Experiment 6

Basic Electronic circuits

Filters using Op-Amps

1. Design a Low pass filter circuit having unity gain with f_H=15.9KHz.
   R = 1KΩ and C =0.01µF.

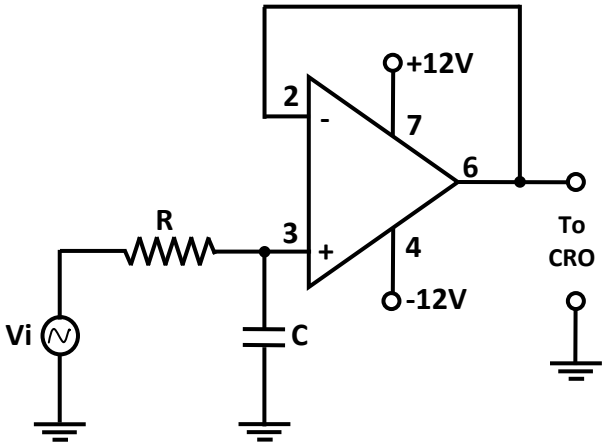

Fig 8.1: Low Pass Filter Circuit.

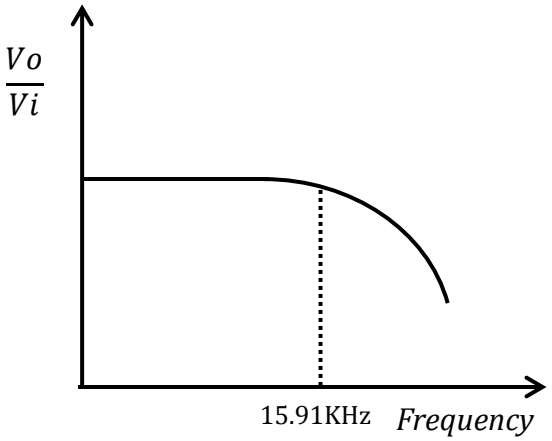

Fig 8.2 Model Graph for Low pass filter

$$f_H = \frac{1}{2\pi RC} = \frac{1}{2\pi * 1K * 0.01\mu} = 15.91\text{KHz}$$

Frequency (Hz)	**Vin(v)**	**Vout(V)**	**Voltage Gain In dB** $(20 \log_{10} \frac{Vo}{Vi})$
100			
200			
500			
1K			
1.5K			
2K			
5K			
10K			
12K			
15K			
20K			
50K			
100K			

2. Design a High Pass filter circuit having unity gain with f_L=1.59KHz.

R = 1KΩ and C =0.1µF

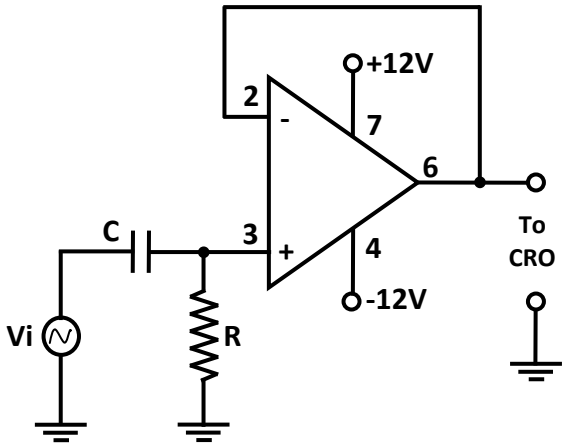

Fig 8.3: High Pass Filter Circuit.

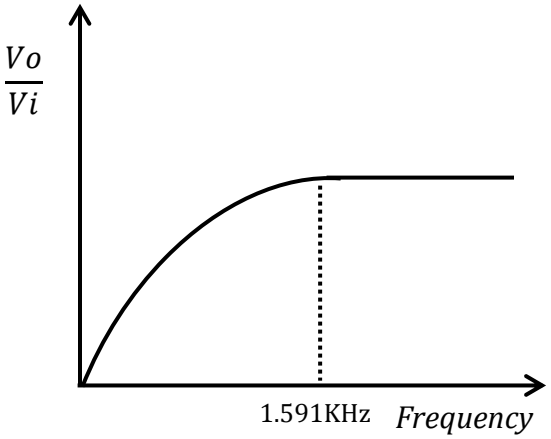

Fig 8.4: Model Graph for High pass filter

$$f_L = \frac{1}{2\pi RC} = \frac{1}{2\pi * 1K * 0.1\mu} = 1.591\text{KHz}$$

Frequency (Hz)	Vin(v)	Vout(V)	Voltage Gain In dB $20\log_{10}\frac{Vo}{Vi}$
100			
200			
500			
1K			
1.5K			
2K			
5K			
10K			
12K			
15K			
20K			
50K			
100K			

3. Design a Band Pass filter circuit having unity gain with f_L=1.59K Hz and f_H = 15.9KHz.

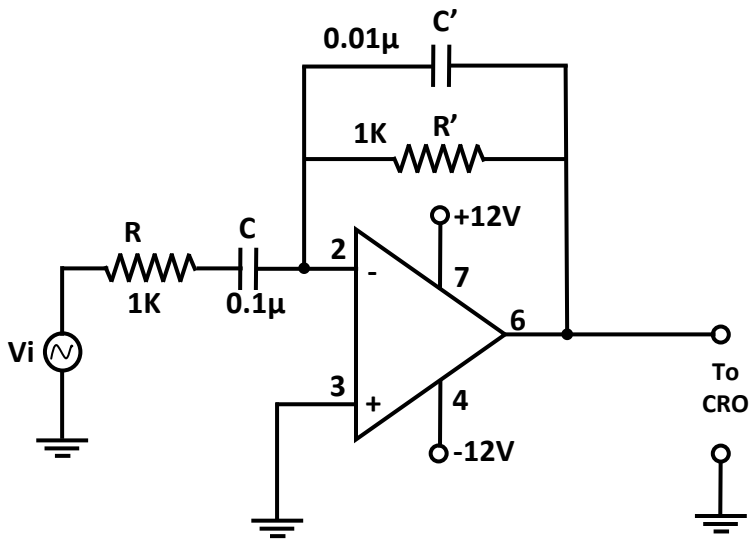

Fig 8.5: Band Pass Filter Circuit.

$fc_1 = \frac{1}{2\pi RC}$ $fc_2 = \frac{1}{2\pi R'C'}$ Voltage Gain = $-\frac{R'}{R}$

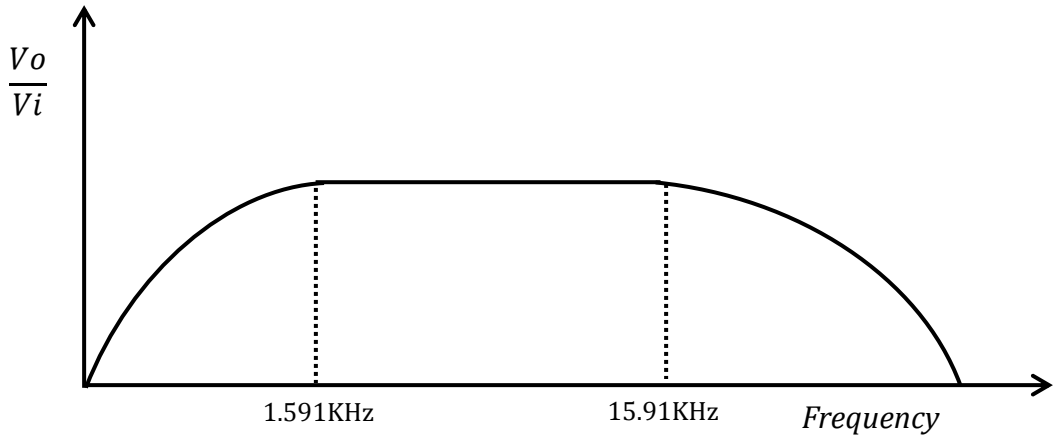

Fig 8.6: Model graph for Band Pass Filter

Frequency (Hz)	Vin(v)	Vout(V)	Voltage Gain In dB $20\log_{10}\frac{Vo}{Vi}$
100			
200			
500			
1K			
1.5K			
2K			
5K			
10K			
12K			
15K			
20K			
50K			
100K			