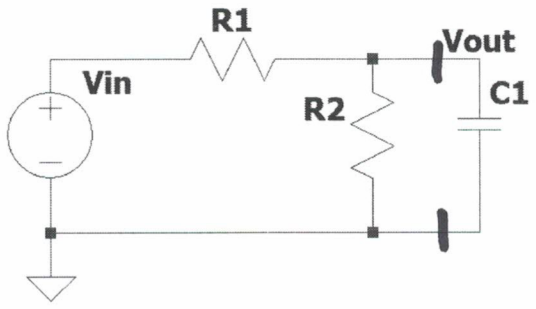
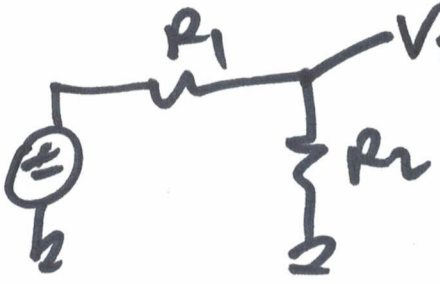
CE338 F2025 Quiz 1, close book, close notes

1. Determine the time delay at Vout using R1, R2, and C1 when Vin is a digital square wave input. To receive credit, you must include the Thevenin equivalent values of Vth, Rth, and the expression for the time delay. (30 points)



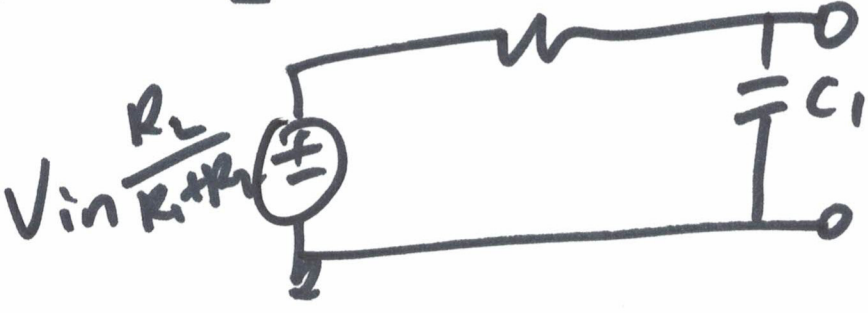
$\tau = RC$
time constant

$R_1 // R_2$ (R_{TH})

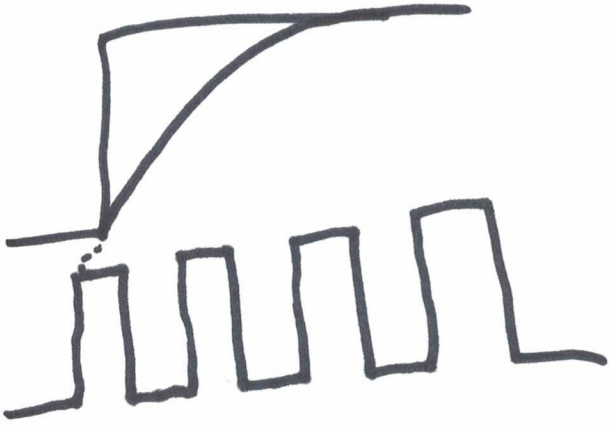


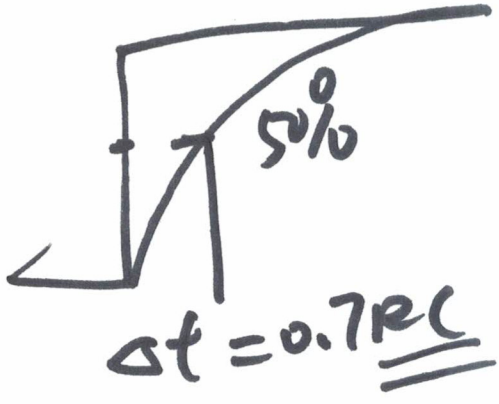
$V_{TH} = V_{in} \cdot \frac{R_2}{R_1+R_2}$

$0.7RC =$
$0.7(R_1 // R_2)C_1$

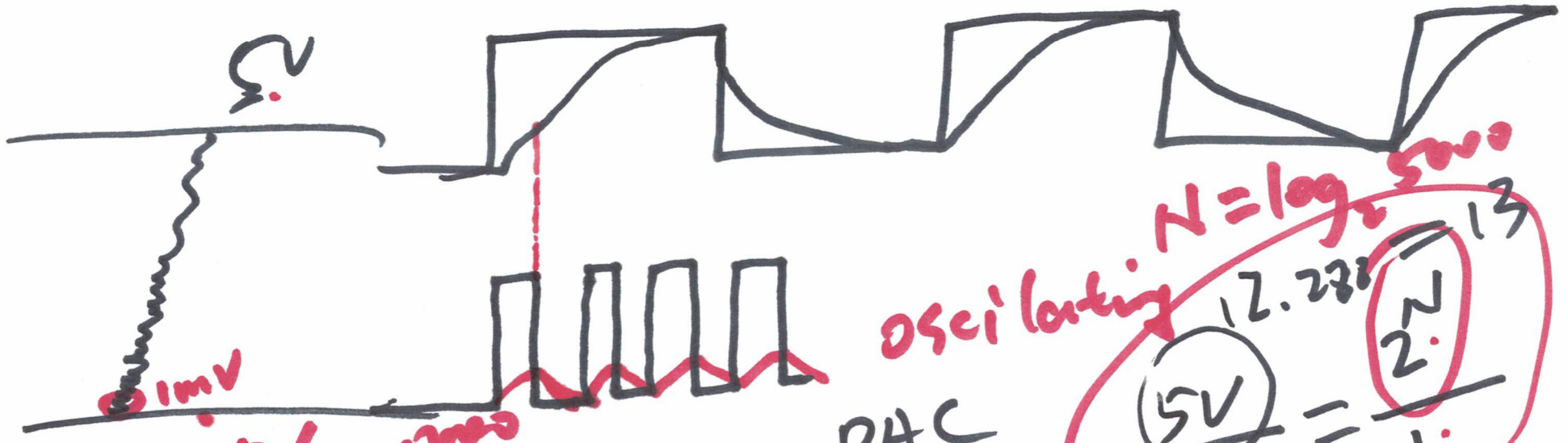


$t_d =$
$\Delta t =$





$\Delta t = 0.7RC$



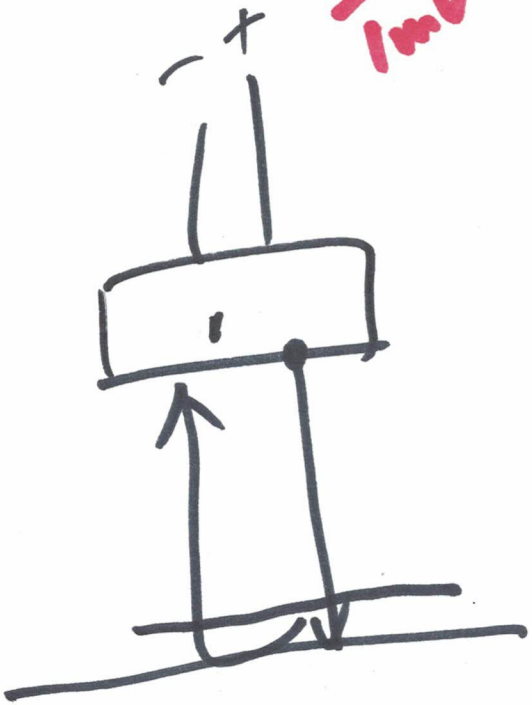
$$N = \log_2 5000$$

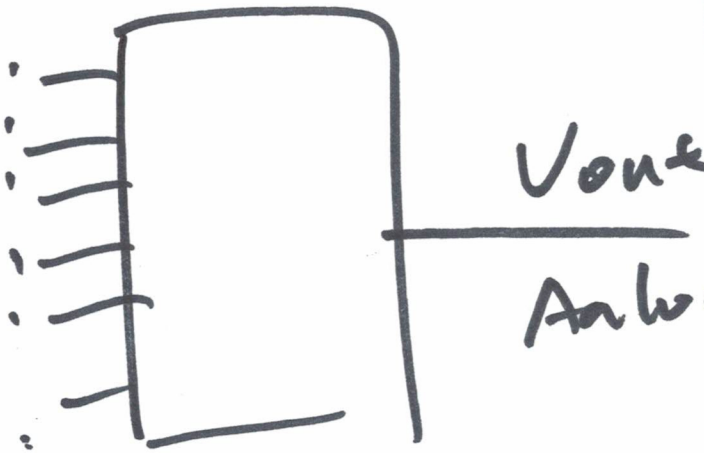
$$\frac{5V}{1mV} = \frac{2^N}{1}$$

12.288

13

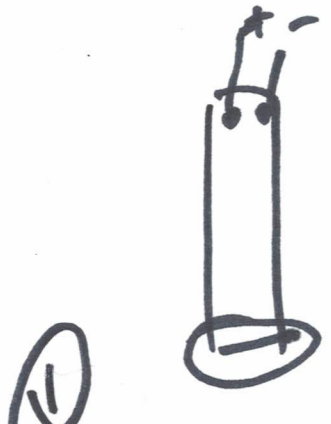
DDR 2



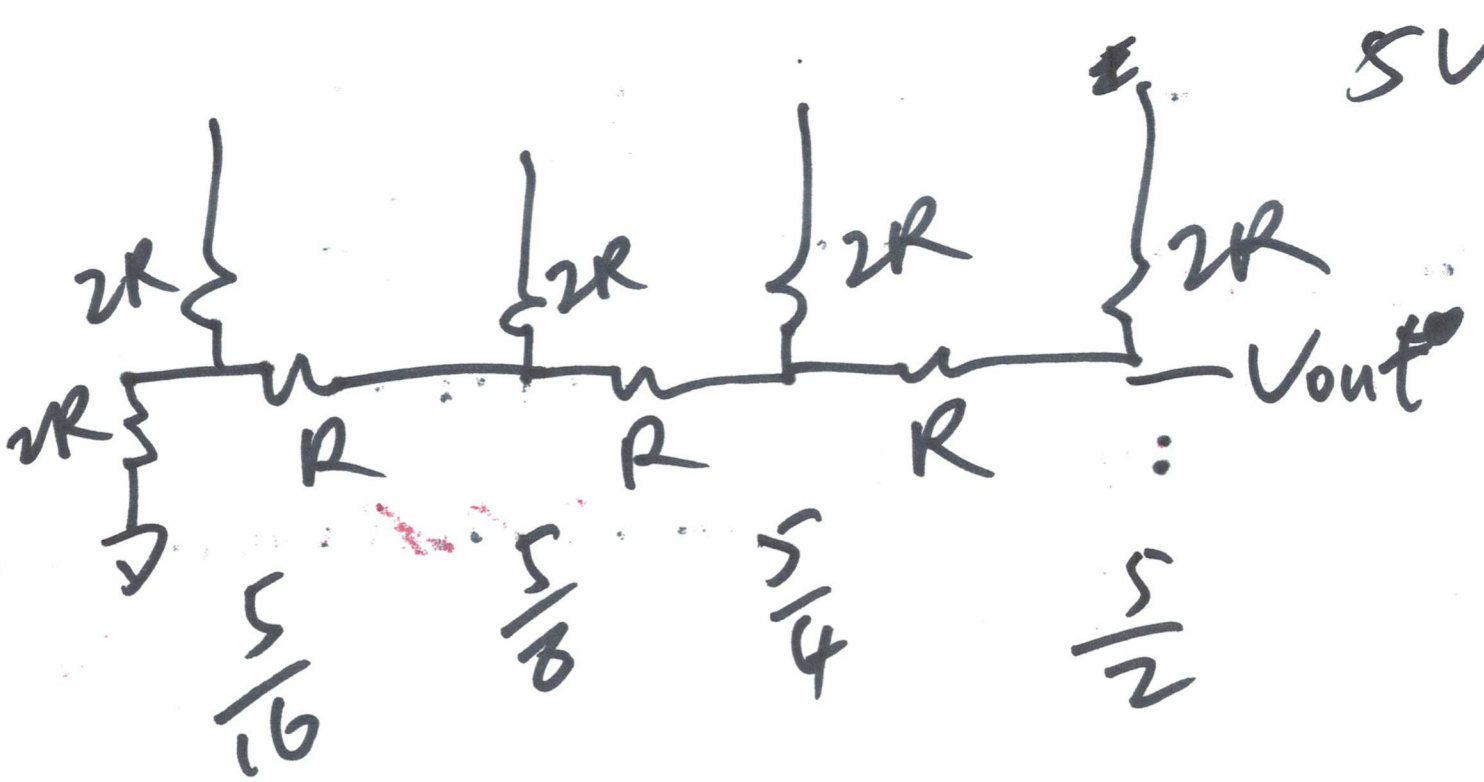


1 mV increments

Vref = 5V

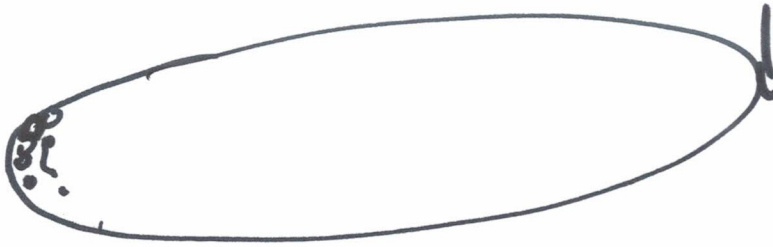


actuators
piezoelectric



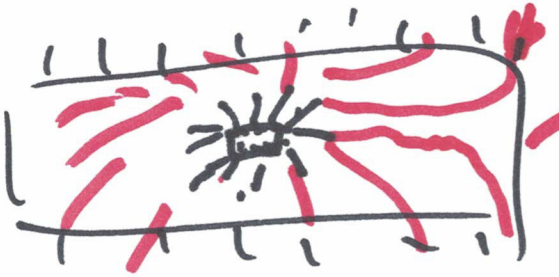
1000

8 16



dope
impurities

SMD



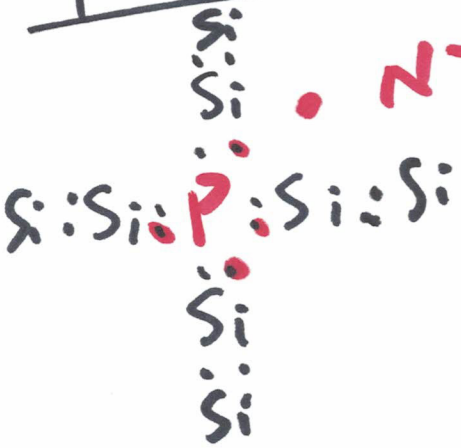
package
DIP-40

24

288

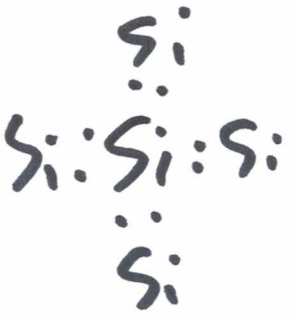
N-type

phosphorus 5



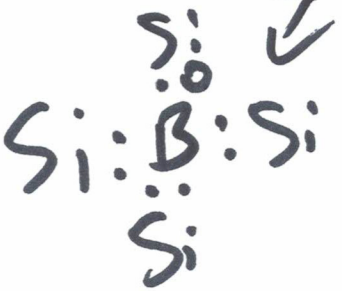
N-type

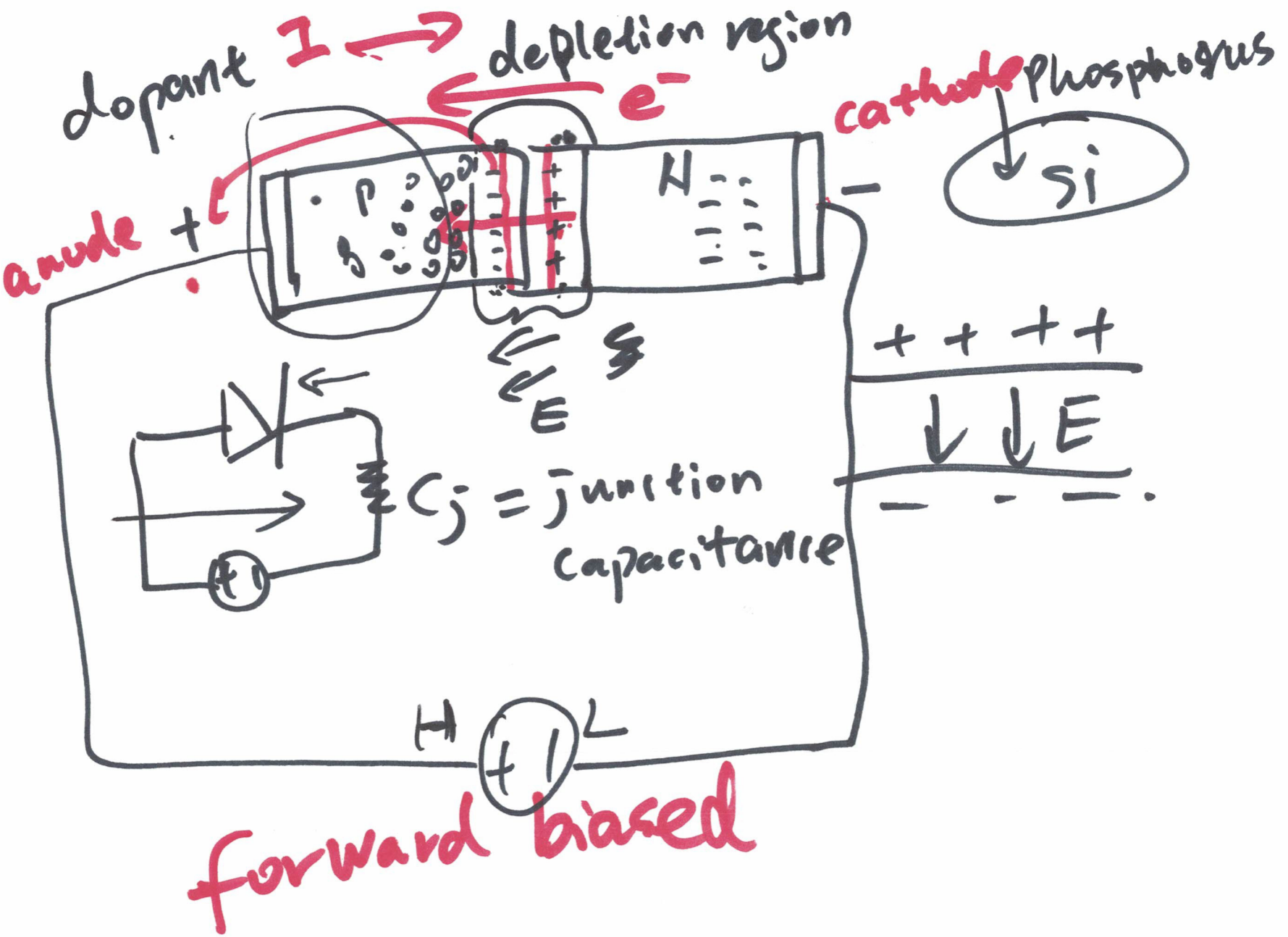
P-type

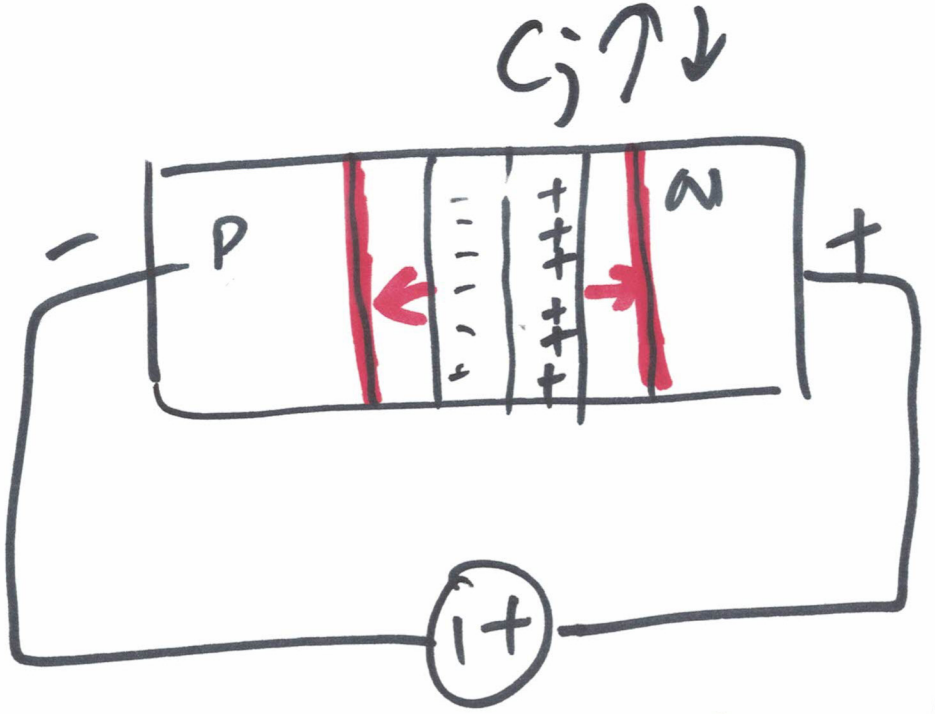


Boron

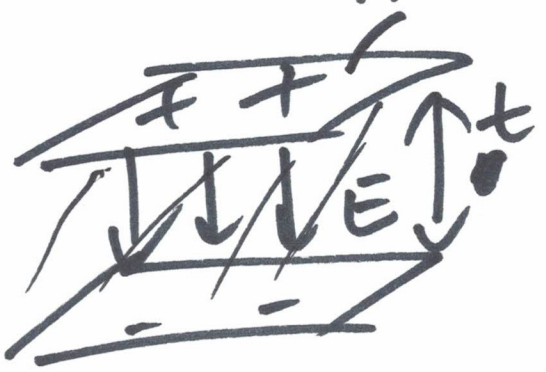
P-type




dopant I →
depletion region
e⁻
cathode
Phosphorus
Si
anode +
P
N
−
E
Cj = junction capacitance
+ + + +
E
H
L
forward biased



$C_j = \varepsilon \frac{A}{t}$ ↓



parasitic capacitance

Reversely Biased diode