NAME: Mohammed Abdulmalik

MAT. NO: 18/ENG06/043

DEPARTMENT: Mechanical Engineering

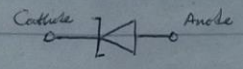
ENG 222

Mohammed Abdulmalik
18/ENG06/1043
Mechanical Engineering
ENG 222

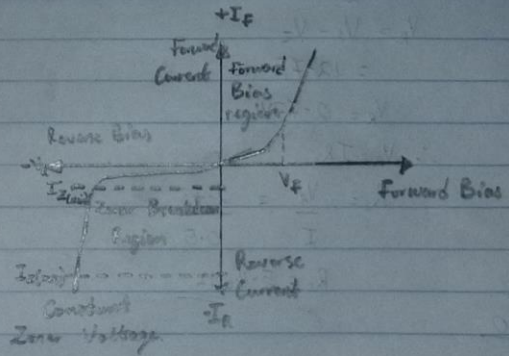
1) A zener diode regulator is a circuit which consists of a resistor connected in series with the zener diode to limit current flow through the diode and the voltage source. The zener diode's cathode terminal is connected to the positive rail of the DC supply so it is reverse biased and operating in the breakdown condition.

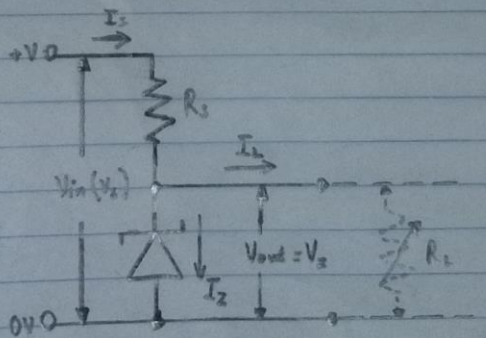
When there is no load connected, load current will be zero and the circuit current will pass through the zener diode which dissipates it's maximum power. When the resistor value is small, the diode current will be ~~greater~~ greater when the load resistor is connected. The load and the diode are connected in parallel so their voltages are the same.

I)



II)





2) Max power = 5W

5) $I_s = 500mA = 0.5A$

$V_{s_{max}} = 20V$

V_{max} to D.C = $\frac{2V_{max}}{\pi}$

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

I_s (Max. current) = $\frac{P}{V_z}$

$V_z = \frac{P}{I_s} = \frac{5}{0.5}$

$V_z = 10V$

$V_R = V_s - V_z$

$= 12.73 - 10$

$V_R = 2.73V$

$\therefore V_R = IR_s$

$R_s = \frac{V_R}{I} = \frac{2.73}{0.5}$

$R_s = 5.46\Omega$

1) $I_L = \frac{V_z}{R_L} = \frac{10}{500}$

$I_L = 0.02A = 20mA$

$I_z = I_s - I_L$

$= 500 - 20 = 480mA$