Fundamentals of Nanotransistors

L2.3 Quiz

ANSWERS

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Lecture 2.3: Gate Voltage and Surface Potential

1) What is the physical meaning of the term, $-Q_S(\psi_S)/C_{ox}$?

a) It is the voltage drop across the semiconductor.
b) It is the voltage drop across the semiconductor-oxide interface.
c) It is the voltage drop across the inversion layer.
d) It is the voltage drop across the oxide.
e) It is the metal-semiconductor workfunction difference.

2) Which of the following is true when $\psi_S = 2\psi_B$?

a) The semiconductor is at flatband.
b) The semiconductor is at the beginning of accumulation.
c) The semiconductor is at the onset of inversion.
d) The semiconductor is on the verge of breakdown.
e) The gate voltage is equal to the surface potential.

3) The parameter, $m = 1 + C_D / C_{ox}$, plays an important role in our discussions. What is $m = 1 + C_D / C_{ox}$ used for?

a) To compute the flatband capacitance.
b) To estimate how far above $2\psi_B$ the surface potential is when in strong inversion.
c) To estimate the surface potential under depleted conditions when the gate voltage is known.
d) To estimate the surface potential under inverted conditions when the gate voltage is known.
e) To estimate the surface potential under accumulated conditions when the gate voltage is known.