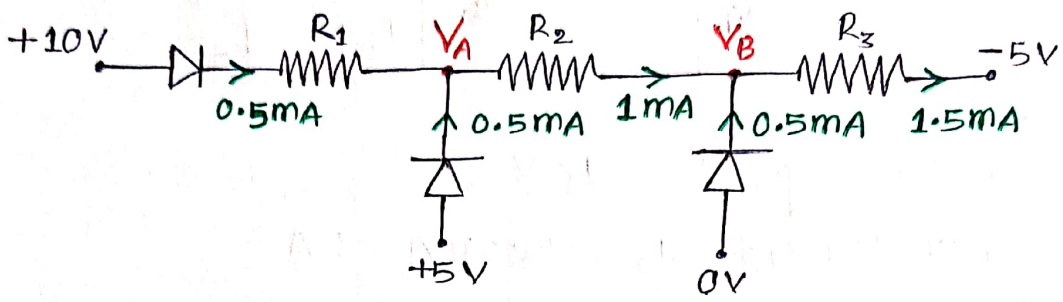
BE Quiz-6 RUBRIC

SOL(1) :



Each diode current = 0.5 mA
Cut in voltage of each diode = 0.6 V } (Given)

$\therefore V_A = (5-0.6)V = 4.4V$ — (a)

$\therefore V_B = (0-0.6)V = -0.6V$ — (b)

$\therefore R_1 = \frac{10-V_A-0.6}{0.5\times10^{-3}} = \frac{10-4.4-0.6}{0.5\times10^{-3}} = 10K\Omega$ — (c)

→ (2.5 Point)

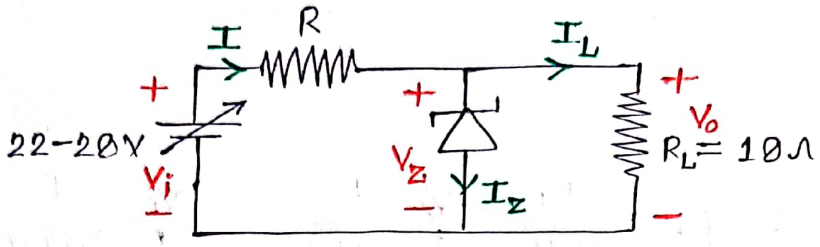
$\therefore R_2 = \frac{V_A-V_B}{1\times10^{-3}} = \frac{4.4-(-0.6)}{1\times10^{-3}} = 5K\Omega$ — (d)

→ (2.5 Point)

$\therefore R_3 = \frac{V_B-(-5)}{1.5\times10^{-3}} = \frac{(-0.6)-(-5)}{1.5\times10^{-3}} = 2.93K\Omega$ — (e)

→ (2.5 Point)

SOL(2):



Given —

Zener Voltage, $V_z = 18\ V$

Zener Current, $I_z = 200mA - 2A$

Input Voltage, $V_i = 22 - 28\ V$

Load resistance, $R_L = 18\ \Omega$

$I = I_z + I_L$

(I and I_z: varying; I_L: const)

$\left(\because I_L = \frac{V_o}{R_L} = \frac{V_z}{R_L} = \frac{18}{18} = 1A\right)$ — (a)

Condition: when $(V_i)_{max} = 28\ V$

then I & I_z will be maximum.

$$\frac{(V_i)_{max} - V_z}{R} = (I_z)_{max} + I_L$$

$$\left(\frac{28-18}{R}\right) = 2 + 1$$

$$\therefore R = \left(\frac{10}{3}\right)\Omega \quad \text{— (b)} \quad \rightarrow (7.5\ Point)$$