

Fundamentals of Nanotransistors

L1.5 Quiz

ANSWERS

Mark Lundstrom
Purdue University

Lecture 1.5: Energy Band View of MOSFETs

- 1) Which of the following is true about a well-designed MOSFET?
 - a) The energy barrier between the source and channel is weakly controlled by the gate voltage and strongly by the drain voltage.
 - b) The energy barrier between the source and channel is strongly controlled by the gate voltage and weakly by the drain voltage.**
 - c) The energy barrier between the source and channel is weakly controlled by both the gate and drain voltages.
 - d) The energy barrier between the source and channel is strongly controlled by both the gate and drain voltages.
 - e) There is no energy barrier between the source and channel.

- 2) Which of the following is true about the electric field in the channel of a MOSFET operating in the linear region?
 - a) It is approximately constant.**
 - b) It increases linearly with distance from the source to the drain.
 - c) It increases quadratically with distance from the source to the drain.
 - d) It decreases linearly with distance from the source to the drain.
 - e) It decreases quadratically with distance from the source to the drain.

- 3) What most strongly limits the current of nanoscale N-channel transistor in the saturation region?
 - a) The ability of electrons to hop over the source to channel energy barrier.**
 - b) The ability of electrons to hop over the drain to channel energy barrier.
 - c) The magnitude of the electric field near the drain.
 - d) The voltage on the drain.
 - e) Carrier scattering near the drain.