

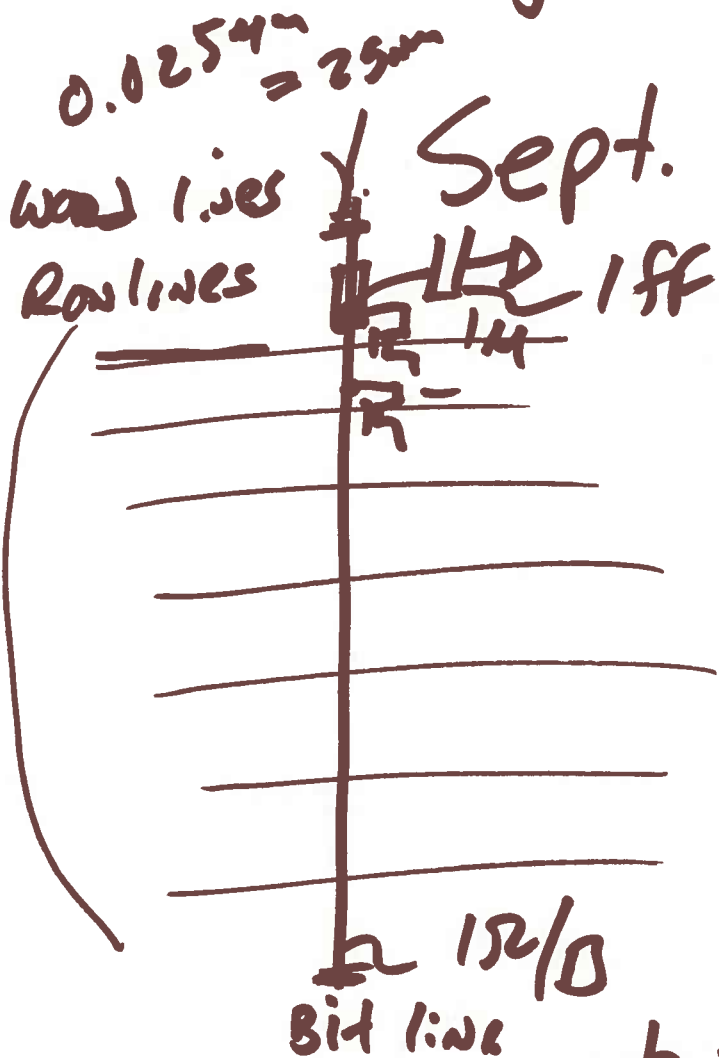
EE 421 / ECG 621

Digital IC Design

Sept. 14, 2018

1k = 1,024

Lecture 6



14 x 25μm

$$R = \frac{1\Omega \cdot 14 \cdot 8,192}{.025\mu\text{m}}$$

$$R = 327\text{K}\Omega$$

$$C = 1\text{fF}$$

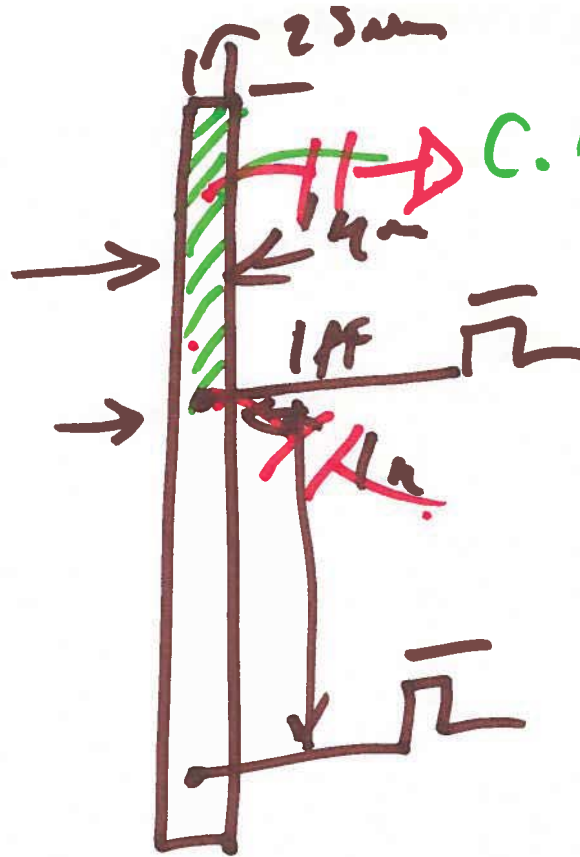
$$C_{\text{tot}} = 8,192\text{fF}$$

$$t_d = 0.35 \cdot 327\text{K} \cdot 8.192\text{pF}$$

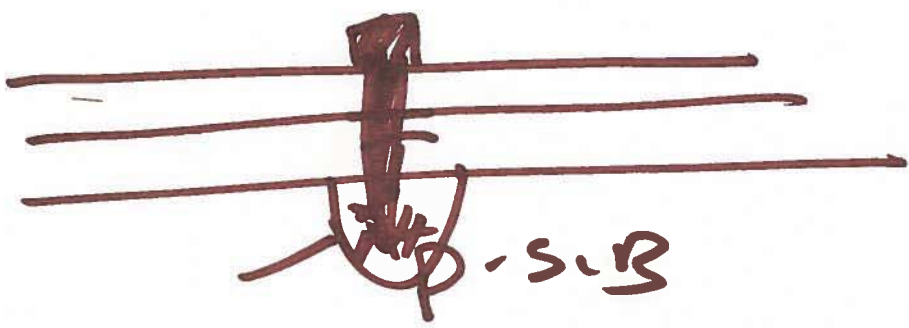
$$= \underline{940\text{ns}} \approx 1\mu\text{s}$$

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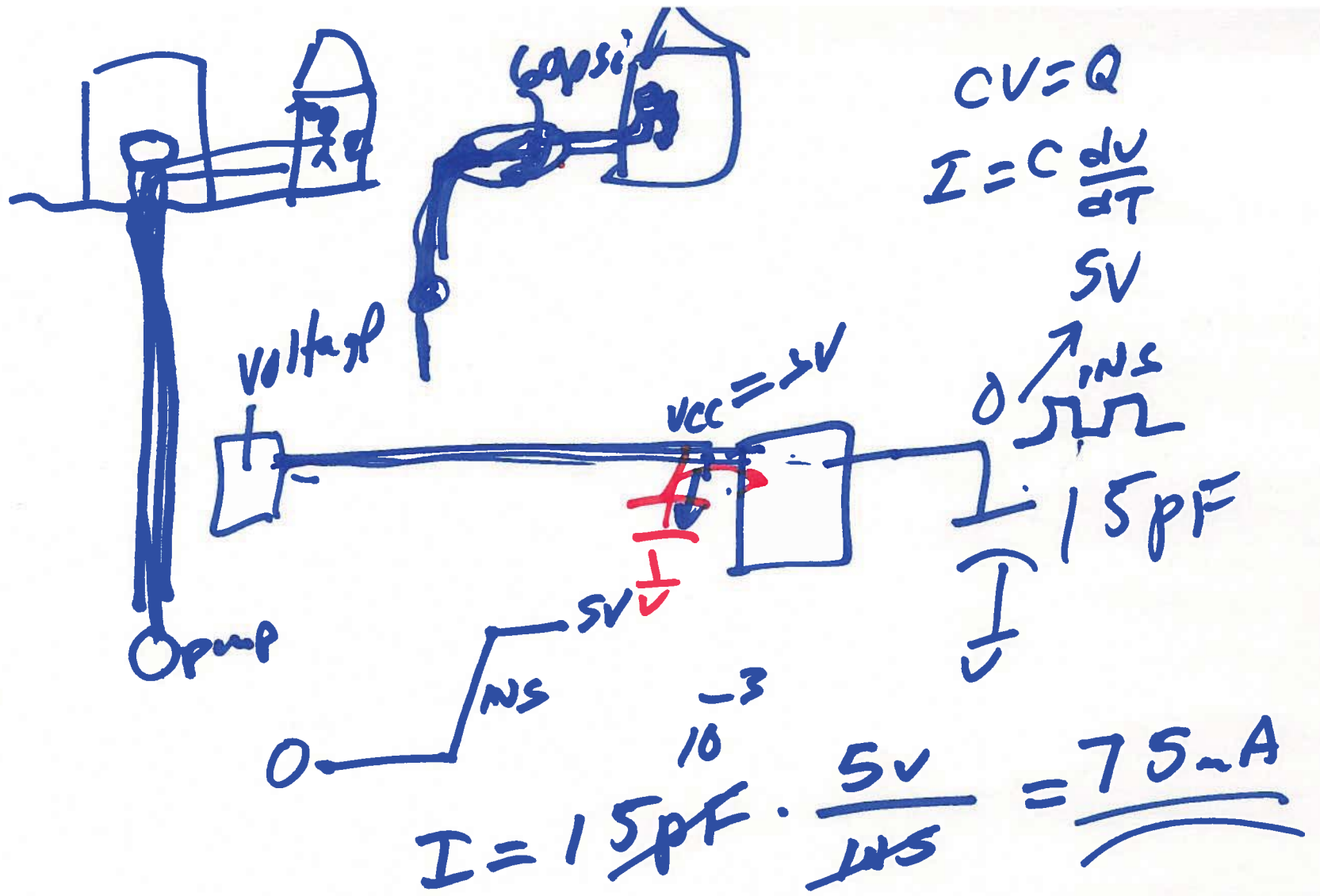
1)



$$C \cdot 14 \cdot .0254 = C_{\text{wire}} + 1 \text{ AF}$$



2)

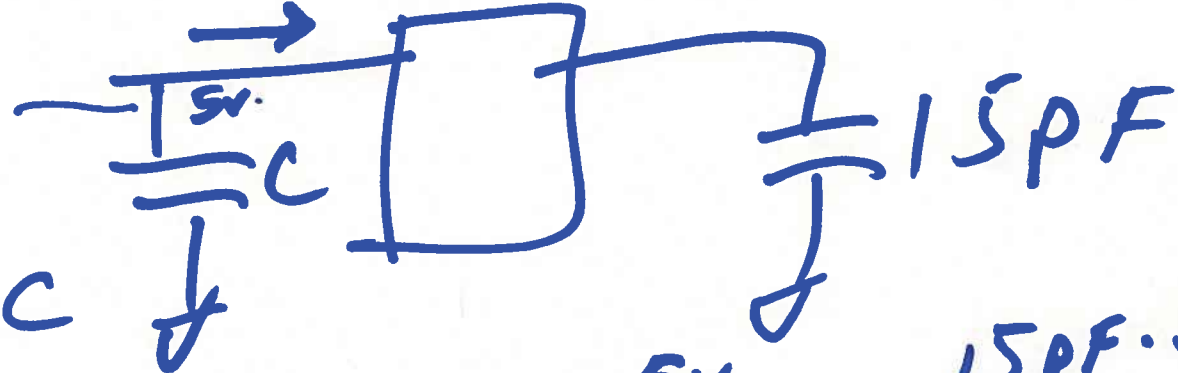


3)

$$S \rightarrow 4.995V$$

$$S-\Delta V \\ 5mV$$

$$75\mu A$$



$$75pC = 5mV \cdot C$$

$$C = 15nF$$

$$= .015\mu F$$



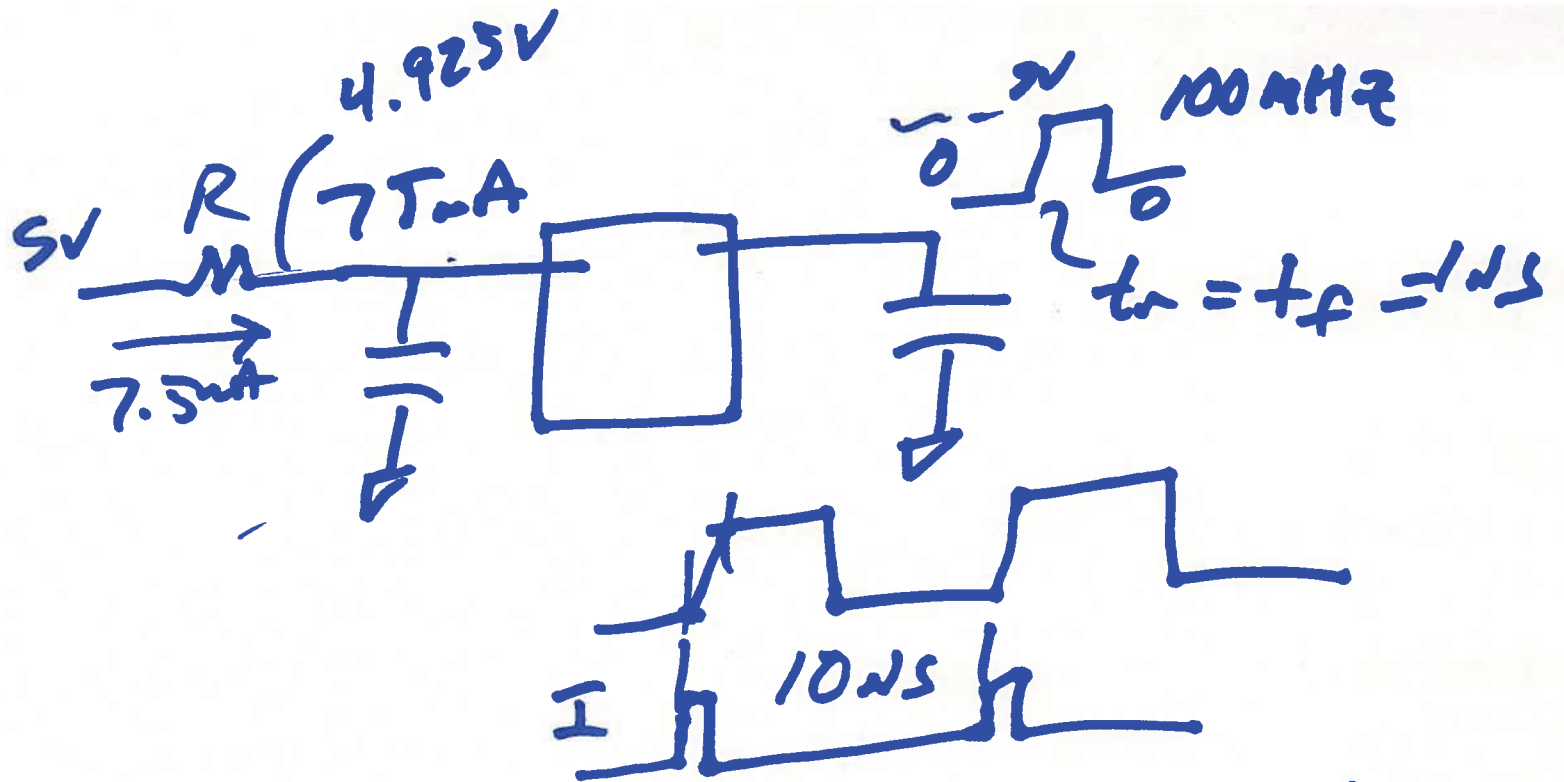
$$15pF \cdot 5V = Q$$

$$= 75pC$$

$$75\mu A \cdot 1ns$$

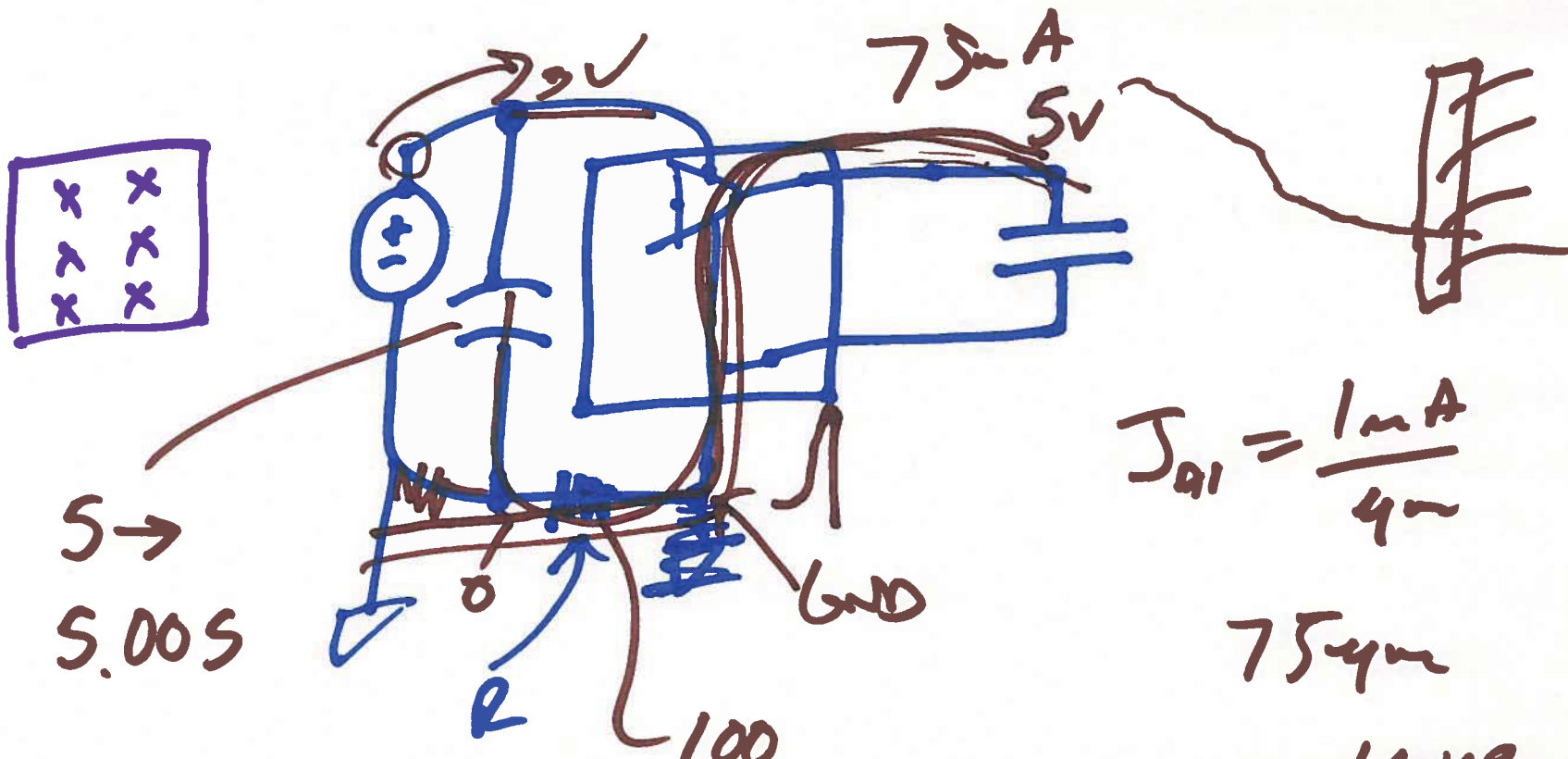
$$= 75pC$$

4)



$$\begin{aligned}
 I_{avg} &= 75nA \cdot \frac{1ns}{10ns} \\
 &= 7.5nA \\
 \bar{I}_{avg} &= \frac{75pC}{10ns} = 7.5nA
 \end{aligned}$$





$$J_{a1} = \frac{1 \mu A}{4 \mu m}$$

$75 \mu m$

Long metal lines \rightarrow Resistance

