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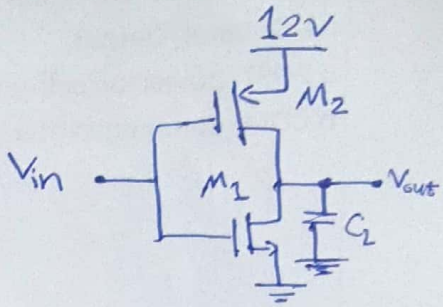
سكشن: 1

بنش نمبر: 38

Question 2



$$\Rightarrow T_{pLH} = R_{on_2} C_L \left[\frac{2|V_{th2}|}{V_{DD} - |V_{th2}|} + \ln\left(3 - \frac{4|V_{th2}|}{V_{DD}}\right) \right]$$

$\because T_{pLH} = 70\ fs = 70 \times 10^{-15}$

$$\therefore 70 \times 10^{-15} = R_{on_2} \times 1 \times 10^{-12} \left[\frac{2 \times 3.63214}{12 - 3.63214} + \ln\left(3 - \frac{4 \times 3.63214}{12}\right) \right]$$

$\therefore R_{on_2} = 48.28 \times 10^{-3}$ $\quad \left\{ R_{on} = \frac{1}{\mu_n C_{ox} \frac{W}{L} (V_{GS} - V_{th})} \right.$

$$\therefore \frac{W}{L} = \frac{1}{48.28 \times 10^{-3} \times 5.22109 \times (0 - 12 - 3.63214)}$$

$\therefore \left(\frac{W}{L}\right)_{PMOS} = 0.254 \rightarrow$ for PMOS

$$\Rightarrow T_{pHL} = R_{on_1} C_L \left[\frac{2V_{th_1}}{V_{DD} - V_{th_1}} + \ln\left(3 - 4\frac{V_{th_1}}{V_{DD}}\right) \right]$$

$\because T_{pHL} = 70\ fs = 70 \times 10^{-15}$

$$70 \times 10^{-15} = R_{on_1} \times 1 \times 10^{-12} \times \left[\frac{2 \times 1.72558}{12 - 1.72558} + \ln\left(3 - 4 \times \frac{1.72558}{12}\right) \right]$$

$R_{on_1} = 0.057$ $\quad \left[R_{on} = \frac{1}{\mu_n C_{ox} \frac{W}{L} (V_{GS} - V_{th})} \right.$

$$\therefore \frac{W}{L} = \frac{1}{0.240544 \times 0.057 \times (12 - 0 - 1.72558)} = 7.081$$

$\therefore \left(\frac{W}{L}\right)_{NMOS} = 7.081$