Week 10 Quiz ANSWERS: MS Diodes
ECE 305: Semiconductor Devices
Mark Lundstrom, Purdue University, Spring 2015

Answer the **multiple choice questions** below by choosing the **one, best answer**.

1) For a metal-semiconductor diode, which of the following is true?
   a) The saturation current density is much larger than for a PN junction with the same bandgap semiconductor.
   b) The the \( n = 2 \) current is absent.
   c) The diode turn-on voltage is reduced as compared to a PN junction with the same bandgap semiconductor.
   **d) All of the above.**
   e) None of the above.

2) To make an ohmic contact to an n-type semiconductor, one could:
   a) **Select a metal with a workfunction smaller than that of the semiconductor.**
   b) Select a metal with a workfunction larger that that of the semiconductor.
   c) Use a lightly doped semiconductor.
   d) Insert a thin insulating layer under the metal.
   e) Reduce the minority carrier lifetime in the semiconductor.

3) For an ideal metal-n-type GaAs diode, which type of carrier transport dominates under reverse bias?
   a) **Electron injection from the metal to semiconductor.**
   b) Electron injection from the semiconductor to metal.
   c) Hole injection from the metal to semiconductor.
   d) Hole injection from the semiconductor to metal.
   e) Electron-hole recombination in the semiconductor.

4) The electrostatics of the MS diode in question 3) are similar to which of the following?
   a) **A p+/n junction.**
   b) A p/n junction.
   c) An n+/p junction.
   d) An n/p junction
   e) None of the above.

5) For an ideal metal-p-type GaAs diode, which type of carrier transport dominates under forward bias?
   a) Electron injection from the metal to semiconductor.
   b) Electron injection from the semiconductor to metal.
   c) Hole injection from the metal to semiconductor.
   **d) Hole injection from the semiconductor to metal.**
   e) Electron-hole recombination in the semiconductor