Ch En 386

**Winter 2014 Homework**

**Homework #6 (20 points)**

**Due Friday, February 14**

Note: Anytime you solve a problem with Polymath or MathCad, you must print a copy of the report (Polymath) or the page with equations (MatchCad).

*Conditioning Problems (0.5 points each- you may not work with other students):*

1. For a plug flow reactor with a specific reaction such that , what terms can always come out of the integral?
2. For a CSTR, when is VR = FA0XA/(-rA) never true?
3. For a gas reaction in a PBR, under what condition is P/P0 = (1-W)0.5 true?
4. Show the integrated form of the following equation. You may assume isothermal.   
     
   

Magnitude and Reasonableness Problems *(0.5 points each)*

1. For a batch reactor with the gas reaction A + B 🡪 C, can you have a constant volume reactor that is isothermal and isobaric? Explain.
2. For turbulent flow, how does the pressure drop in a PBR vary with respect to the cross sectional area if the mass flow rate remains unchanged. You may assume that the PBR packing remains the same.

*Lesson 13: Steady state CSTR*

1. (6 points) Fogler P4-6 a, b, c, and e. For parts a and b, the reactor temperature is 100 ºF. For part b, assume you have two CSTRs of the same volume (1000 gal) in series and determine X of the second CSTR if the production rate of the first reactor remained the same as in part a. For part e, just answer the question relative to what you did in part a.

*Lesson 13: PFR*

1. (3 points) Fogler P4-11. Round up to the nearest number of tubes.
2. (3 points) Fogler P4-12a. This is a gas reaction and C is an inert. The reactor is also isobaric.

*Lesson 14: PBR*

1. (4 points) Fogler P4-18. For part d, assume that the flow is turbulent such that term 2 of Equation 4-25 is much more dominant than term 1.
2. (1 point) Fogler P4-22.