

## CH302 Random Musings: March 20, 2007

1. Welcome back from Spring Break. One of the things that will amaze those of you new to college is how rapidly the last half of the spring semester disappears leading to final exams. For many of you it will be the most challenging academic experience of your life if you are in a bunch of science courses. I still vividly recall my own experience that first spring semester trying to do well in chemistry, calculus, biology, chemistry lab and biology lab plus two liberal arts courses. I don't think I slept the week I had five finals in three days. So just strap on a seat belt and enjoy the ride. It will make what comes later in college seem like a walk in the park.

2. Starting three years ago I decided that my second round of children would not grow up thinking that spring break was when you stayed home and caught up on your e-mail. So beginning with New Orleans, and then the Smokey Mountains, and now New York, my spring breaks involve carting a very large family around in a minivan somewhere far from home. Below are photos of Sam, Maddie and Nathan wearing skis for the first time at a sweet little ski resort an hour from New York City.



3. On Worksheet 8 there is a typo that I can't fix easily, so I tell it to you here. The problem is number 2, about  $\text{NaH}_2\text{PO}_4$  and in the answer key the  $\text{Na}^+$  is not considered in the charge balance. Also, if you consider  $\text{Na}^+$ , there are 7 unknowns, so there are 7 equations needed, and the one additional equation is a mass balance for Na:  $C_{\text{NaH}_2\text{PO}_4} = [\text{Na}^+]$ . Sorry for the confusion.

4. I am posting for your use, an approximation of the 30 question types on Exam 2 that will be given on the exam next Wednesday evening—notice the minor change—I have added an extra electrochemistry problem, the famous battery question, and have taken out a polyprotic acid equilibrium question.

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| 1. Calculating simple buffers                                  | 16. Mass and charge balance                              |
| 2. Identifying buffers (after neutralization)                  | 17. Setting up complex equilibrium problems              |
| 3. Ranking acidity and basicity based on equilibrium constants | 18. Equilibrium expressions for a polyprotic acid        |
| 4. Buffer capacity   | 19. Equilibria Calculations: dilute solutions            |
| 5. Buffer neutralization calculation                           | 20. Equilibrium Calculations: sulfuric acid case         |
| 6. Identifying features of a titration curve                   | 21. Balancing redox reactions (in acid or base)          |
| 7. Titration calculation                                       | 22. Balancing redox reactions (in acid or base)          |
| 8. Titration calculation                                       | 23. Ranking oxidizing and reducing strengths             |
| 9. Estimating solubility from $K_{\text{sp}}$                  | 24. Assigning EC cell nomenclature                       |
| 10. Calculating molar solubility from $K_{\text{sp}}$          | 25. Assigning EC cell nomenclature                       |
| 11. Common ion calculation                                     | 26. Calculating $E_{\text{cell}}$ at standard conditions |
| 12. Selective precipitation                                    | 27. Relating $E$ , $\Delta G$ and $K$                    |
| 13. Approximations of acid base equations                      | 28. Stoichiometry calculation from current               |
| 14. polyprotic acid equilibria                                 | 29. Calculating cell potentials (Nernst)                 |
| 15. polyprotic acid calculations                               | 30. Famous battery question                              |

5. Review session. The review session for Exam 2 is being moved to Monday evening because this is a holiday weekend that will find many students at home with their families. The only room and time available that I could find was Monday, March 24, 8-9 pm, in JGB 2.324 (that's the Geology Building.) The academic community for that evening will need to work around this review, and as always, I will post the stuff I write on the web the next morning.

6. Details about the exam will be forthcoming next Tuesday but we will have a similar structure—there will be an exam on Wednesday evening and a make-up exam available to all comers the following Sunday evening.

7. Remember to be getting your extra credit number 1 in.

8. Undergraduate Research Forum. I'm big on doing and since I am not your father so you can listen to me when I say that your education here at UT will be mightily improved if you take the bold step of deciding to engage in an active learning environment. The best such environment, of course, is found in one of the hundreds and hundreds of research labs where people are curing cancer and figuring out how old the universe is. On Friday, April 18 right outside this room, about 150 of your undergraduate peers in the College will be displaying their efforts at original scientific research. You should wander through and be amazed that people just like you are doing all kinds of science that you are just beginning to fathom right now. Use this as motivation to get started yourself—I believe it is the principle reason to go to a large university like UT—surely it isn't the machine graded exams. For more information on the research forum go to: <http://cns.utexas.edu/current%5Fstudents/ohris/>

9. Extra credit number 2 is coming soon. Okay, so some of you remain unconvinced that you should spend time staring at posters about science that might make you feel inadequate compared to your peers. Well what if I offered up 1% of your grade to go to the poster session, find a poster you like, talk to the person standing in front of it for 5 minutes, and then going home and e-mailing me about your experience. More details to follow but the procedure for getting credit will be the same.

10. Poetry Corner. So now that I am on my research kick, I take a time out from regular poetry to read some prose from a scientist's scientist, C. P. Snow, who is describing that warm tingly feeling he would get in the lab. If you can of well up as I read this, maybe earning a graduate degree in scientific research is the course in life you should chart.

*And so for weeks I was alone in the laboratory, taking photographs, gazing under the red lamp at films which still dripped water, carrying them to the light and studying them until I knew every grey speck on them, from the points which were testing my structures down to the flaws and scratches on the surface.*

*Then, when my eyes tired, I put down my lens and turned to the sheets of figures that contained the results, the details of the structure and the prediction I was able to make...For days my predictions were not only vaguely right, but right as close as I could measure. I still possess those lists of figures, and I have stopped writing to look them over again. It is ten years and more since I first saw them and yet as I read:*

<i>Predicted</i>	<i>Observed</i>
1.435	1.44
2.603	2.603

*and so on for long columns, I am warmed with something of that first glow....It was as though I had looked for a truth outside myself, and finding it had become for a moment part of the truth I sought; as though all the world, the atoms and the stars, were wonderfully clear and close to me, and I to them, so that we were part of a lucidity more tremendous than and mystery*

*C.P. Snow,  
The Search*

11. A Spring Break postscript on the dangers of not going to your grandmother's for spring break.

### **The Day After Spring break**

The day after spring break  
And all through my mind  
No brain cells are functioning  
I have begun to unwind

All the things that I did  
In the name of fun  
Have landed me in this cell  
To think over what I have done

I didn't do anything bad  
I just had one drink  
How am I supposed to know  
That would make me lose my ability to think

Apparently one drink's enough  
To make me violent  
The only thing I remember hearing is  
"You have the right to remain silent"

Now I sit in this cell  
In some Mexican jail  
Hey Dr. Laude  
Can you please post my bail?