ChE 333 Transport Phenomena III, fundamentals of Mass Transfer
Studio Worksheet #14 Interphase mass-transfer

NAME_____

Studio Section	**Studio 12:00-12:50**	**Studio 13:00-13:50**	**Studio 14:00-14:50**	**Studio 15:00-15:50**

Instructions: Open book, notes, and homework. Make sure to write your name and studio on any additional sheet of paper with your solution. Show your calculation, algebraic setup, and make sure to include units. If you do not complete the problem by the end of class, please turn in your completed solution to your Studio section Teaching Assistant at the next Studio session.

Problem 1: A packed-bed tower is used for absorption of pollutant from an air stream using water as the solvent. At one point in the tower the partial pressure of pollutant in the gasphase is 0.06 atm and 0.005 kgmole/m^3 in the liquid phase. The tower is isothermal at 30C and the total system pressure is 1.0 atm. The convective mass-tranfer coefficients are:

k_G=0.610 kgmole/m^2 hr atm [for the gas film]
k_L=12.21 m/hr [for the liquid film]

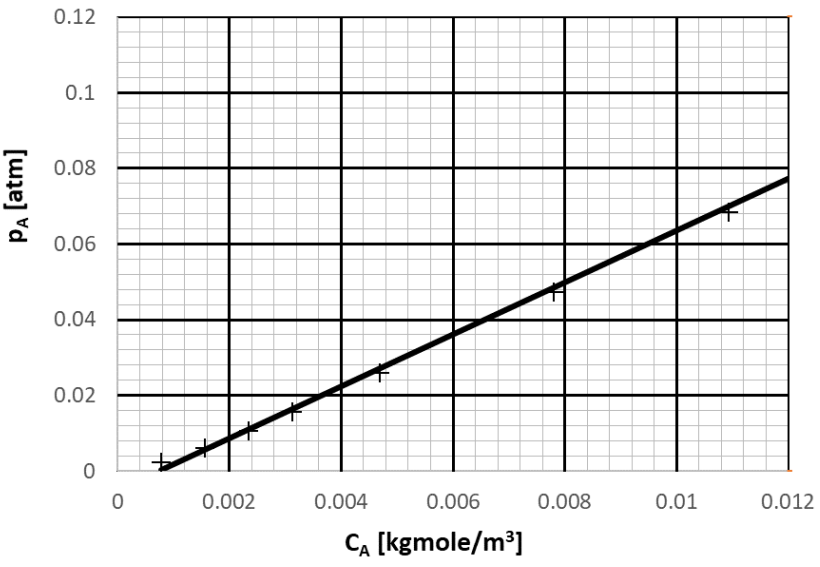
Write a flux equation for flux of pollutant:

A. Through the air stream to the air-water interface
B. From the air-water interface to the bulk water
C. From the bulk air to bulk water

The equilibrium line for pollutant in water is shown below.

D. Use the plot to determine p^*_A and c^*_{AL}. What does p^*_A and c^*_{AL} represent, explain in your own words.
E. Determine the gas-liquid interface compositions, $p_{A,i}$ and $c_{AL,i}$
F. Estimate K_G, K_L, K_y and K_x and the molar flux N_A at the operating point.
G. How much, in %, of the overall transport resistance is in the gas phase at the operating point. [$(1/k_G)$ / $(1/K_G)$]

What is the flux from the gas to the liquid?



Gas	Value	unit
p_A=		
p^*_A=		
$p_{A,i}$=		
K_G=		
K_y=		
Liquid		
c_{AL}=		
c^*_{AL}=		
$c_{AL,i}$=		
K_L=		
K_x=		