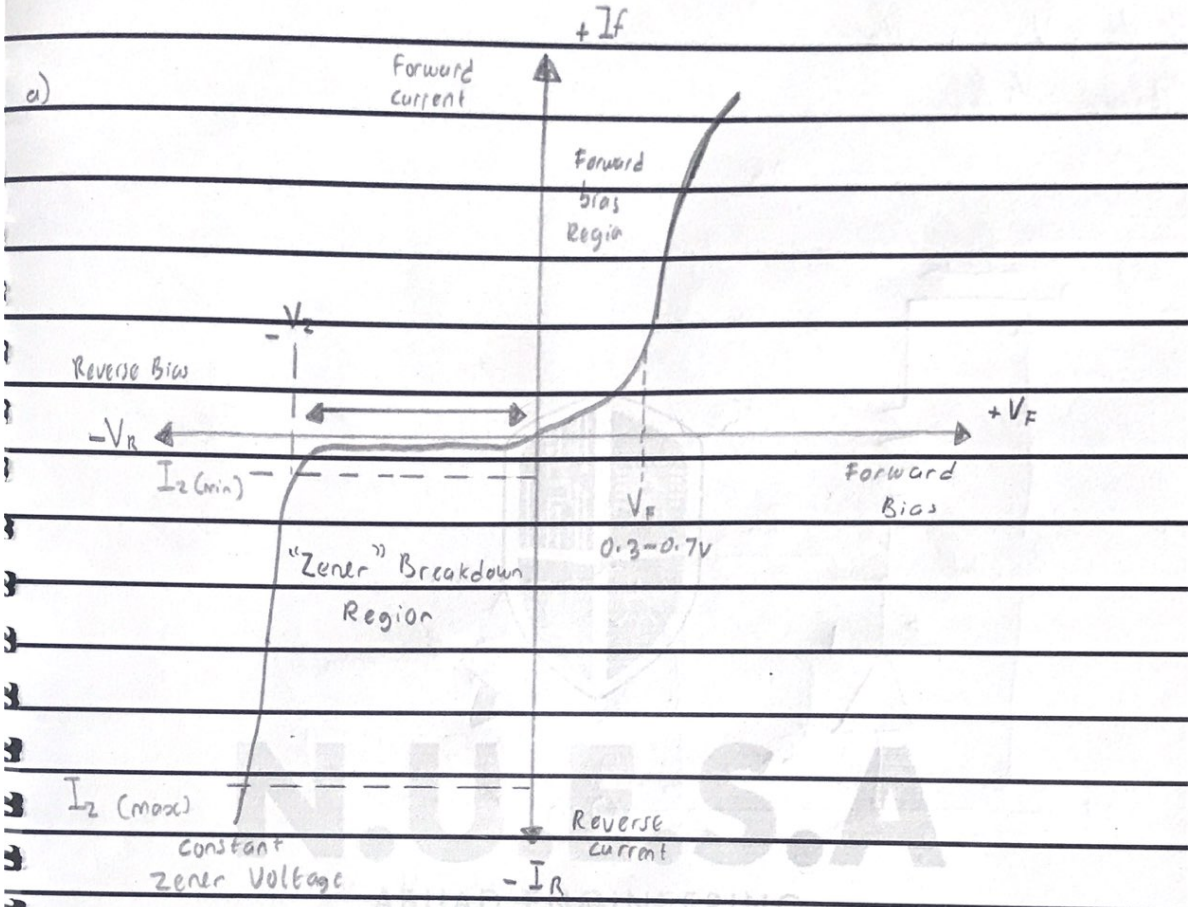
NAME: AMADI-DURU, C. MELVIN

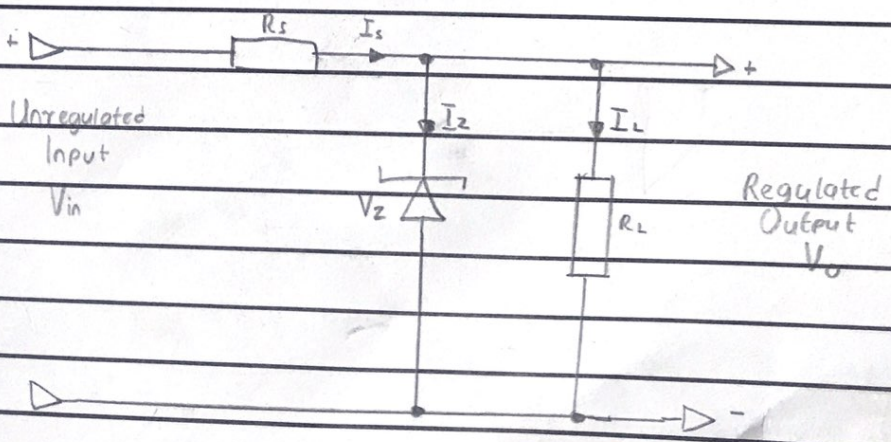
MAT NO: 18/ENG04/013

DEPT: ECECT/ECECT

a)



b)



$V_{in} - V_z$ = Volt drop

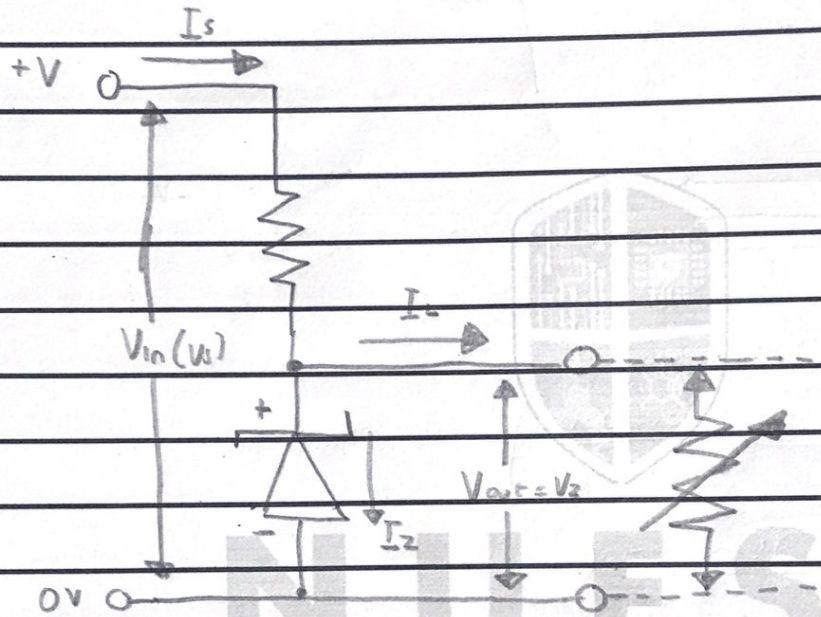
$I_S = I_{z\,min} + I_{L\,max}$

$I_{z\,min}$ =

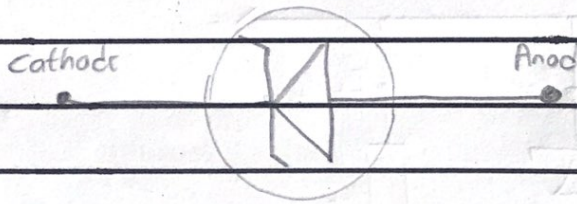
$V_S = V_{in\,min} - V_z$

$R_{S\,min} = V_S / I_S$

OR



Zener Diode Symbol



a) minimum value, current 500mA, power = 5W

$V_z = 10V$, $V_{max} = 20V$,

max current = $\frac{\text{watts}}{\text{voltage}}$

$500mA = \frac{5}{V}$

$\text{Voltage} = \frac{5}{500 \times 10^{-3}} = 10 \text{ volts}$

$V_{dc} = \frac{2V_{max}}{\pi} = \frac{2 \times 20}{\pi} = 12.732V$

Using $R_s = \frac{V_s - V_z}{I_z} = \frac{12.732 - 10}{500mA} = 5.46\Omega$

$R_s = 5.46 \text{ ohms}$ //

b) $V = IR$

$I = \frac{V}{R} = \frac{10}{500} = 20mA$

$I_n = I_L + I_z$

$500mA = I_z + 20mA$

$I_z = 500mA - 20mA = 480mA$ //

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19/ENG04/013

Zener diodes are widely used as voltage references & as shunt regulators to regulate the voltage across small circuits. When connected in parallel with a variable voltage source so that it is reverse biased, a Zener diode conducts when the voltage reaches the diode's reverse breakdown voltage