

ELEG 667-010 - Advanced Nanostructure Devices – Fall 2006
Homework #10 - due Tuesday, 12 December 2006, at noon in Dept.
office

1. Derive the Child-Langmuir equation, Eqn. (8.30), p. 330 in ML 2nd edition. Hints: Use the substitution, $V(z) = az^b$ and substitute to find the b and the a.

2. Problem 9.1a only, in chapter 9, Lundstrom, p. 408 in 2nd edition. Hints: put in form $\tau = \tau_o (E/k_B T)^s$ where $\tau_o = \lambda_o(m^*/2k_B T)^{1/2}$, and make use of the typical form for $\langle\langle\tau_o\rangle\rangle$ in terms of Γ functions.

3. Problem 9.3, in chapter 9, Lundstrom, p. 409 in 2nd edition.

4. Problem 8.9, in chapter 8, Lundstrom, p. 362 in 2nd edition. Hints: Just present brief discussion.

5. Problem 9.6, in chapter 9, Lundstrom, p. 410 in 2nd edition. Hint: put v_z in terms of k_z and combine inside differential $d(k_z^2)$ to yield energy.

6. Problem 9.11, in chapter 9, Lundstrom, p. 410 in 2nd edition. Hint: resistance is V_{DS}/I_{Dlin} for small V_{DS} .

Homework assignments will appear on the web at:

<http://www.ece.udel.edu/~kolodzey/courses/eleg667f06.html>

Note: On each homework and report submission, please give your name, the due date, assignment number and the course number. For full credit - include units/dimensions for all numerical quantities