NAME: ABUBAKAR HANNY OSHIOZOKHAI

MATRIC NO: 18/ENG05/003

DEPARTMENT: MECHATRONICS

COURSE CODE: ENG 222

ASSIGNMENT

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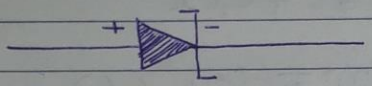
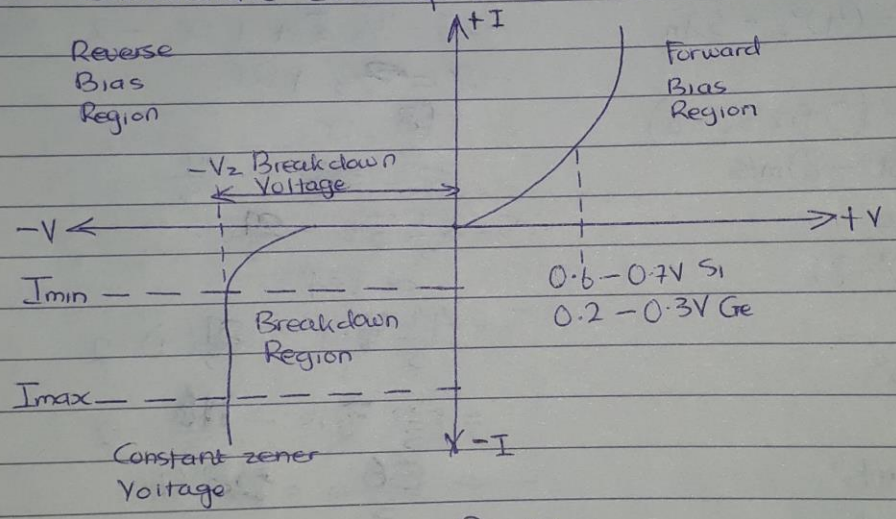
ASSIGNMENT

1) A zener diode regulator is the simplest form of voltage regulator formed by connecting a zener diode is the reverse bias position to the applied voltage. This diode takes advantage of its fixed breakdown voltage to produce an almost constant voltage output from an unsteady voltage input source.

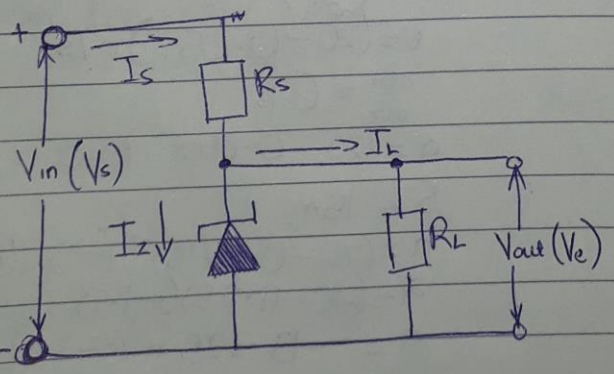
a) Zener Diode Symbol



I-V Characteristics Curve of Zener Diode



b) Circuit Diagram of Zener Regulator



2) $P_z = 5W$

$I_z = 500mA$

$V_s = 20V_{max} = \frac{2 \times 20}{\pi} = 12.73V$

But $V_z = ?$

Recall, $P_z = I_z V_z$

$5 = 500 \times 10^{-3} \times V_z$

$V_z = 10V$

Also, $R_s = \frac{V_s - V_z}{I_z}$

$= \frac{12.73 - 10}{500 \times 10^{-3}}$

$R_s = 5.46\Omega$

Recall, $I_s = I_z + I_L$

$I_z = I_s - I_L$

But $I_L = \frac{V_z}{R_L} = \frac{10}{500}$

$I_L = 0.02A = 20mA$

$I_s = 500mA$ (i.e zener current without any load)

$\therefore I_z = 500mA - 20mA$

$= 480mA$