

ELEG 646; ELEG 446 - Nanoelectronic Device Principles – Spring 2007
Homework #12 - due Thursday, 17 May 2007, noon, in Dept. office

1. Problem 8.5 in chapter 8 of Muller & Kamins, p.422 in 3rd edition. (Hint: see Berglund, IEEE TED, v. ED13, p. 701, 1966. Start with $Q_s = -C_{ox}(V_G - V_{FB} - \psi_s)$ and then $C_G = -dQ_s/dV_G$. Note that V_{FB} is a constant with V_G , but that ϕ_s is not. Recall that ψ and ϕ differ by a constant. Hint 2: careful with book's notation: sometimes they use ϕ_s with the meaning as in our lectures, and sometimes they use ϕ_s to mean our ψ_s , as in Fig. 8.8 and on page 393.
2. Problem 9.1 for nMOS and $N_A = 1E15$ and $1E16 \text{ cm}^{-3}$ only, in chapter 9, Muller & Kamins, p.477 in 3rd edition.
3. Problem 9.3, in chapter 9, Muller & Kamins, p.477 in 3rd edition.
4. Problem 9.4 (a) only, in chapter 9, Muller & Kamins, p.477 in 3rd edition.

Homework assignments will appear on the web at:

<http://www.ece.udel.edu/~kolodzey/courses/eleg646s07.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