

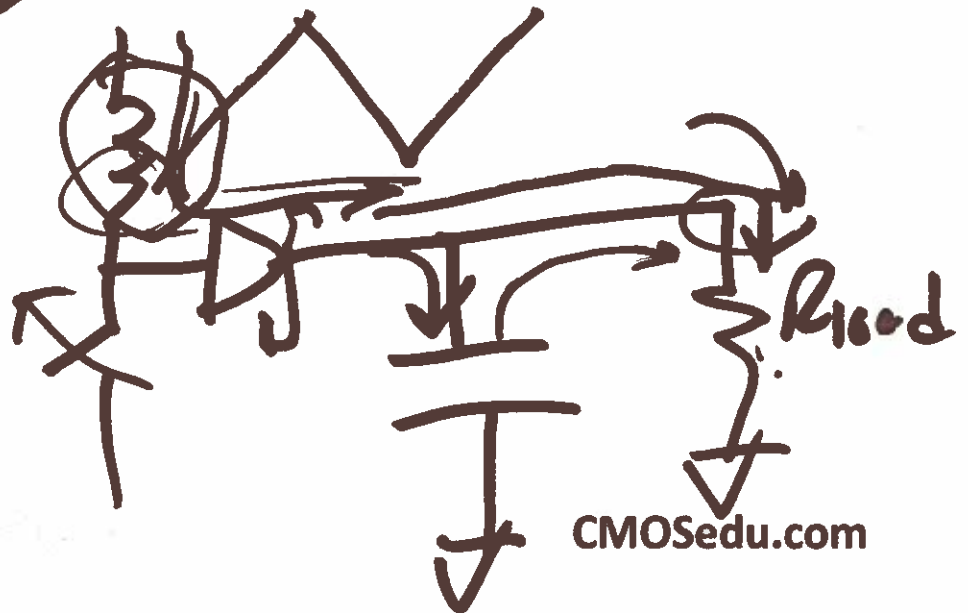
EE 421/ELG621

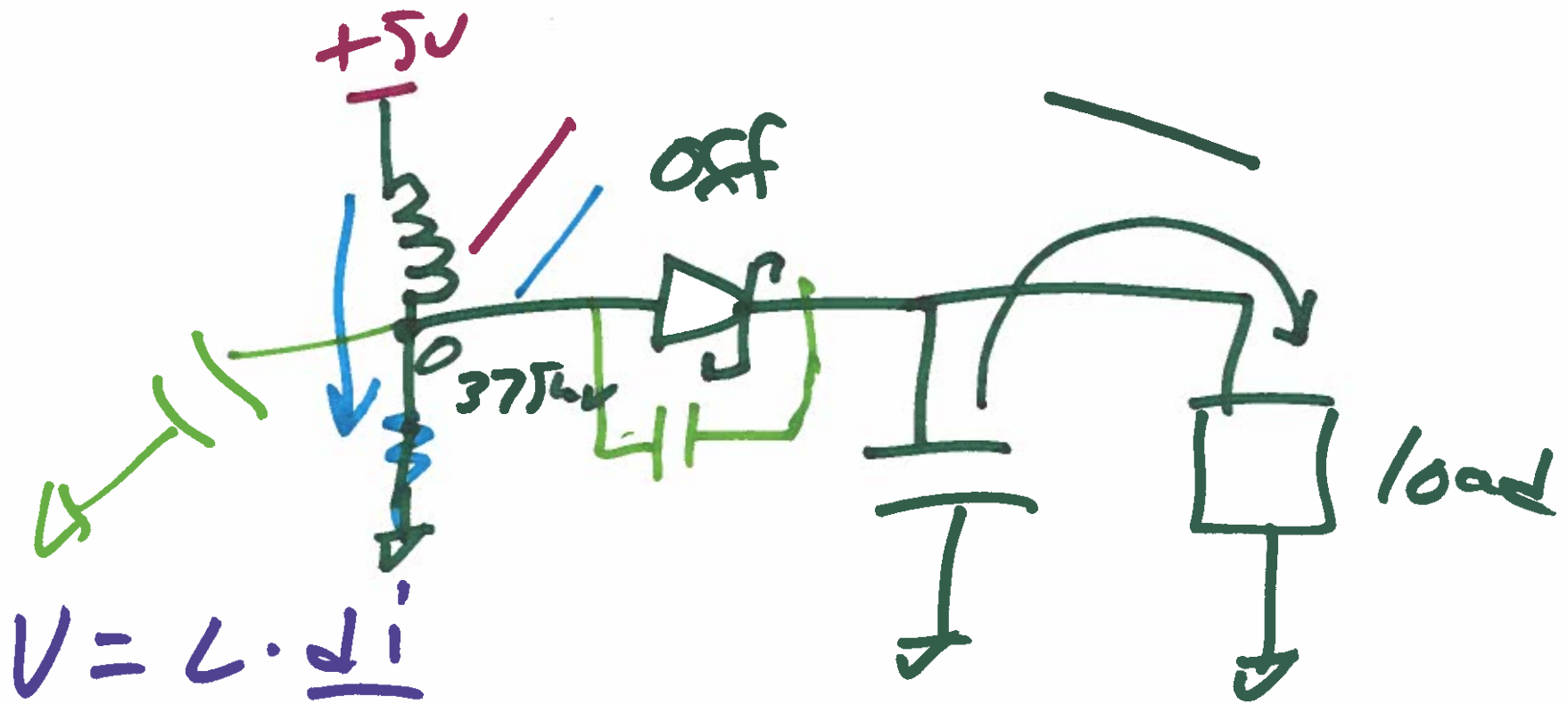
Digital IC Design

NOVEMBER 20, 2019

Lecture 23

$$N_S(t_{PHL} + t_{PL}) + N_F(t_{PHL} + t_{PLH})$$





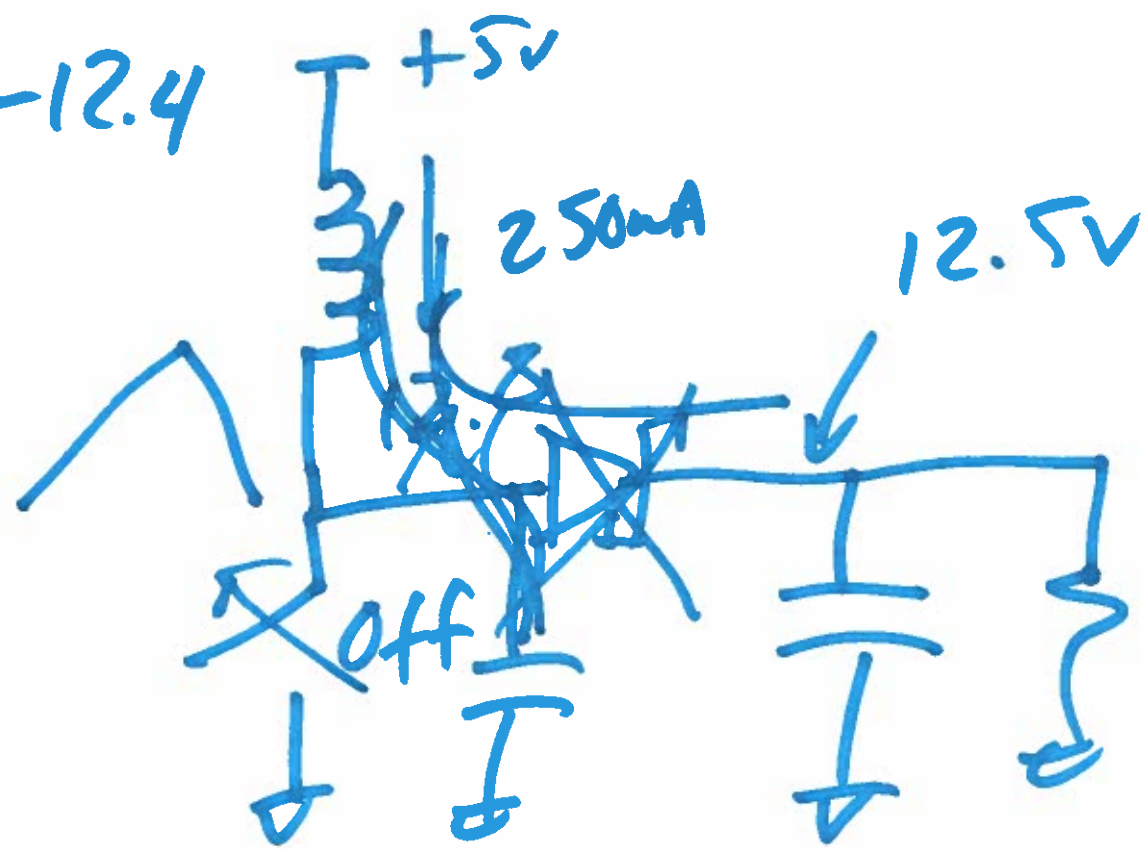
$$V = L \cdot \frac{di}{dt}$$

↑
const

$$\frac{di}{dt} = \frac{V}{L} = \text{const}$$

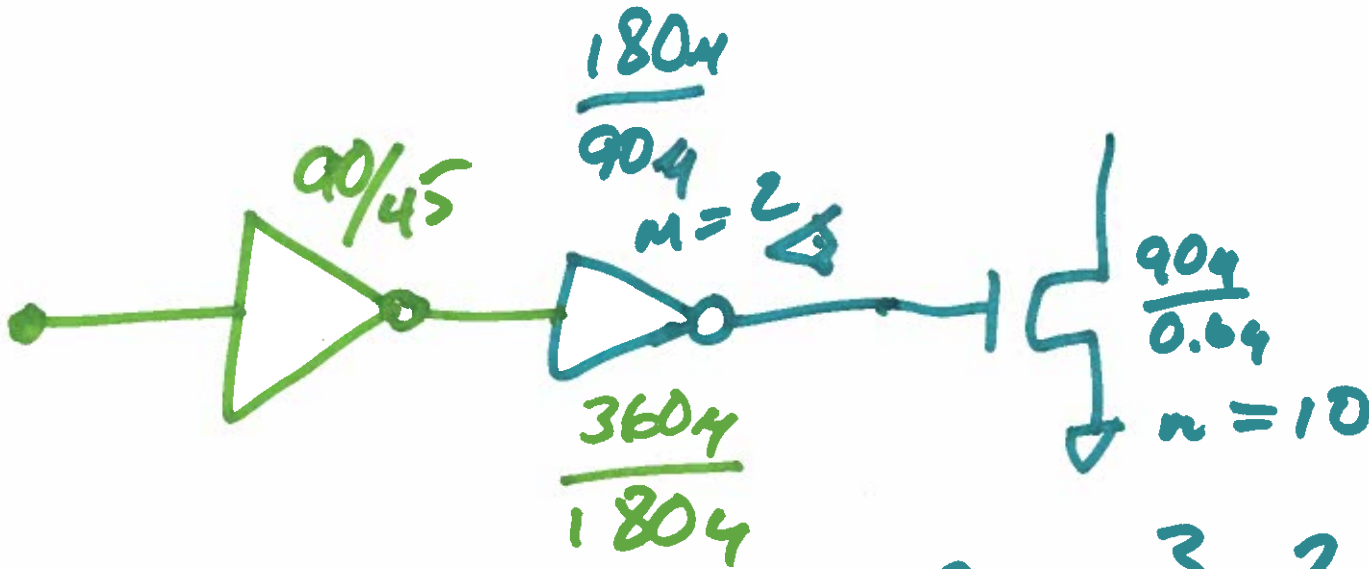
$$i = I_{\text{ramp}}$$

5-12.4



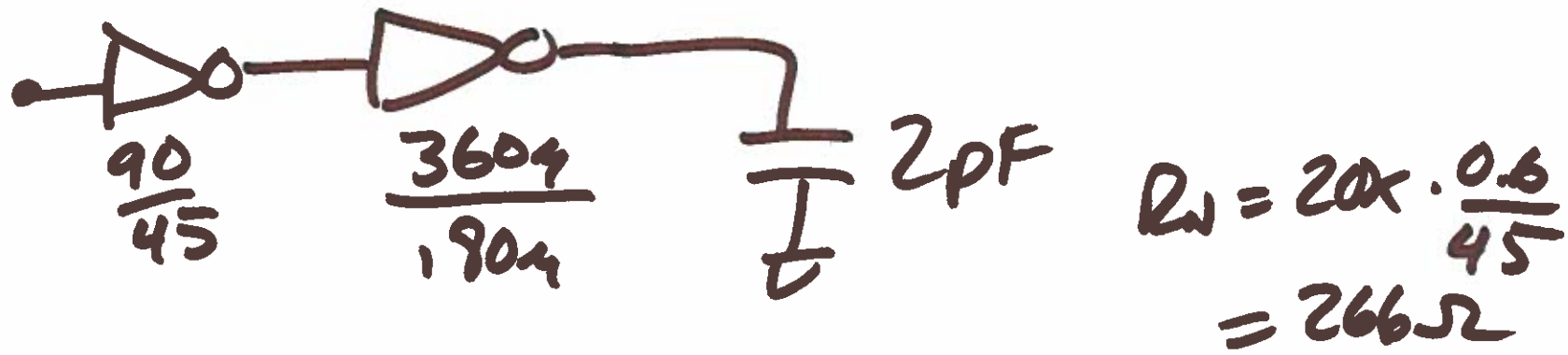
$$\frac{1}{2\pi\sqrt{LC}} = f_0$$

3)



$$C_{in} = \frac{3}{2} \cdot \frac{2.5ff}{A_{in}^2} (10 \cdot 90 \cdot .6)$$

$$\approx 2, pF$$



$$C = \frac{2.5 \text{ fF} \cdot 45 \cdot 0.6}{4 \mu\text{m}^2} = 67.5 \text{ fF} = C_{ox}$$

$$90 \rightarrow 135 \text{ fF} = C_{ox}$$

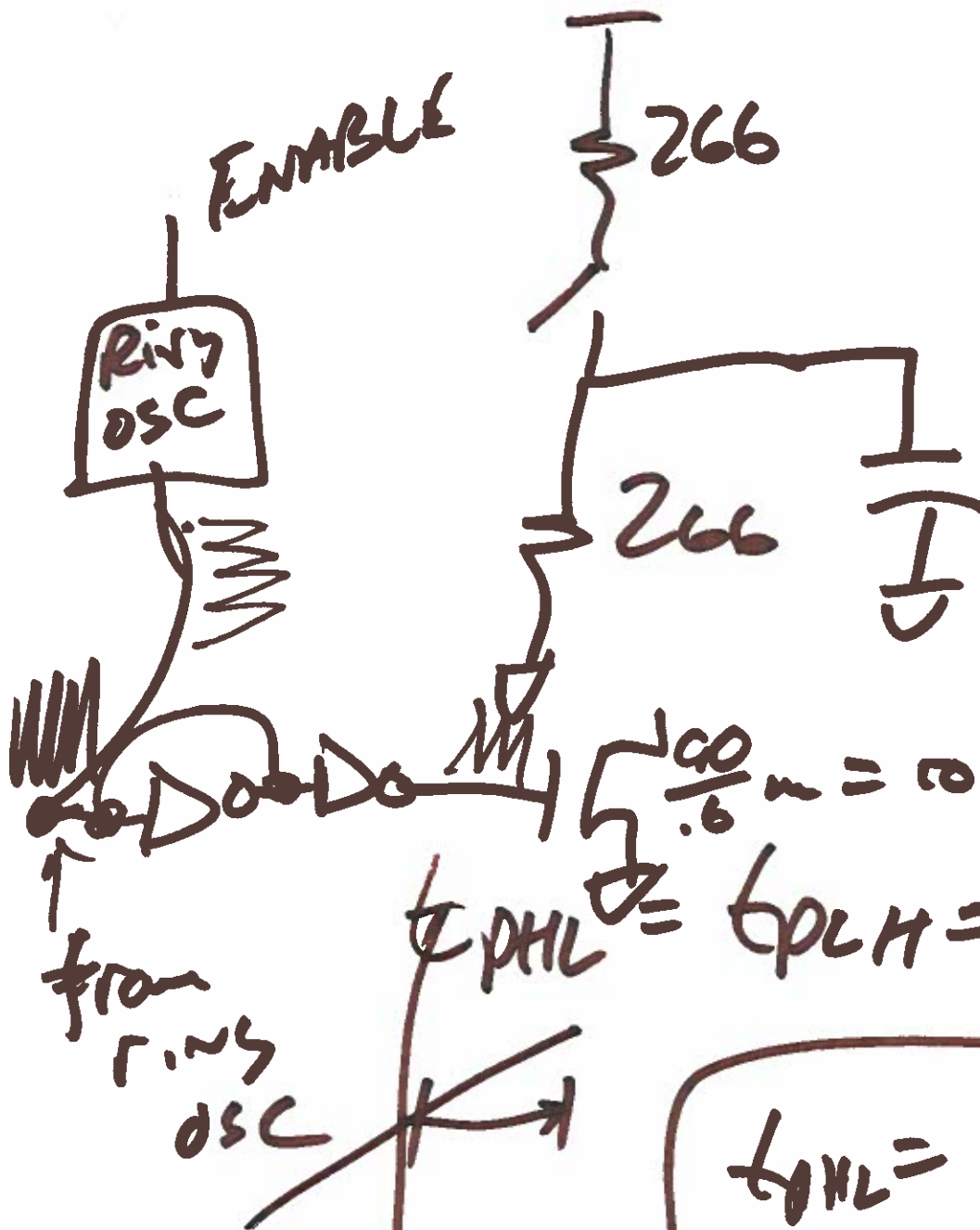
$$180 \rightarrow 270 \text{ fF} = C_{ox}$$

$$360 \rightarrow 540 \text{ fF} = C_{ox}$$

$$R_{N45} = 266 \quad , \quad R_{p90} = 266$$

$$R_{N180} = 66.7 \quad R_{p360} = 66.7$$

5)



1417.5 ff

$67.5 + 135 + \frac{3}{2}(270 + 540)$

INPUT C OF NEXT INVERTER

$t_{PHL} = 263 \text{ ps} = t_{PLH}$

b)