HW 1

Background:

The Department of Chemical Engineering at Auburn University is an ABET accredited program. As such, we have a curriculum which develops and demonstrated proficiency in eleven areas called "Program Educational Outcomes". The following assignment focuses on three of these outcomes:

> *Outcome 1: Our graduates will be able to apply mathematics, science, and engineering principles to solve chemical engineering problems. Although there will be an emphasis on chemical engineering principles, proficiency is also required in various general engineering and science areas as well.*
>
> *Outcome 2: Our graduates will be able to identify, formulate, and solve a range of chemical engineering problems systematically employing the skills of critical thinking and creative problem solving.*
>
> *Outcome 8: Our graduates will demonstrate proficiency in written communications.*

Problem Overview:

One of the prerequisite topics necessary to succeed in CHEN3660 Chemical Engineering Separations is a working knowledge of phase equilibria. This topic has been covered in several courses including CHEN2100 and CHEN3370. This assignment provides an opportunity to demonstrate retention and proficiency in material covered in previous courses, employ critical thinking skills, and be able to clearly and correctly explain and communicate information to informed readers via short memos and technical memos.

Vended Cola Problem:

When purchasing a canned cola product from a vending machine, one should leave the can unopened for a short period of time before opening the can. Failing to do so can lead to a very messy "spewing" of the contents.

In order to "scientifically" approach this problem, the following "thought experiment" is conducted:

Three identical refrigerated cans of cola (labeled A, B, and C) are obtained. They are subjected to the following treatments.

- Cans A and C are simultaneously vigorously shaken for 30 seconds. Can B is not shaken and is allowed to sit on a desktop.
- Can A is opened immediately following shaking and (as expected) spews.
- Can B is opened at the same time as Can A and (as expected) does not spew.
- Can C is allowed to sit on a desktop for 2 minutes and is then opened and does not spew.

Referring to the results of the thought experiment, explain the behavior of the vended cola product.

Restrictions:

The analysis of this problem is to be entirely your own work. You may not consult with classmates, professors, etc, or use any textbooks, web resources or other information. The object is to determine your knowledge and basic understanding of equilibrium and other engineering and science principles and to examine your ability to convey technical information to an informed individual. The problem is not intended to require specific equations or data, but rather focused on communicating the chemical and physical processes involved.

Report requirements:

Your analysis should be communicated as a short memorandum. Information about the specifications for such written communications is found at the following web link:

http://www.eng.auburn.edu/~tplacek/courses/templates