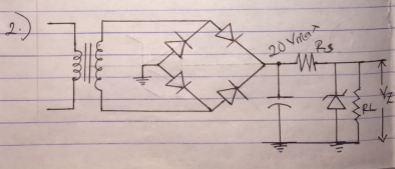
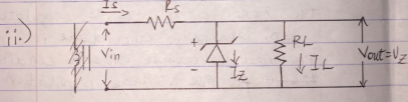
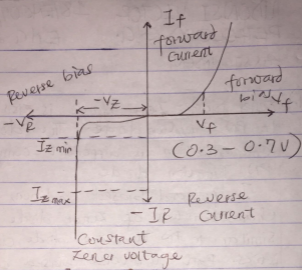
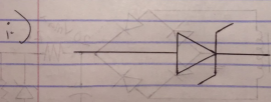


ASSIGNMENT.

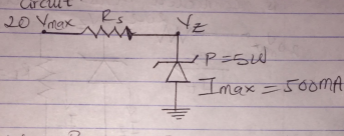
1.) Zener Diode: Zener diode is also similar to PN Junction diode. The doping concentration is different compared to PN Junction diode.

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 the voltage regulation.



(i) In first case, consider the output circuit.



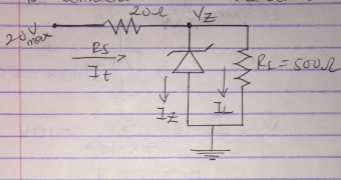
$$V_Z = \frac{P}{I_{max}} = \frac{5}{500 \times 10^{-3}} = 10V$$

$$\therefore \boxed{V_Z = 10V}$$

$$\text{Series resistance, } R_s = \frac{V_{max} - V_Z}{I_{max}} = \frac{20 - 10}{500 \times 10^{-3}}$$

$$\boxed{R_s = 20 \Omega}$$

ii.) When load Resistance of  $500 \Omega$  is connected across the diode



$$\text{Load current, } I_L = \frac{V_Z}{R_L} = \frac{10}{500} = 0.02$$

$$\therefore \boxed{I_L = 20mA}$$

$$I_t = I_Z + I_L$$

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

$$0.5 = I_Z + 0.02$$

$$\therefore I_Z = 0.5 - 0.02 = 0.48$$

$\therefore \boxed{I_Z = 480mA}$ . The current across diode for load of  $500 \Omega$  is  $480mA$ .