Karnatak Science college ,Dharwad

Dept of Physics/Electronics

B.Sc V Semester(NEP)

Electronics Paper I,

Electronics communication II,

Lab Manual

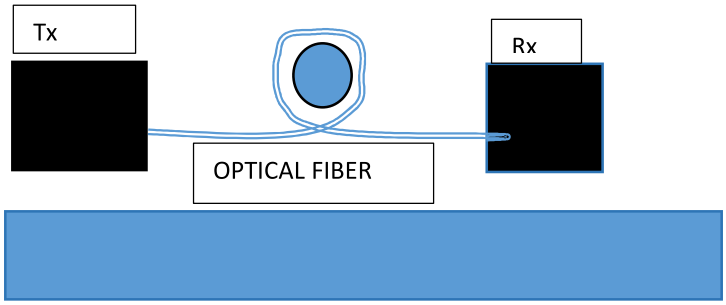
Course Code :035ELE012

Experiment:BENDING LOSSES IN OPTICAL FIBER

AIM: To study the optical losses in fiber by bending the fiber .

APPARATUS:OPTICAL FIBER KIT, Different size bends ,DMM.

DIAGRAM:



TABULAR COLUMN:

SL NO	BEND SIZE in cm	OUTPUT VOLTAGE in volt

RESULT:

Experiment :Numerical Aperture of Given OFC

Aim:Study the numerical aperture of given optical fiber(OFC).

Apparatus:OFC, Light source(LED or LASER), Scale.

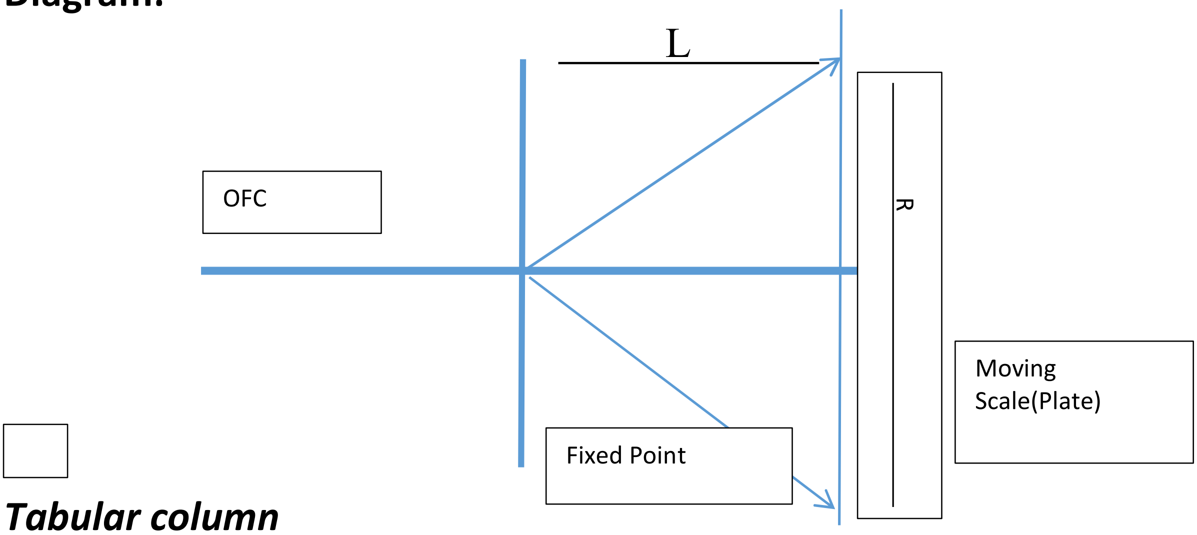
Formula:

$$\text{Numerical Aperture(NA)} = \frac{R}{\sqrt{R^2 + L^2}}$$

Where R=Radius of the circle fully focused in cm.

L= Distance between moving scale and OFC on fixed plate in cm.

Diagram:



Tabular column

SL NO	Diameter of circle fully covered" D" (cm)	R=D/2 In cm	Distance between OFC and plate L(cm)	NA $= \frac{R}{\sqrt{R^2 + L^2}}$	Mean NA	$\sin^{-1}(NA)$

Result:

Experiment :Frequency response of OFC

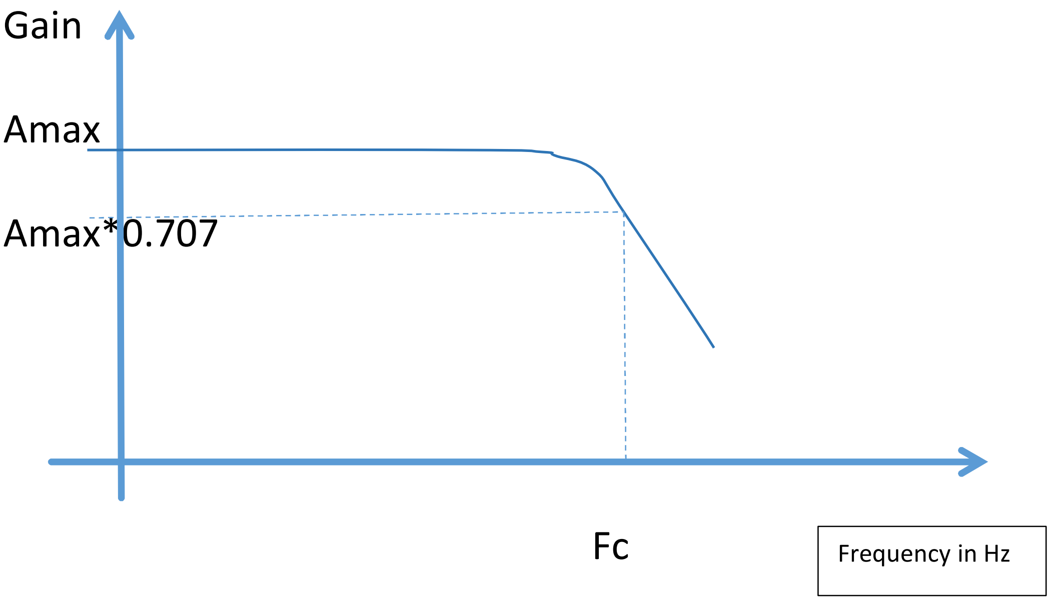
Aim:To study the Relationship between the input signal and output (Received)signal i,e Frequency response of optical fiber link.

Apparatus:CRO, Optical fiber kit,Chords,Power supply.

Formula:
Gain=Vout/Vin

Where Vout =Output voltage
Vin= Input voltage

Nature of graph:



Observations:

Frequency f in Hz	Input Voltage(Vin) in Volt	OutputVoltage(Vout) in Volt	Gain=Vout/Vin

Result:

Experiment :CLASS C TUNED AMPLIFIER

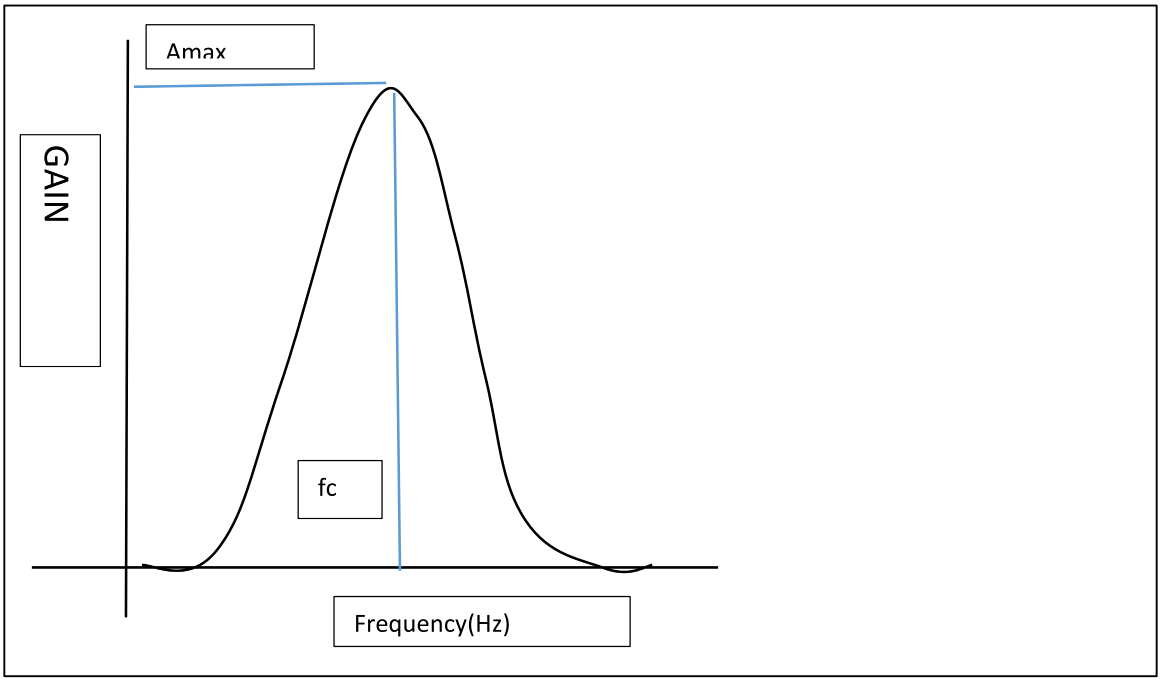
AIM: To design and test a class c tuned amplifier to work at the given frequency and to determine its cut-off frequency.

APPARATUS: Power Supply,Function Generator,AC milli-voltmeter or CRO,Transistor,Resistors, Capacitors, Connecting wires.

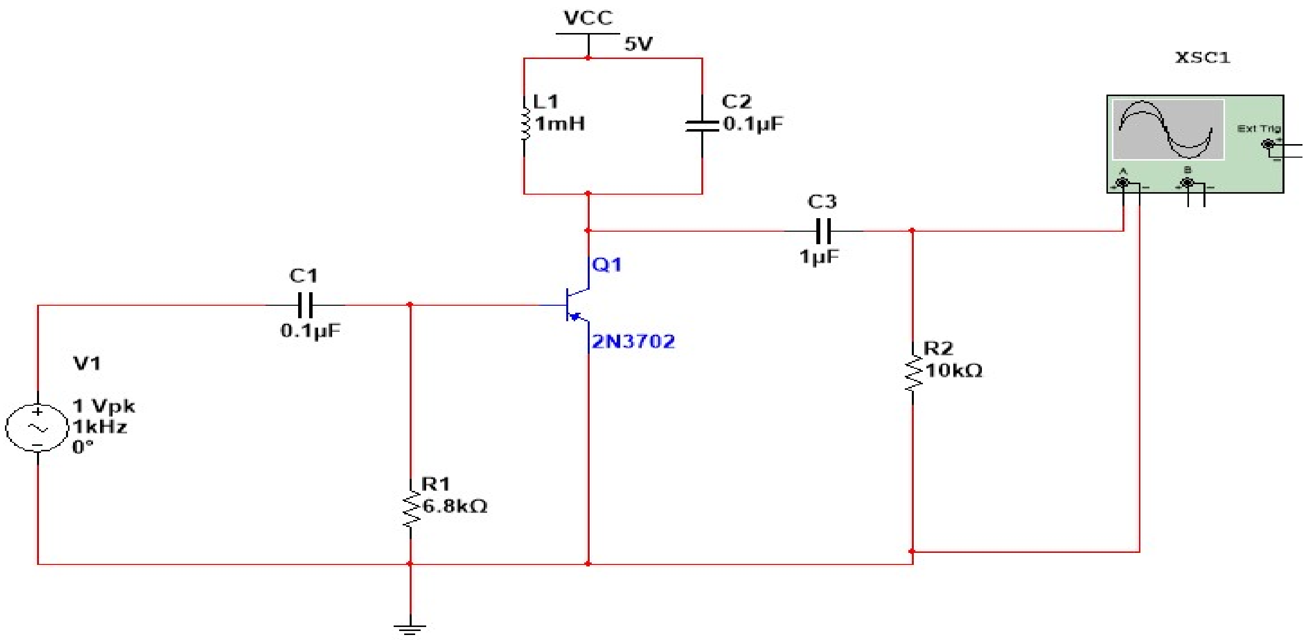
FORMULA: Cut-off Frequency

$$fc = \frac{1}{2\pi\sqrt{LC}} \quad Hz$$

NATURE OF GRAPH:



CIRCUIT DIAGRAM:



TABULAR COLUMN

L=…….H C=……F fc=…….Hz

Frequency in Hz	Input voltage (Vin) V	Output voltage (Vout) V	Gain=Vout/Vin

RESULT:

Experiment :Active Low Pass Filter

Aim:To design active low pass filter and to obtain the frequency of the active low pass filter.

Apparatus: Capacitors,Resisters,OP-AMP(IC-741), Dual Power supply, AC millivoltmeter,Signal Generator.
Formula:

- For First Order Low pass filter

$fc = \frac{1}{2\pi RC}$ Hz

- For Second Order Low pass filter

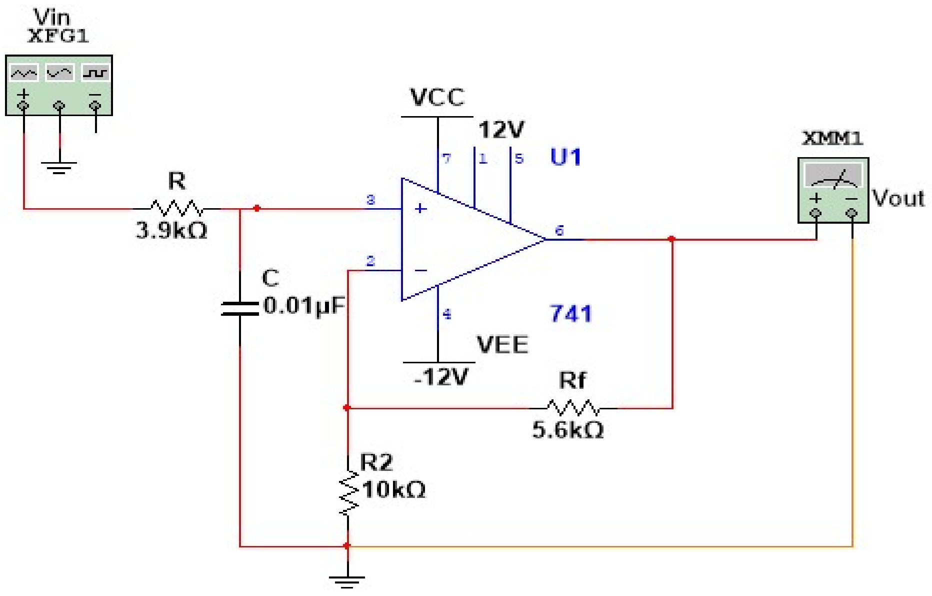
$fc = \frac{1}{2\pi\sqrt{R1R2C1C2}}$ Hz

If R1=R2=R ,C1=C2=C

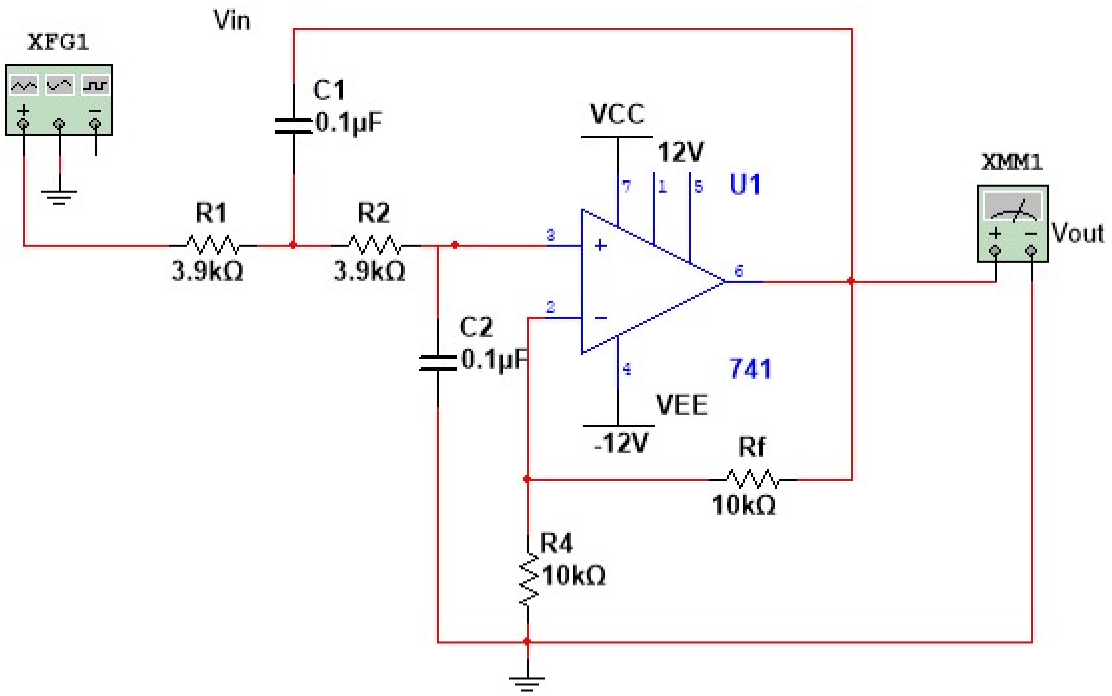
Then $fc = \frac{1}{2\pi RC}$ Hz

- Gain $Av = 1 + \frac{Rf}{R1}$

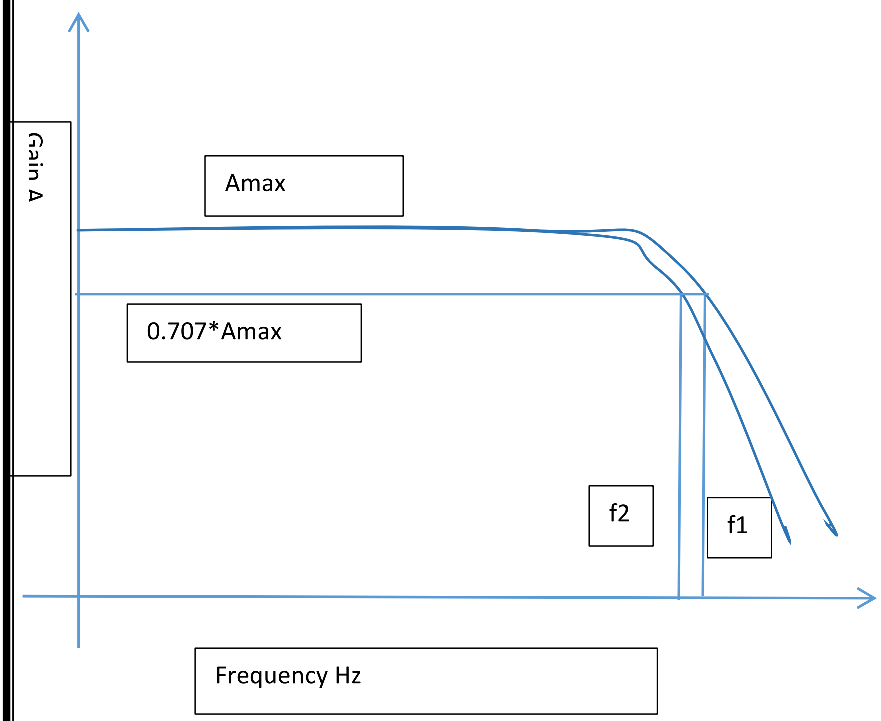
Circuit Diagram
First order Low pass filter



Second order Low pass filter



Nature of Graph



f 1=High frequency

F 2=Low frequency

Tabular column

Input voltage,Vin= V

Input Frequency = Hz

First order Low pass filter

Frequency in Hz	Output voltage Vout(V)	Gain(A)=Vout/Vin

Second order Low pass filter

Frequency in Hz	Output voltage Vout(V)	Gain(A)=Vout/Vin

Result:

Experiment :Frequency Multiplier

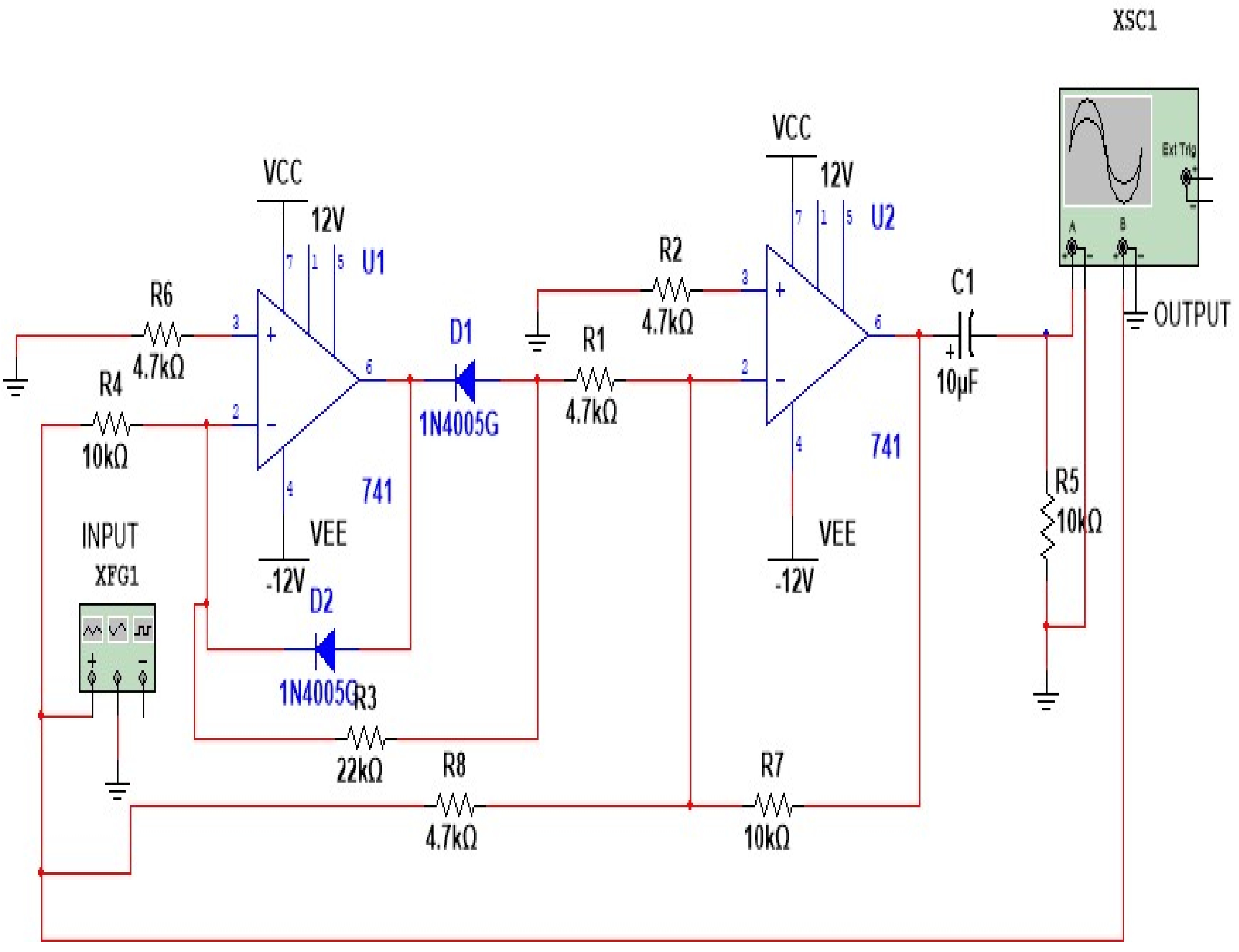
Aim:To design and setup a Frequency multiplier circuit using OP-AMP to multiply an input frequency by a factor N(i.e N=2).

Apparatus: Capacitors,Resisters,OP-AMP(IC-741), Dual Power supply, CRO,Signal Generator.

Formula:

Output Frequency=2*input frequency
Fout=2*Fin   Hz

Circuit Diagram



Tabular column

Input Frequency		Output Frequency Fout=2*Fin Hz			
SL NO	Fin in Hz	No of div(a)	Time/div (b) sec	Time T=a*b sec	Fout=1/T Hz

Result:

Experiment :Study of Notch filter

Aim:To design and setup a Notch filter and Study the Frequency of the Notch filter.

Apparatus: Capacitors,Resisters,OP-AMP(IC-741), Dual Power supply, AC millivoltmeter,Signal Generator.

Formula:

- Notch Frequency

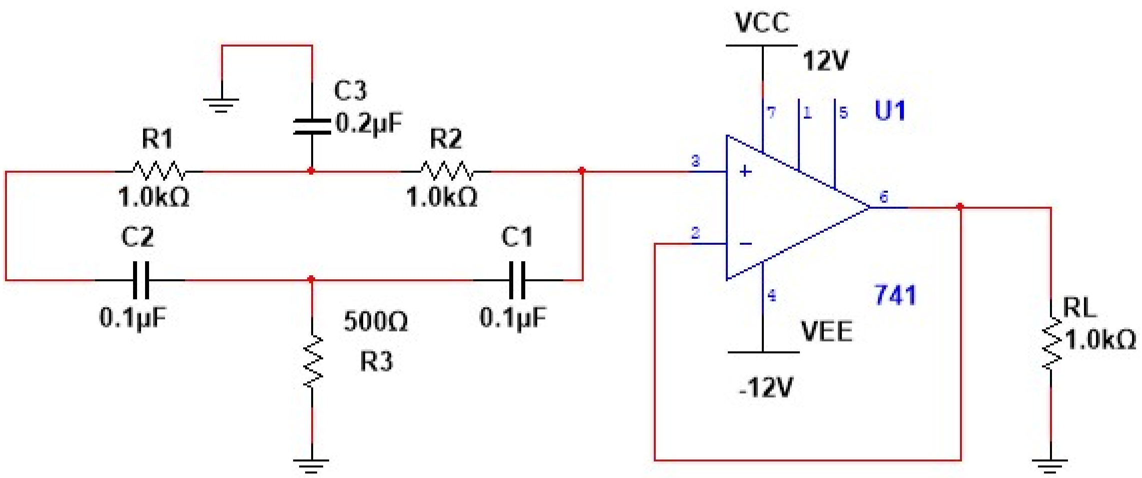
$fN = \frac{1}{2\pi RC}$ Hz

- Gain $Av = \frac{Vout}{Vin}$
- Bandwidth=BW=fL-fH Hz

fL=Lower cut off frequency

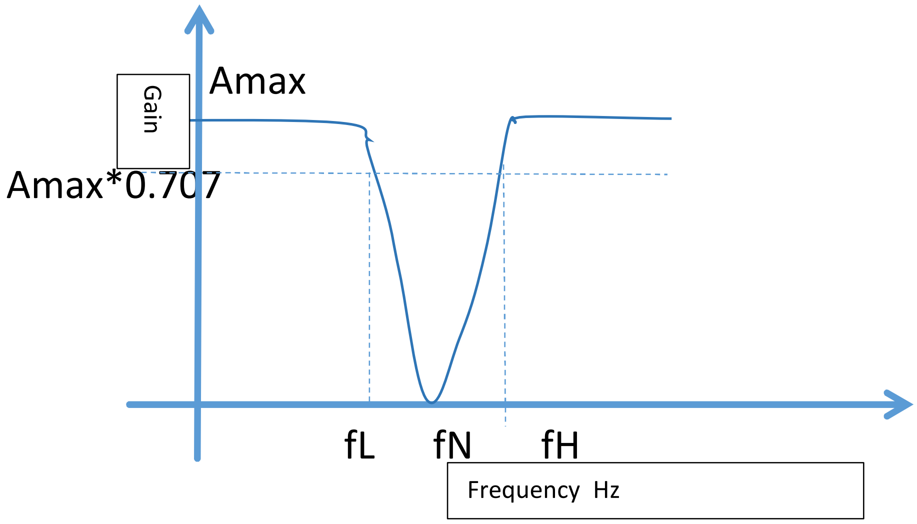
fH=Higher cut off frequency

Circuit Diagram



R1=R2=1KΩ . R3=500Ω C1=C2=0.1μF C3=0.2μF

Nature of Graph



Tabular column

Input Frequency =   Hz

Frequency in Hz	Input voltage Vin(V)	Output voltage Vout(V)	Gain(A)=Vout/Vin

Result:

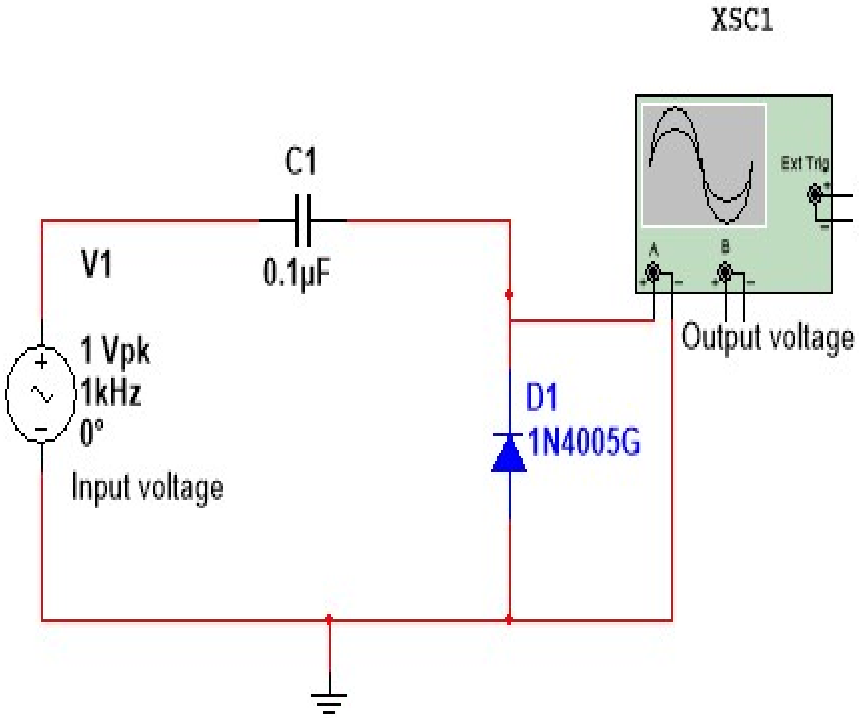
Experiment :Diode Clamping

Aim:Set up semiconductor diode as clamping circuits. Study biased and unbiased circuits. Draw the input and output waveforms for these circuits.

Apparatus: Capacitors, Diodes, Power supply, CRO,Signal Generator.

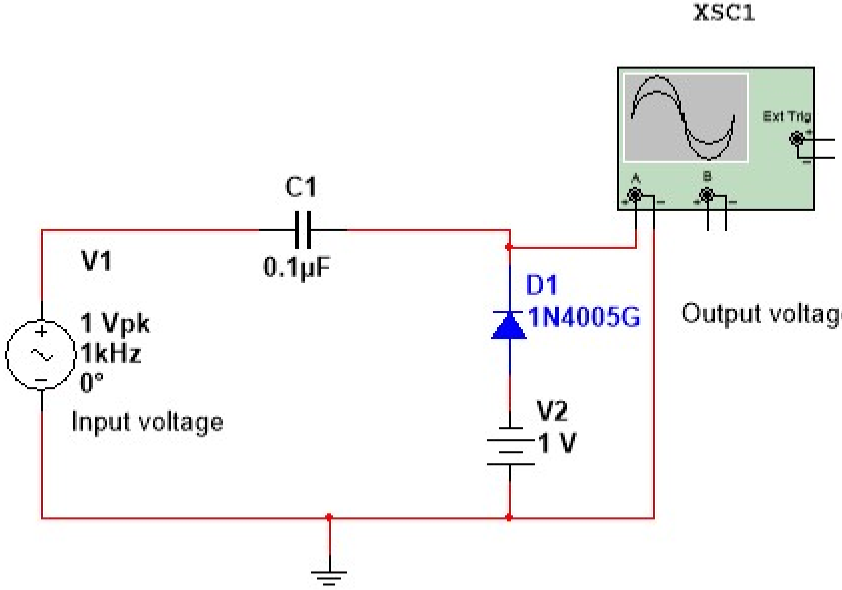
Circuit Diagram and Tabular column

1) Positive Clamping without bias.



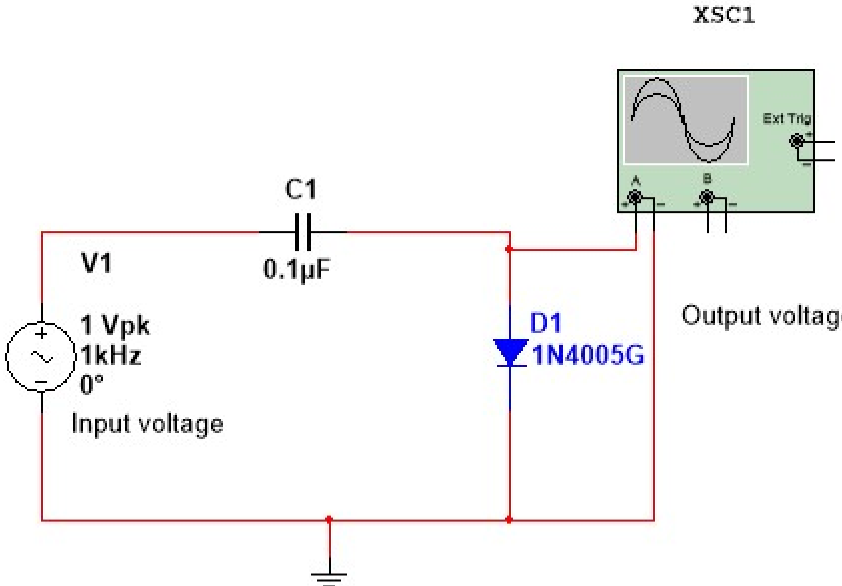
Peak voltage of I/P in Vp(v)	Shift in O/P waveform in div(A)	Volts/div (B)	Clamped voltage V=A*B in v	Voltage Across Capacitor Vc=Vp-Vb in v

2) Positive Clamping with bias voltage.



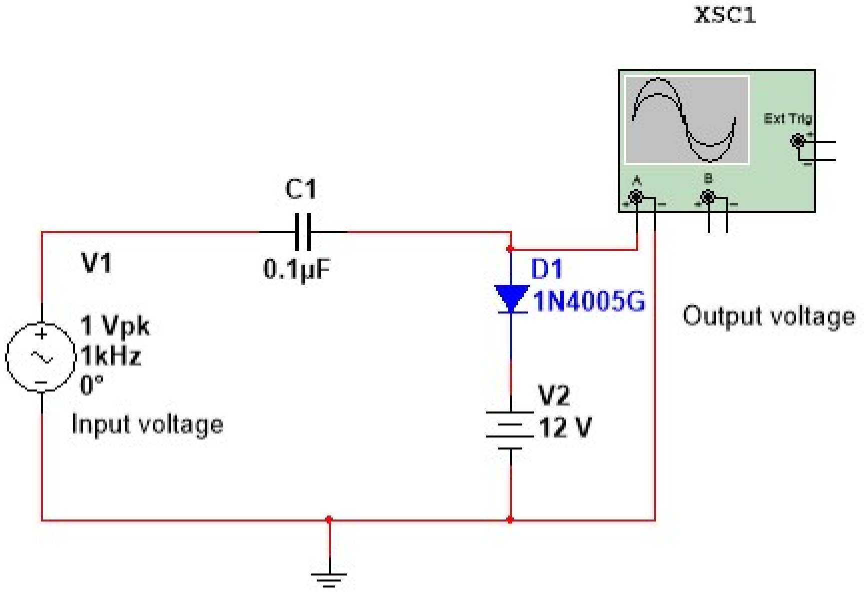
Peak voltage of I/P in Vp(v)	External bias voltage Ve iv v	Shift in O/P waveform in div(A)	Volts/div (B)	Clamped voltage V=A*B in v	Voltage Across Capacitor Vc=Vp-Ve-Vb in v

3) Negative Clamping without bias.



Peak voltage of I/P in Vp(v)	Shift in O/P waveform in div(A)	Volts/div (B)	Clamped voltage V=A*B in v	Voltage Across Capacitor Vc=Vp-Vb in v

4) Negative Clamping with bias voltage.



Peak voltage of I/P in Vp(v)	External bias voltage Ve iv v	Shift in O/P waveform in div(A)	Volts/div (B)	Clamped voltage V=A*B in v	Voltage Across Capacitor Vc=Vp-Ve-Vb in v

Result: