ii) current across the diode at full load of 500Ω, I.

$$I = \frac{V_z}{R_L}$$

$$I_L = \frac{10}{500}$$

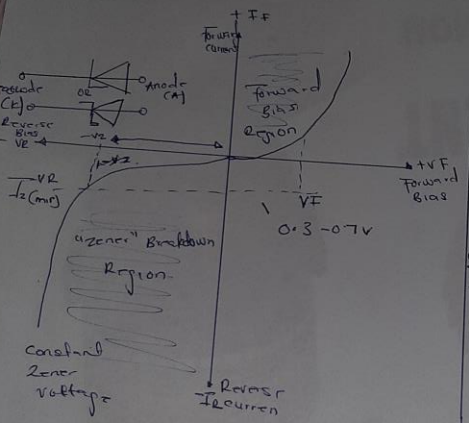
$$= 2mA$$

NAME: AUDI FATIMAH
MATRIC: 18/ENG08/001
DEPT: BIOMEDICAL
COURSE: ELECT ELECT

ANSWER

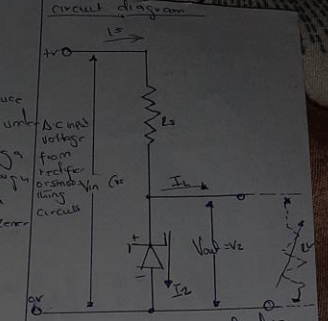
i) Zener diode: This can be used to produce a stabilized voltage output with low ripple under varying load current conditions. By passing a small current ~~through~~ ~~by passing~~ through the diode from the voltage source via a suitable current limiting resistor (R_s), the zener diode will conduct sufficient current to maintain a voltage drop of Vout.

i) I-V characteristic curve



From the I-V characteristics curve above, we can see that the zener diode has a region in its reverse bias characteristics of almost a constant negative voltage regardless of the value of the current flowing through the diode.

circuit diagram



Resistor R_S, is connected in series with the zener diode. Limit the current flow through the diode with the voltage source, Vs being connected across the combination. Stabilized output voltage Vout is taken from across the zener diode.

i) $P_x = 5W$, $V_s = 20V$

$I_{max} = 500mA$

$\because I_{max} = \frac{W}{V_2}$

$\therefore 500mA = \frac{5}{V_2}$

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

$V_x = 10V$

i) Minimum value of series resistor in the zener diode,

R_S

$R_S = \frac{V_T - V_2}{I_Z} = \frac{20-10}{500mA}$

$= \frac{10}{0.5} = 20\Omega$