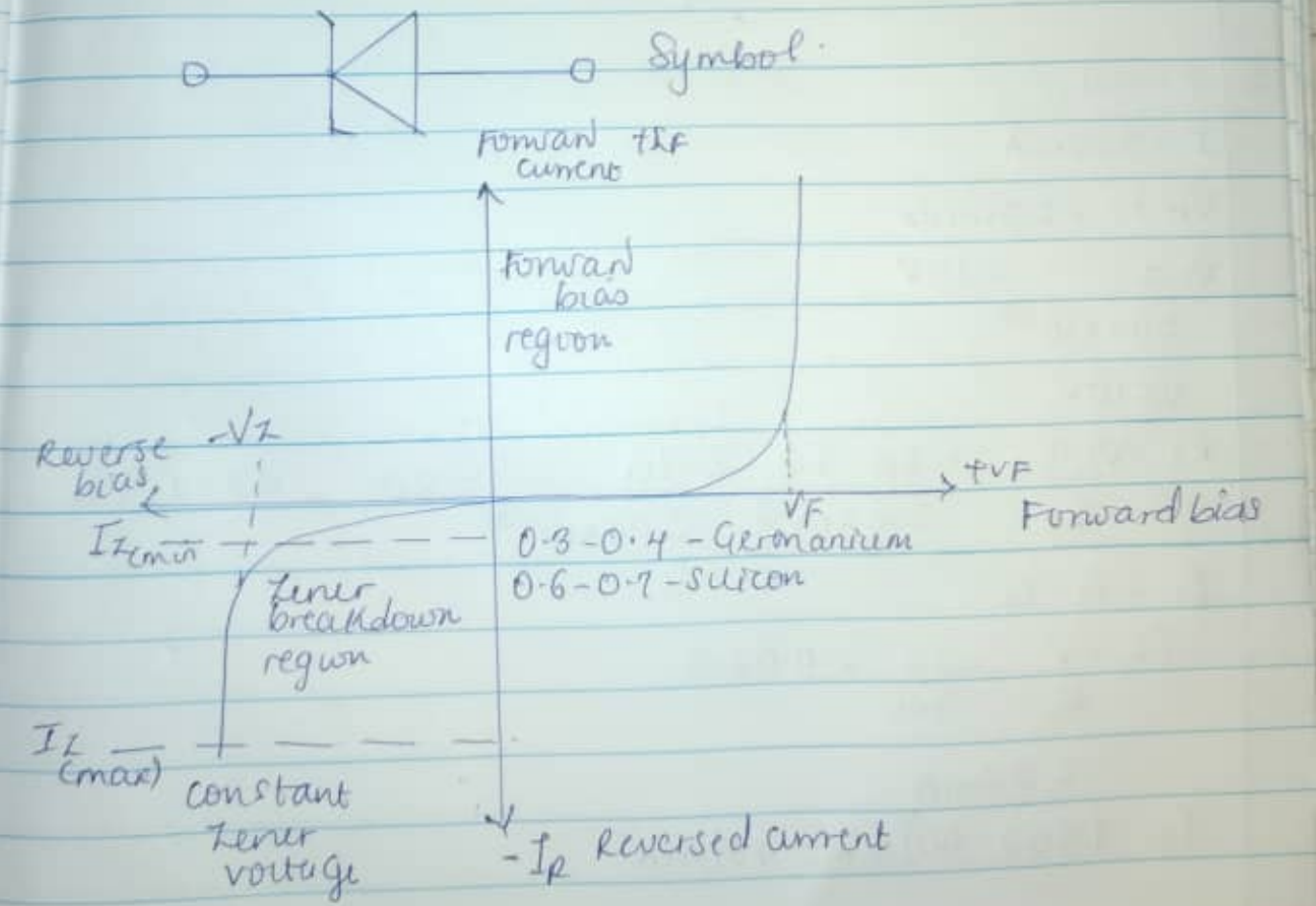
030. Oluwadara Tolulwani

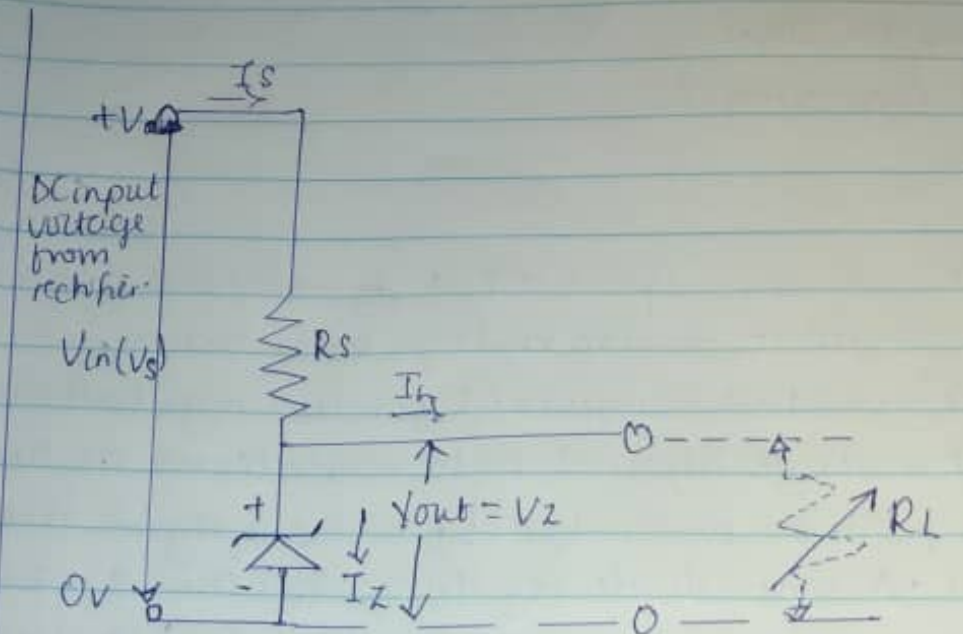
Basic Electrical Engineering II

18/ENG02/072

1. A Zener diode is always operated in its reversed biased condition. The constant reverse voltage V_Z of the zener diode makes it a valuable component for the regulation of the output voltage against both variations in the input voltage from an unregulated power supply in the load resistance. A zener diode regulator is a shunt regulator used to regulate voltage across small loades. It steps down the input voltage and limits the current into the diode.



IV- characteristics curve.



Zener diode regulator

2 $P = 5W$

$I = 500mA$

$V_{max} = 20V_{max}$.

$V_s = \frac{5}{500 \times 10^{-3}} = 10V$

$V_Z = 10V$

$R_S = \frac{V_s - V_z}{I_z} = \frac{20 - 10}{500 \times 10^{-3}} = \frac{10}{500 \times 10^{-3}} = 20$, $R_S = 20\Omega$,

$I_L = I_S - I_L$.

$I_L = \frac{V_.}{R_L} = \frac{10}{500} = 0.02\Omega$

$= 20mA$

$I_Z = (500 - 20)mA = 480mA$.