Homework 3 Due: 02/18/2016

Applied Transport Phenomena - CHME420

Exercise 1. Turn in problem 10B.1 parts a to c if you did not complete it for the previous homework.

Exercise 2. BSL 2B.9

Exercise 3. BSL 3B.2 and 3B.3 Read these problems carefully. Note that they do not ask you to derive the profiles.

Exercise 4. BSL 3B.15 Part (a) Get as far as you can. The amount of algebra is substantial.

Exercise 5. BSL 10B.16 - For Part (a), the most important thing is for you to be able to derive the differential equation. Once you do that, use a math handbook, or for the more technological inclined, a crafty web search for the integral. You do not need to complete the integration or apply the boundary conditions. Try to do part (b) in a spreadsheet program.

Exercise 6. From the following sample exam `http://paws.kettering.edu/~sturgmancohen/pdfs/chme420_ex2.pdf` complete the first problem, parts a to c. The key to this problem is paying close attention to the definition of the variables in problem 2B.7. T_b is defined in §10.8.

Exercise 7. Describe in your own words the difference between the partial, total, and substantial (or material) derivative. Use an example if you can.

Exercise 8. Write the microscopic linear momentum conservation equation in terms of $\boldsymbol{\tau}$ and identify what each term represents.

Exercise 9. In the case of solid materials, what does the combined energy flux vector reduce to? Explain.