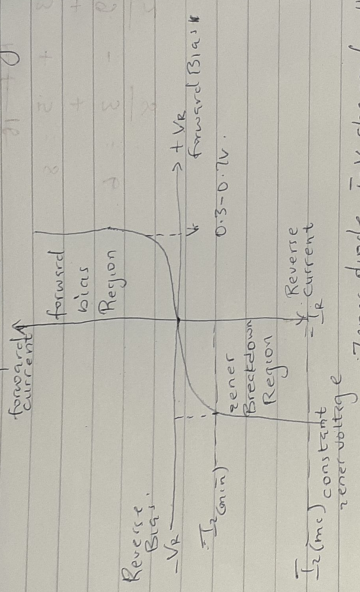
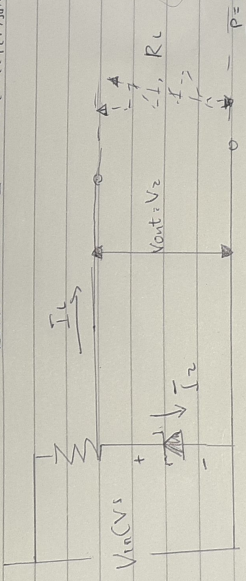


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MECHANICAL ENR.

1) A zener diode regulator is a circuit with a zener diode connected reverse at bias. A zener diode is a voltage regulator. So a reverse diode regulator is used to regulate the voltage and current flowing through a device and it is also used to provide a constant voltage output.



Zener diode I-V characteristic curve



$P = 5W$
 $I_{max} = 500mA$
 $V_{in} = 20V_{max}$

minimum value of series resistor
 $R_s = \frac{V_{in} - V_{out}}{I_{max}} = \frac{20 - 10}{500 \times 10^{-3}} = 20\Omega$

(ii) The current across the diode at full $500mA$ by 20Ω is $20 \times 0.02A = 20mA$
 $I_L = \frac{P}{V_{out}} = \frac{5W}{10V}$

(i) maximum current = $\frac{Watt}{V_{out}}$
 $\therefore V_{out} = \frac{Power}{I_{max}}$

$V_{out} = \frac{5W}{500mA} = 10V$
 $V_{out} = 10V_{min}$