Fundamentals of Nanotransistors
L1.6 Quiz
ANSWERS

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Lecture 1.6: Traditional IV Theory

1) Which of the following observations would indicate that **velocity saturation** is occurring in the MOSFET?

a) A drain to source saturation current that varies as $I_{DS} \mu \sqrt{\left(V_{GS} - V_T\right)}$.

b) A drain to source saturation current that varies as $I_{DS} \mu \left(V_{GS} - V_T\right)$.

c) A drain to source saturation current that varies as $I_{DS} \mu \left(V_{GS} - V_T\right)^{3/2}$.

d) A drain to source saturation current that varies as $I_{DS} \mu \left(V_{GS} - V_T\right)^{2}$.

e) A drain to source saturation current that varies as $I_{DS} \mu \left(V_{GS} - V_T\right)^{3}$.

2) Which of the following expressions describes an N-channel MOSFET in the **linear region**?

a) $I_{DS} = W C_{ox} \upsilon_{sat} \left(V_{GS} - V_T\right)$.

b) $I_{DS} = \frac{W}{L} C_{ox} u_{sat} \left(V_{GS} - V_T\right)$.

c) $I_{DS} = W m_n C_{ox} \left(V_{GS} - V_T\right) V_{DS}$.

d) $I_{DS} = \frac{W}{L} \mu_n C_{ox} \left(V_{GS} - V_T\right) V_{DS}$.

e) $I_{DS} = \frac{W}{2L} \mu_n C_{ox} \left(V_{GS} - V_T\right)^2 V_{DS}$.

3) Which of the following expressions describes a short channel N-channel MOSFET in the **saturation region**?

a) $I_{DS} = W C_{ox} \upsilon_{sat} \left(V_{GS} - V_T\right)$.

b) $I_{DS} = \frac{W}{L} C_{ox} u_{sat} \left(V_{GS} - V_T\right)$.

c) $I_{DS} = W m_n C_{ox} \left(V_{GS} - V_T\right) V_{DS}$.

d) $I_{DS} = \frac{W}{2L} \mu_n C_{ox} \left(V_{GS} - V_T\right)^2$

e) $I_{DS} = W \upsilon_{sat} C_{ox} \left(V_{GS} - V_T\right)^2$.