

For CpE 151, 5 lowest grade questions will be dropped. For EEE234 2 questions will be dropped.

Name: _____

1. ✓ Shown below are transistor higher order effects. Identify a lateral field effect from below.
 - a. Subthreshold conduction
 - b. Mobility degradation
 - c. Body effect
 - ✓ (d) Velocity saturation
2. ✓ Shown below are transistor higher order effects. Identify a vertical field effect from below.
 - a. Subthreshold conduction
 - ✓ (b) Mobility degradation
 - c. Body effect
 - d. Velocity saturation
3. ✓ "Pinch-off" because of channel length modulation occurs in which region of operation?
 - a. Subthreshold
 - ✓ (b) Saturation
 - c. Linear
 - d. Both (b) and (c)
4. ✓ Because of channel length modulation, I_{ds} increases (increases/decreases) with V_{ds} and the L_{eff} decreases (increases/decreases).
5. ✓ Body effect modulates the threshold voltage (V_t) of a MOSFET. As V_s increases/ V_b decreases, what happens to the V_t ? increases (increases/decreases)
6. ✓ Because of short channel effect, the V_{th} of a MOSFET increases (increases/decreases) with increasing values of L .
7. ✓ I_{ON} of a MOSFET decreases with temperature and I_{OFF} increases with temp.
8. ✓ For the pass transistor chain shown in figure - 1 below, what is the voltage at the output?

$$V_{DD} - V_{TH}$$

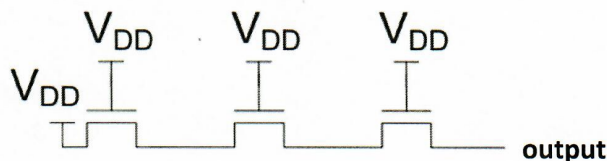


Figure - 1

9. For the pass transistor shown in figure - 2 below, what is the voltage at the output?

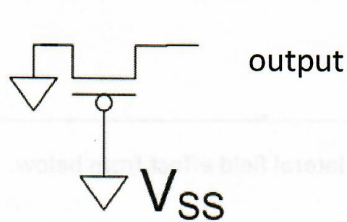


Figure - 2

$$GND + |V_{th}|$$

10. For the pass transistor chain shown in figure - 3 below, what is the voltage at the output?

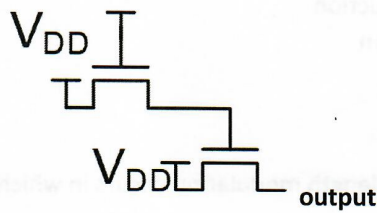


Figure - 3

$$V_{DD} - 2V_{th}$$

11. For each of the regions shown below in the DC transfer curve, identify the regions of operation for the PMOS and NMOS. Fill in the table from figure - 4. (5 Points)

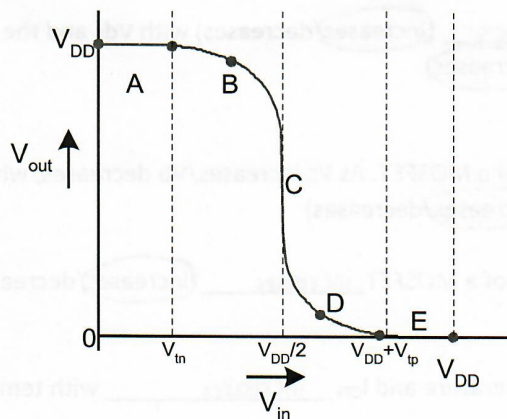


Figure - 4

Region	nMOS	pMOS
A	OFF	Linear
B	Saturation	Linear
C	Saturation	Saturation
D	Linear	Saturation
E	Linear	OFF