NAME: ABIMBOLA OLUWAFEMI GIDEON

DEPARTMENT: MECHATRONICS ENGINEERING

MATRIC NO: 18/ENG05/002

COURSE TITLE: BASIC ELECTRICAL ENGINEERING ASSIGNMENT

COURSE CODE: ENG222

18/ENG05/002

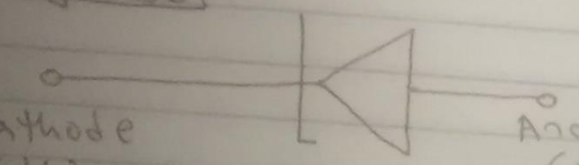
Abimbola Oluwafemi Gideon
Department: Mechatronics Engineering
Matric NO: 18/ENG05/002

Basic Electrical Engineering Assignment
ENG222

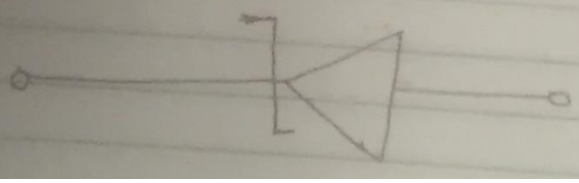
(1) Question 1 solution

Zener diode is a general purpose diode, it behaves like a normal diode when it is forward biased. When it is reverse biased, current does not ~~flow~~ flow until a certain voltage known as Zener breakdown voltage is reached, then voltage remains constant for a wide range of current. Zener diodes are widely used as voltage regulators to regulate the voltage across small loads. The zener diode is connected parallel to the load such that the applied voltage will reverse bias it. When the applied voltage exceeds the zener breakdown voltage, voltage across the load will be constant.

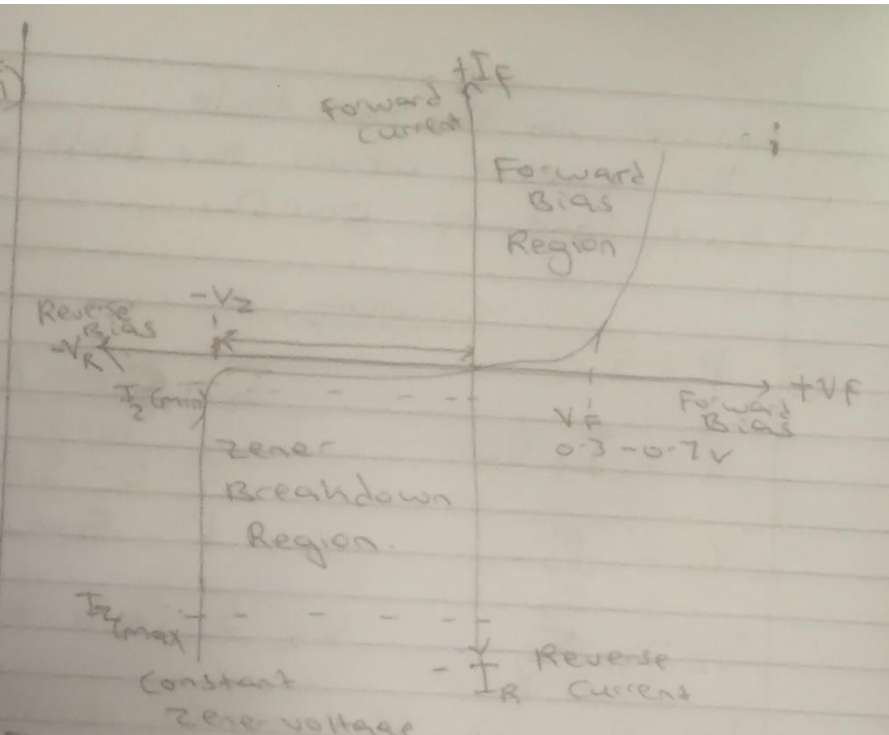
(i) ~~symbol~~



or

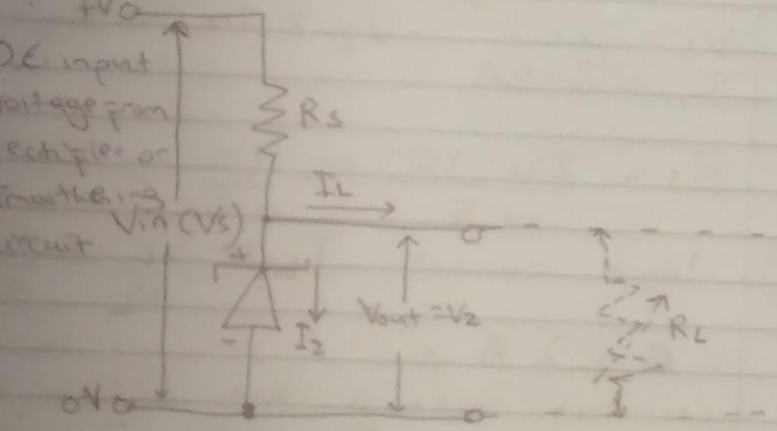


(i)



Zener Diod I-V Characteristic Curve

(ii)



Zener Diode Regulator Circuit Diagram.

(2) Question 2 solution

Data given

5W, I_{zmax} = 500mA

20V, calculate

(i) minimun value of the series

(2) Resistor to the zener diode

(ii) The current across the diode at full load of 500Ω.

Solution

(i) $P = IV$

$P = I_2 V_2$

$V_2 = \frac{P}{I_2}$

$V_2 = \frac{5}{0.5}$

$V_2 = 10$ VOLTS //

$I_2 = \frac{500mA}{1000}$

$= 0.5A$

$P = 5W$

let R_s be the series resistor

$R_s = \frac{V_s - V_2}{I_2}$

$V_s = 20V$, $V_2 = 10V$, $I_2 = 500mA$

$I_2 = 0.5A$

$R_s = \frac{20-10}{0.5} = \frac{10}{0.5} = 20\Omega$ //

(ii) load current $I_L = \frac{V_2}{R_L} = \frac{10}{500}$

$= 0.02A$ //

Current across the diode at full load, $I_Z = I_S - I_L$

$= 0.5A - 0.02A$

$= 0.48A = 480mA$ //