Week 15 Quiz Answers
ECE 606: Solid State Devices
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Quiz 1:
Answer the four multiple choice questions below by choosing the one, best answer.

1) What is the “Negative Bias Temperature Instability” (NBTI) of a MOSFET?
   a) A change in threshold voltage due to the breaking of Si-O bonds in P-MOSFETS that occurs under negative gate bias
   b) A change in threshold voltage due to the breaking of Si-O bonds in N-MOSFETS that occurs under negative gate bias
   c) A change in threshold voltage due to the breaking of Si-H bonds in P-MOSFETS that occurs under negative gate bias.
   d) A change in threshold voltage due to the breaking of Si-H bonds in N-MOSFETS that occurs under negative gate bias.
   e) A change in threshold voltage due to the breaking of Si-Si bonds in N-MOSFETS that occurs under negative gate bias.

2) In NBTI, the number of hydrogen bonds broken varies as time to what power?
   a) one-fourth
   b) one-half
   c) three-fourths
   d) one
   e) five-fourths

3) The “Anode hole injection model” describes what?
   a) The physical mechanism of NBTI.
   b) The mechanism for breaking Si-O bonds in the oxide, which leads to oxide breakdown.
   c) Radiation induced charge build-up due to trapped holes in a MOSFET.
   d) The mechanism for radiation induced gate dielectric rupture.
   e) The movement of mobile sodium ions in the oxide.

4) What is the most important reliability problem in modern MOSFETs?
   a) Hot carrier injection.
   b) Oxide breakdown.
   c) NBTI in P-MOSFETS
   d) NBTI in N-MOSFETS
   e) Radiation induced damage.