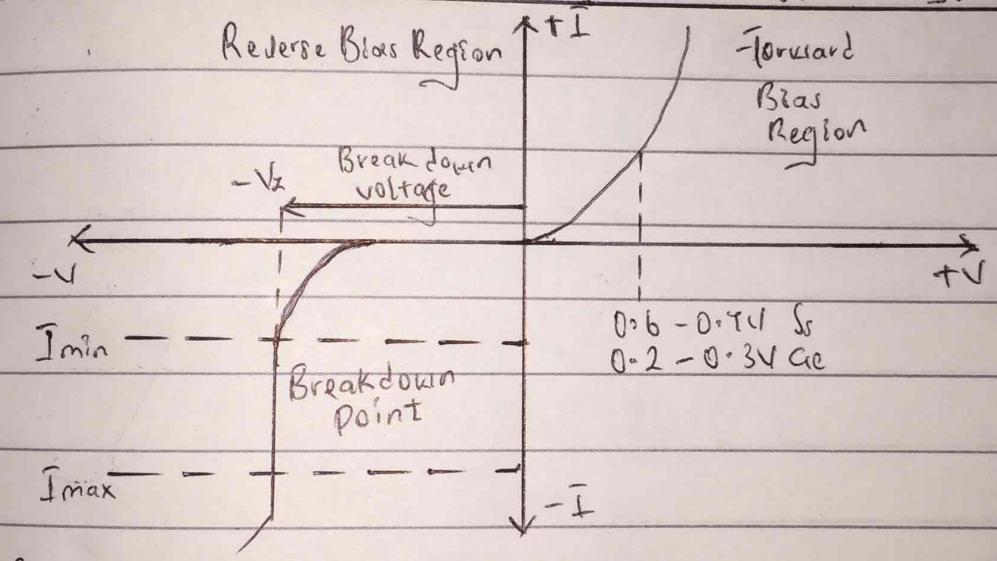
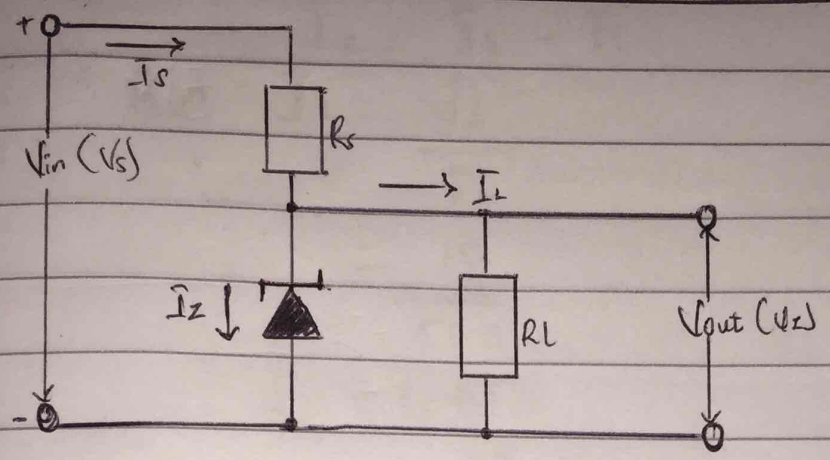
NAME : DIAGOGO TAMUNOMIBAKA SIMPSON
MATRIC NO: 18/ENG05/013
DEPARTMENT: MECHATRONICS ENGINEERING

1a) Zener Diode Symbol

I - V characteristics Curve of Zener Diode



b) CIRCUIT DIAGRAM OF ZENER REGULATOR



2) $P_Z = 5W$, $I_Z = 500mA$, $V_S = 20V_{max} = \frac{2 \times 20}{\sqrt{2}} = 12.73V$

$V_Z = ?$

a) Recall, $P_Z = I_Z V_Z$

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

$$V_Z = 10V$$

Also, $R_S = \frac{V_S - V_Z}{I_Z}$

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

$$R_S = 5.46\Omega$$

b) 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)

$\therefore I_Z = 500mA - 20mA$

$= 480mA$