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Low Pass Passive Filter

OBJECTIVE:

- To understand the working principle of Low pass RC Passive Filter.

EQUIPMENTS:

- Oscilloscope.
- Function generator.
- DC power supply (Positive and negative).
- Digital Multimeter.
- Breed board
- Connecting wires.
- Few Resistors

THEORY DISCUSSION:

A filter is a circuit that passes certain frequencies and attenuates or rejects all other frequencies. A low pass filter is one that passes frequencies from dc to f_c and significantly attenuates all other frequencies.

The most basic low-pass filter is a simple RC circuit consisting of just one resistor and one capacitor. This basic RC filter has a single pole and it rolls off at -20dB/decade beyond the critical frequency. The critical frequency is given by,

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

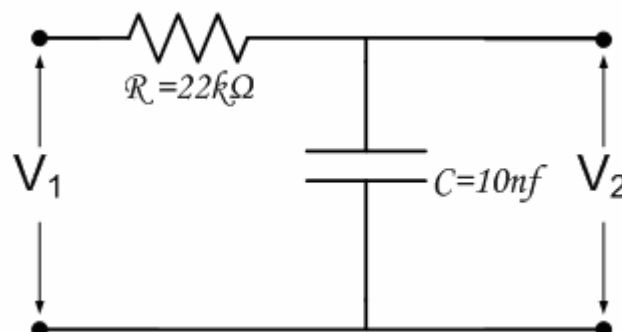


Figure 1

PROCEDURE:

1. Wire the circuit as shown in figure 1.
2. Set the function generator to 100Hz and the output of sinusoidal 1V_{p-p}.
3. Step the frequency of generator as shown in table, and measure the output voltage of filter for each frequency.



OBSERVATIONS:

S.#:	Frequency	O/p V_{p-p}
1.	100Hz	
2.	200 Hz	
3.	400 Hz	
4.	600 Hz	
5.	800 Hz	
6.	1000 Hz	
7.	1200 Hz	
8.	1400 Hz	
9.	1600 Hz	
10.	1800 Hz	
11.	2000 Hz	
12.	3000 Hz	
13.	5000 Hz	
14.	8000 Hz	
15.	10,000 Hz	

f_c calculated	f_c measured



Review Questions

Q # 01. What is a passive filter?

Ans: _____

Q # 02. What is the bandwidth of the filter shown in figure 1?

Ans: _____

Q # 03. What is the gain at frequency 10 Times greater than f_c ?

Measured	Calculated

CONCLUSIONS: _____

