

# Homework 4 Due: 03/10/2016

## Applied Transport Phenomena - CHME420

- Exercise 1.** What is the pseudo-binary assumption?
- Exercise 2.** In what situations can we simplify mass transfer problems by neglecting the mass transport by convection?
- Exercise 3.** What is the pseudo-steady state (or quasi-steady state) approximation? When do you expect it to be valid?
- Exercise 4.** From what you have seen in class, what is the importance of solving for the quantity  $N_A$  in reactive systems? What does it represent physically?
- Exercise 5.** What does it mean for a reactive system to be “diffusion-controlled” or “diffusion-limited”? What does it mean to be “reaction-controlled” or “reaction-limited”?
- Exercise 6.** What is a “film model”?
- Exercise 7.** 18A.1
- Exercise 8.** 18B.2
- Exercise 9.** 18B.6
- Exercise 10.** 18B.8
- Exercise 11.** 18B.11 **Hint for part b):** You may leave your answer in terms of  $\delta$  even though it is unknown. To find  $\delta$ , you can use the fact that the reaction is 1-to-1 in A and B. Therefore, the fluxes of A and B reaching the  $\kappa\delta$  plane are equal.
- Exercise 12.** 11B.10