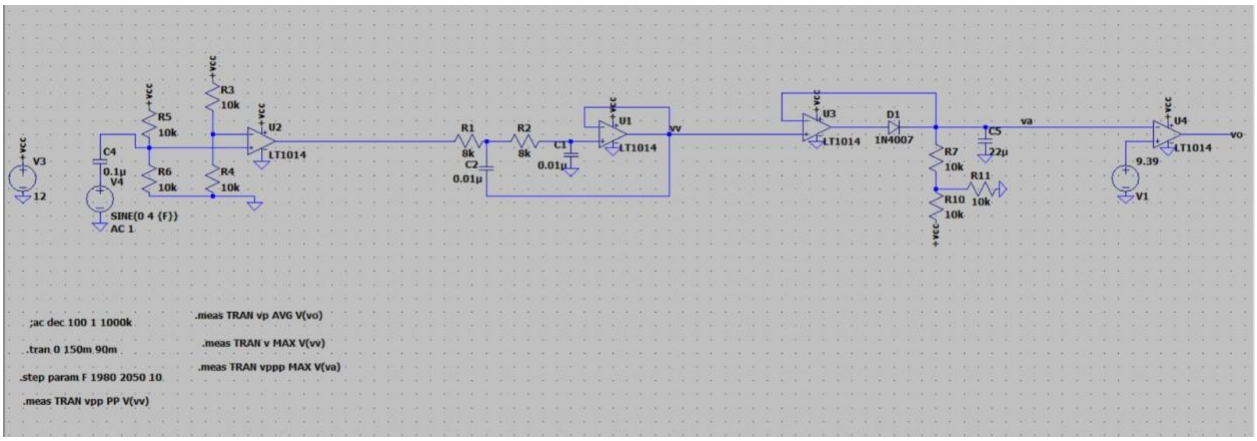
• Resistor value R1=8k ohm And R2=8k ohm

• The capacitor values are

C1=0.01uF

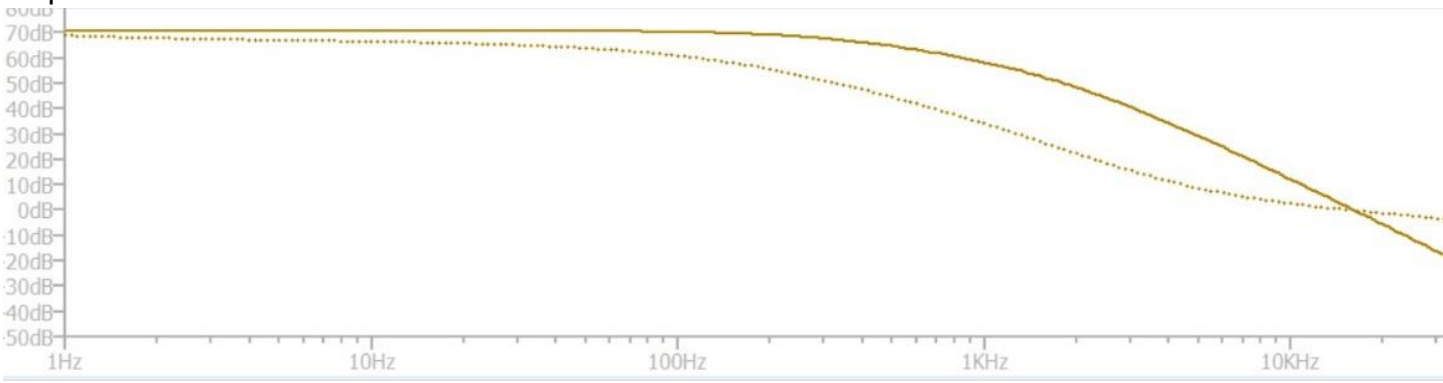
C2=0.01uF

CIRCUIT SCHEMATIC:



WAVEFORMS:

output waveform of filter :




```
.step f=1980
.step f=1990
.step f=2000
.step f=2010
.step f=2020
.step f=2030
.step f=2040
.step f=2050
```

```
Measurement: vp
  step             AVG(v(vo))
     1             0.0395031
     2             0.0706227
     3             11.3419
     4             11.3748
     5             11.3942
     6             11.4049
     7             11.4111
     8             11.4143
```

INFERENCE:

A frequency-selective circuit was implemented and verified, featuring a LEDs at the output. One LED illuminates when the input signal is at greater than 2kHz, providing a clear indication of the circuit's frequency-selective behavior

PCB DESIGN :