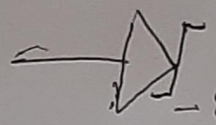
NWOGU PAUL
18/ENG05/037
MECHATRONICS

1-05-2020

ENG 222

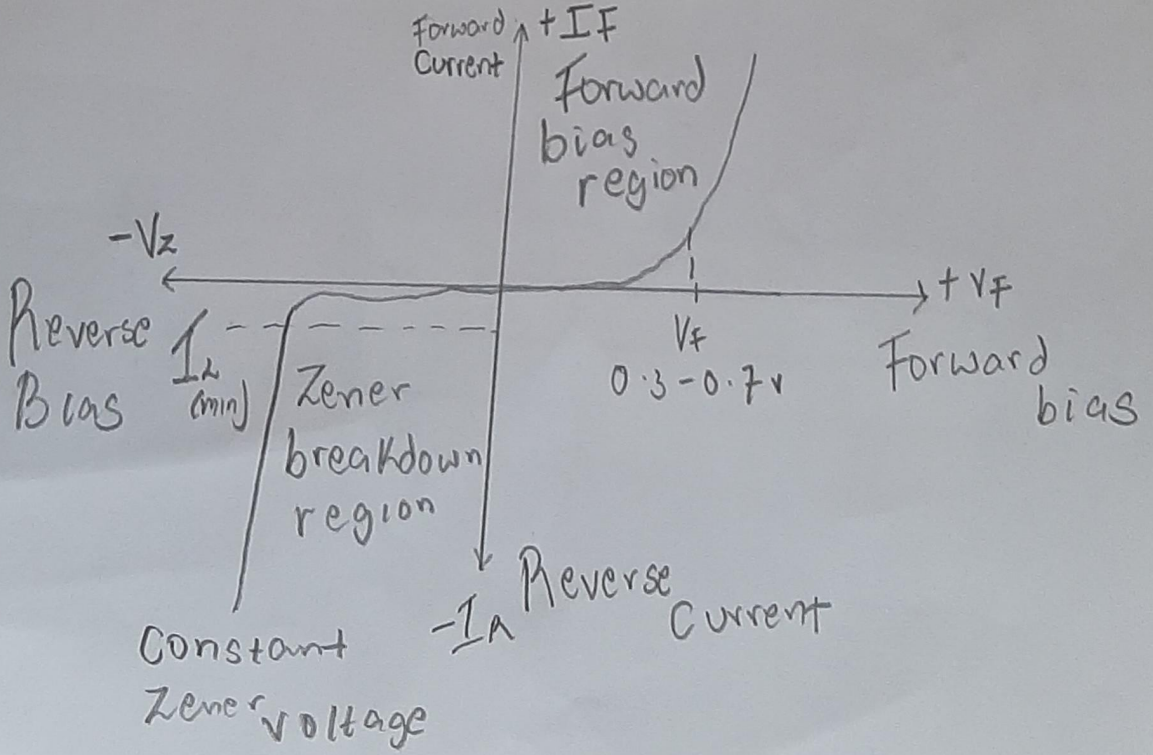
1) A Zener diode is like an ordinary P-N junction except when ~~othe~~ placed under certain conditions like a high reverse voltage, which the P-N junction would block totally except with the Zener diode when the high reverse bias voltage is increased beyond the capacity (breaking point / Breakdown voltage(V)) it can be utilized. Allowing current flow.



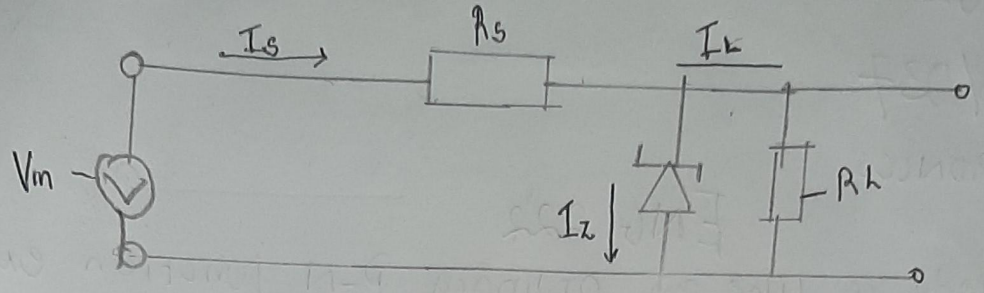
- symbol.

This would allow us to maintain a steady DC output voltage despite increase in input voltage.

2) I - V Characteristic Curve.



Circuit Diagram



2) $P_z = 5\ W$

$I_z = 500mA \simeq 0.5A$

$V_{max} = 20V$ $\quad V_{dc} = 2 \times 0.318\, V_{max}$

$= 2 \times 0.318 \times 20 = \underline{12.72V}$

$P_z = I_z V_z$

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

1) Minimum value of series resistor

$R_s = \frac{V_{in} - V_z}{I_z}$

$= \frac{12.72 - 10}{0.5} = \frac{2.72}{0.5} = \underline{5.44\,\Omega}$

ii) Current Across diode at full load (500Ω)

$I_z = ?$

$R = 500$

$V_z = 10$

$I_z = \frac{V_z}{R} = \frac{10}{500} = \underline{0.02A}$