Name:_____

Student ID #:_____

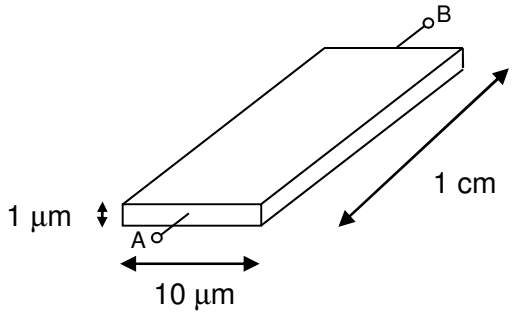
EECS 170A
Homework #1

HW will be collected in discussion section.
Please do not turn your HW in anywhere else.
Due: Noon Thursday, October 6, 2011.

Please *staple* this sheet to the front of your homework.

1	2	3	Total
/20	/50	/30	/100

1) Pure, bulk copper (Cu) has a resistivity (ρ) of 1.7 μΩ-cm. A thin metal wire as shown in the figure below is made of copper. It is 1 cm long, 10 μm wide, and 1 μm thick. Calculate the resistance.



2) A metal circular wire has diameter 1 mm. It's length is 50 cm. The resistance is 100 Ω.
   a. Calculate the resistivity.
   b. Calculate the conductivity.
   c. Calculate the resistance if the wire length is ten times higher.
   d. Calculate the conductance if the wire length is ten times higher.
3) A piece of silicon that is heavily doped has a resistivity of 10^{-3} Ω-cm.
   a. Assume a "wire" is made of silicon that is the same dimensions as question #2. Calculate the resistance.
   b. Now assume it is lightly doped, so that is has a resitivity of 1 kΩ-cm. Calculate the resistance.