CH302 Random Musings March 1, 2007

1. I am not exactly sure what to do. I was thinking of resigning as a professor and letting someone who can teach better take over. This is how I felt after seeing the 61% average on quiz 3. It wasn't the lower percentage, which is always the case on the first water chemistry quiz, it was how it happened. On one of the questions, the pH of a dilute strong acid or base, only 25% got it right. This was the question that inspired me to dump a liter of 10^{-9} M HCl on Mazen to show you that the pH of a dlute strong acid or base is pretty much neutral. But instead, on the exam the vast majority of you wanted me to know that a strong basic has an acidic pH. Made me sad. Mazen too. So we will try again on the next quiz.

2. Maybe the problem is that I put too much emphasis on the 6 steps for solving acid base problems and should have made it 8 steps that included: Can I approximate? and: Does it make sense? Because if you had asked yourself those questions on the dilute strong acid/base problem I am fairly certain you would have said no and no to a base being acidic.

So let's try creating an 8 step recipe for acid/base calculations:

- get rid of spectators
- assign H^+ and OH^-
- assign HA, A^-, B, and BH^+
- do you neutralize
- neutralize
- do you approximate?
- calculate
- does it make sense?

3. There were many e-mailed questions about how certain problems were done. In most I noticed a common them—a lack of real certainty about how to use your calculator to do exponent math. I do encourage you to break out your instruction booklet if you are having trouble making it work for you. It will be worth it to learn how to take a fourth root or how to convert between decimal and scientific notation formats. Mad calculator skills are absolutely essential to success in CH302.

3. Quiz 4 is next week on the Thursday before Spring Break. Most of the questions on that quiz are still answered using the slacker equations that assume approximations, but although getting to the calculation is much tougher because they involve neutralizations or polyprotic acid systems, the 6 (no make it 8) step approach still works. Here are the question types:

- pH of a dilute strong acid or base
- buffer capacity
- Identifying buffers (after neutralization)
- Buffer neutralization calculation
- Equilibrium expressions for a polyprotic acid
- Identifying features of a titration curve
- Titration of strong acid and strong base
- Titration of weak acid/base with strong base/acid

4. Hint. The answer to the first question type is slightly more or less than 7.

5. Extra Credit 1—how to earn an extra 1 % of your grade in this course.

   - I want you to teach a science-hater something interesting about chemistry that you have learned in this class. The person you teach has to say to you, "gee, I had no idea chemistry was that interesting" when you have finished (you can make them say it even if they don't mean it.). You can choose what you teach but I would recommend that it be something of interest and utility from CH302: while you are on the beach tell someone why fish explode when you clean a fish tank or why they are dying from global warming (if you believe in global warming); while your car breaks down on the way to South padre, explain why you shouldn't add pure antifreeze to your car; while you are serving up a delicious glass of ice water to your grandmother, explain how neutral water isn't always pH 7 and on and on. Choose anything from the course and have a fine conversation.
   - Submit the assignment as simple text in an e-mail (no attachments)
   - Use the specific text written below as the subject heading of the e-mail:

     spring break extra credit—your uteid
   - Send it to dalaude@mail.utexas.edu.
   - If you do not provide your UTEID you will not receive credit.
   - Due Date: April 1 at 3 a.m.

6. Public Service Announcements:
   - **Explore UT.** This weekend is UT's annual open house. More than 300 free activities, performances and demonstrations will allow visitors to unravel scientific mysteries, unleash creative energies and uncover the wealth of educational opportunity at the University. If by some chance you wake up on Saturday before nightfall, and wander across campus, you will find yourself in the middle of a million people exploring UT (hence the name.) Natural Sciences is well represented on Speedway in front of Welch Hall where even I will be, presenting multiple chemistry circuses starting at noon. The loud explosions you will hear across campus at noon and 2 pm during that time will be me exploding stoichiometrically-mixed hydrogen balloons. Maybe I will wake you up early.

   - The University Theatre Guild will be performing the British Comedy "Habeas Corpus" by Alan Bennett this weekend. Showtimes are Friday, Saturday, and Sunday at 7pm in the Art Building, room 1.102. Tickets are $5 for students, and $7 for general admission. See www.texasutg.org for more info.

   - RANSOM NOTES FUNDRAISER CONCERT. Ransom Notes are an a cappella group with UT ties performing a benefit concert on Friday March 2nd @ 7 PM. Tickets are $3 at the door in UTC 2.112A More information at http://www.ransomnotes.org/

   - Hillel is sponsoring the Isreali Block Party sponsored today, right after class from 3:30 to 9:30 on the South Mall. Free food, music, etc.

   - Health Careers Mentorship Program (HCMP) is a 100% student run organization that gives its members the opportunity to shadow doctors (8 hrs/wk) and do some valuable networking. We offer 3 4-week shadowing "rotations" in pediatrics, adult medicine, and public health to give members a little taste of all sides of medicine. The info sessions are next week Monday-Thursday (flyers all over the place) and have a table just outside of our classroom. Feel free to ask questions! http://studentorgs.utexas.edu/hcmp/

- The Joint Admissions Medical Program is designed to assist highly-qualified, economically-disadvantaged students with admission to medical school. Those who are admitted to JAMP and maintain the program requirements will be guaranteed admission to a Texas medical school upon the completion of their undergraduate degree. Additional information about the program is available on the JAMP website: (http://www.utsystem.edu/jamp <http://www.utsystem.edu/jamp>)

  The application period begins March 1 with an application deadline of October 1. Student must meet the following criteria to apply for the program:

  * Be Pell Grant-eligible for the first year of college (check with the Financial Aid office)
  * Have entered UT the fall following graduation from high school
  * Have completed 27 semester hours of credit with a 3.25 overall GPA and a 3.0 GPA in science courses during the freshman year

  If you meet these requirements and are interested in applying, please plan to attend one of the following information sessions:

Thursday, March 1	Monday, March 5	Tuesday, March 6
5:00 - 6:00	1:00 - 2:00	5:00 - 6:00
WEL 3.502	UTC 4.104	GRG 102

5. **Poetry corner.** Spring is here—I saw red buds in the redbuds. Rebirth and all, I should be happy but even rebirth reminds me that I am one spring season closer to death. To help spring along I am offering up a couple of poems about spring. One is by a favorite poet of mine, Gerard Manley Hopkins, (though this one is way too positive to be a personal favorite) and for the cynics in the world, spring from a slightly skewed perspective by Edna St. Vincent Millay.

Spring --Gerard Manley Hopkins
Nothing is so beautiful as spring--
When weed in wheels, shoot long and lovely and lush;
Thrush's eggs look little low heavens, and thrush
Through the echoing timber does so rinse and wring
The ear, it strikes like lightening to hear him sing;
The glassy peartree leaves and blooms, they brush
The descending blue: that blue is all in a rush
With richness; the racing lambs too have fair their fling
What is all this juice and all this joy?
A strain of the earth's sweet being in the beginning
In Eden garden--Have, get, before it cloy,
Before it cloud, Christ, lord and sour with sinning.
Innocent mind and Mayday in girl and boy,
Most, O maid's child, thy choice and worthy the winning.

Spring -- Edna St. Vincent Millay
To what purpose, April, do you return again?
Beauty is not enough,
You can no longer quiet me with the redness
Of little leaves opening stickily,
I know what I know,
The sun is hot on my neck as I observe
The spikes of the crocus,
The smell of earth is good,
It is apparent that there is no death.
But what does that signify?
Not only underground are the brains of men
Eaten by maggots,
Life in itself
Is nothing,
An empty cup, a flight of uncarpeted stairs.
It is not enough that yearly,
Down the hill,
April, Come like an idiot, babbling and strewing flowers.

6. Amusing dialog corner—forwarded to me during Chapter 8, sorry for the delay in case this might have helped with exam 1:

DIALOGUE WITH SARAH, AGED 3: IN WHICH IT IS SHOWN THAT IF YOUR DAD IS A CHEMISTRY PROFESSOR, ASKING "WHY" CAN BE DANGEROUS

By Stephen McNeil
- FROM THE ARCHIVES -

SARAH: Daddy, were you in the shower?

DAD: Yes, I was in the shower.

SARAH: Why?

DAD: I was dirty. The shower gets me clean.

SARAH: Why?

DAD: Why does the shower get me clean?

SARAH: Yes.

DAD: Because the water washes the dirt away when I use soap.

SARAH: Why?

DAD: Why do I use soap?

SARAH: Yes.

DAD: Because the soap grabs the dirt and lets the water wash it off.

SARAH: Why?

DAD: Why does the soap grab the dirt?

SARAH: Yes.

DAD: Because soap is a surfactant.

SARAH: Why?

DAD: Why is soap a surfactant?

SARAH: Yes.

DAD: That is an EXCELLENT question. Soap is a surfactant because it forms water-soluble micelles that trap the otherwise insoluble dirt and oil particles.

SARAH: Why?

DAD: Why does soap form micelles?

SARAH: Yes.

DAD: Soap molecules are long chains with a polar, hydrophilic head and a non-polar, hydrophobic tail. Can you say 'hydrophilic'?

SARAH: Aidrofawwic

DAD: And can you say 'hydrophobic'?

SARAH: Aidrofawwic

DAD: Excellent! The word 'hydrophobic' means that it avoids water.

SARAH: Why?

DAD: Why does it mean that?

SARAH: Yes.

DAD: It's Greek! 'Hydro' means water and 'phobic' means 'fear of'. 'Phobos' is fear. So 'hydrophobic' means 'afraid of water'.

SARAH: Like a monster?

DAD: You mean, like being afraid of a monster?

SARAH: Yes.

DAD: A scary monster, sure. If you were afraid of a monster, a Greek person would say you were gorgophobic.

(pause)

SARAH: (rolls her eyes) I thought we were talking about soap.

DAD: We are talking about soap.

(longish pause)

SARAH: Why?

DAD: Why do the molecules have a hydrophilic head and a hydrophobic tail?

SARAH: Yes.

DAD: Because the C-O bonds in the head are highly polar, and the C-H bonds in the tail are effectively non-polar.

SARAH: Why?

DAD: Because while carbon and hydrogen have almost the same electronegativity, oxygen is far more electronegative, thereby polarizing the C-O bonds.

SARAH: Why?

DAD: Why is oxygen more electronegative than carbon and hydrogen?

SARAH: Yes.

DAD: That's complicated. There are different answers to that question, depending on whether you're talking about the Pauling or Mulliken electronegativity scales. The Pauling scale is based on homo- versus heteronuclear bond strength differences, while the Mulliken scale is based on the atomic properties of electron affinity and ionization energy. But it really all comes down to effective nuclear charge. The valence electrons in an oxygen atom have a lower energy than those of a carbon atom, and electrons shared between them are held more tightly to the oxygen, because electrons in an oxygen atom experience a greater nuclear charge and therefore a stronger attraction to the atomic nucleus! Cool, huh?

(pause)

SARAH: I don't get it.

DAD: That's OK. Neither do most of my students.

Stephen McNeil is an Assistant Professor of Chemistry at University of British Columbia Okanagan in Kelowna, British Columbia. His lectures and conversation tend to incorporate a large degree of both gesticulation and pontification, occasionally of a frighteningly unbridled and reckless nature. He often reminds people of his namesake on "Blue's Clues", and he knows that already, so you really don't need to mention it again.