LAB-3 REPORT

TABLE NO:-42

ROOM NO:-117

NAME:-SANTHOSH

ROLL NO:-2024102054

NAME:-AKSHAY

ROLL NO:-2024102014

OBJECTIVE:-

To check the zener resistance at which the regulation of zener diode starts at the voltage across zener diode as 4.7v and to check the output voltage when the input is sinusoidal to check the behaviour of voltage across the zener diode when load resistance is increased and decreased

EQUIPMENT REQUIRED:-

LT SPICE

PROCEDURE:-

Construct a circuit contain a series resistor known as zener resistance and the parallel resistance known as load resistance

In the It spice application now,keep the value of zener resistance as fixed(1000 ohms) and then change the load resistance at different values like (RL>RZ),(RL=RZ),(RL<RZ) then find the difference in their properties when these resistances are changed

Now calculate the value of RL for which the diode breaks at 4.7 volts note the value of RL in observations

Now take the input as sinusoidal and check the output of the sinusoidal wave

The above observations should be done at a voltage of 15 volts

OBSERVATIONS AND RESULTS:-

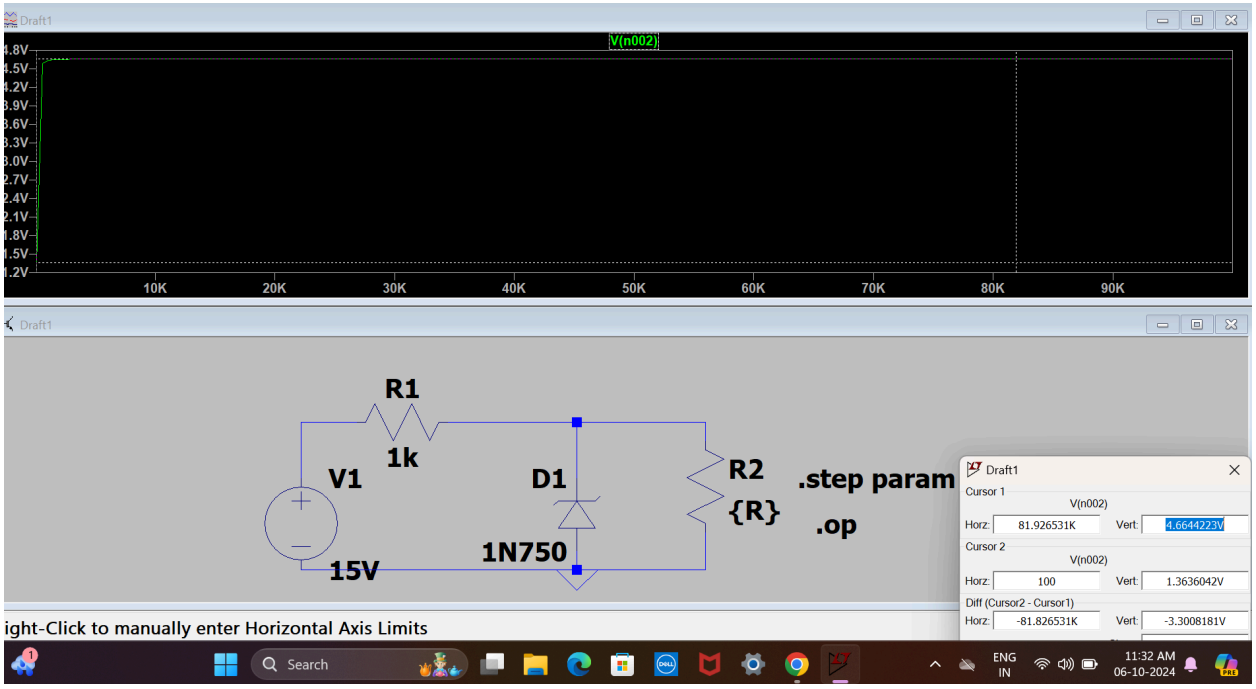
We can observe that when we keep the Zener resistance and the load resistance are equal then the break down happens some value before 4.7

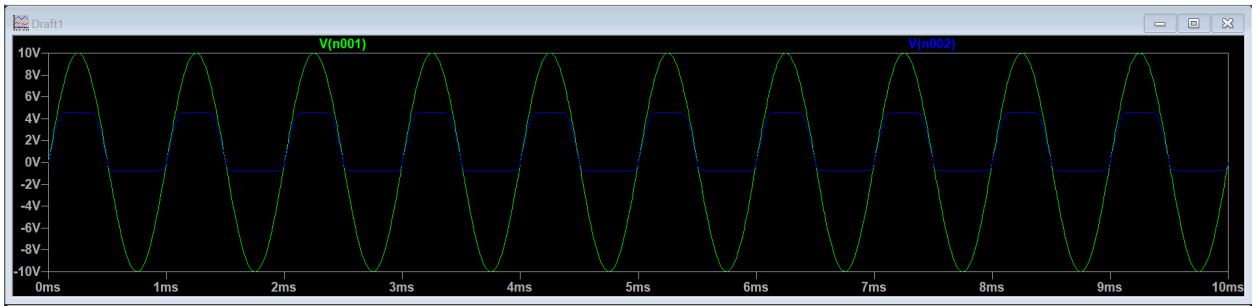
When the load resistance is lesser than the zener resistance the break down happens at very low voltage

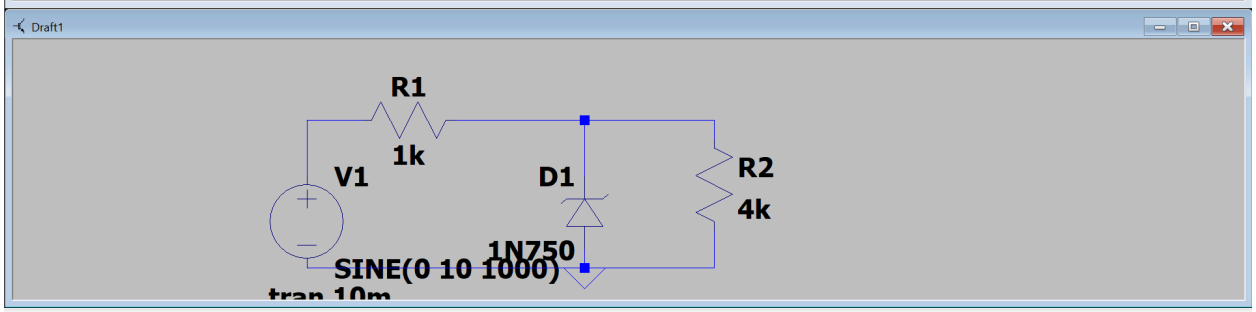
when we keep the input signal as

sinusoidal we can observe that when the amplitude is 5 volts the upper curve the voltage breaks at 4.7 volts but when the curve goes downward diode goes to forward bias

IMAGES AND CALCULATIONS:-




Draft1
V(n001)
V(n002)
10V
8V
6V
4V
2V
0V
-2V
-4V
-6V
-8V
-10V
0ms
1ms
2ms
3ms
4ms
5ms
6ms
7ms
8ms
9ms
10ms


Draft1
R1
1k
V1
D1
R2
4k
1N750
SINE(0 10 1000)
tran 10m

(2) $R_L = 250$ $R_L = 4.1k$

Regulating 4.7V

4.7

(1) $R_Z > R_L$ 4.69

Breakdowning for less Voltage ✓

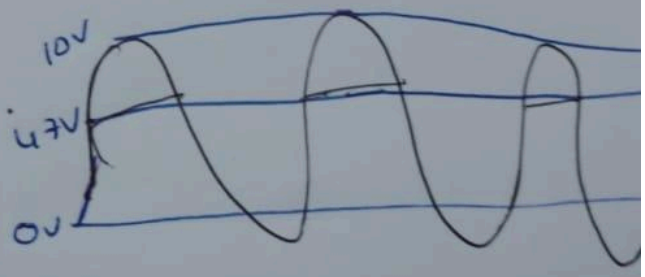
$R_Z = R_L$ = 4.6

~~Same but means to the zener breakdown voltage~~

$R_Z < R_L$ Break down at very voltages (diode does not work)

(III)

4.7 Regulating



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CONCLUSION:-

When we take the zener resistance lesser and load resistance more then the diode goes forward biassed

When the input voltage is sinusoidal with amplitude 5 volts and in reverse biassed the diode breaks at 4.7 volts then it becomes constant After 4.7 volts and it will have a very little voltage in forward biassed (negative region of sinusoidal wave)