

Project-3

Group-ECC03

End Semester Electronic Device and Circuit Laboratory Project

Question:

Using a 3.6 V Zener diode, design a voltage regulator to provide a constant voltage of 4.1 V, from a rectified pulsating DC between 6 and 8 V, and with the load drawing any current from 0-70 mA.

Components:

S.No	Component	Specification	Quantity
1	Power supply	-	1
2	Capacitor	470 μ	1
3	Diode	1N4007	1
4	Zener Diode	1N4729A	1
5	Resistor	56 Ω , 75 Ω	1 Each
6	Connecting Wires	-	As Required

Theoretical Calculation:

$$R_L = (V_Z / I_L) * 1000$$

$$R_L = (4.1V / 70mA) * 1000$$

$$R_L = 58.57\Omega$$

$$R_S = ((V_{IN} - V_Z) / I_L) * 1000$$

$$R_S = ((7V - 4.1V) / 70mA) * 1000$$

$$R_S = 41.42\Omega$$

Design:

The AC source, with an Amplitude of 1v and a frequency of 500Hz, is rectified using a diode for half-wave rectification. The resulting unidirectional waveform is then filtered through a capacitor to smoothen out fluctuations, aiming for a more constant DC voltage. To regulate this DC voltage a 3.6V Zener diode, along with suitable resistors, is used. This configuration ensures that the load receives a stable DC voltage despite variations in the input AC signal.

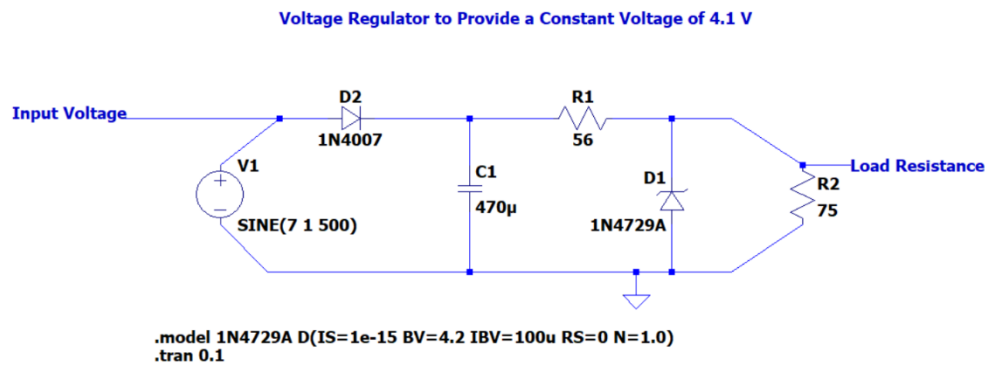
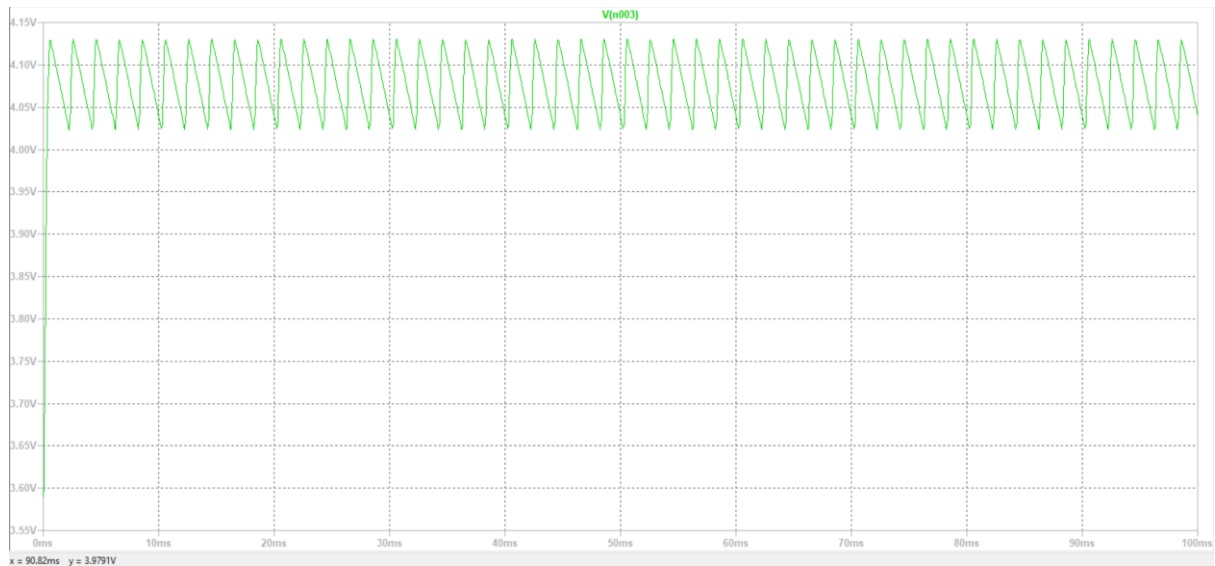
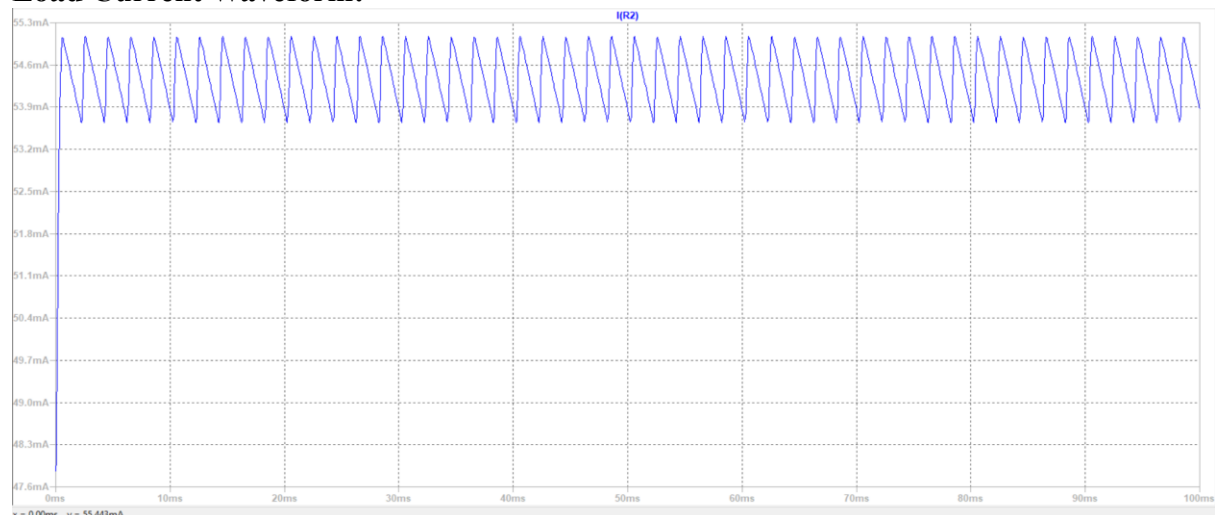
Circuit:**Zener Voltage Waveform:****Load Current Waveform:**

Table 1.1:

Input Voltage Pulsating DC (6V to 8V)	Zener Voltage (4.1V)	Load Current(0-70mA)
7	4.1V	55.05mA

Inference:

From this circuit we get a constant voltage of 4.12V at it's peak and the amount of load current we get is 55.05mA.