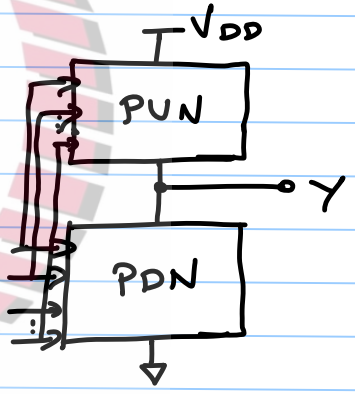
20/9/2019

EE5311

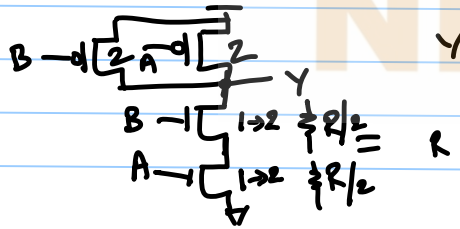
MODULE 4- COMBINATIONAL CIRCUITS

$Y = f(A, B, C \ldots)$
$= \Sigma m(0, 1, 2 \ldots)$

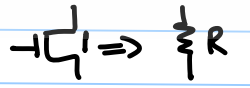
① $\bar{Y} = f(A, B, C \ldots)$

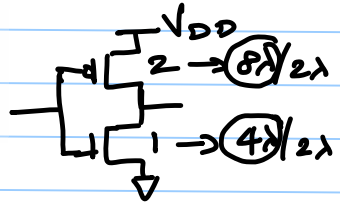


NAND2!



$Y = \overline{AB}$

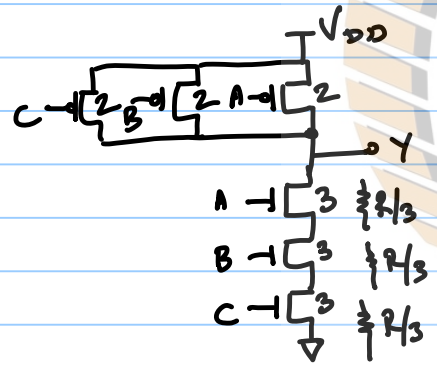




NAND3:

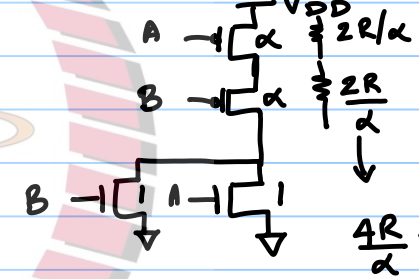
$Y = \overline{ABC}$

$\overline{Y} = ABC$



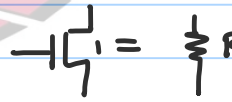
NOR2

$Y = \overline{A+B}$

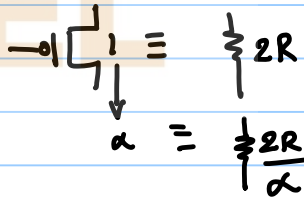


$\frac{4R}{\alpha} = R$

$\Rightarrow \alpha = 4$

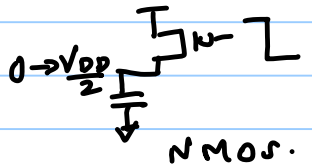


$R_N = \frac{3V_{DD}}{4 I_{DSAT-N}}$



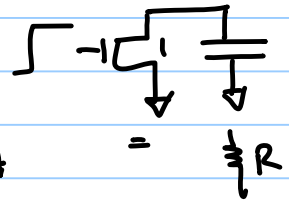
$R_p = \frac{3V_{DD}}{4 I_{DSAT-P}}$

PMOS

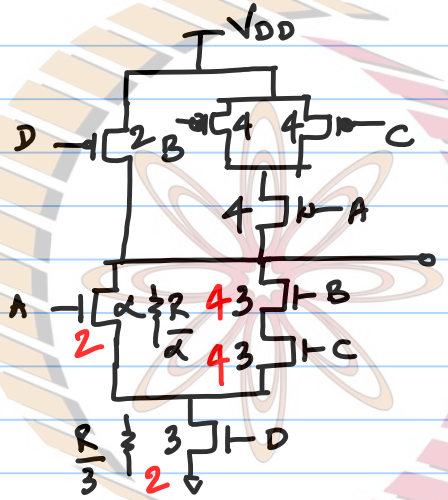


NMOS.

$V_{DD} \rightarrow V_{DD}/2$



$$Y = \overline{(A + BC)D}$$



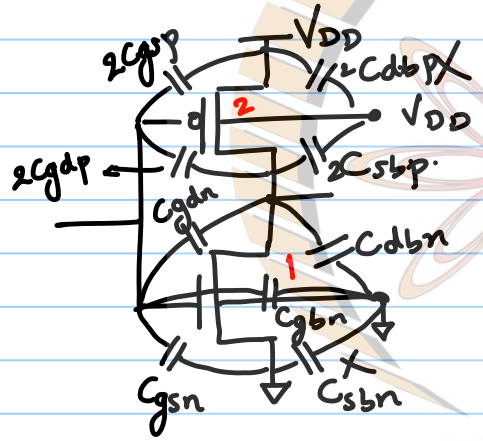
$\Sigma W_p = 12$

$\Sigma W_n = 10.5$

$$\frac{R}{\alpha} + \frac{R}{3} = R$$

$$\therefore (\alpha = 3/2)$$

CAPACITANCE



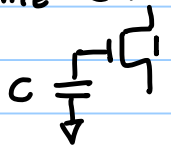
ALL CAPS SCALE AS $\propto W$

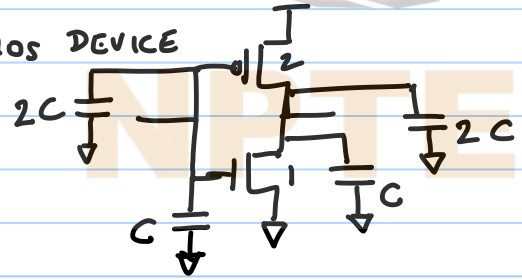
$C_{gsn} = C_{gsp}$

ASSUMPTIONS :

1) LUMP ALL CAPS.
2) ALL CAPS TO AC GND
3) ALL CAPS ARE EQUAL

C → GATE CAP OF A UNIT NMOS DEVICE





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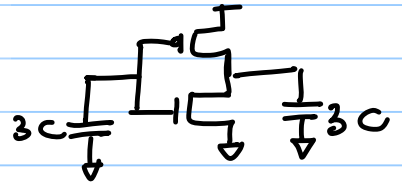
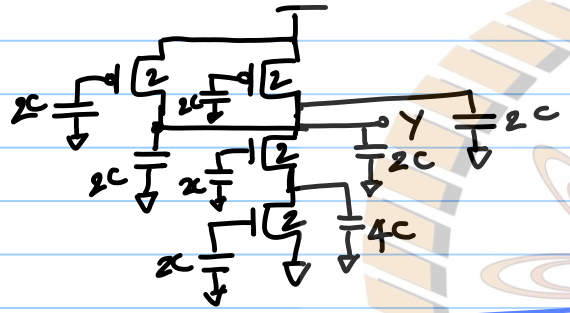
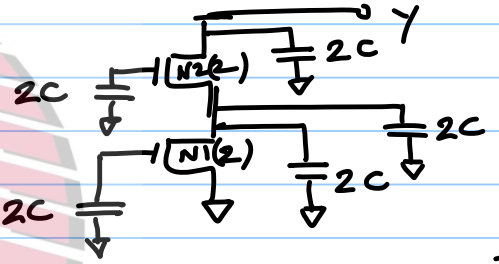
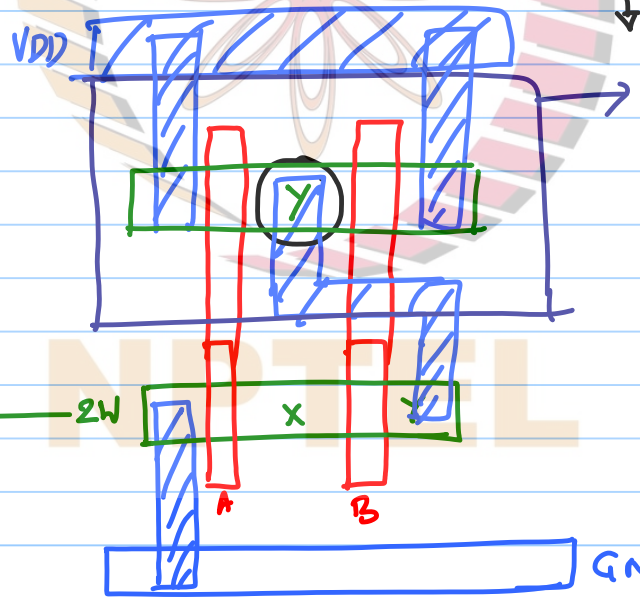


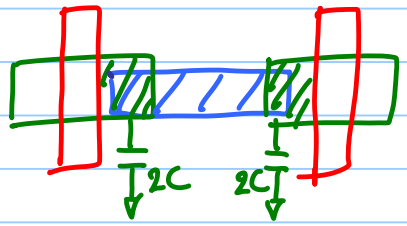


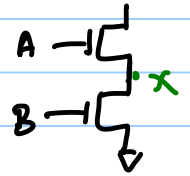


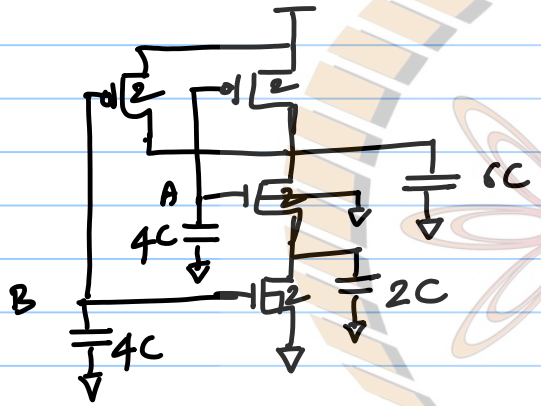
UNCONTACTED SHARED DIFFUSION

⇒ DO NOT DOUBLE COUNT CAP








1
2
A
4C
6C
B
2
2C
4C