Key Concepts for the F.E. Exam

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February 26, 2002

General Points

- You are never going to be more prepared to take the FE exam than right now, so take it now.
- The pass rate of our students on the FE exam is used to determine the level of funding for the Department of Chemical Engineering at the University of Tennessee. If you would like to maintain the reputation of the department from which your degree comes, then it is in your best interests to help our funding by passing the FE exam.
- In the past, virtually all of the few of our students who have failed the FE exam have failed by 1 or 2 problems. In other words, don't give up. Work until time is up. The odds are greatly in your favor that if (i) you make a legitimate effort and (ii) you stay for the entire duration of the exam, that you will pass the FE exam.
- In the afternoon, you have a choice between the general and discipline specific exam. Take the discipline specific exam. Year after year, we get statistical data that the odds for passing are greatly in your favor if you take the discipline specific exam.
- It's better to get 1 problem right, than 2 problems wrong. Make an intelligent decision on whether you have a realistic chance of correctly solving the problem. If so, work the problem even if it exceeds the average time per problem rate.
- Problems frequently come in sets. Sometimes, the time spent on the first problem in a set exceeds the average time per problem rate. Answering the following, related problems in the set, take only a minute or so. The average time spent on the problems will hopefully fall within the average time per problem rate.
- Familiarize yourself with the FE reference handbook before the exam. Know where to look for information. Memorizing page numbers is not above and beyond the call of duty.

Specific Points for Material and Energy Balance Problems

Follow the established procedure for writing material and energy balances.
Draw a picture of the system with all streams.

- Each stream has a flowrate and a mole fraction for each component.
- Identify which variables are given.
- Identify which variables are unknown. Count them up.
- Write down as many equations as you have unknowns. These equations will always include n_c material balances, where n_c is the number of components in the system and n_s constraints that the mole fractions have to sum to unity, where n_s is the number of streams in the system. If, after writing out these equations, you still have more unknowns than equations, then reread the problem for additional information that can be expressed as an equation, such as a separation ratio.
- In solving the equations, remember that we don't need a complete solution. We only need enough of a solution to determine which of the four multiple choice answers is correct.

Taking Advantage of the Multiple Choice Format

- Look at the answers, before you work the problem. Sometimes, hints are given in the solution.
- Eliminate unphysical answers.
- Sometimes, substitution of numerical values into equations is a faster way to determine which of the four multiple choice answers are correct, than working out the equations completely.

Solution Notes on Problem 6, 7, 8:

Orsat Analysis exclude Water.
We have 10 unknowns.
We need 10 equations.
In a system with reaction, we can write balances for each atom.
4 atom balances.
2 mole fraction constraints. (1 is useless)
4 dry gas composition constraints
Pick a basis for F. Then 9 equations, 9 unknowns.
Solve as quickly as possible.
See attached solutions.

Solution Notes on Problem 15:
Error in solution.
4 eqns, 4 unknowns
easy.

Solution Notes on Problem 25-26:
Extractor
6 eqns, 6unknowns

problem 25.
eliminate answers (c) and (d) because no Furfural in raffinate
so just try 2 numbers.
or just try 1, if the first one doesn't work, the second one must be right