ECE 59500: Spring 2019
Theory and Practice of Solar Cells: A Cell to System Perspective

Lecture 2 Quiz:

1) How do we interpret the slope of the conduction band on an energy band diagram?

   a) It is proportional to the electrostatic potential
   b) It is proportional to minus the electrostatic potential
   c) It is proportional to the electric field
   d) It is proportional to minus the electric field
   e) It is proportional to the space charge density

2) For a semiconductor doped with $N_D > N_A$ and under optical illumination but with no applies bias, which of the following is true?

   a) $np = n_i^2$ b) $np > n_i^2$ c) $np < n_i^2$ d) $np = N_D N_A$ e) $np = N_D^+ N_A^-$

3) If an electron-hole pair is generation by optical illumination **on the neutral P-side** of a short-circuited PN junction, how many electrons flow in the external circuit. You should assume that there is no recombination.

   a) 0 b) 1 c) 2 d) 3 e) 4

4) If an electron-hole pair is generation by optical illumination **in the transition region** of a short-circuited PN junction, how many electrons flow in the external circuit. You should assume that there is no recombination.

   a) 0 b) 1 c) 2 d) 3 e) 4

5) If the bandgap of a semiconductor is larger than the optimum value, the efficiency is lowered. Why?

   a) The short-circuit current is too low
   b) The short-circuit current is too high
   c) The open-circuit voltage is too low
   d) The open-circuit voltage is too high
   e) The fill factor is reduced