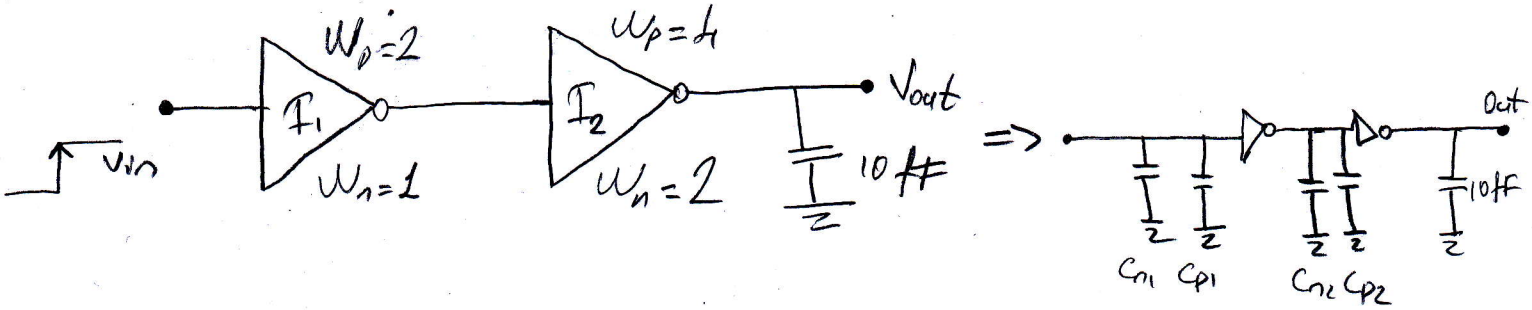
Quiz-1, 2)



→ Since input is low-to-high, I_1 output is high to low.

→ Since input I_2 is output I_1, I_2 output is low-to-high.

⇒ Calculating both delays according to their characters;

$$t_{PLH_{I_1}} = (C_L/C_N).\zeta_n = \left(\frac{C_{P_2}+C_{n_2}}{C_{n_1}}\right)\zeta_n = \left(\frac{C_{ox}(4.2.10^{-12}+2.2.10^{-12})}{C_{ox}(1.1.10^{-12})}\right).\zeta_n = 6.\zeta = \boxed{6\,ps}$$

$$t_{PHL_{I_2}} = (C_L/C_p)\zeta_p = \left(\frac{10.10^{-15}}{C_{ox}(4.1.10^{-12})}\right) = \left(\frac{10}{4}\right)\zeta_p = 2{,}5\zeta_p = \boxed{2{,}5\,ps}$$

→ total delay = 6 + 2,5 = $\boxed{8{,}5\,ps}$

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1) All statements are FALSE

a) Increasing W_n → decreasing R_n → increased leakage currents → V_{OH} can't increase.

b) $t_{PLH} = s_p\zeta_p$ → W_n has no effect in this equation.

c) $V_T = \dfrac{V_{DD} - |V_{Tp}| + \sqrt{\frac{\beta_n}{\beta_p}}V_{Tn}}{1+\sqrt{\frac{\beta_n}{\beta_p}}}$ → k_n', k_p' could differ. There is no certainty.

$\sqrt{\frac{\beta_n}{\beta_p}} \rightarrow \sqrt{\frac{(\frac{W}{L})_n.k_n'}{(\frac{W}{L})_p.k_p'}}$

d) $C_{out} = \underbrace{\left[(C_{GD_n}+C_{GD_p})+(C_{DB_n}+C_{DB_p})\right]}_{C_{int}} + C_L$

C_{int} → no C_{GS} capacitance considered