

RASHI UMMU-SALMA 0122E
18PEN008/020

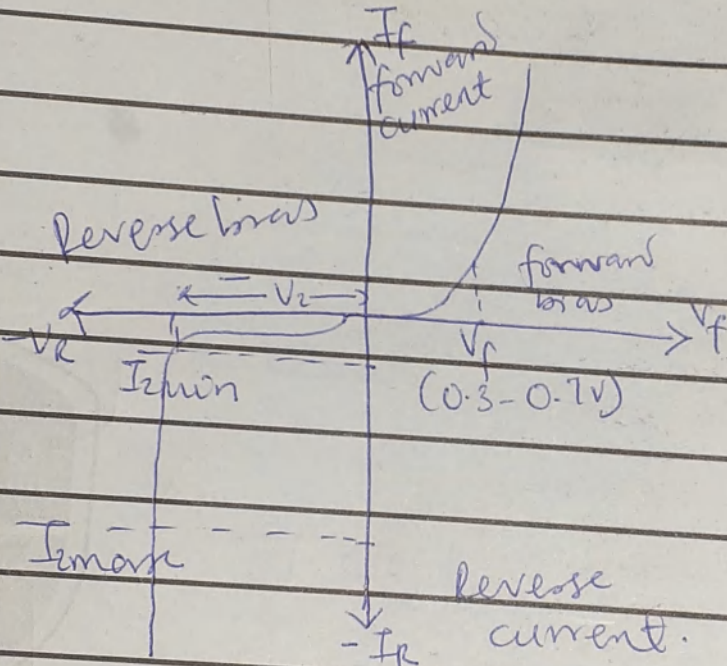
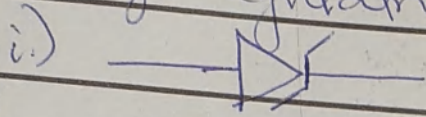
BIO MEDICAL ENGINEERING

ASSIGNMENT

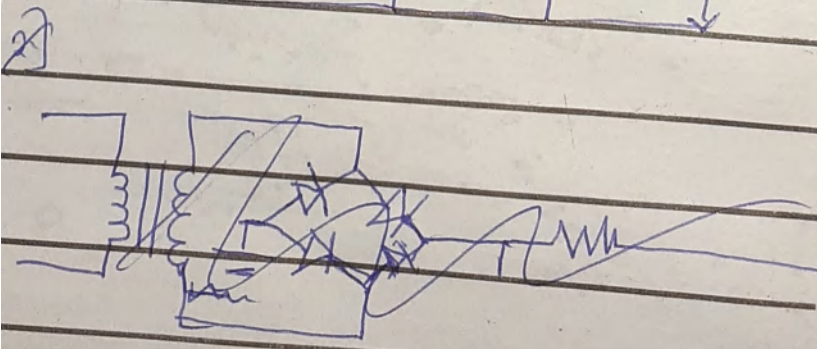
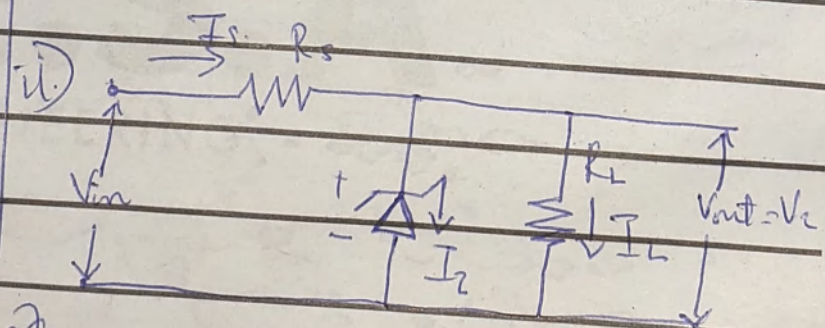
1] Zener diode: - This is also similar to PN junction diode. The doping concentration is different compared to PN Junction diode.

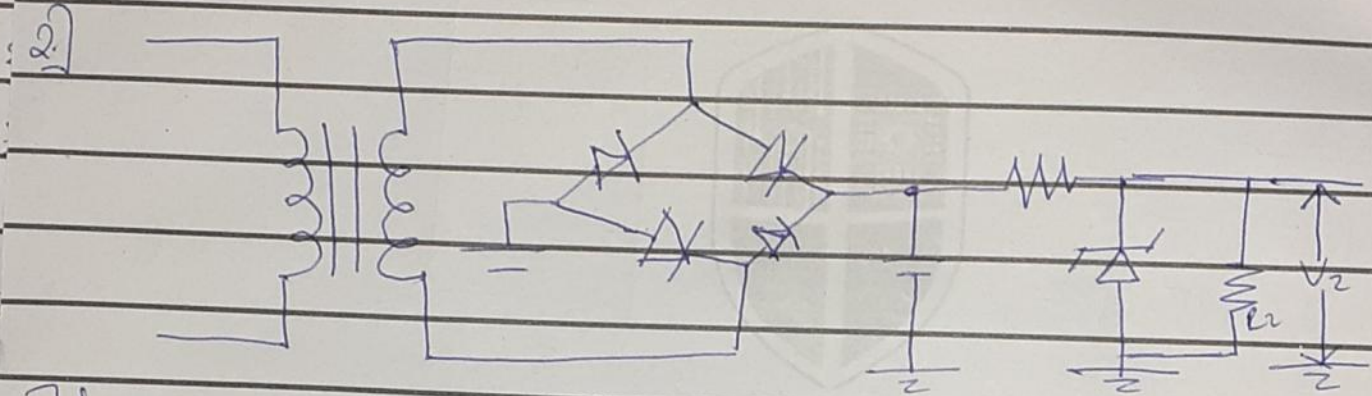
In forward biased condition, the characteristics of Zener diode are similar to PN junction diode characteristics but in reverse biased condition, the Zener diode acts as regulator.

So, generally zener diode is preferred in reverse biased condition for voltage regulation.

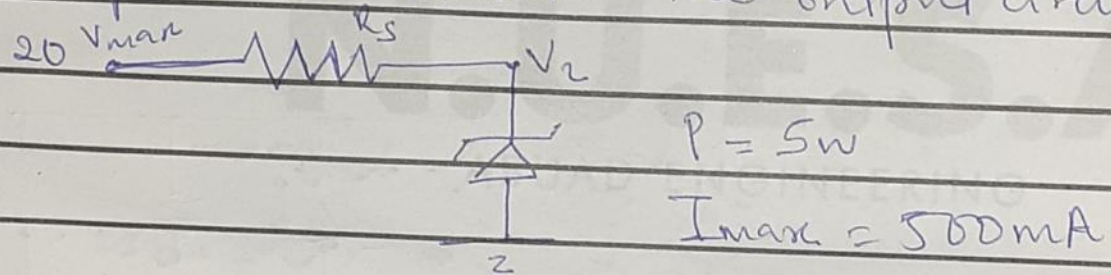


15 I_{max}
constant
zener
voltage





c) In first case consider the output circuit



$$V_z = \frac{P}{I_{max}} = \frac{5}{500 \times 10^{-3}} = 10V$$

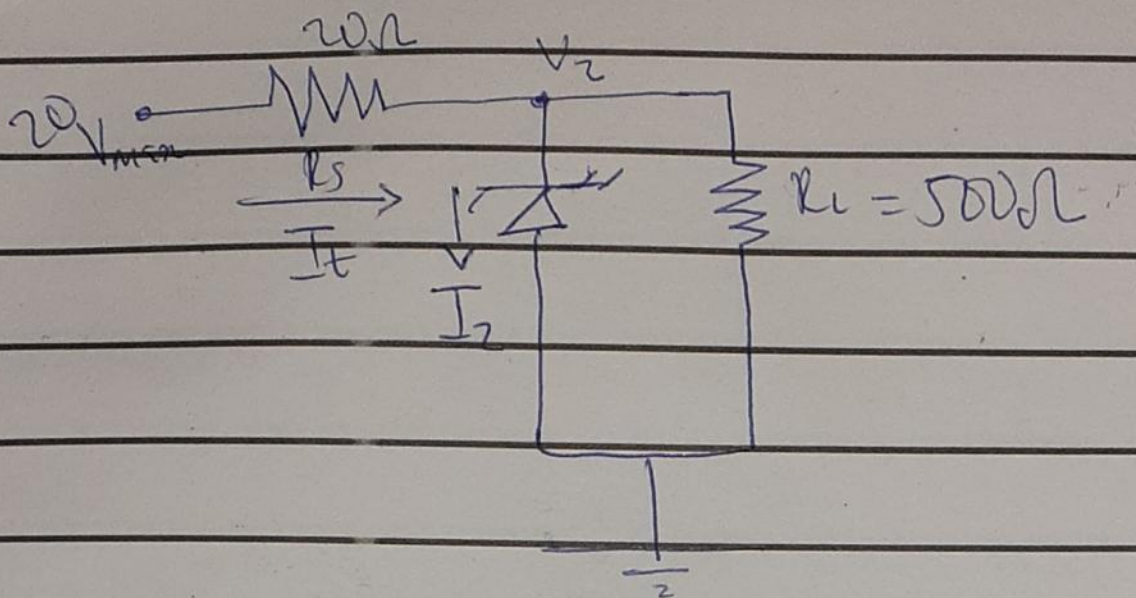
$$\therefore V_z = 10V$$

$$\text{Series resistance, } R_s = \frac{V_{max} - V_z}{I_{max}}$$

$$= \frac{20 - 10}{500 \times 10^{-3}}$$

$$R_s = 20\Omega$$

ii) when load resistance of 500Ω is connected across the diode



$$\text{Load current, } I_L = \frac{V_z}{R_L}$$

$$= \frac{10}{500} = 0.02$$

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

$$I_t = I_z + I_L$$

$$\frac{20 - 10}{20} = I_z + 20 \times 10^{-3}$$

$$0.5 = I_z + 0.02$$

$$I_z = 0.5 - 0.02 = 0.48$$

$$I_z = 480 \text{ mA}$$

∴ The current across diode at full load of 500Ω is 480mA.