

Random Musings—April 5, 2011

1. The scores for exam 2 and the make-up were within a point of each other round 70%. The grades broke down nice and flat—about 30 perfect scores including about 100 As, 100 Bs, 200 Cs, 50 Ds and 50 Fs. For the level of difficulty of the material, this is about where things should be. I believe we have killed the questions that needed to be killed and that these are true scores, but I can entertain concerns that you e-mail me.

2. Some good news--the last third of the semester prepares you for the last exam of the semester, one that typically has the highest averages, often in the mid to high 80s—and it is worth twice as much as the second exam (240 points). So why is the exam average so high? There is a lot of descriptive chemistry to end the course and this means a lot of qualitative material that students tend to manage well. To help you get started studying for exam 3, the question types are found at the bottom of the musings.

3. This is where I remind you once again to never give up. Many of you came to see me in preparing for the second exam after struggling on the first—some did much better. Some are still getting used to how to do well on this kind of exam. But you have to keep after it—this second exam is not a good marker for improvement since it is a much more challenging set of material than exam 1. But remember that all it takes is getting everything under control and in your head for just one glorious 3 hour period during the final exam in May, and you can have your A for the course as well. To help you prepare, I provide the question types from the final exam at the bottom of the musings.

4. We will be finishing up electrochemistry today and having delayed testing on it for exam 2, we need to start coming up to speed with it. I encourage you to take advantage of the worksheets (11-13 and their video clips), and the lecture videos (lecture 17 is already posted). I should have lecture 18 and most of the worksheet clips up by this weekend.

5. The 8 electrochemistry question types for quiz 5 that will be given on Thursday the 14th are found below. As always I will provide an electrochemistry practice quiz this weekend and the TAs will provide another Sunday or Monday.

- Identifying oxidation and reduction in a chemical reaction
- Balancing a chemical reaction in acid or base
- Assigning cell convention in an electrochemical cell
- Understanding the table of standard half cell reduction potentials
- Calculating a standard cell potential
- Nernst equation calculation
- Ranking oxidizing and reducing agents
- Stoichiometry calculation using the Faraday

6. Painful as this may be, to stay close to on schedule I will give my last lecture on electrochemistry today and be moving on to kinetics on Thursday. Any material on electrochemistry that sort of flew by you because you were focusing on exam 2 material can be found in the video clips.

7. Oh, and here are the question types for quiz 6 which is coming up in a few weeks

- assigning rate expressions
- method of initial rates
- reaction order from rate constants
- Arrhenius calculation
- integrated rate law calculation
- half life calculation
- collision and transition state theory
- reaction mechanism

8. Extra Credit assignments and your course grade. No, I don't curve. But as mentioned, I will be offering three extra credit opportunities in this class, each worth 1% of your grade. This is what I do rather than "curving" because I am sure that no one in here wants to get a grade they haven't earned.

So here are the details on earning your 3 extra credit. Procedures for turning in extra credits all follow the extra credit process used for Extra Credit 1--you must follow these in order to get the points--please don't make my life difficult by not doing what you are told.

Procedure:

- Complete the extra credit task below.
- Write it up (probably 100 words or so, but write as much as you want to tell the story.)
- Submit it as plain text in the body of the e-mail (no attachments!!)
- Include your uteid when you identify yourself in the e-mail.
- Send it to dalaude@mail.utexas.edu by the deadline
- Jump for joy at having earned 1% of your course grade

Extra Credit Assignment 1:

- Title: **EC1s11 uteid** (If you do not use this subject you will not be filtered into the file from which I assign extra credit.)
- Due Date: I have set this twice and about 97% of you have gotten it in. The rest should do so as well, ASAP.

Instructions. During spring break I want you to teach a science-hater something interesting about chemistry that you have learned in this class. To get the points, 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, like the complications of cooking at high altitude if you happen to be skiing at spring break or why fish explode if you happen to be at the beach, or why South Park was wrong or the value of adding salt to water to boil your pasta or why you shouldn't add pure antifreeze to your car or why water balls up on windshields or how neutral water isn't always pH 7 and on and on. It is your choice.

Extra Credit Assignment 2:

- Title: **EC2s11 uteid** (If you do not use this subject you will not be filtered into the file from which I assign extra credit.)
- Due Date: Saturday May 7 at 3 am

Instructions. Go to the undergraduate poster session on Friday, April 8th, sometime between 11 am and 3 pm in the Welch Foyer (right outside this classroom.)

For details, see: <http://cns.utexas.edu/research/undergraduate-opportunities/undergraduate-research-forum>

Find a poster you like, talk to the person standing in front of it for 5 minutes, and then going home and email me about your experience. Spend a few sentences telling me who did the poster, why you liked the poster and how neat it is to see that students your own age are doing world class research that you could also be doing with a little initiative.

For those of you who can't go to the poster session, an alternative bonus opportunity is to walk through a science building on campus on the upper floors, staring at the walls. You will see scads of research posters that are up for your perusal. Just take a look at one of those and email me with the same instructions as above except include the name of the first author on the poster.

Extra Credit Assignment 3:

- Title: EC3s11 uteid (If you do not use this subject you will not be filtered into the file from which I assign extra credit.)
- Due Date: Saturday May 7 at 3 am

Instructions. This campus is littered with seminars of a scholarly nature that occur in addition to the normal course lectures that are given. Every department will hold literally hundreds of these a year. You will see signs for these posted everywhere. For example, while walking to a help session last week in Geological Sciences, the first four doors I passed, had descriptions of four entirely separate events that were holding multiple scholarly lectures. Typically these talks are about 50 minutes in length with a question answer period and occur in the late afternoon. They occur non-stop, year round, and should become part of your academic experience as you evolve into an intellectual force on campus. Some of you questioned might ask whether concerts or plays might be considered, or whether the presentation has to be about science. My response is that you must establish a relevance to your academic interests. So if you are a pre-med history major I can see going to a talk about breast cancer cures or why Rome fell, but I am not sure you can justify the ballet. But really, I leave it to you to make the justification as part of your explanation of the experience.

10. There is no way in the world that we will collect all 1500 extra credits without something getting messed up. PLEASE PLEASE PLEASE do not treat this as life and death. I guarantee that we will provide a mechanism for you to check whether you received credit and to rectify any errors before grades are assigned. But sending me panicked e-mails asking if you got credit is not the way to do it.

10. See the public service announcement below on TAAL 2011

11. Poetry Corner. Student Poetry makes a difference. Most of the student poetry I receive has little impact on the world, even when it gets published in my random musings. One exception is the following poem that was written last year and is the reason I didn't put electrochemistry on the second exam. I guess someone could write a poem that would convince me not to put it on the third exam either..... but it would have to be a heck of a good poem.

The Night Before

With lines upon lines upon two supersized screens
Creates splitting headaches that forces me to scream,
“Why, Dr. Laude, why? Why are you so mean?”

Within barely four classes of electrochemistry,
(And after seven nights where I lost the ability to see)
You inform me of a test, how can this be?!?

No, seriously, is this a joke?
A shenanigan meant to make me choke
On my Spring Break lies, when I told the old parental folks

Which I'll happily quote, as, “Yes daddy-o, I did try my first drink and boy it was sweet!”
Then I passed out on my toilet with not another peep
But now sir, I will admit: I drank myself into a hole; it was very, very deep.

So for the last time, I beg on one knee,
That I'll promise to learn: electrochemistry.
But you must first postpone this test, please, PLEASE, **PLEASE!**

No?!? Why, Dr. Laude, why? Why are you so mean?
You've created splitting headaches that forces me to scream
“I hate all these lines upon lines upon two supersized screens!!!!”

12. Poetry corner. Spring is here—I saw red buds in the redbuds and as a now happy soul, I provide you with happy spring poetry, alright, and a cynical spring poetry.

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

Question types for Exam 3 are found below:

Question Types for Electrochemistry

1. balancing a chemical reaction in acid or base
2. balancing a chemical reaction in acid or base
3. assigning cell convention in an electrochemical cell
4. understanding the table of standard half cell reduction potentials
5. Nernst equation calculation
5. ranking oxidizing and reducing agents
6. electrolysis
7. stoichiometry calculation using the Faraday
8. current calculation
9. calculation involving relationship between E, K and ΔG
10. famous battery
11. rust in the real world

Question Types for Kinetics

12. calculating reaction rates
13. method of initial rates
14. integrated rate law calculation
15. integrated rate law calculation (half life)
16. extracting information from straight line plots
17. kinetic theory—collision
18. kinetic theory—transition state
19. combined Arrhenius calculation
20. reaction mechanisms
21. reaction mechanisms
22. E_a and energy profiles
23. famous catalysts

Descriptive Chemistry

24. properties and reactivity of alkali metals
25. properties and reactivity of alkali earths
26. properties and reactivity of the B family
27. properties and reactivity of the N family
28. properties and reactivity of the C family
29. properties and reactivity of the O family
30. properties and reactivity of the halogen family
31. famous named chemical manufacturing processes
32. famous named chemical manufacturing processes
33. identifying famous gemstones

Organic Molecules

34. hydrocarbon isomers
35. naming organic molecules
36. naming organic molecules
37. organic polymer structure
38. organic polymer reactions
39. biomolecule structure
40. biomolecule reactions

The 60 questions on the final exam

Chapter 8

1. Theory: temperature and physical equilibria
2. Theory: dissolving gases, liquids, solids
3. Theory: dissolving gases, liquids, solids
4. Ranking: miscibility of liquids
5. Problem: phase diagram navigation
6. Calculation: ΔH for heating across phases
7. Calculation: vapor pressure in binary system
8. Calculation: Clausius Clapeyron
- 9 theory: free energy and colligative properties
10. Calculation: colligative property

Chapter 9

11. Setting up K from equilibrium expression
12. Calculation: equilibrium concentrations from K
13. Problem: Reaction direction from Q and K
14. Problem: LeChatelier and reaction direction

Chapter 10,11

15. Temperature dependence of K_w
16. Ranking A/B strength from K values
17. Approximations of A/B equations
18. Simple A/B calculation (strong, weak, buffer)
19. Identifying buffers (after neutralization)

20. Buffer neutralization calculation
21. Identifying features of a titration curve
22. Titration strong A/B with strong A/B
23. Titration weak A/B with strong A/B
24. Estimating solubility from K_{sp} values
25. Calculating molar solubility from K_{sp}
26. Common ion calculation, K_{sp}
27. Equilibrium expressions for a polyprotic acid
28. polyprotic acid calculations
29. polyprotic acid calculations
30. Mass and charge balance
31. Equilibria Calculations: dilute solutions

Chapter 12

32. relating E, ΔG and K
33. balancing redox equations
34. ranking oxidizing and reducing agents
35. stoichiometry calculation from current
36. interpreting electrochemical cell diagrams
37. electrolysis cells
38. calculating cell potentials (not Nerst)
39. calculating cell potentials (Nernst)
- 40 rust in the real world
- 41 famous batteries

Chapter 13

Question Types for Kinetics

42. assigning rate expressions
43. calculating reaction rates
44. units of rate constants
45. method of initial rates
46. integrated rate law calculation
47. extracting information from straight line plots
48. kinetic theory
49. Arrhenius equation theory
50. combined Arrhenius calculation
51. reaction mechanisms
52. E_a and energy profiles
53. Famous catalysts

Descriptive Chemistry

54. properties and reactivity of main group elements
55. properties and reactivity of main group elements
56. properties and reactivity of main group elements
57. Famous names chemical manufacturing processes
58. naming organic molecules
59. organic polymer chemistry
- 60 biomolecule reactions



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