IC161P: APPLIED ELECTRONICS

Introductory class Assignment

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1.Abstract

The objective of the experiment is to plot Vin and Vout graph for the following circuits using LT SPICE and understand the behaviour of the diode.

2.Apparatus Required

| S.N.	Name
1	Diode
2	Resistance
3	Capacitor
4	Power Supply
5	Connecting Wires

3.Theory

A Diode is an electronic device made by joining P type and N type semi-conductor which allows the current to flow in one direction that is forward biased. The opposite side which doesn't allow is reverse biased. The P side has holes as its majority charge carriers while N side has electrons as its majority charge carriers.
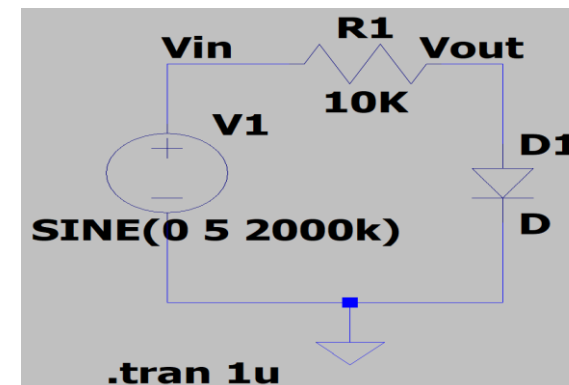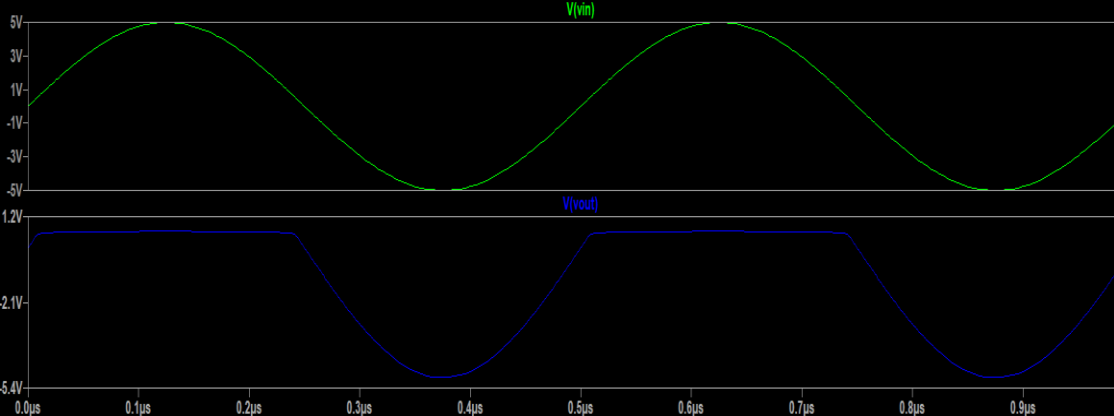
Diode Symbol
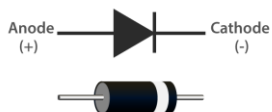
4.Prcocedure

Experiment-1
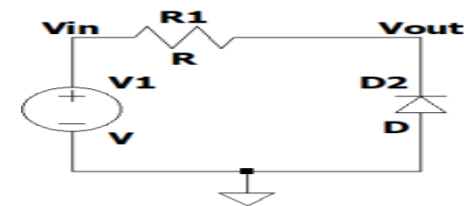
•Take a diode(D1) ,a 10kΩ resistance(R) and an AC sinusoidal source(V1) of frequency of 2 MHz and amplitude 5V and connect them by wires as prescribed in circuit above.

•Label the respective nets as given (Vin & Vout).

•Plot the graphs of voltages at Vin and Vout.

Experiment-3

•Take two diode(D4 & D5) ,two 10kΩ resistance(R4 & R5) and an AC sinusoidal source(V4) of frequency of 2 MHz and amplitude 5V and connect them by wires as prescribed in circuit above.
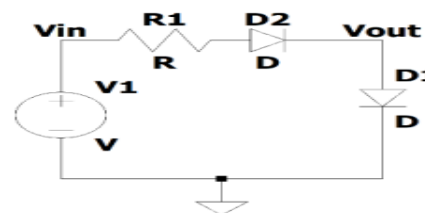
•Label the respective nets as given (Vin, VoutA & VoutB).

•Plot the graphs of voltages at Vin, VoutA & VoutB.

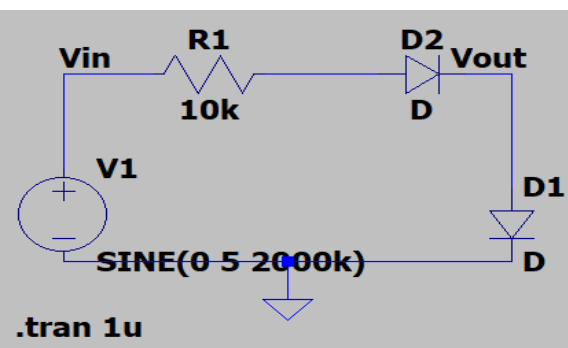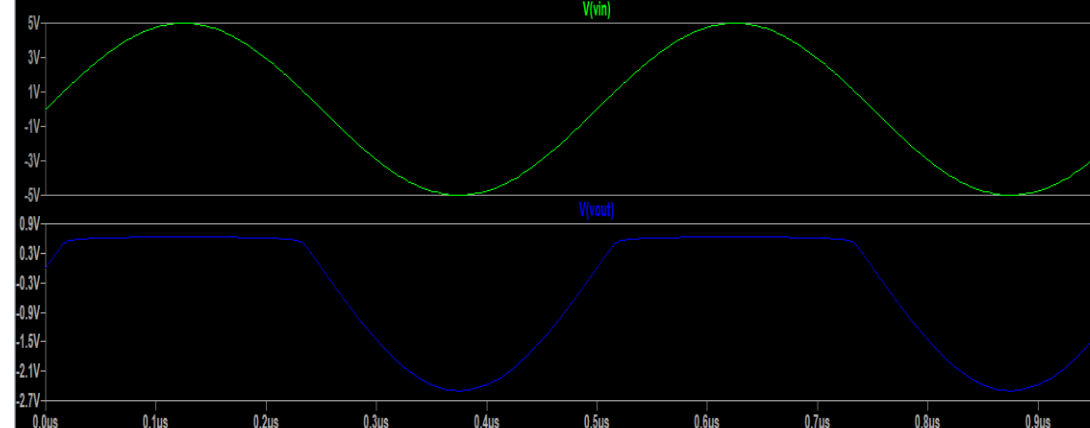## Experiment-2

•Take two diode(D1 & D2) ,a 10kΩ resistance(R1) and an AC sinusoidal source(V1) of frequency of 2 MHz and amplitude 5V and connect them by wires as prescribed in circuit above.
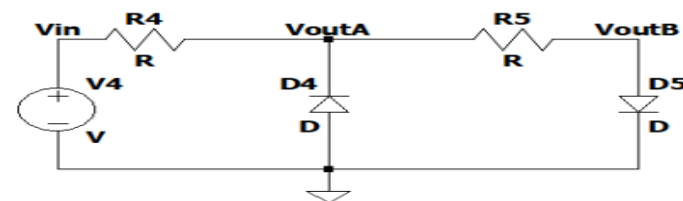
•Label the respective nets as given (Vin & Vout).
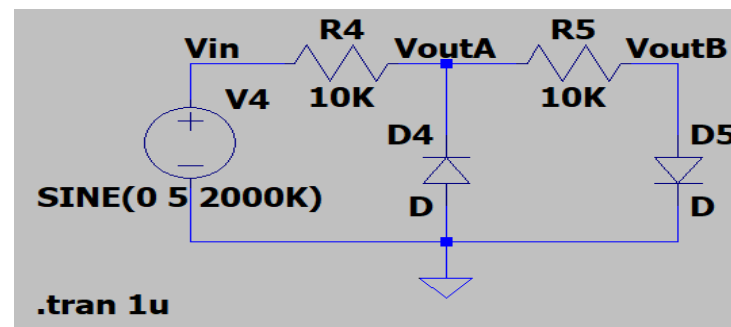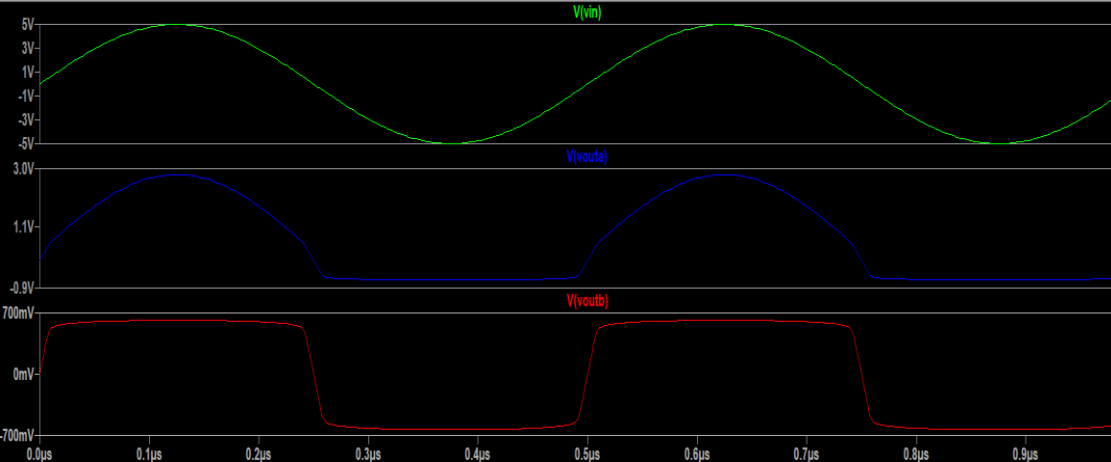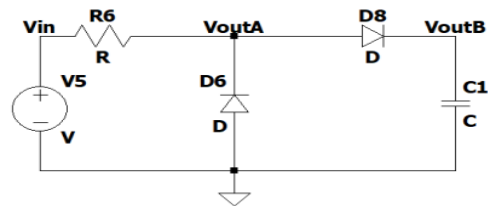

•Plot the graphs of voltages at Vin and Vout.

V(vin)

5V
3V
1V
-1V
-3V
-5V

V(vouta)

3.0V

1.1V

-0.9V
700mV

V(voutb)

0mV

-700mV

0.0µs   0.1µs   0.2µs   0.3µs   0.4µs   0.5µs   0.6µs   0.7µs   0.8µs   0.9µs

V(vin)

5V
3V
1V
-1V
-3V
-5V

V(vouta)

700mV

0mV

-700mV

V(voutb)

13µV

7µV

0µV

0.0µs   0.1µs   0.2µs   0.3µs   0.4µs   0.5µs   0.6µs   0.7µs   0.8µs   0.9µs   1.0µs

Experiment-4

Vin R6 VoutA D8 VoutB
R
V5 D6
V D
C1
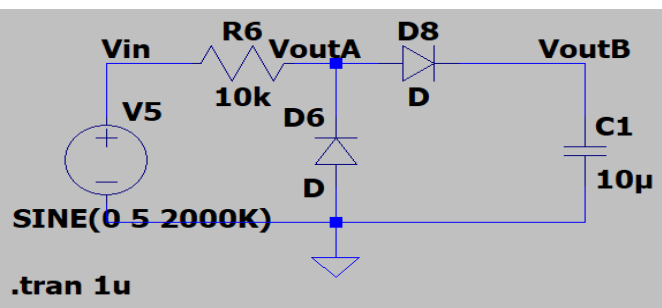C
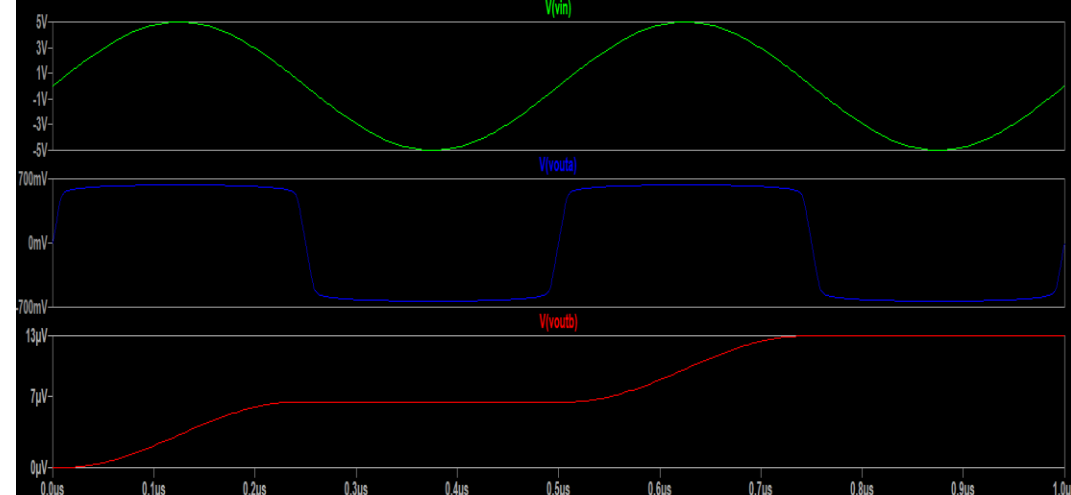
•Take two diode(D6 & D8) ,a 10kΩ resistance(R6), a 10µF capacitor(C1) and an AC sinusoidal source(V5) of frequency of 2 MHz and amplitude 5V and connect them by wires as prescribed in circuit above.

•Label the respective nets as given (Vin, VoutA & VoutB).

Vin R6 VoutA D8 VoutB
V5 10k D6 D
C1
D 10µ
SINE(0 5 2000K)

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•Plot the graphs of voltages at Vin, VoutA & VoutB.

4.Conclusion

In forward biased, the diode starts conducting after a certain voltage called threshold voltage(which is nearly 0.7V) while in reverse biased, it almost has a non-conducting nature.

Something interesting happens in capacitor's case where frequency of time constant of capacitor is much less than the frequency of power source which allows the capacitor to loose a very little charge when voltage is decreasing till the voltage is gained to that point. This results in constant voltage across capacitor after few cycles.