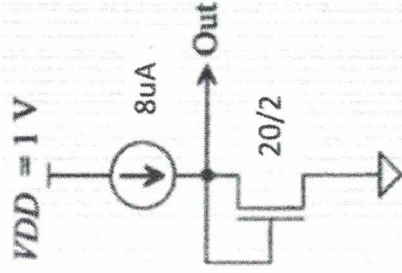
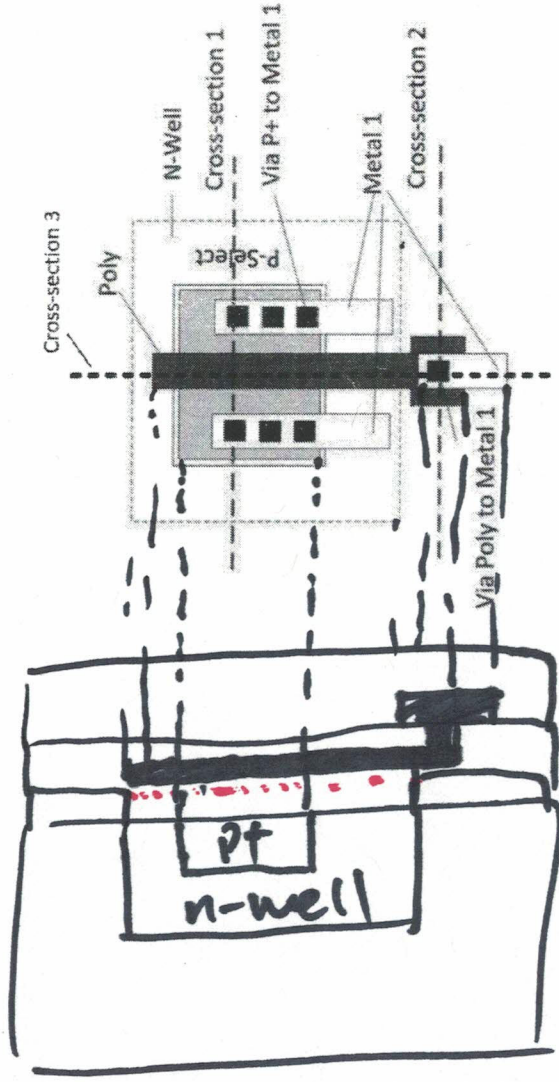


ENGR338 Quiz 3

1. Calculate V_{GS} in the following circuit. $K_{Pn} = 120 \mu A/V^2$. (50 points)



2. Draw cross-section 3 for the following layout. (50 points)

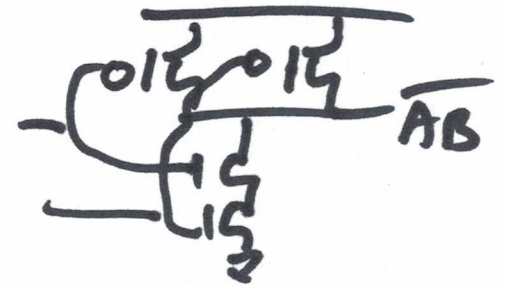


AOI Logic

XOR
XNOR

$$A \oplus B = \overline{A \odot B}$$

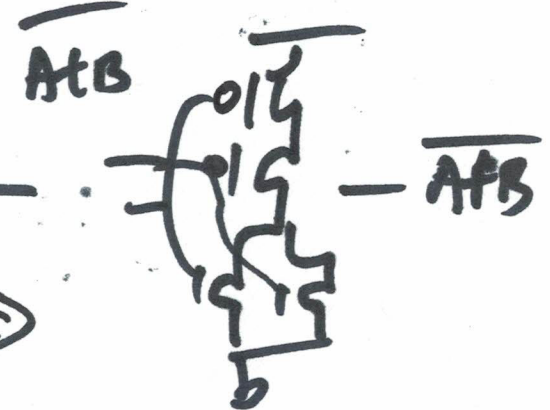
$$\overline{AB} = \overline{AB + \bar{A}\bar{B}}$$



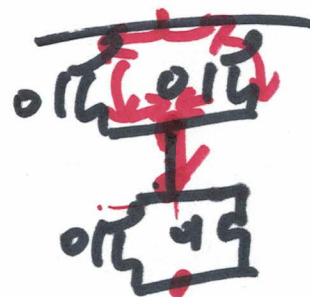
$$Y = \overline{A}B + A\overline{B} = A \oplus B$$

$$= \overline{\overline{A}B + A\overline{B}} = \overline{\overline{A}B} \cdot \overline{A\overline{B}}$$

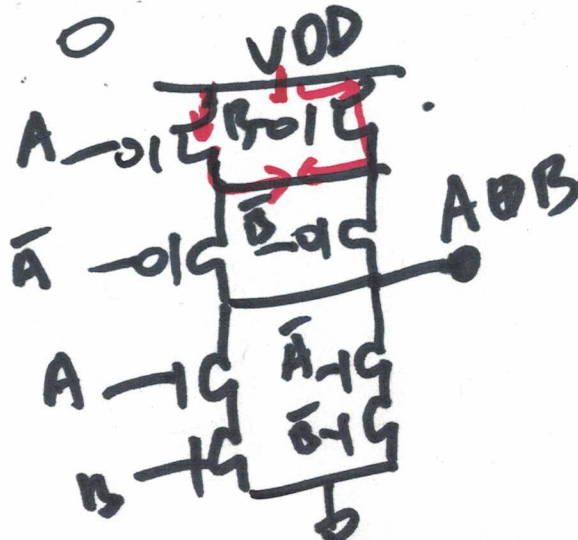
$$= (\overline{\overline{A}} + \overline{B}) \cdot (\overline{A} + \overline{\overline{B}}) = (A + \overline{B}) \cdot (\overline{A} + B)$$



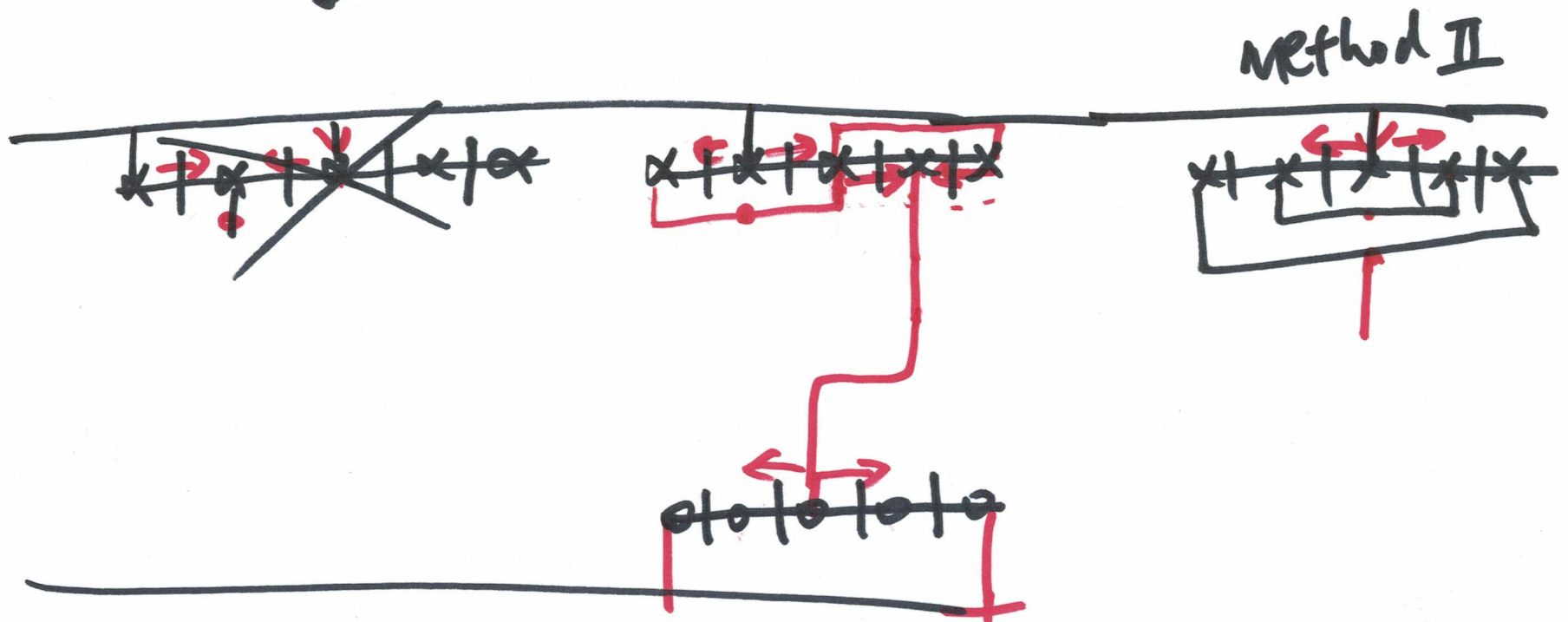
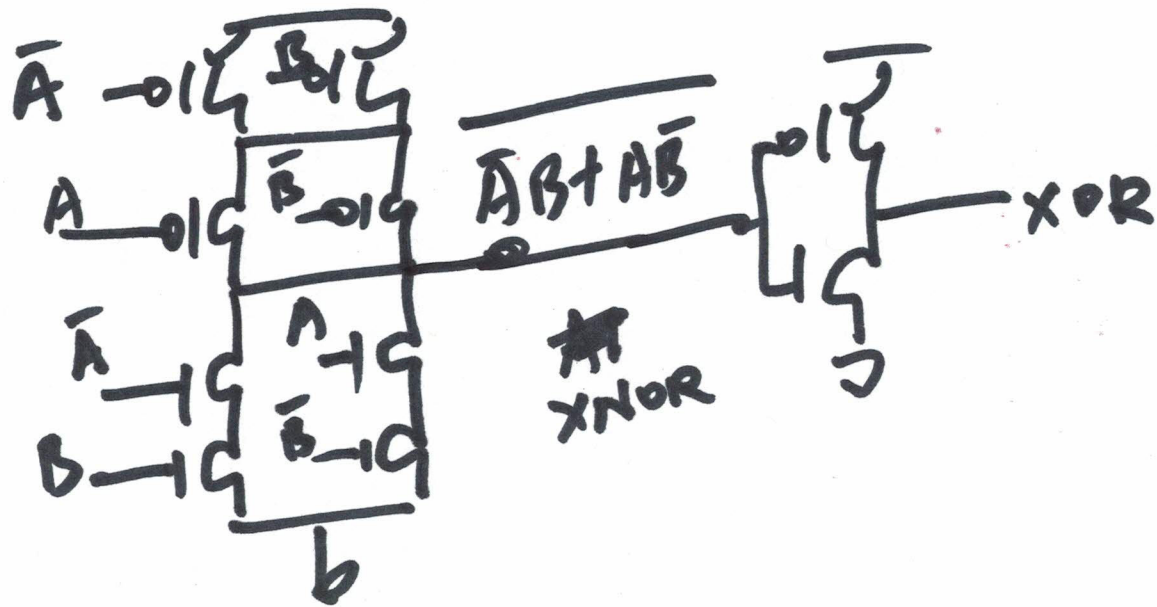
$$= \overline{A \cdot \overline{A} + AB + \overline{A}\overline{B} + B\overline{B}} = \overline{AB + \overline{A}\overline{B}} \Rightarrow$$



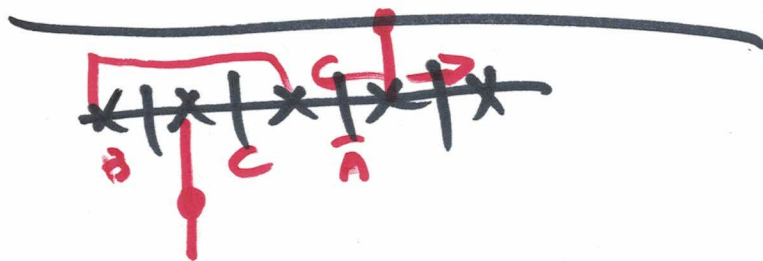
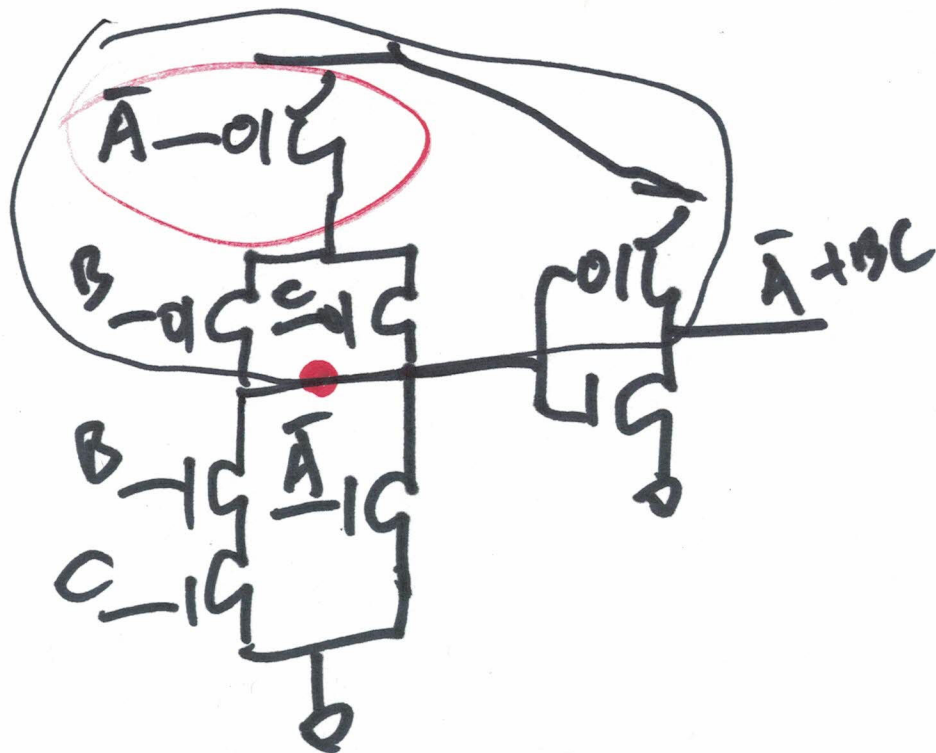
$$\begin{aligned} \overline{A \cdot B} &= \overline{A} + \overline{B} \\ \overline{A + B} &= \overline{A} \cdot \overline{B} \end{aligned}$$



①



$$Y = \bar{A} + BC$$



$$Y = \overline{\overline{A} + BC}$$

$$= \overline{\bar{A} \cdot \overline{BC}} = \overline{A \cdot (\bar{B} + \bar{C})}$$

$$= \overline{A\bar{B} + A\bar{C}}$$

