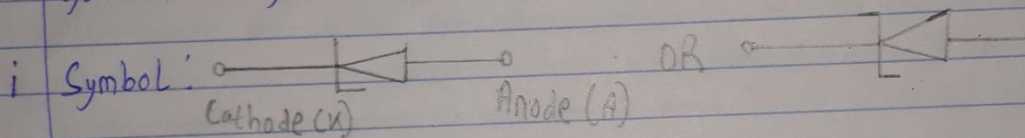
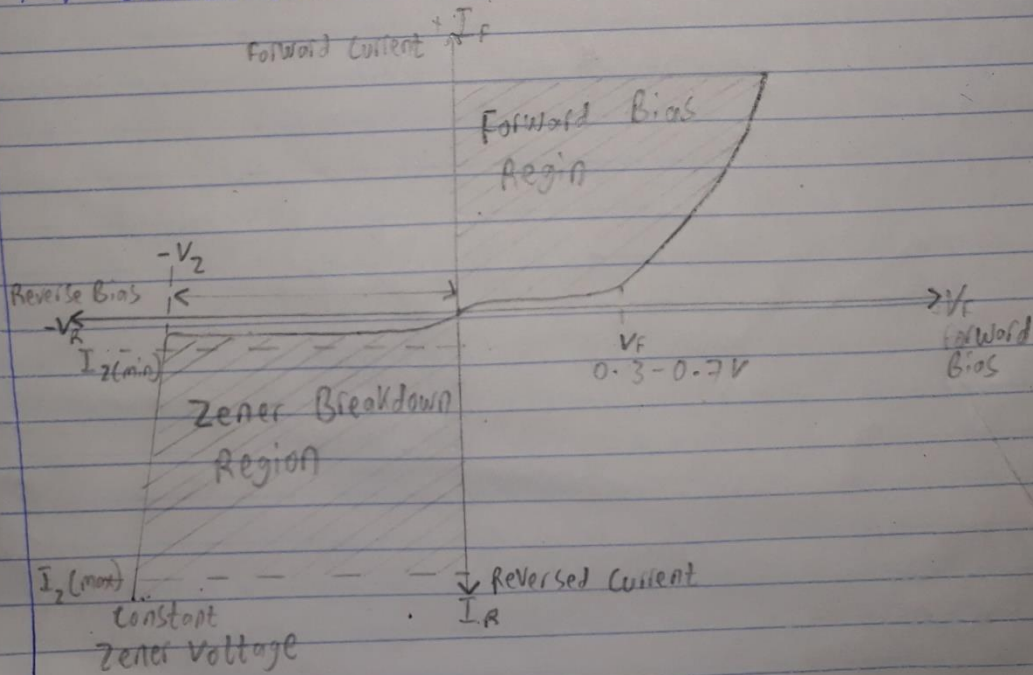


Ebitu, Ukpoko Friday  
 18/ENG04/027  
 Electrical Electronics Engineering  
 ENG222 Assignment.

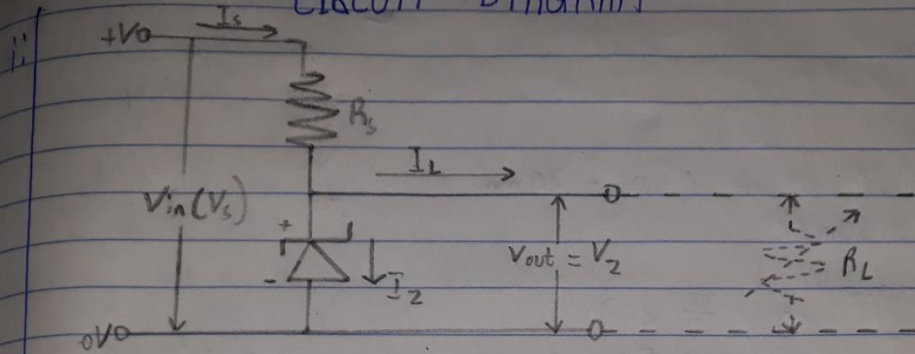
1. The Zener diode is like a general-purpose signal diode consisting of a silicon PN junction. When biased in the forward direction it behaves just like a normal signal diode passing the rated current, but as soon as a reverse voltage is applied across the Zener diode it exceeds the rated voltage of the device. The Zener diode is the simplest type of voltage regulator and the point at which a Zener diode breaks down or conducts is called the "Zener Voltage". Zener diodes are widely used as shunt voltage regulators to regulate voltage across small loads.



I-V characteristics Curve



## CIRCUIT DIAGRAM



2.  $P = 5W$

$$I_z = 500mA = 500 \times 10^{-3} = 0.5A$$

$$V_{max} = 20V_{max} \quad V_{dc} = 2 \times \frac{V_{max}}{\pi} = \frac{2 \times 20}{\pi} = 12.73V_{dc}$$

i) The minimum value of the series resistor of the Zener diode

$$R_s = \frac{V_s - V_z}{I_z}, \quad V_z = ?$$

Recall  $P_z = I_z V_z$

$$V_z = \frac{P_z}{I_z} = \frac{5}{0.5} = 10V$$

$$R_s = \frac{12.73 - 10}{0.5} = \frac{2.73}{0.5} = 5.46 \Omega$$

ii) The current across the diode at full load of  $500 \Omega$

$$I_L = \frac{V_z}{R_L} = \frac{10}{500} = 0.02A$$

$$= 20mA$$