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Civil Engineering

2)  $V_s = 20V$   
 $V_z = ?$

Max current  $500mA = I_s$   
 $P_t = 5W$

i)  $I_s = \frac{P_t}{V_z} = \frac{5}{500 \times 10^{-3}} = 10V$

$\therefore V_t = 10V$

$R_s = \frac{V_s - V_t}{I_s} = \frac{20 - 10}{500 \times 10^{-3}} = \frac{10}{500 \times 10^{-3}} = 20$

$R_s = 20\Omega$

ii)  $I_z = I_s - I_L \text{ \& } I_L = \frac{V_t}{R_L} = \frac{10}{500} = 0.02A$

$= 20mA$

$\therefore I_z = (500 - 10) mA = 490mA$

1) The Zener diode is used in its "reverse bias" or reverse break down mode, i.e. the diodes anode connect to the negative supply. The Zener diode has a region in its reverse bias characteristics of almost a constant negative voltage, regardless of the value of the current flowing through the diode. It remains nearly constant even with large changes in current as long as the Zener diode current remains between the breakdown current  $I_{z(min)}$  & max current rating  $I_z(max)$ .

