PLAN :

DATE :

NO :

Ubani - Wokoma Blossom Chinazor
18/ENG04/071
Elect/Elect
Eng 222

18/ENG04/071

1) Zener diode voltage regulator consists of a current limiting resistor Rs connected in series with the input voltage Vs with the zener diode Rz. In this reversed biased condition. The stabilized output voltage is always selected to be the same as the breakdown voltage of the diode.

I-V Characteristics Curve

Uban-Utkona Blessom Chinazor / 18/ENG07/071

1) Since it's connected in series, and same current flows

$I_S = I_2 + I_1$

$I_2 = I_S - I_L$

$I_L = \frac{V_Z}{R}$

$= \frac{10V}{500\Omega}$ $= 0.02A = 20mA$

$I_2 = 500mA - 20mA$

$= 480mA = 0.48A$

$P_2 = 5W$

$I_2 = 500mA$

$2V_{max}$

To convert V_{max} to V_{DC}

$V_{dc} = \frac{2V_{max}}{\pi}$

$V_S = \frac{2 \times 20}{\pi} = 12.73V_{DC}$

Recall that $P = IV$

$V = P_2 / I_2 = 5 / 500 \times 10^{-3}$

Recall that $V_Z + V_R = V_S$

$V_R = V_S - V_2$

$\frac{2 \times 20}{\pi} - 10$

$= 12.73 - 10 = 2.73V$

$\therefore V = IR$

$R = \frac{V}{I} = \frac{2.73}{500 \times 10^{-3}}$

$R = 5.46$