University of New Mexico

Department of Electrical and Computer Engineering

ECE 520 - VLSI Design (spring 2026) Homework #5

Due in class: Thursday March 5, 2026

1. Design a CMOS inverter using 0.25um CMOS devices, such that $V_M=V_{DD}/2$. Assume that the NMOS and PMOS device parameters are given below and V_{DD}=2.5V and (W/L)n=1.5.

- In our generic 0.25 micron CMOS process, using the process parameters from table a V_{DD} = 2.5V, and a minimum size NMOS device ($(W/L)_n$ of 1.5)

	V_{T0}(V)	$\gamma(V^{0.5})$	V_{DSAT}(V)	k'(A/V²)	$\lambda(V^{-1})$
NMOS	0.43	0.4	0.63	115×10^{-6}	0.06
PMOS	-0.4	-0.4	-0.8	-30×10^{-6}	-0.1

2. Estimate all static parameters of the inverter in problem 1, including V_{OL}, V_{OH}, V_M, V_{IL}, V_{IH}, NML, and NMH.