

$$40 \mu\text{A}/\text{V}^2$$

$$\frac{K_P P}{2} \frac{W_P}{L_P}$$

$$(V_{DD} - V_{SP} - V_{THP})^2 = \frac{K_N}{2} \frac{W_N}{L_N} (V_{SP} - V_{THN})^2$$

$$\frac{P_P}{2} (V_{DD} - V_{SP} - V_{THP})^2 = \frac{P_N}{2} (V_{SP} - V_{THN})^2$$

$$\frac{(V_{DD} - V_{SP} - V_{THP})^2}{(V_{SP} - V_{THN})^2} = \frac{P_N}{P_P}$$

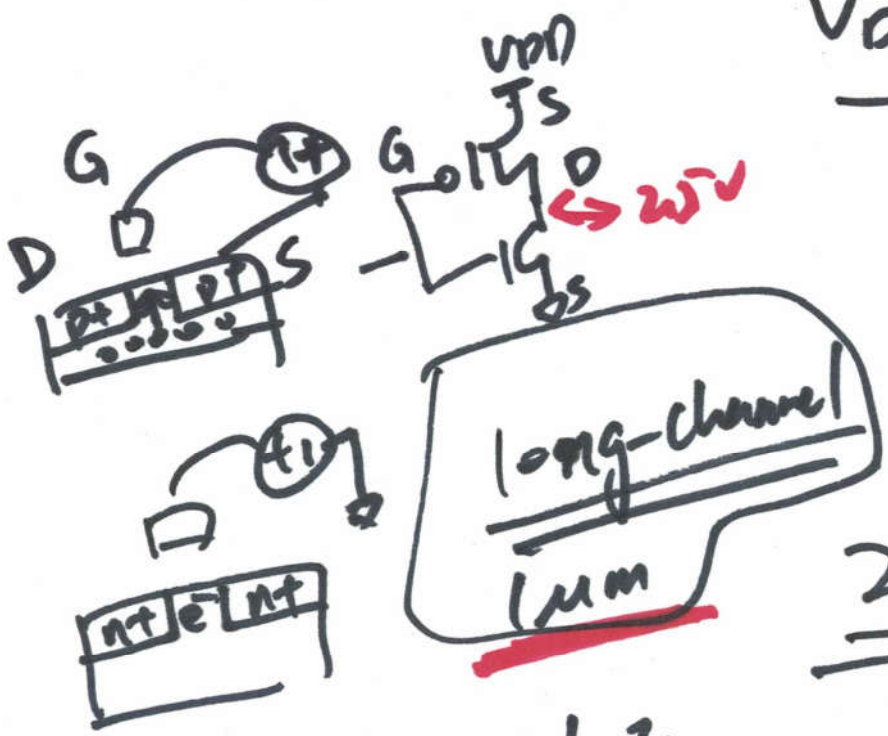
$$\frac{V_{DD} - V_{SP} - V_{THP}}{V_{SP} - V_{THN}} = \sqrt{\frac{P_N}{P_P}}$$

$$V_{DD} - V_{SP} - V_{THP} = \sqrt{\frac{\beta_n}{\beta_p}} (V_{SP} - V_{THN})$$

$$V_{DD} - V_{THP} + \sqrt{\frac{\beta_n}{\beta_p}} \cdot V_{THN} = V_{SP} \left( \sqrt{\frac{\beta_n}{\beta_p}} + 1 \right)$$

$$V_{SP} = \frac{V_{DD} - V_{THP} + \sqrt{\frac{\beta_n}{\beta_p}} \cdot V_{THN}}{\sqrt{\frac{\beta_n}{\beta_p}} + 1}$$

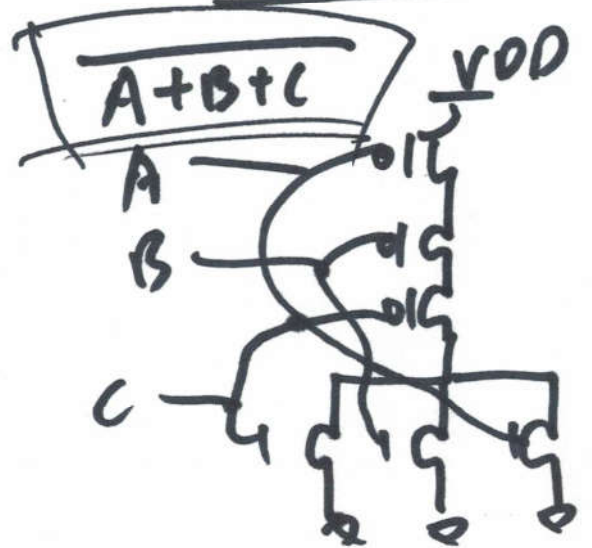
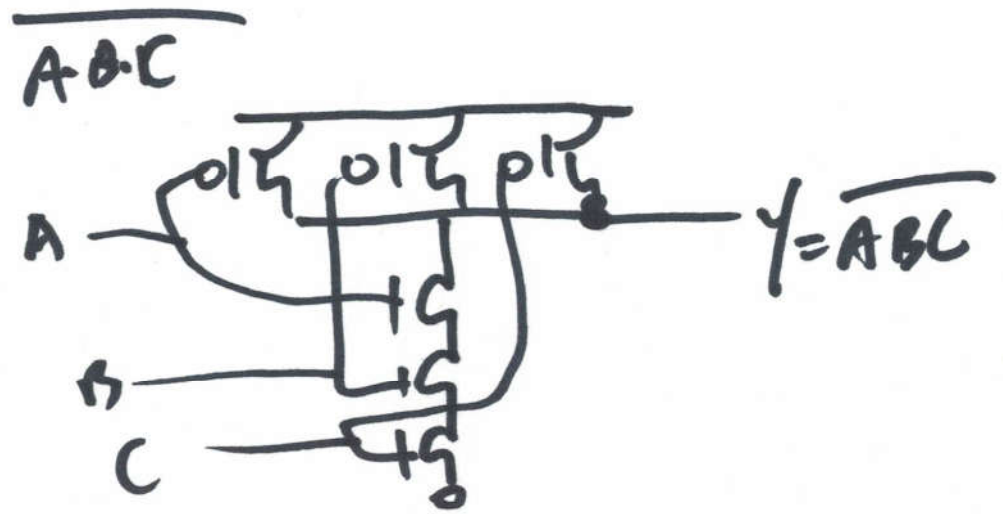
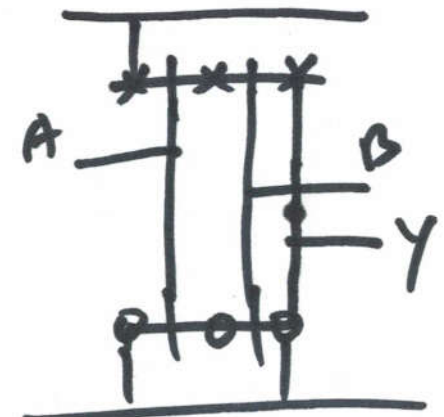
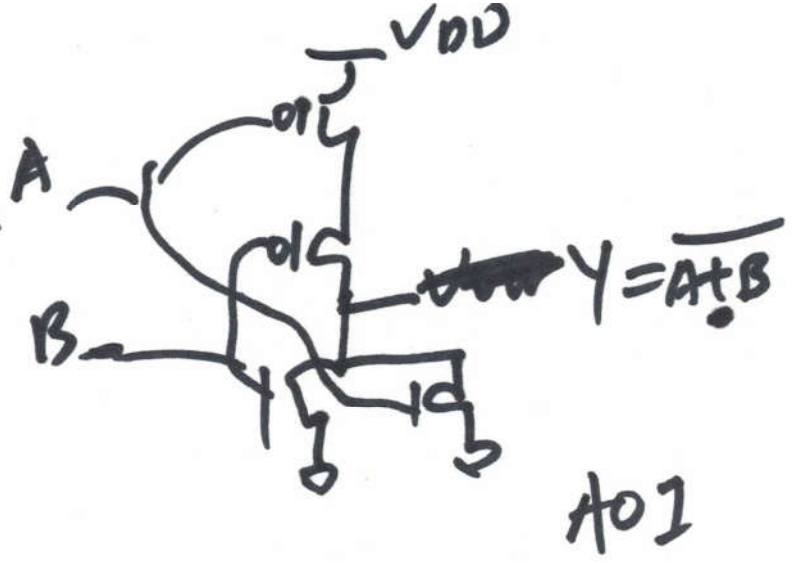
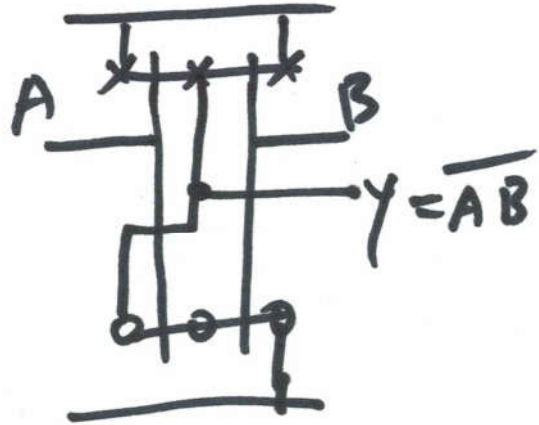
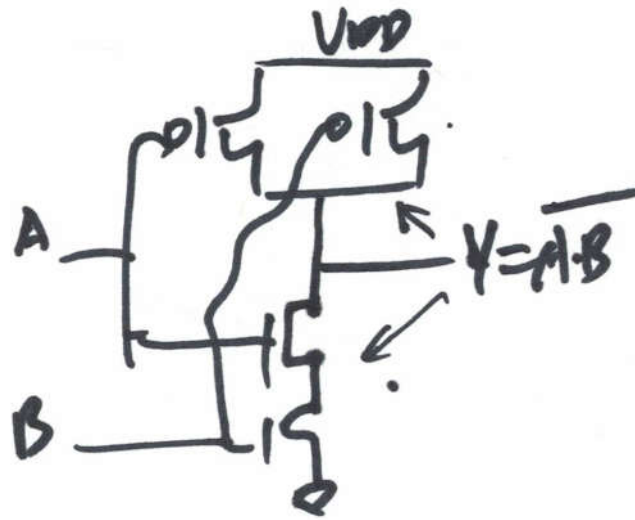
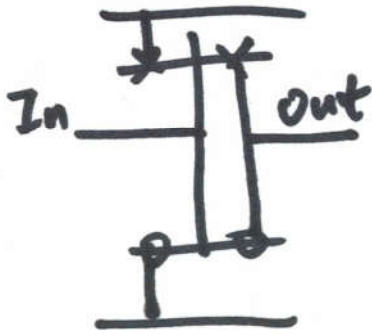
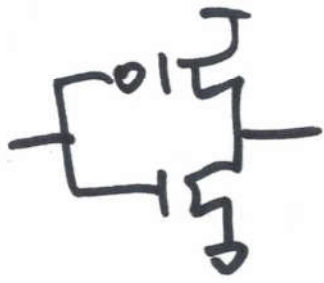
$$2.5V = \frac{5 - 0.9 + \sqrt{\frac{\beta_n}{\beta_p}} \cdot 0.8}{\sqrt{\frac{\beta_n}{\beta_p}} + 1}$$



$\begin{cases} \mu_{n} = 120 \text{ cm}^2/\text{Vs} \\ \mu_{p} = 40 \text{ cm}^2/\text{Vs} \end{cases}$   
 mobility of particles  
 $V_0$

$\sqrt{\frac{\beta_n}{\beta_p}} + 1$   
 $\beta_n = \beta_p \Rightarrow K_{Pn} \cdot \frac{W_n}{L_n} = K_{Pp} \cdot \frac{W_p}{L_p}$   
 electrons has higher mobility than holes

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