

Applied Quantum Mechanics
Homework #3, due Monday Jan 28, 2008

Problem 1: Calculate the current density in a one dimensional rectangular potential well of size L with infinite barrier for:

a) The ground state ψ_1 .

b) The state $\psi = \frac{1}{\sqrt{2}}(\psi_1 + \psi_2)$

where ψ_1 is the wave function for the ground state and ψ_2 is the wave function for the first excited state.

Problem 2: Calculate the current density for a free electron in 1D.

Hint: $\psi(x, t) = e^{i(kx - \omega t)}$
