

Matric no: 18ENG021096

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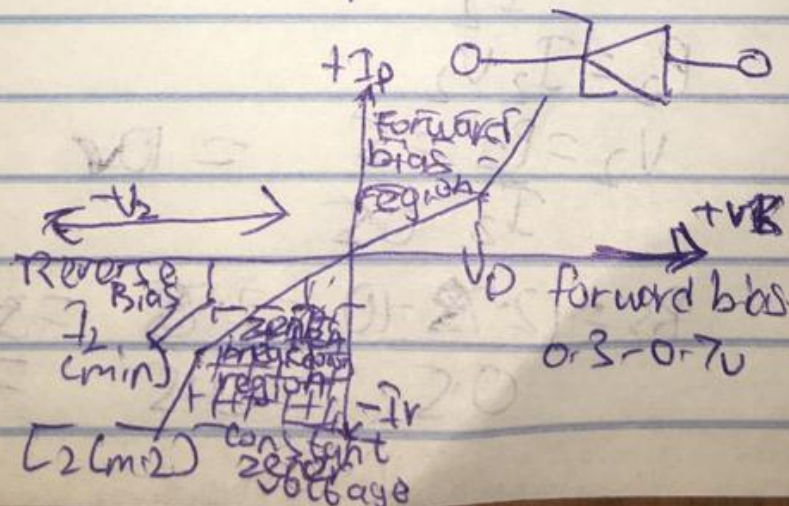
Dept: Computer Engineering

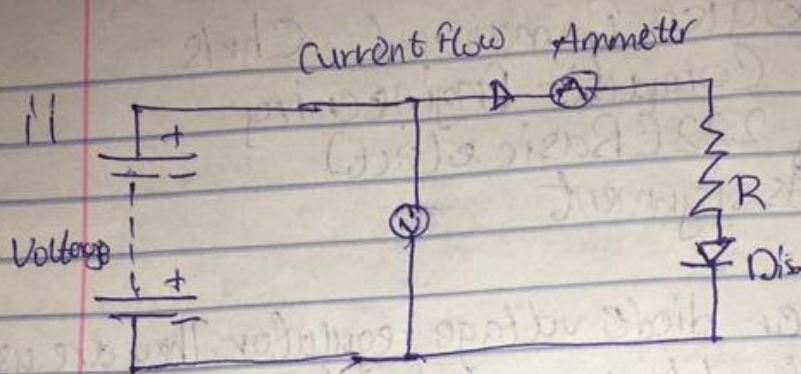
Course: Eng 222 (Basic elect)

### Assignment

1. Zener diode voltage regulator. They are used as shunt voltage regulators to regulate voltage across small loads. Zener diodes have a sharp reverse breakdown voltage and breakdown voltage will be constant for a range of currents. Thus we will connect the zener diode parallel to the load such that the applied voltage will reverse bias it. Thus if the reverse bias voltage across the zener diode exceeds the knee voltage across the load.

Symbol





$$P = 500$$

$$I_R = 500 \text{ mA}$$

$$= 500 \times 10^{-3}$$

$$= 0.5 \text{ A}$$

$$V_{dc} = 20 \text{ V}$$

$$\pi$$

$$= \frac{60}{\pi} = 12.73 \text{ V}$$

$$\pi$$

i) The minimum value

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

$$P_2 = I_2 V_2$$

$$V_2 = \frac{P_2}{I_2} = \frac{5}{0.5} = 10 \text{ V}$$

$$R_s = \frac{12.73 - 10}{0.5} = 2.73 = 5.46 \Omega$$

(ii) The current across diode

$$I_c = \frac{V_c}{R_c}$$

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

$$= 0.02 \text{ A}$$

$$= 20 \text{ mA}$$

$$I_c = 20 \text{ mA}$$

$$I_c = 20 \text{ mA}$$