

George Mason University

Department of Electrical and Computer Engineering

ECE 684 --- MOS Device Electronics

Spring 2008

Problem Set # 2

Due date: Monday, 2/11/2008

Policy: Provide details of the solution for each problem. A solution with only final results will not get credit.

Problem: pn junction, p side is doped N_a , n side is doped N_d . The scales are shown in the figure. (you can find the hint from the textbooks.)

- (1) Calculate the build-in voltage (V_{bi}).
- (2) Plot the band diagram in equilibrium.
- (3) Calculate and plot the electric field $E(x)$ profile in x-direction at zero bias.
- (4) Calculate and plot the potential $V(x)$ in x-direction at zero bias.
- (5) Calculate the current when it is forward biased V .
- (6) Calculate the current when it is reverse biased V .

