

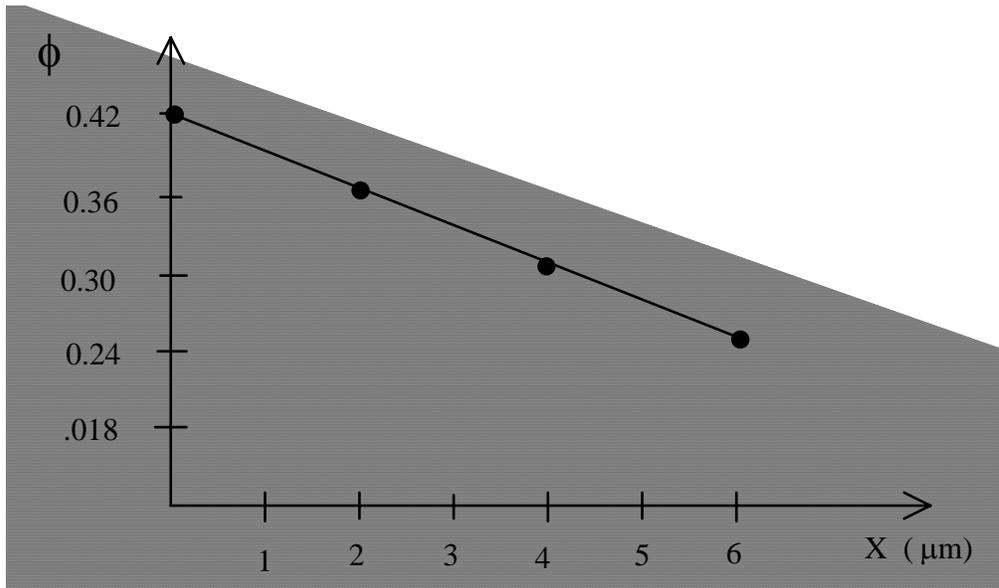
Massachusetts Institute of Technology
Department of Electrical Engineering and Computer Science
6.012 Microelectronic Devices and Circuits
Homework #1

Problem 1 – Howe and Sodini P2.4

Problem 2 – Howe and Sodini P2.6

Problem 3

Consider a bar of silicon in thermal equilibrium. A plot of the potential vs. x is shown below. (It linearly falls from 0.42V at $x = 0$ to 0.24V at $x = 6 \mu\text{m}$) Assume that the reference for this potential $\phi = 0$, when $n_o = p_o = n_i$.



- Plot the electron and hole concentration vs. x from $0 \leq x \leq 6 \mu\text{m}$.
- Plot the electric field vs. x .

For parts c-d assume $\mu_n = 1000 \text{ cm}^2/\text{V}\text{-sec}$

- Calculate the electron drift current density vs. x .
- Calculate the electron diffusion current density vs. x .

Problem 4 – Howe and Sodini – P2.10a

Problem 5 – Howe and Sodini – P2.11a

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