Name: Harrison Shola

Matric NO: 18/ENG07/005

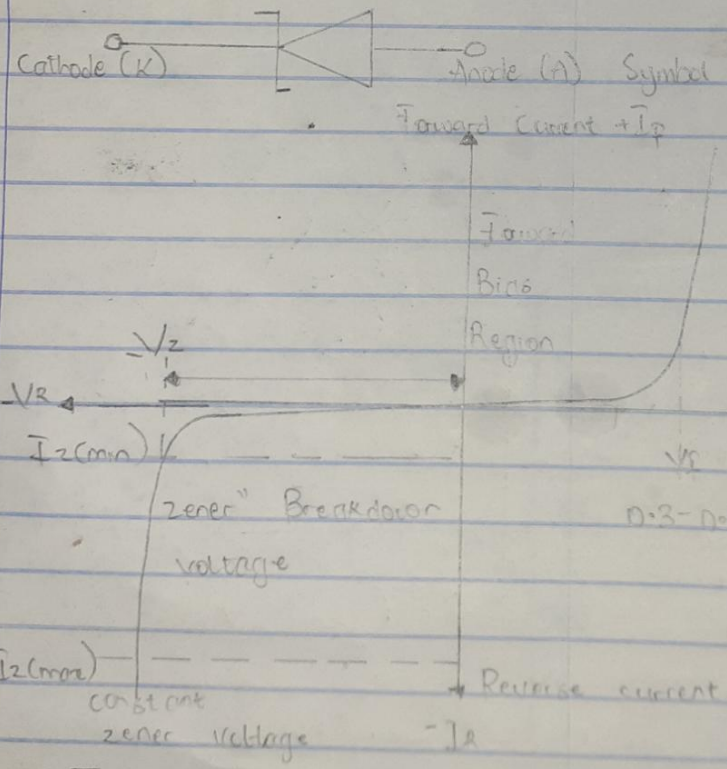
Department: Petroleum Engineering

1 ~~The zene~~

a) The zener diode or breakdown Diode are basically the same as the standard PN junction diode but are specially designed to have a low pre-determined Reverse Breakdown Voltage that takes advantage of high reverse voltage. The zener diode is a signal diode consisting of a silicon PN junction. When biased in the forward direction, it behaves like a normal signal diode but when in reverse direction, the diode breakdown voltage is reached at a point where a process called Avalanche Breakdown occurs

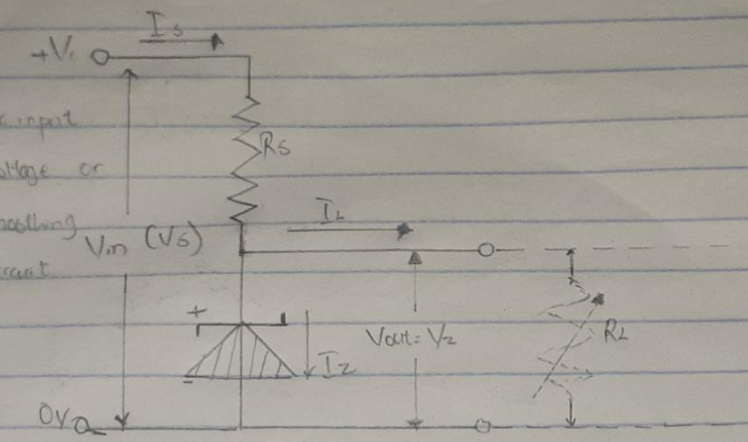
i

ii)



ii The Zener Diode I-V Characteristics

i)



The Circuit Diagram for Zener diode

2 $P_z = 5W$ maximum current (I_z) = 500mA $V_s = 20V$

The minimum value of the series resistor R_s = ?

Recall: maximum current = $\frac{\text{watts}}{\text{voltage}} = I_z = \frac{P_z}{V_z}$

$I_z = V_z = P_z / I_z$

$V_z = 5W / 500mA = 5000 / 500$

$V_z = 10V$

i) $R_s = \frac{V_s - V_z}{I_z} = \frac{20 - 10}{500mA} = \frac{10 \times 1000}{500mA} = 20\Omega$

ii) The current across the diode at full load of 500Ω

$I_L = \frac{V_z}{R_L} = \frac{10V}{500\Omega} = 20mA$

The zener current at full load

$I_z = I_s - I_L$

$= 500mA - 20mA$

$= 480mA$