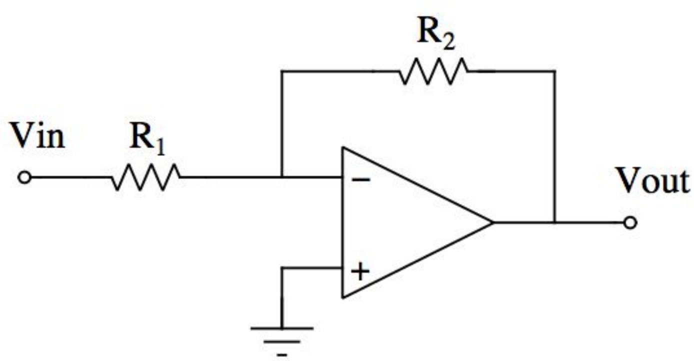
**EE 236 Lab Report**
**Basic Electronic Devices**

**Experiment No. 2**

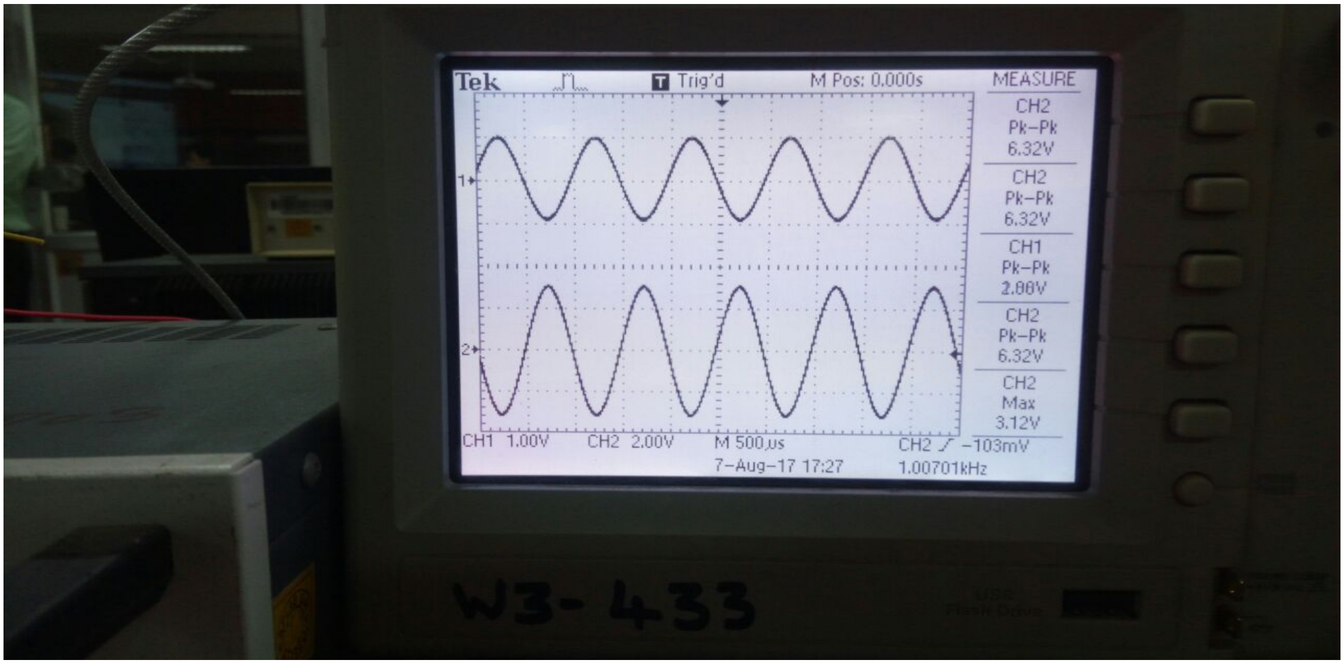
Name : Devesh Kumar    Roll No: 16d070044
Batch:Monday    Table No: 20
Exp Date:
Name of TA/RA :Arindam Sarkar

1. Connect the circuits shown in Fig.1. Use $R_1$=1k and $R_2$=10k
(A)

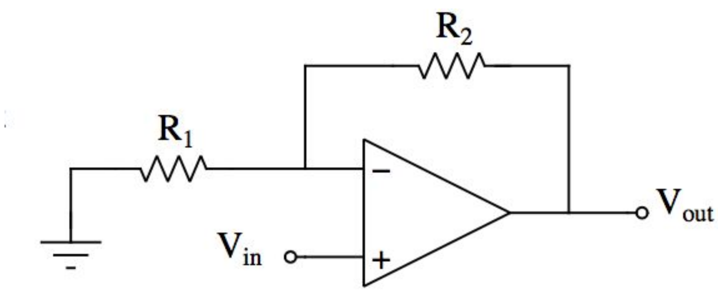



Inverting amplifier part a.
Vout=-r2.Vin/r1=10.Vin

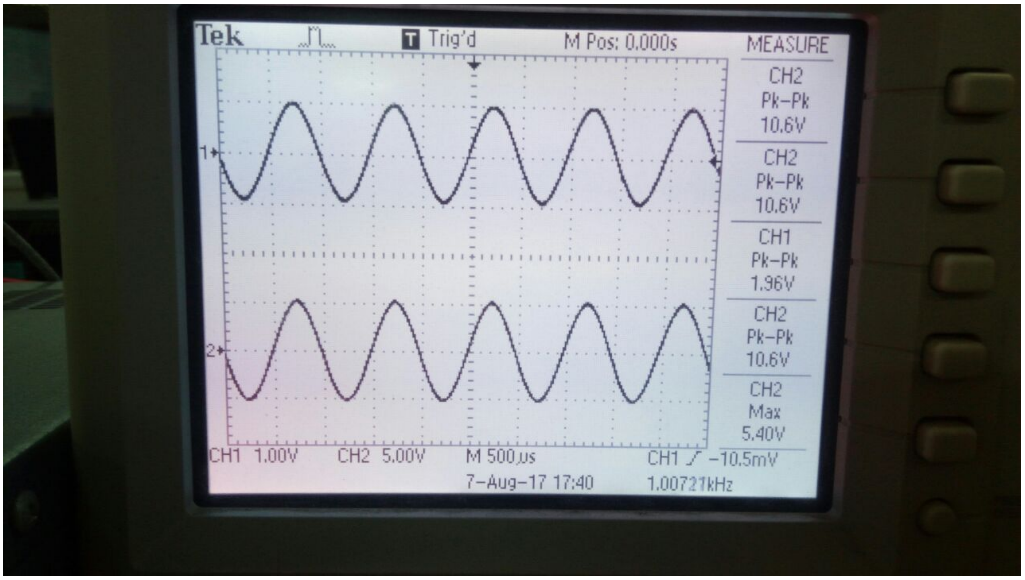
.The output wave has a phase shift of 180 degree
And its value has also changed,magnitude increased.



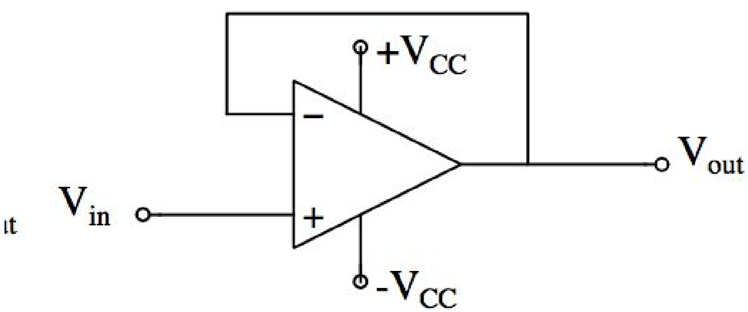

(B)




Non inverting amp:
vout= vin.(r1+r2)/r1=11.Vin
Output has same phase as that of vin.just its magnitude has changed



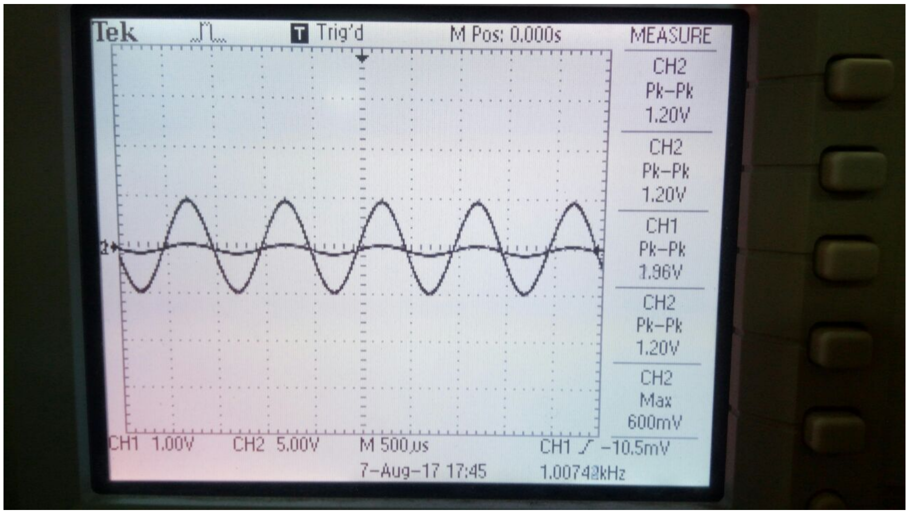

(C)




Voltage follower:

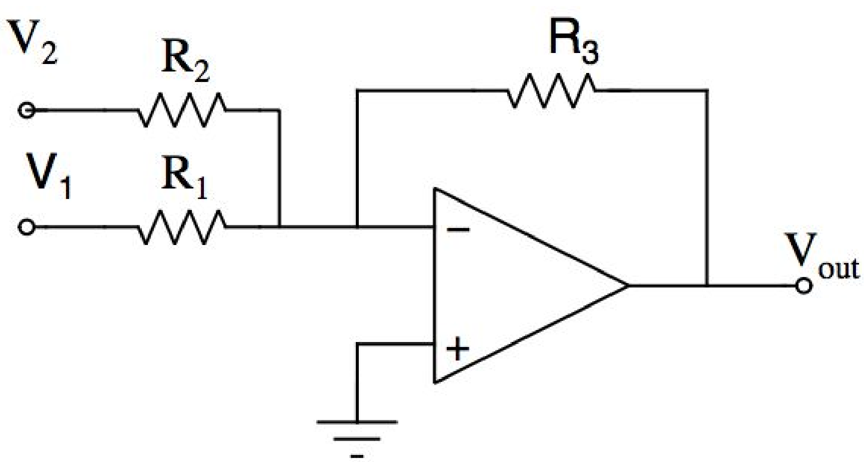
Vin =vout.

There is no phase change or change in magnitude of vout

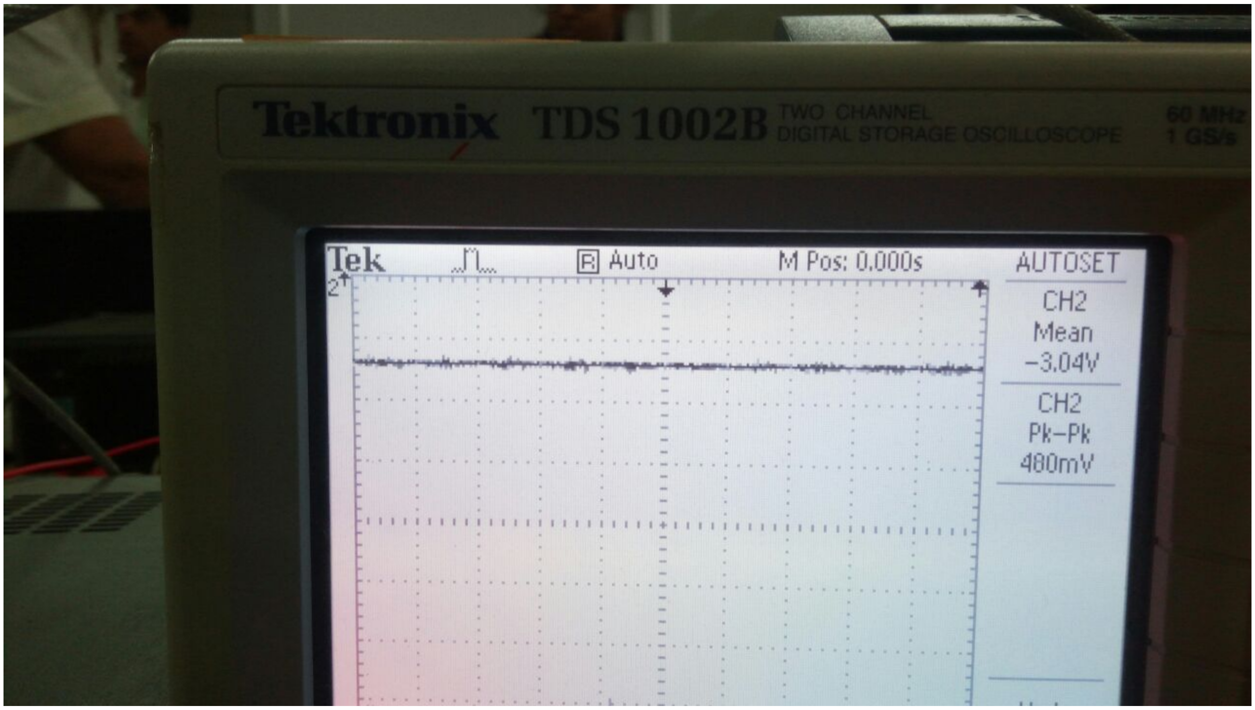



In all the above cases ch2 represent vout.ch1 represent 2*vin(as we had used a potential divider

Q4 Connect the circuit shown in Fig.2.



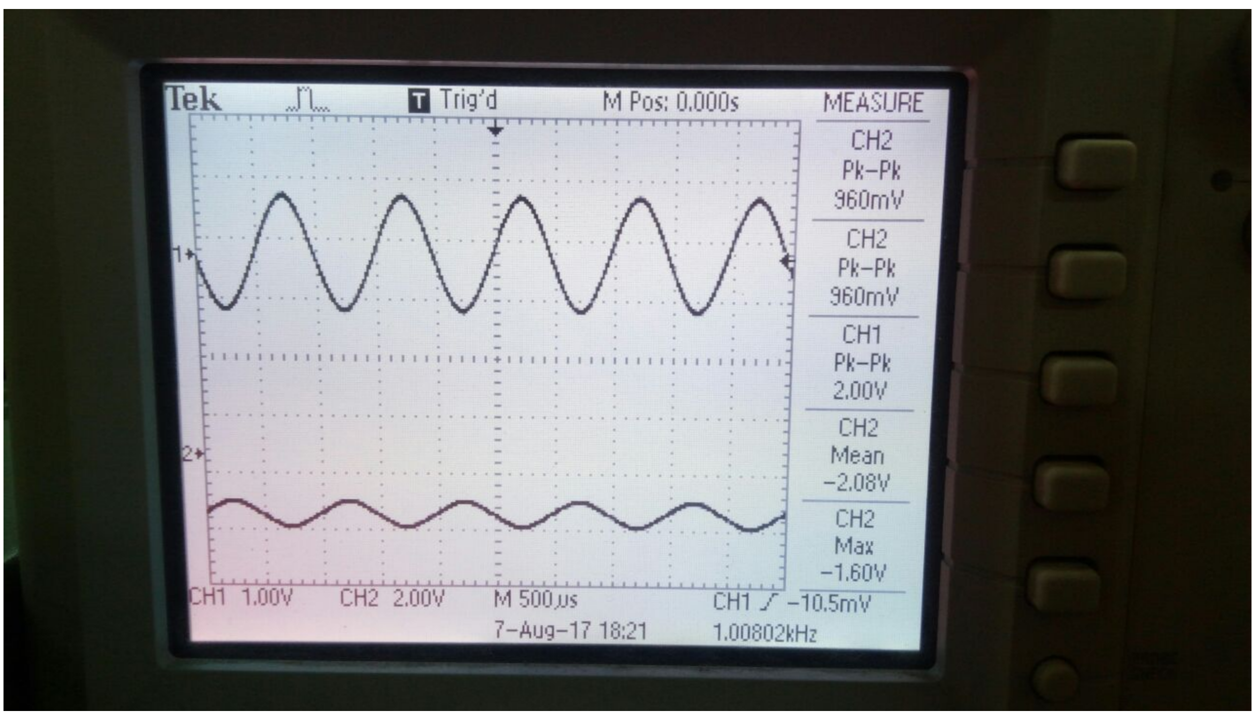

Q6Set $V_1$=2V DC and $V_2$=1V DC and measure $V_{out}$.




Above circuit is voltage adder:

vout=-(v2.r2+v1.r1)/r2=3v (dc output)

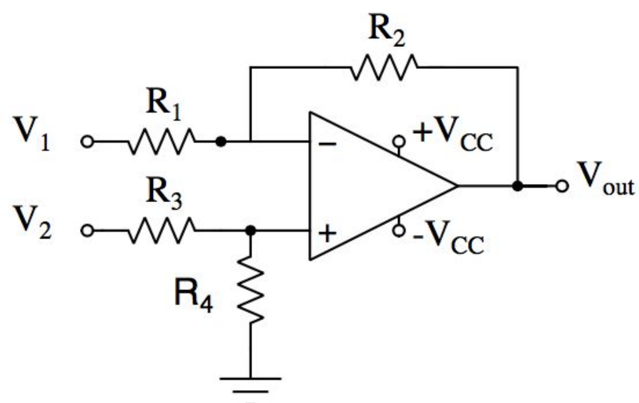
Q7 Now set $V_2$ = 1Vpp, 1kHz and observe $V_{out}$ with reference to $V_{in}$.

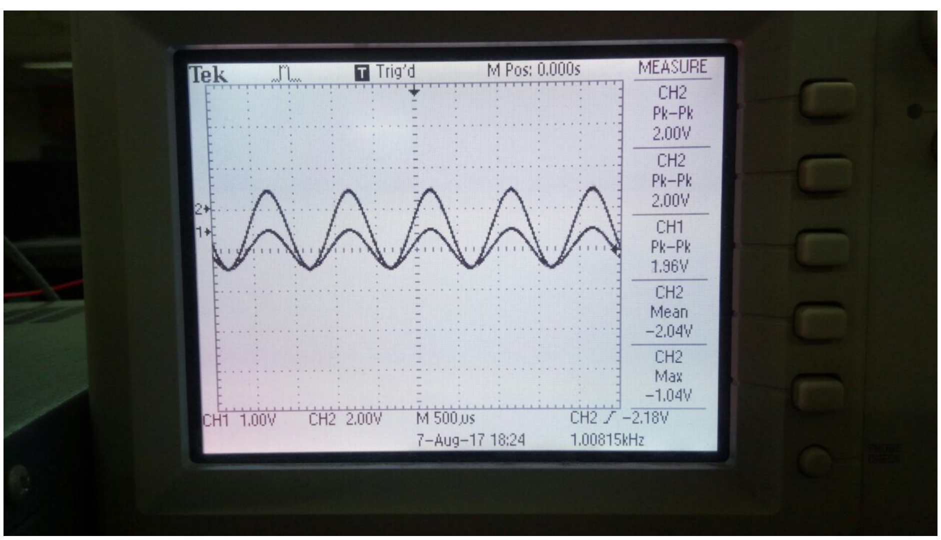



Voltage adder:

It adds the voltage v1 and v2(as r1=r2=r3)just like previous case but this time it adds one dc voltage(v1)and ac voltage v2.

Q 8Connect the circuit shown in Fig. 3.

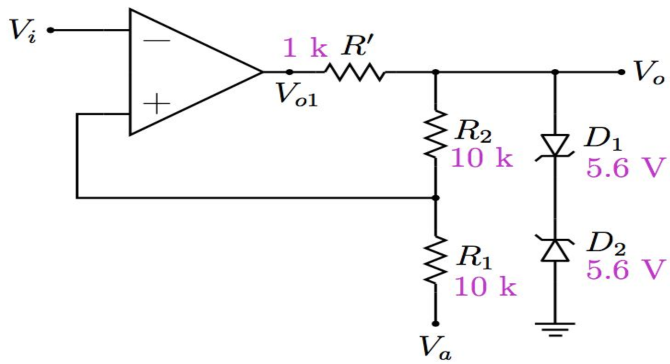



Voltage subtractor :
As all the resistance aire equal so the circuit just substract v1&v2.

# Schmitt Trigger, Monostable, and Astable Circuits

## (I) Schmitt trigger




Schmitt trigger

1.Wire up the Schmitt trigger circuit shown in the figure. Use ±15 V supply for the Op Amp. Let $V_a$ = 0 V (ground).

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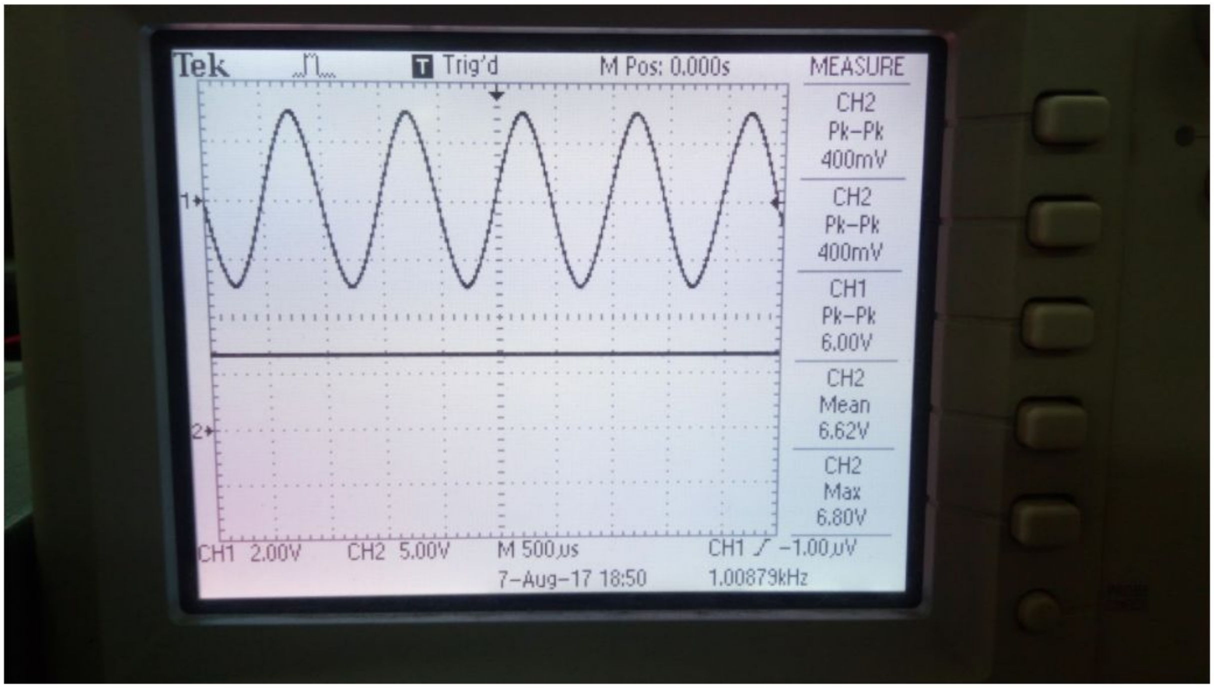
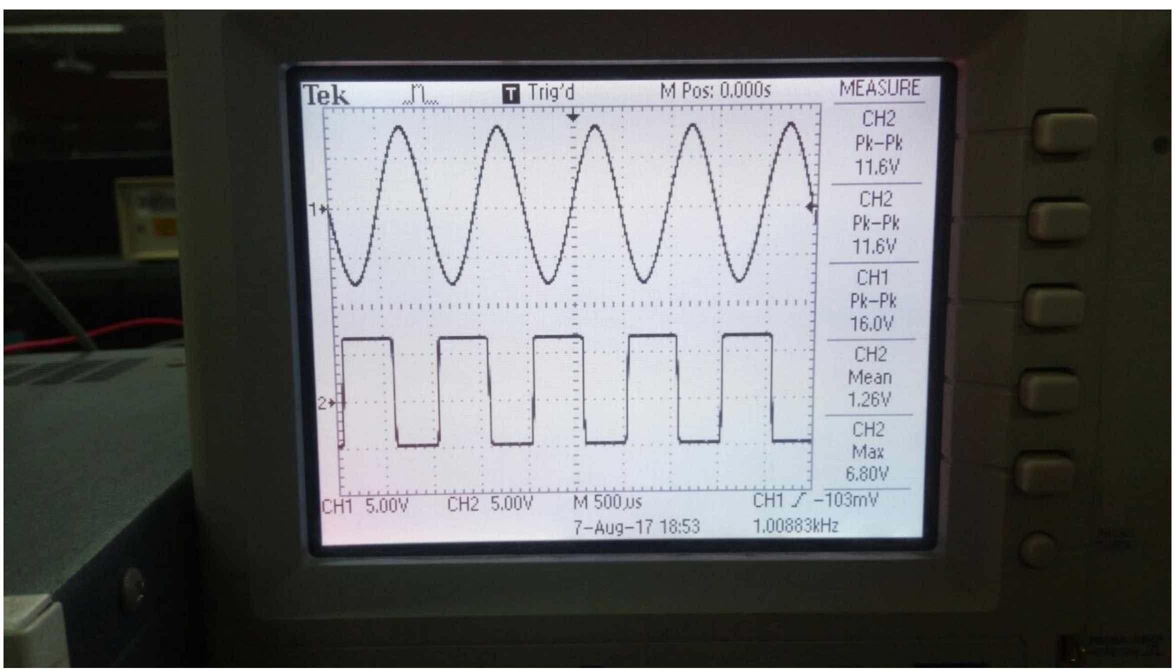



initially for vi =6v pk-pk no square wave was obtained



2.Connect a sinusoidal input (6V peak, 1kHz) and observe $V_o(t)$. Also, display $V_o$ versus $V_i$ using the X-Y mode of the oscilloscope. Compare the threshold voltages $V_{TH}$ and $V_{TL}$ with the values you expect theoretically.

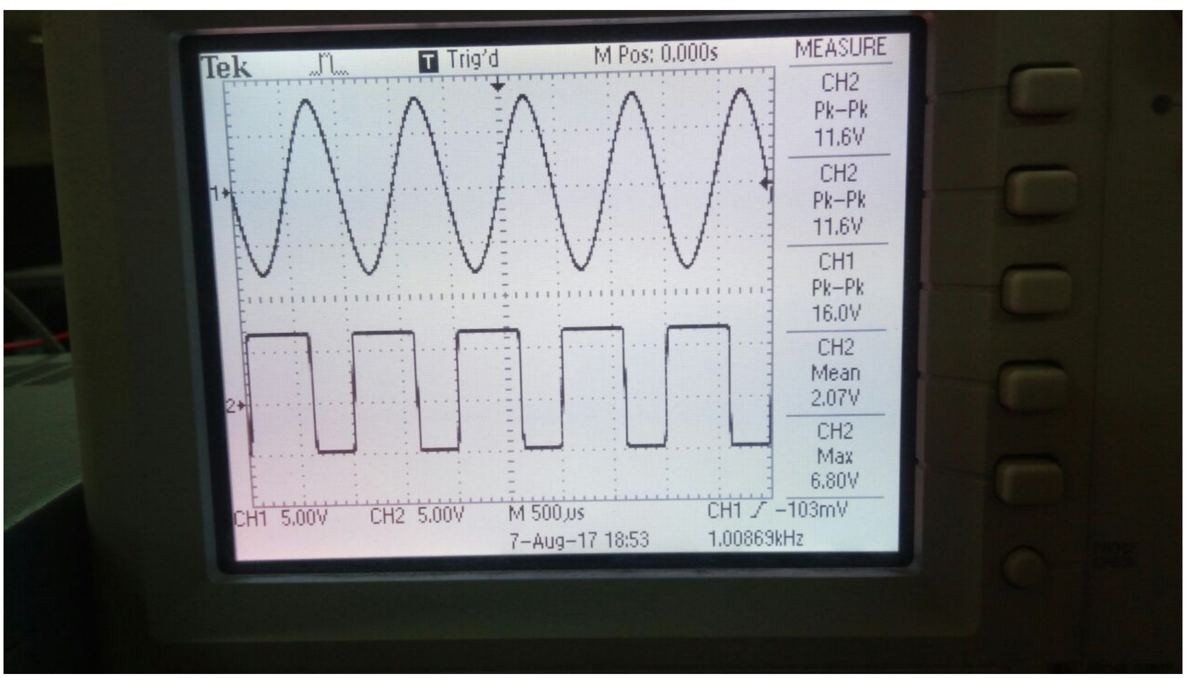
Theoretical value of Vth=3.15v(0.7 across diode)

Vtl=-3.15v( 0.7 across diode)

Observed value of Vth =4v

Of vtl=-3.6v

3.RepeatforV$_a$=3V.



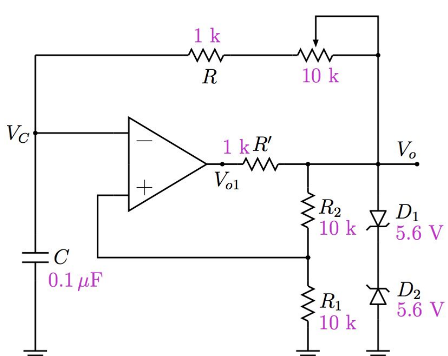
Theoretical value of Vth=4.65v(0.7v across diode)

Vtl=-1.65v( 0.7v across diode)

Observed value of Vth =5.6v

Of vtl=-2.2v

(II) Astable multivibrator



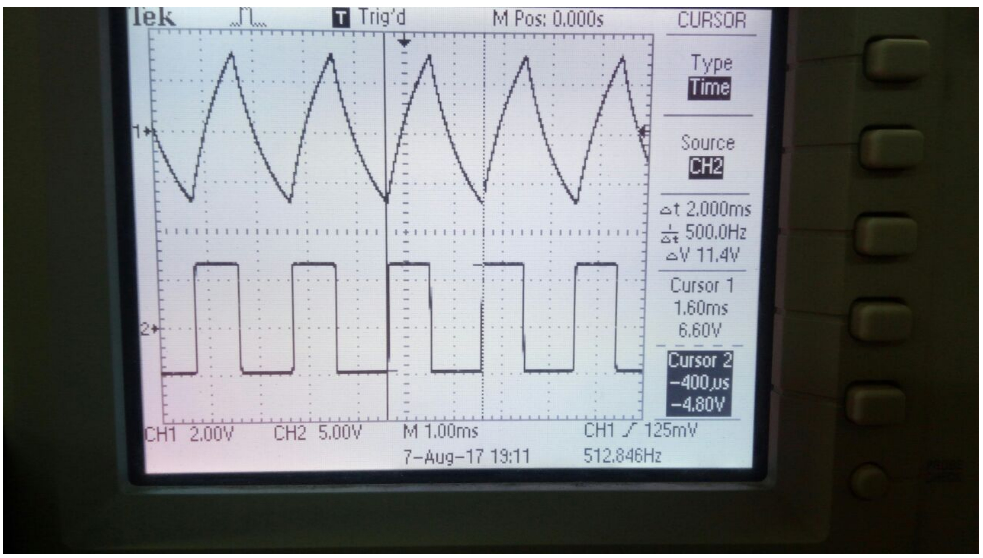

Astable multivibrator

1For the astable multivibrator shown in the figure, calculate the minimum and maximum period of oscillation (as the 10 k pot is changed).

2.Wire up the circuit and observe the voltages $V_C$ and $V_o$ on the oscilloscope.

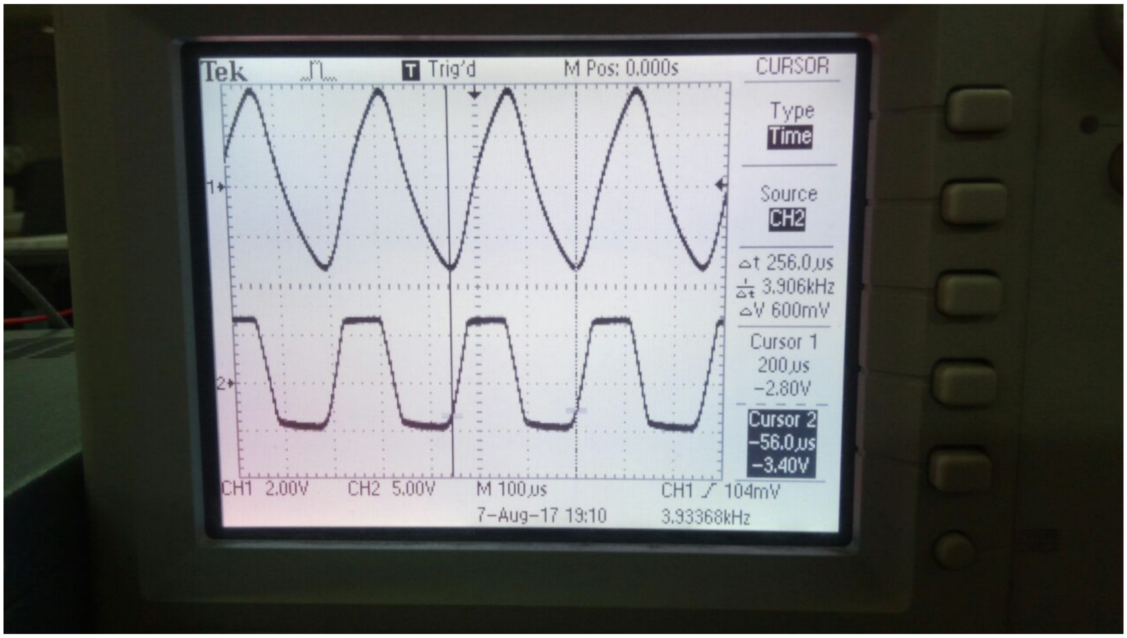
3.Vary the 10 k pot and see its effect on the waveforms. Compare the minimum and maximum period of oscillation with your calculation.

Max time period: 2 ms occurs when value of pot is max ie 10k

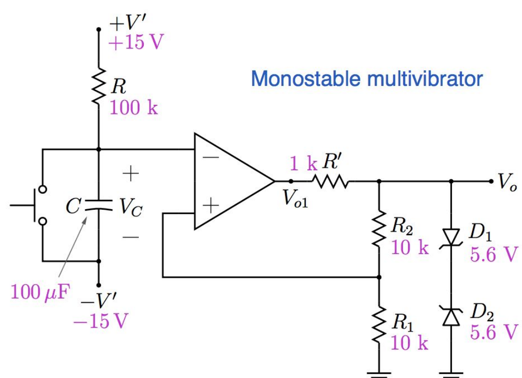



Vo ch2
Vc ch1

Min time period :256 microsecond occurs when value of pot is min   ie 0k




(III) Monostable multivibrator




Calculate the output pulse width for the monostable circuit shown in the figure when the push button is closed and released.

Adjust the oscilloscope Volts/div setting so that both the high and low values of the output voltage can be seen on the display. Close and release the push button, and measure the duration of the output pulse using your wrist watch. Compare with your calculation.

Using CH1 and CH2 of the oscilloscope, observe $V_-$ and $V_o$ simultaneously (use the same Volts/div setting for CH1 and CH2, and make their ground traces coincide)


The observed output pulse width for the monostable circuit is 13.1s.