Lecture 4.4: Transmission Theory of the MOSFET: I

1) How does the transmission vary with drain bias?
   a) It increases as $V_{DS}$ increases from 0 to $V_{DD}$.
   b) It decreases as $V_{DS}$ increases from 0 to $V_{DD}$.
   c) It reaches a maximum for $V_{DS}$ between 0 V and $V_{DD}$.
   d) It reaches a minimum for $V_{DS}$ between 0 V and $V_{DD}$.
   e) It is independent of $V_{DS}$.

2) How is the linear region current in the presence of scattering, $I_{LIN}$, related to the ballistic linear region current, $I_{LIN}^{ball}$?
   a) $I_{LIN} = T_{LIN} I_{LIN}^{ball}$.
   b) $I_{LIN} = \left( \frac{T_{LIN}}{2} \right)^2 I_{LIN}^{ball}$.
   c) $I_{LIN} = \left( \frac{T_{LIN}}{1 + T_{LIN}} \right) I_{LIN}^{ball}$.
   d) $I_{LIN} = \left( \frac{T_{LIN}}{2 + T_{LIN}} \right) I_{LIN}^{ball}$.
   e) $I_{LIN} = \left( T_{LIN} \left( 2 \frac{T_{LIN}}{1 + T_{LIN}} \right) \right) I_{LIN}^{ball}$.

3) How is the saturation region current in the presence of scattering, $I_{SAT}$, related to the saturation region current, $I_{SAT}^{ball}$?
   a) $I_{SAT} = T_{SAT} I_{SAT}^{ball}$.
   b) $I_{SAT} = \left( \frac{T_{SAT}}{2} \right)^2 I_{SAT}^{ball}$.
   c) $I_{SAT} = \left( \frac{T_{SAT}}{1 + T_{SAT}} \right) I_{SAT}^{ball}$.
   d) $I_{SAT} = \left( \frac{T_{SAT}}{2 + T_{SAT}} \right) I_{SAT}^{ball}$.
   e) $I_{SAT} = \left( T_{SAT} \left( 2 \frac{T_{SAT}}{1 + T_{SAT}} \right) \right) I_{SAT}^{ball}$.