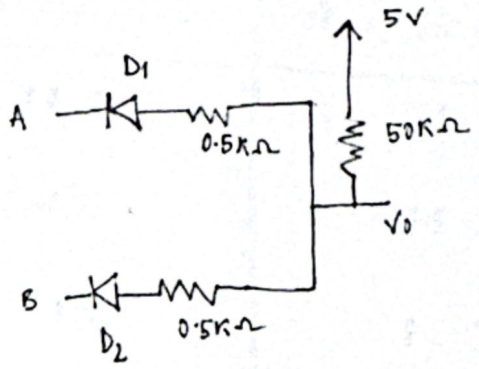
Assignment - 03



Case-01 Both diode are on.

$A = B = \text{logic } 0 = 0.2\text{V}$

Applying KCl at V_0,

$$I_3 = I_1 + I_2$$

$$\Rightarrow \frac{5 - V_0}{50\text{K}\Omega} = 2 \times \frac{V_0 - 0 - 0.7}{0.5}$$

$$\therefore V_0 = 0.72\text{V}$$

$$P_{100} = (5 - 0.72) \cdot \frac{5 - 0.72}{50} + 2 \times \frac{0.72 - 0.7}{0.5} \times (0.72 - 0)$$

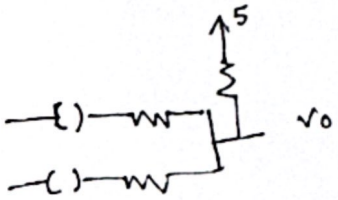
$$= 0.36 + 0.05$$

$$= 0.41\text{ mW}$$

Case - 02 Both diode are off

$A = B = \text{logic } 1 = 5\text{V}$

All $I_3 = I_1 = I_2 = 0\text{ mA}$



So, $I_3 = 0$

$$\Rightarrow \frac{5 - V_0}{50\text{K}\Omega} = 0$$

$$\therefore V_0 = 5\text{V}$$

$$P_2 = (5 - 5) \times 0$$

$$= 0\text{mW}$$

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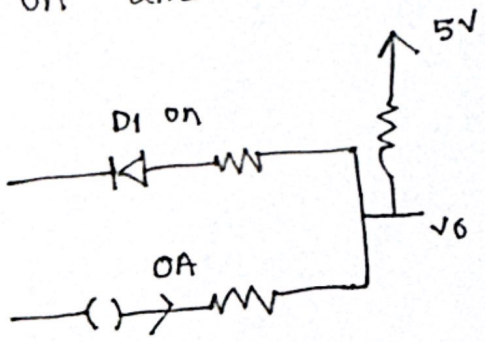
case 3 and 4 are similar:

$A = 0,\ B = 5V$

Diode D_1 is on and D_2 diode off.



$$I_3 = I_1$$

$$\Rightarrow \frac{5 - V_0}{50} = \frac{V_0 - 0.7}{0.5}$$

$$\therefore V_0 = 0.74V$$

$$P_3 = P_4 = \cancel{(5-0)\ 5 - 0.74}\ I(5 - V_0)$$

$$= \frac{(5 - 0.74)}{50} \times (5 - 0)$$

$$= 0.426\ mW$$

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A(V)	B(V)	Output Voltage, Vo	Dissipated Power (mW)
0	0	0.72	0.41
0	5	0.74	0.426
5	0	0.74	0.426
5	5	5	0

Average power dissipation $= \frac{0.41 + 0.426 + 0.426 + 0}{4}$

$= 0.31$ mW (Ans)

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