



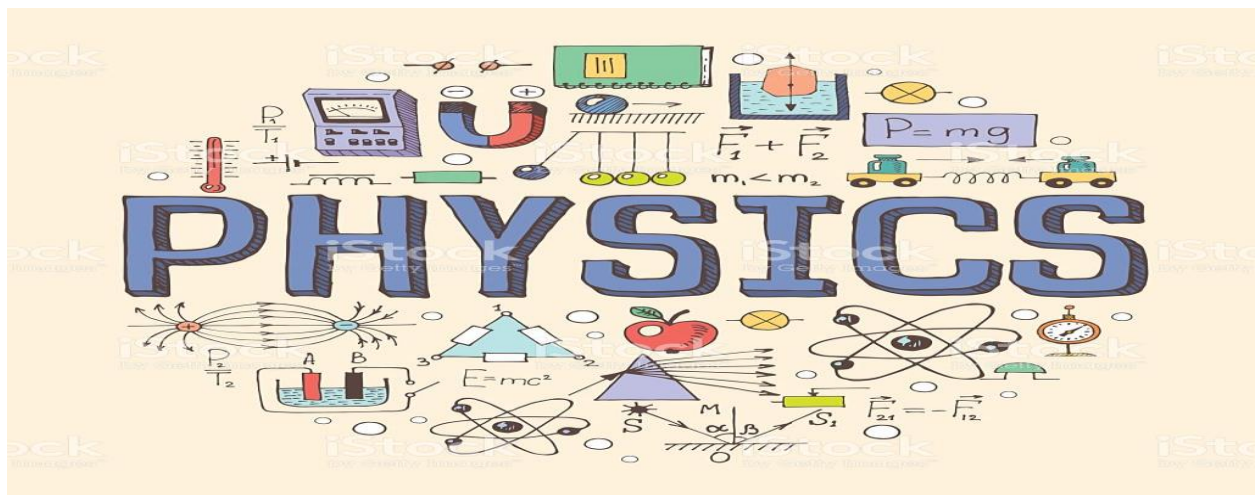
Physics Department

Physics 112

*Report 10*

*Done by :Rayan Ghnimat.*

*“The world is a book and those who do not travel read only one page.”*





PHYSICS DEPARTMENT

PHYSICS 112

EXPERIMENT NO. 10

FILTER

9.5

قال تعالى: ("يَزِفَعُ اللهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ")

Student's Name: Rayan Ghnimat.

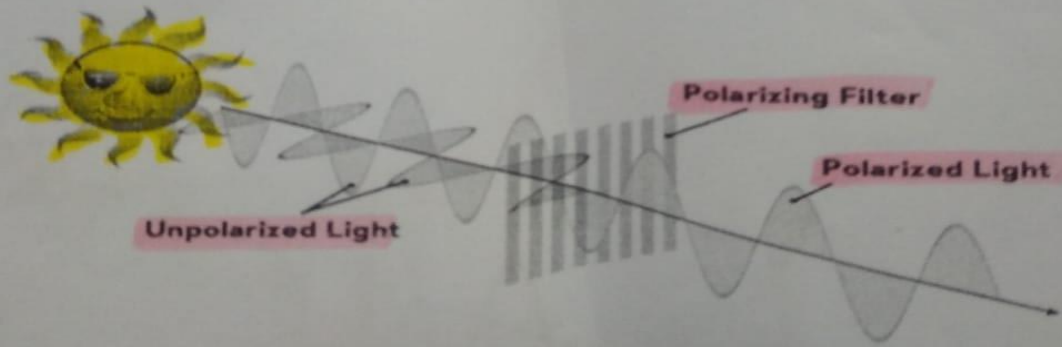
Partner's Name: Aya, Layan.

Student's No.: 1211073 .

Partners' No.: 1211439.

Section :6,

Instructor: Khaled Eid.



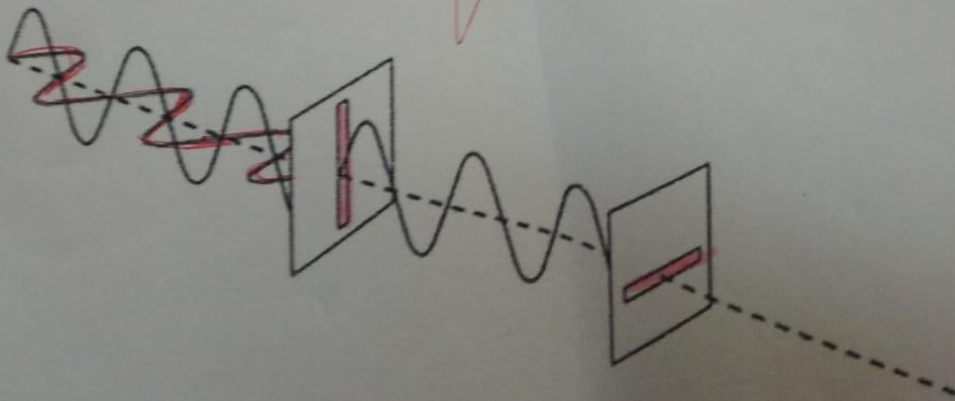
### Abstract:

1-**The aim of the experiment:** is to find the attenuation factor for both cases of low and high pass filters.

2-**The method used:** is by connecting a filter circuits and read the data from the DSO screen to draw graphs that we can find the frequency of the band pass filters.

### • Introduction:

Filters, in electronic circuits, are units used to allow only certain frequencies to pass through while others are blocked, Filters are useful units electrical devices such as radio, TV, etc. There are three types of filters: high pass filters, low pass filters, and band pass filters. **In this experiment,** it is expected to use the Signal Generator and DSO to connect filter circuits, to find the omega of the cut off frequency at low-pass and high-pass filters. As well as prove whether the low-pass filter can find integration, while the high-pass filter can find the differentiation.



## Experiment 10

### Filters

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 Partner's Name: Aya Layan Partner's No.: 1211439  
 Instructors Name: Khalid Eid Section No.: 6  
 Date: 18/1/2023

$R = 1 \text{ k}\Omega$

$C = 0.1 \mu\text{F}$

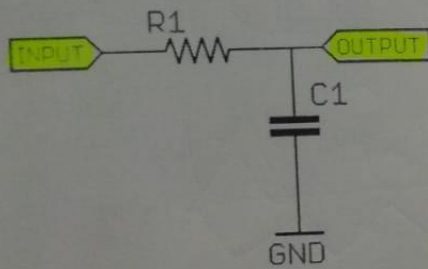
$V_{in_{rms}} = 4 \text{ Volt}$

	Low-pass filter			High-pass filter	
	$\omega$ (rad/sec)	$V_{o_{out}}$ (Volt)	A	$V_{o_{out}}$ (Volt)	A
$f = \frac{\omega}{2\pi}$ 200	1256	4.32	1.08	0.72	0.18
300	1884	4.3	1.075	1.08	0.27
500	3140	4.14	1.035	1.76	0.44
600	3768	4.06	1.015	2	0.5
800	5024	3.86	0.965	2.48	0.62
1000	6280	3.62	0.905	2.96	0.74
1200	7536	3.46	0.865	3.28	0.82
1500	9420	3.22	0.805	3.8	0.95
1800	11304	2.96	0.74	4.08	1.02
2000	12560	2.76	0.64	4.28	1.07
3000	18840	2.08	0.52	4.8	1.2
5000	31400	1.015	0.25	5.15	1.29
8000	50240	0.85	0.21	5.45	1.36
10000	62800	0.68	0.17	5.5	1.4

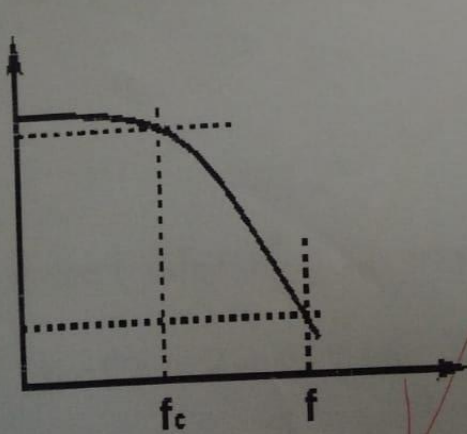
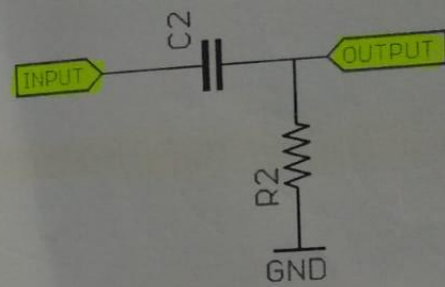
$$\frac{V_{out}}{V_{in}}$$

**Low and High pass Filters:**

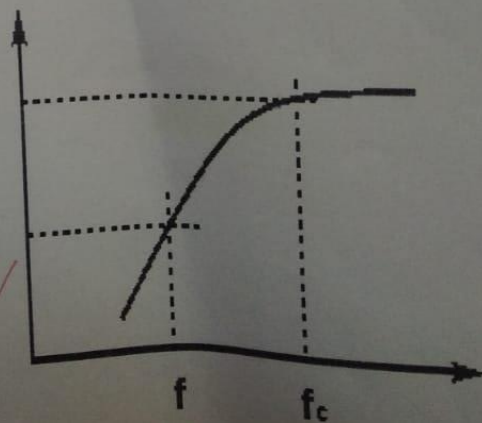
**Low Pass Filter**



**High Pass Filter**



**Low Pass**



**High Pass**

**Data Analysis:**

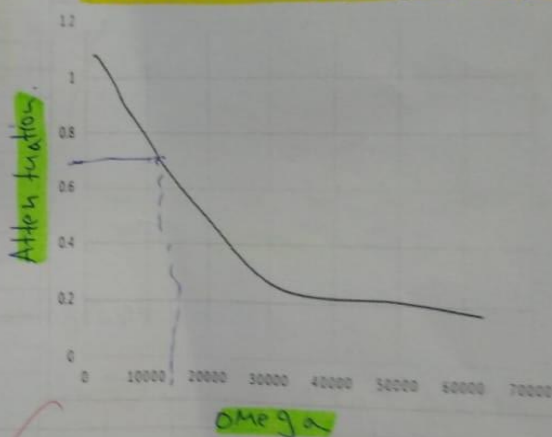
Theoretical:  $-\frac{w}{3dB} = \frac{1}{RC} = \frac{1}{(1 \times 10^3)(0.1 \times 10^{-6})}$   
 $= 1 \times 10^4 \text{ rad/s}$

**Low pass Filters**

( Shows Integration of function )

1256	1.08
1884	1.075
3140	1.035
3768	1.015
5024	0.965
6280	0.905
7536	0.865
9420	0.805
11304	0.74
12560	0.69
18840	0.52
31400	0.25
50240	0.21
62800	0.17

Attenuation Vs. Omega Graph.



$A =$  Highest value of  $y$  on graph  $\times 0.7$

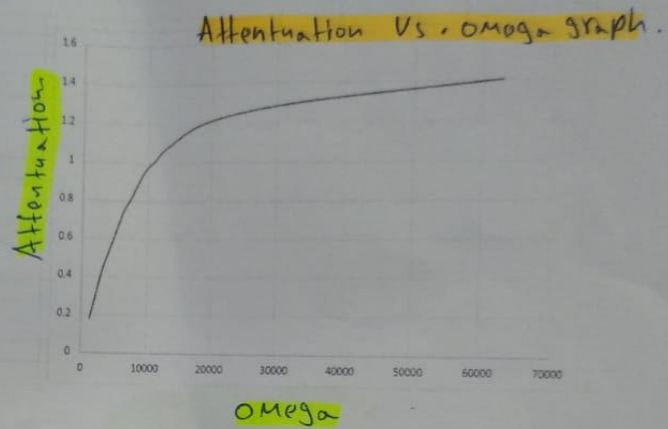
$A = 1.08 \times 0.7 = 0.756 \implies w_{3dB} = 11304 \text{ rad/sec.}$

Data Analysis:

High pass Filters:

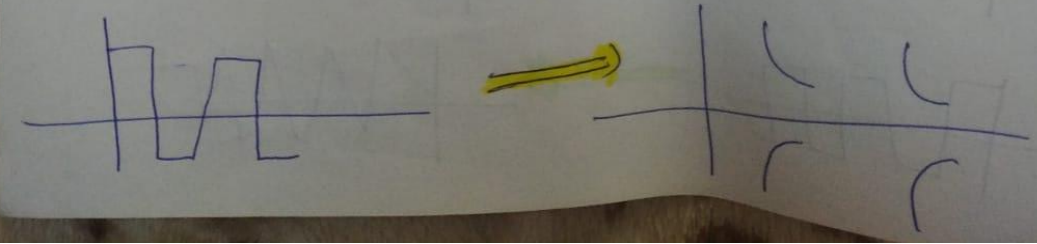
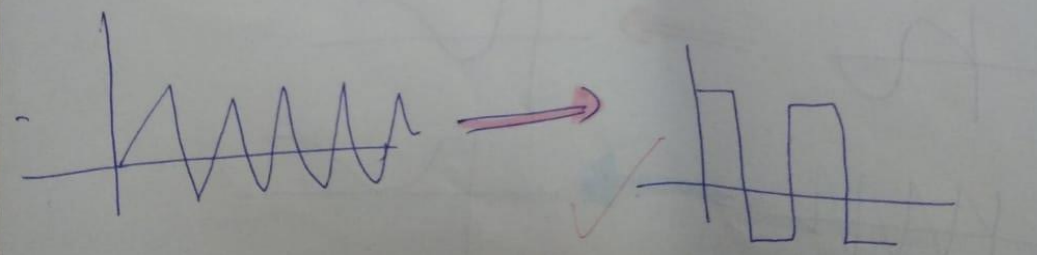
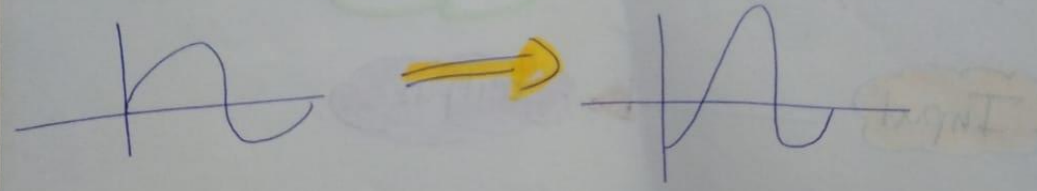
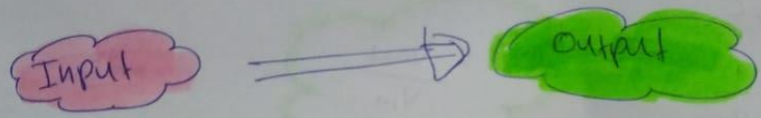
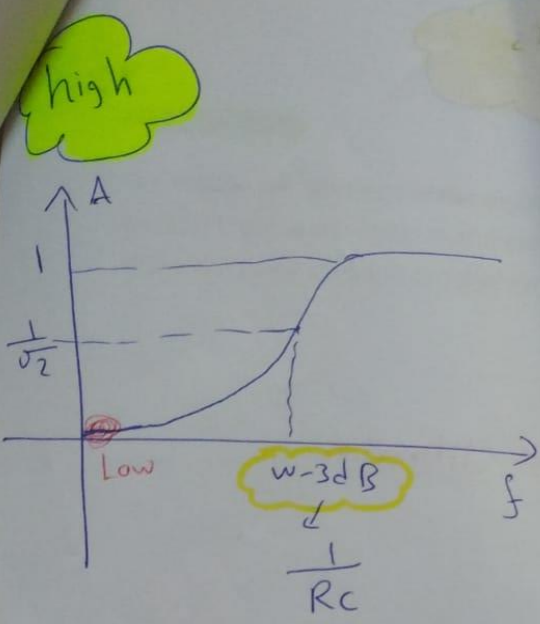
(Shows Differentiation of function).

1256	0.18
1884	0.27
3140	0.44
3768	0.5
5024	0.62
6280	0.74
7536	0.82
9420	0.95
11304	1.02
12560	1.07
18840	1.2
31400	1.29
50240	1.36
62800	1.4



$A$  = Highest value of  $y$  on graph  $\times 0.7$ .

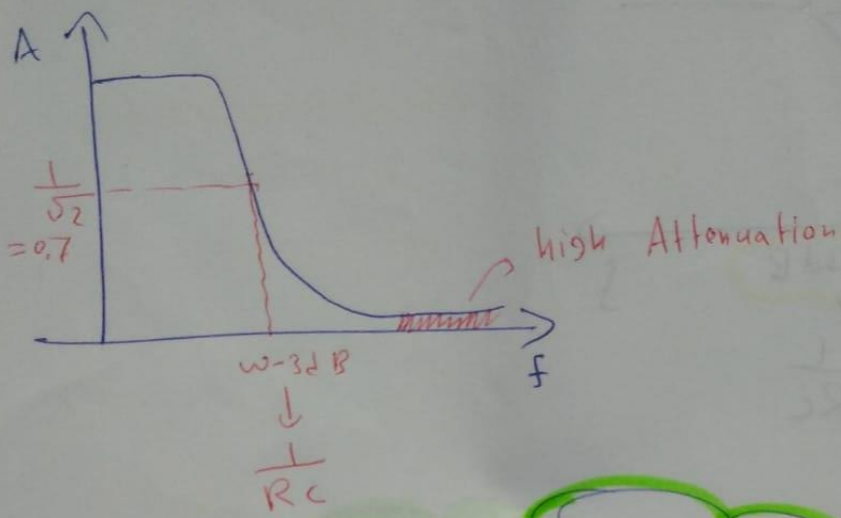
$$A = 1.4 \times 0.7 = 0.98 \Rightarrow \omega_{-3dB} = 11304 \text{ rad/sec.}$$





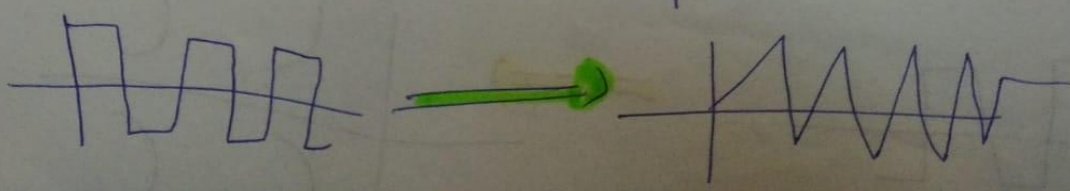
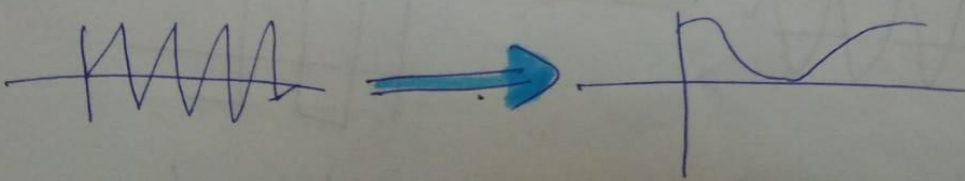
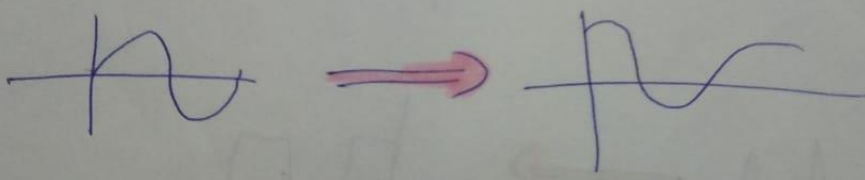
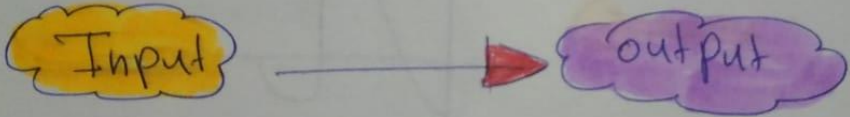
# filters

① Low-pass  $\omega \rightarrow f$



$$f_{-3dB} = \frac{1}{2\pi RC}$$

$$\Rightarrow A = \frac{V_{out}}{V_{in}}$$



### CONCLOUSION:

The results we obtained in this experiment seem to be fairly accurate; but there are some errors that make our data not very accurate ,also there are some errors in our graphing by hand .