Week 11 Lecture 28 Quiz:
Scattering: The BTE Revisited

ECE 656: Electronic Conduction In Semiconductors

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Student's name: _____

Answer the **multiple choice questions** below by choosing the **one, best answer**. Then **ask a question** about the lecture.

1) Mathematically, what is the solution to the equilibrium BTE?
   a) The Fermi-function.
   b) The Fermi function or the Bose-Einstein distribution.
   c) Any function of kinetic energy.
   d) Any function of total energy.
   e) Any function of total momentum.

2) Which of the following statements is true in equilibrium?
   a) The electrostatic potential is constant with position.
   b) The chemical potential is constant with position.
   c) The carrier density potential is constant with position.
   d) The electrochemical potential is constant with position.
   e) The electrochemical potential and temperature are constant with position.

3) What are the proper boundary conditions for the 1D BTE?
   a) The carrier densities at the two contacts.
   b) The incident and emerging fluxes are the two contacts.
   c) The incident and emerging fluxes at one of the two contacts.
   d) The incident fluxes at the two contacts.
   e) The carrier densities at the two contacts.

4) In a ballistic device, the states in the devices fall into what two classes?
   a) Spin up and spin down states.
   b) Those fillable from contact one and those fillable from contact two.
   c) Those fillable from contact one, those fillable from contact two, and those not fillable.
   d) Conduction and valence band states.
   e) None of the above.

5) What is the quantity: $\frac{h}{2L}\sum_{\vec{k}}|v_x|\delta(E-E_k)$?

a) The transport distribution at energy, *E.*
b) The mean-free-path at energy, *E*.
c) The transmission at energy, *E.*
d) The diffusion coefficient at energy, *E.*
e) The number of channels at energy, *E*.

6) What question do you have about this lecture?

Turn in to Prof. Lundstrom in class on Friday, Nov. 1 .