

DMENOKU PERPETUAL ISTIOMA

18/ENGG06/060

MECHANICAL ENGINEERING

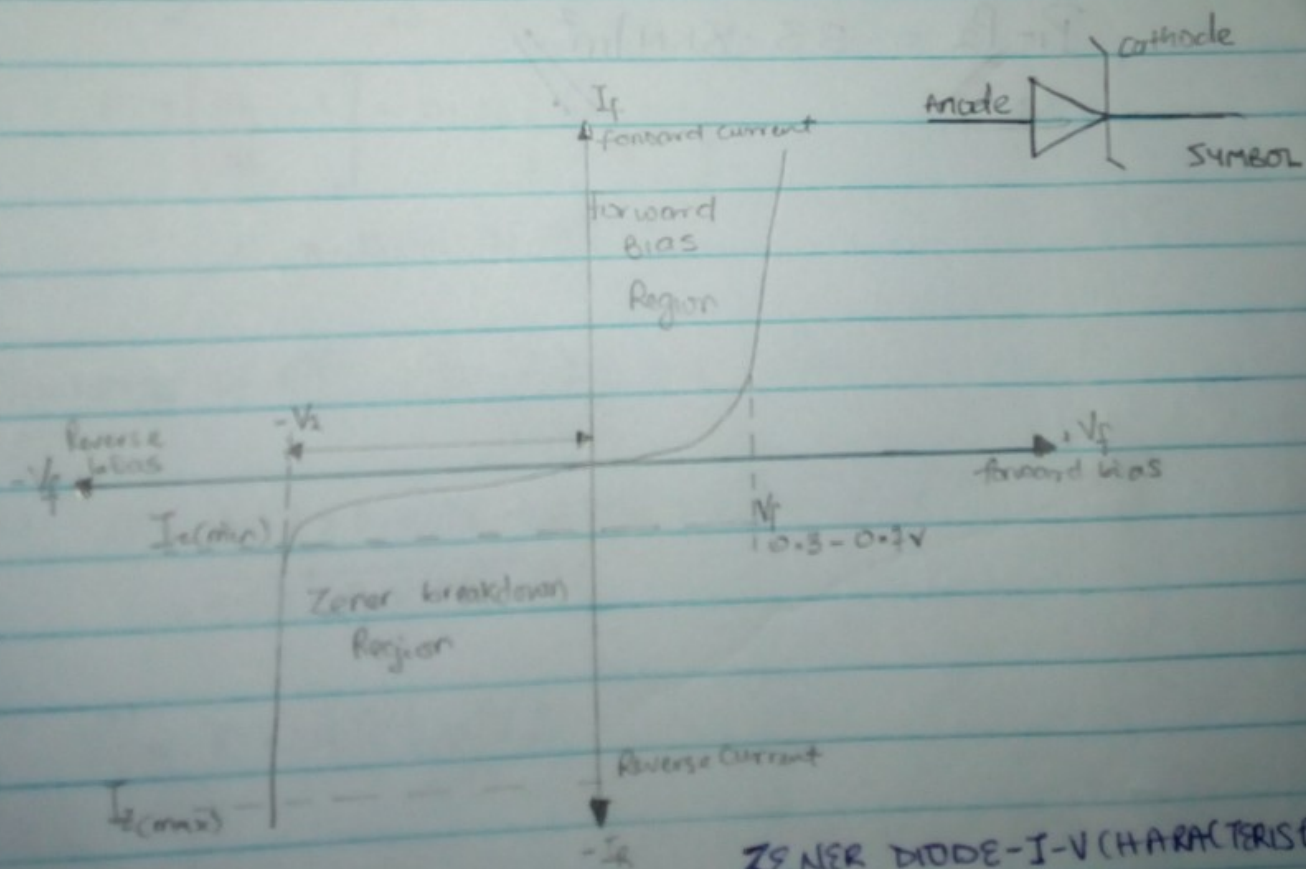
A Zener diode is a type of diode that allows current to flow in the conventional manner from its anode to its cathode.

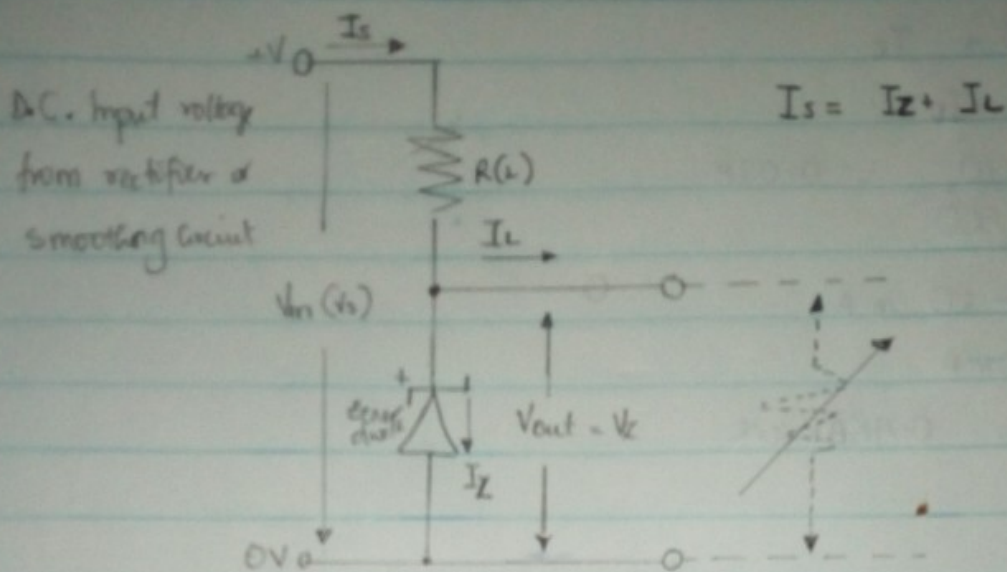
A Zener diode is always operated in its reverse biased condition.

As such a simple voltage regulator circuit can be designed.

The Zener diode in its ability to control itself can be used to great effect to regulate or stabilise a voltage source against supply or load variations.

The fact that the voltage across the diode in the breakdown region is almost constant turns out to be an important application of the Zener diode as a voltage regulator.





CIRCUIT DIAGRAM

TWO

$$\text{Current}(I) = 500\text{mA} = 0.5\text{A}$$

$$\text{Power}(P) = 5\text{Watts}$$

$$\text{Maximum current} = \frac{\text{Max Power}}{\text{Voltage}}$$

$$0.5 = \frac{5}{V}$$

$$V = 0.5 \div 5$$

$$V = 10\text{Volts}$$

$$\begin{aligned} V_{D.C} &= 0.637 V_{max} \\ &= 0.637 \times 20 \\ &= 12.74 V_{DC} \end{aligned}$$

$$R_s = \frac{V_s - V_L}{I} = \frac{12.74 - 10}{0.5} = 5.48 \Omega$$



$$Q.B. \quad I_s = I_z + I_L$$

$$I_z = I_s - I_L$$

$$I_L = \frac{V_Z}{R} = \frac{10}{500} = 0.02A$$

$$I_z = (500 - 20) mA$$

$$= 480 mA$$

$$\frac{480 mA}{1000} = 0.48 \text{ Ampere}$$

1000