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

1) Which of the following is the workfunction?
   a) The energy required to move an electron from $E_C$ to the vacuum level.
   b) The energy required to move an electron from $E_i$ to the vacuum level.
   c) The energy required to move an electron from $E_V$ to the vacuum level.
   d) The energy required to move an electron from $E_F$ to the vacuum level.
   e) The energy required to move an electron from $E_F$ to $E_C$.

2) Which of the following is the electron affinity?
   a) The energy required to move an electron from $E_C$ to the vacuum level.
   b) The energy required to move an electron from $E_i$ to the vacuum level.
   c) The energy required to move an electron from $E_V$ to the vacuum level.
   d) The energy required to move an electron from $E_F$ to the vacuum level.
   e) The energy required to move an electron from $E_F$ to $E_C$.

3) Which of the following is the Schottky barrier height?
   a) The difference between the conduction band at the MS junction of an N-type semiconductor and the Fermi level in the metal.
   b) The difference between the valence band at the MS junction of an N-type semiconductor and the Fermi level in the metal.
   c) The difference between the conduction band at the MS junction of a P-type semiconductor and the Fermi level in the metal.
   d) The difference between the valence band at the MS junction of a P-type semiconductor and the Fermi level in the metal.
   e) a) and d).

4) The bandbending in the semiconductor is equal to what?
   a) The Schottky barrier height.
   b) The semiconductor electron affinity.
   c) The semiconductor workfunction.
   d) The metal workfunction.
   e) The built-in potential of the MS diode.
5) Where does the peak electric field occur in an MS junction?
   a) Deep inside the metal.
   b) Deep inside the semiconductor.
   c) At the edge of the semiconductor transition region.
   d) At the metal-semiconductor interface.
   e) About one Debye length from the metal-semiconductor interface.

6) The forward-biased current in an MS diode can be written as $I_D = I_0 e^{\frac{qV}{nkT}}$, where $n$ is the diode ideality factor. What is the value of the diode ideality factor?
   a) $n = 0.5$
   b) $n = 1$
   c) $n = 1.5$
   d) $n = 1$ at mid forward bias and $n = 2$ at low forward bias.
   e) $n = 2$ at mid forward bias and $n = 1$ at low forward bias.

7) What is the consequence of the fact that MS diodes are majority carrier devices, not minority carrier devices like NP diodes?
   a) The barrier height is smaller than the bandgap.
   b) The small signal model does not have a diffusion capacitance.
   c) The small signal model does not have a junction capacitance.
   d) The diode turn on voltage is smaller.
   e) The series resistance is smaller.