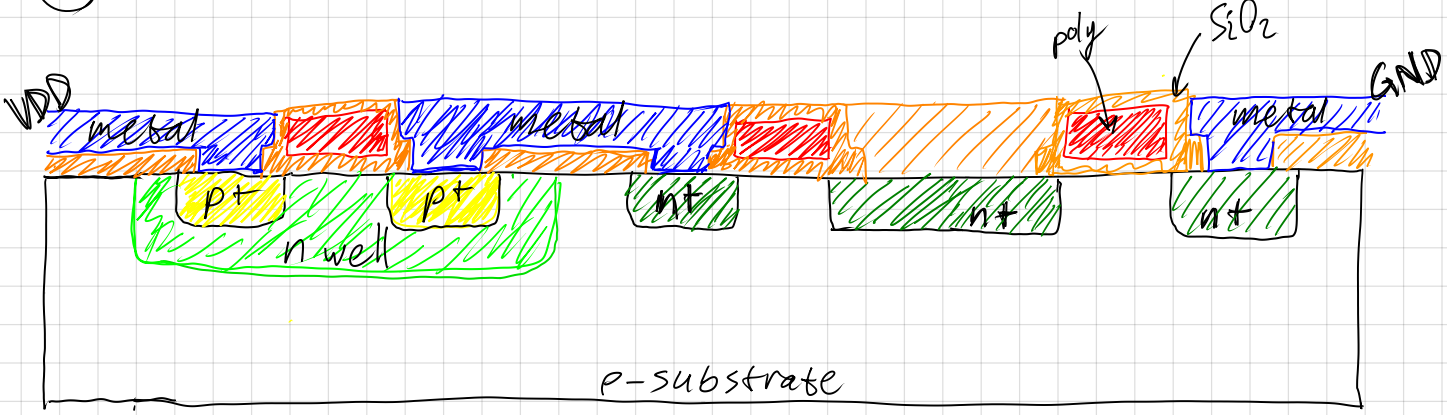
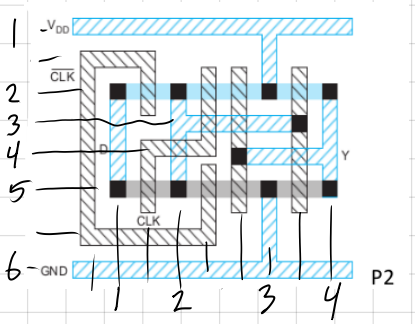
ADAM CORDINGLEY
HW3 ECSE 485

1



2



$4.8\lambda \times 6.8\lambda$

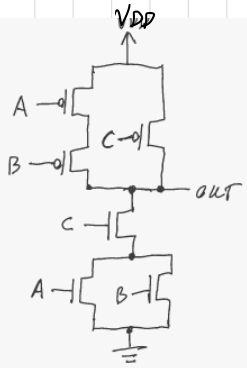
$\boxed{1536\lambda^2}$

3

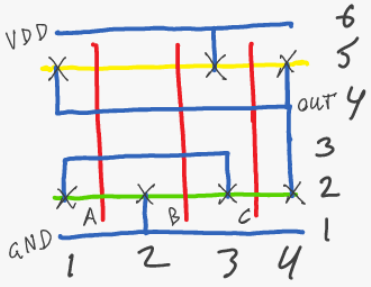
$f_n = \overline{(A+B)\cdot C}$

$f_p = AB + C$

a)



b)



c)

$4.8\lambda \times 6.8\lambda = \boxed{1536\lambda^2}$

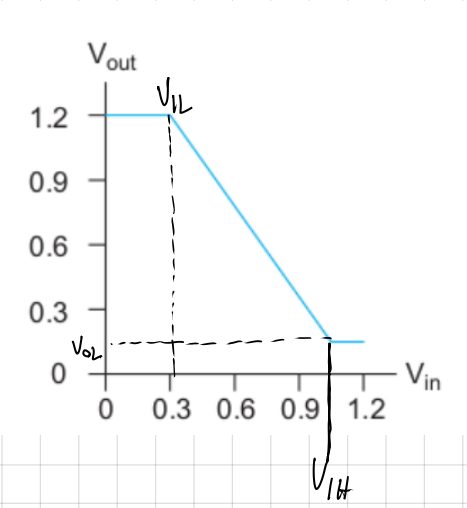
④

$V_{IL} = 0.3V$

$V_{IH} = 1.05V$

$V_{OL} = 0.15V$

$V_{OH} = 1.2V$



$NM_H = V_{OH} - V_{IH} = 1.2 - 1.05$

$NM_H = 0.15V$

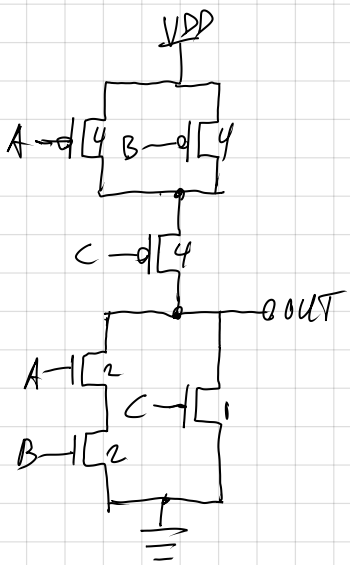
$NM_L = V_{IL} - V_{OL} = 0.3 - 0.15$

$NM_L = 0.15V$

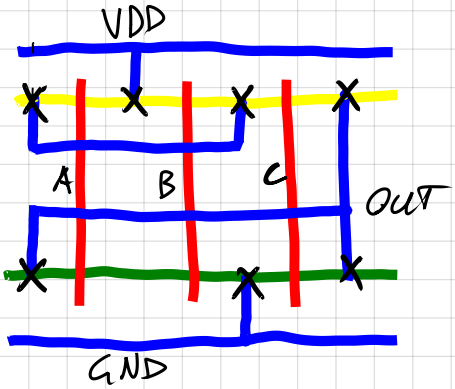
⑤

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

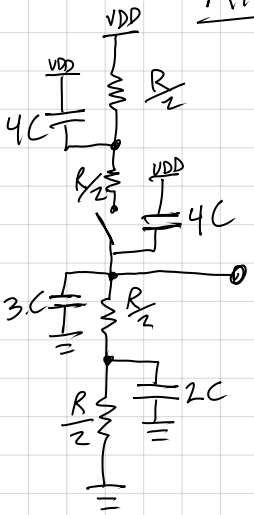
$t_p = (A+B) \cdot C$

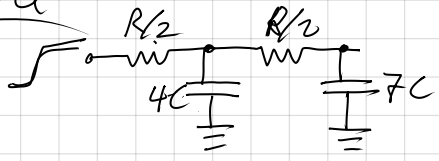


Diffusion Capacitance



RISING



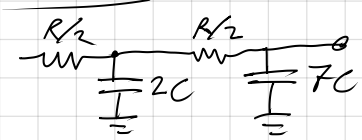


$t_{pd} \approx \frac{R}{2} \cdot 4C + R \cdot 7C$

$\approx 2RC + 7RC$

$t_{pd} \approx$ 9RC rising

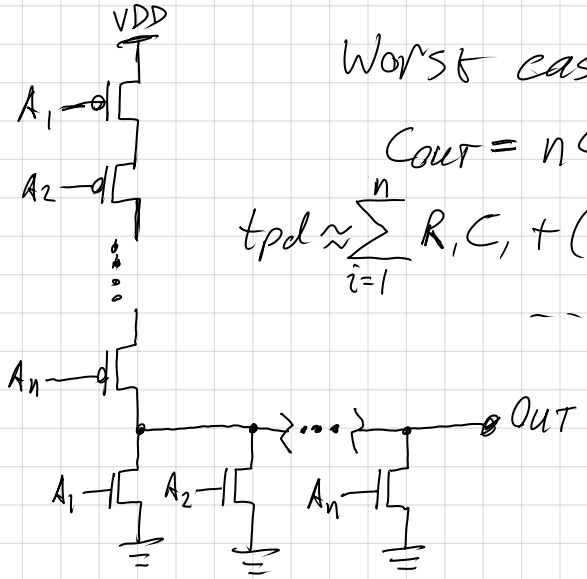
FALLING



$t_{pd} \approx \frac{R}{2} \cdot 2C + R \cdot 7C$

$t_{pd} \approx$ 8RC falling

(6)



Worst case is on rising output

$C_{OUT} = nC$

$$t_{pd} \approx \sum_{i=1}^{n} R_1 C_1 + (R_1 + R_2) C_2 + \dots (R_1 + R_2 + \dots R_n) nC$$

$$\dots + n\frac{2R}{k} \cdot nC$$

$$+ 2n^2 R/k \cdot C$$

(7)