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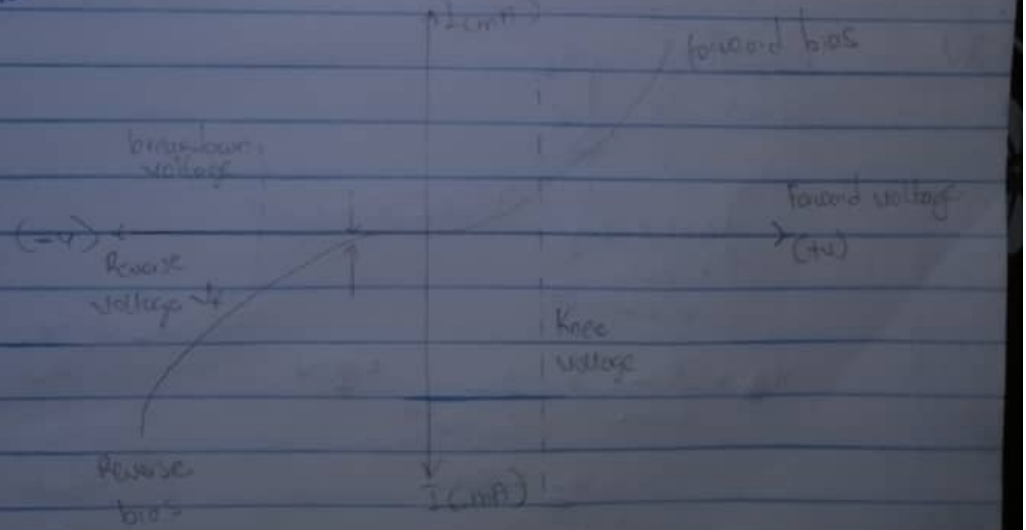
Civil Engineering ENG 222

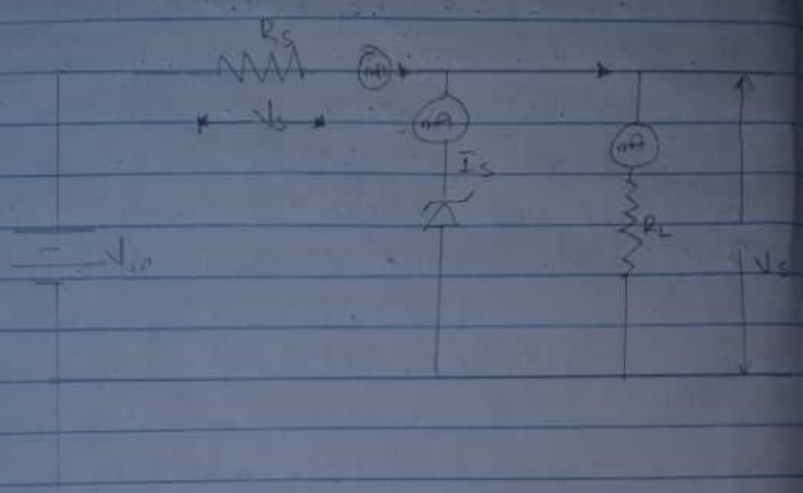
1) A zener diode is a type of diode that allows current to flow in the conventional manner ie from its anode to its cathode. They are widely used as voltage references and as shunt regulators to regulate the voltage across small circuits. When connected in parallel with a variable voltage source such that it is reverse biased, a zener diode conducts when the voltage reaches the diode's reverse breakdown voltage. They are heavily doped compared to ordinary diodes with an entire depletion region, when we apply a voltage more than the zener breakdown voltage, the depletion region vanishes, and large currents start to flow through the junction.

ii)

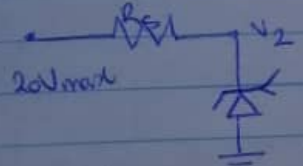


I - V Characteristic Curve

ii)



2.)



$I_{max} = 500mA$

$V_{max} = 20$

$P = 5W$

$I_{max} = 500mA$

$V_Z = \frac{P}{I_{max}} = \frac{5}{500 \times 10^{-3}} = 10V$

$V_Z = 10V$

when Connected in Series,

$R_S = \frac{V_{max} - V_Z}{I_{max}}$

$= \frac{20 - 10}{500 \times 10^{-3}}$

$R_S = 20\Omega$

ii) $I_L = \frac{V_Z}{R_L}$

$= \frac{10}{500}$

$I_L = 0.02A$