CH302 Random Musings April 10, 2008

1. We are rolling downhill to the finish line. In these musings are the question types Exam 3 and the Final Exam. Be thinking about the strategy you will be using to earn the grade you want in this course. Some of you will be trying to achieve something close to perfection on exam 3 so you can be exempt (this is possible because exam 3 usually has the easiest material of the three exams). Others will need to be concentrating on preparation for the final since they know it will be the way they earn the grade they want. E-mail me if you have questions about the strategy you will use.

2. A reminder that except for about 30 of you who are busting the curve on my exams, the rest should absolutely turn all your extra credits in. Details are in last week's musings but basically you need to go to a scholarly talk and tell me about it, and go to a poster session next week and tell me about it.

3. Finally. Killing questions from Exams 1 and 2. The decisions are listed below. Thanks for all your input. If you still don't understand why your request is not included in one of the killed questions below, go ahead and e-mail me. Also, understand that while some of you will earn as many as 36 points back, others will earn as few as 0 points. A simple way of understanding this is that on many of the killed questions, if you got it right it was either because you were thinking incorrectly on a flawed question, or you guessed. Neither is worth additional point. There will be some of you who got a really difficult question right and are not getting the extra points. Chances are you are doing well in the class anyway and it doesn't matter. But if you are borderline for a grade at the end of the semester I will take this into consideration.

4. Killing questions from Exam 1 and the makeup exam 1. Listed below are three questions each from the first exam and the make-up. These are the questions that I will ask Travis to kill and everyone will automatically receive credit. Understand that some of you will get up to 18 additional points (because you missed all three) and some of you will receive 12, 6 or even 0 extra points.

Regular Exam 1 Killed questions:

- The question on diamond and graphite equilibrium will be killed. Explanation: The question potentially has two correct answers because for a solid, the Gibb's energy is a very weak function of pressure. Therefore it is reasonable that at this equilibrium point $\Delta G = \Delta G_{std} = 0$.

- The question on lattice energy will be killed. Explanation: The specifics of terminology relating to distinction between heats of hydration and crystal lattice energy had not been adequately developed in the context of charge density arguments.

- The question involving Le Chatelier and multiple equilibria will be killed. Explanation: Among many confusing aspects of the problem, most persuasive to me was that the definition of hydronium ion (H_30^+) had yet to be explicitly defined in class and consequently it would not have been possible to connect it to proton concentration without knowledge acquired outside class.

Make-up Exam 1 Killed questions:

- The question on MgF_2 solubility will be killed. Explanation: A knowledge of MgF_2 solubility was essential to correctly solving the problem and at that time this information was not made available in the problem.

- The problem involving calculating K_p will be killed. Explanation: The temperature necessary to solve was not provided during the exam and while some correctly assumed it was room temperature, many did not and didn't ask.

- The question asking for identification of various strong and weak acids and bases will be killed. Explanation: In one of the answers, MgO was listed as a strong base, which is true, but required an understanding of the water chemistry of alkali earth oxides that would not be taught until later in the course (Tuesday actually)

5. Regular Exam 2 Killed questions. Only two questions will be killed. Frankly we wrote a really good test and there wasn't a single question for which more than half of the class didn't get 50% correct. So at best I can only find one additional question to toss for valid reasons:

- HPO_4^- concentration in 0.1 M H_3PO_4 will be killed. Explanation: We told you this would be killed—we had not covered sequential equilibrium calculations

- The battery question will be killed. Explanation: I had indicated there would be not specific questions about batteries until after the famous battery lecture (which has yet to be given) and yet there were questions about NiCAD batteries in that question

Make-up Exam 2 Killed questions. The make-up exam has several questions on it that were correct, but simply unfair given the level of trickiness in the problem. These were questions much more difficult than their counterparts of the regular exam 2. In other words, even I missed two of them because I didn't take the time to see how I was being tricked, so I can't expect you to have been adequately aware.

- The acid base calculation at the end point will be killed. Explanation: Providing no hint of the dilution necessary to calculate the volume crossed the line from a fairness perspective

- Phosphate concentration in 0.1 M H_3PO_4 will be killed. Explanation: We told you this would be killed—we had not covered sequential equilibrium calculations

- Number of equations for a mixture of NaF, NaCl and HBr will be killed. Explanation: Again, an easy problem made unnecessarily tricky by requiring you to reform the weak acid HF.

6. I am posting the 60 questions for the final exam today. They are found at the end of the musings in glorious color. The source is pretty simple. I took the three thirty-question tests from the semester and pulled out about 20 questions from each. This is very much a traditional cumulative final covering pretty much everything I have taught. And in keeping with my philosophy that I don't care when you learn it, as long as you learn it, being able to prove to me on May 13th that you know the material well enough for an A is good enough for me.

And for those of you taking the final for everything, I will tell you once again, if you want to have a chance at an A, you have to get organized. And being organized means making sure your brain knows what is on the final before you start filling it with stuff that otherwise has no place to go. So memorize the question types, all 60. Do it by sections and it doesn't hurt as much. If you don't want to do this, don't bother coming to me for help and forget about getting a good grade on the final.

7. Question types for Exam 3 are found below:

Question Types for Kinetics
1. assigning rate expressions
2. relating reaction order to rate
3. units of rate constants
4. method of initial rates
5. integrated rate law calculation
6. integrated rate law calculation
7. extracting information from straight line plots
8. kinetic theory—collision
9 kinetic theory—transition state
10. factors effecting rate
11 combined Arrhenius calculation
12. reaction mechanisms
13. E_a and potential energy surfaces
14. famous catalysts

Survey of Chapters 14-16 and 18, 19
15. properties and reactivity of hydrogen
16. properties and reactivity of alkali metals
17. properties and reactivity of alkali earths
18. properties and reactivity of the B family
19. properties and reactivity of the N family
20. properties and reactivity of the C family
21. properties and reactivity of the O family
22. properties and reactivity of the halogen family
23. d-block physical and chemical property trends
24. d-block physical and chemical property trends
25. hydrocarbon nomenclature
26. organic functional group nomenclature
27. organic reactivity
28. organic polymer nomenclature and function
29. biopolymer nomenclature and function
30. biopolymer nomenclature and function

8. Public Service. FACE AIDS, a student-run organization (with over 150 chapters nationwide) provides financial support for HIV/AIDS refugees in Rwanda and Zambia. All the money raised is sent to pay for antiretroviral treatment and other necessities (food, shelter, etc.) for both child and adult patients. This weekend, we are hosting the National Conference. They will have experts and professors, such as Dr. Sheri Fink, Dr. Henry Epino, and Dr.Barbara Moore, speak about the AIDS epidemic and how it affects our world. They are also hosting a benefit concert ($5) this Saturday. Five dollars is enough to save the life of a child for two months or an adult for one month. By the way, this is an example of an event which includes scholarly lectures that can count toward your extra credit.

9. Poetry Corner. From one of your classmates:

"I wrote a poem for the first time this night/morning and thought it might possibly be random musings worthy. This poem is about the war, the emergence of the scenester crowds, rap and smoking, and the way they all seemed strangely intertwined in my warped thoughts this night/morning. Thanks.

Ambiguity is the new thing
Like being scene
Except minus all the shiny bling.
Immediate mystery
Which equals artsy minus all the credibility
Of rapper who can roll.
No, not just roll
Rap and roll.
It's a new generation
For all those who can't keep up
With the gun shots and open wounds of today
And instead smoke away the days
Days of regret, remorse, and re-lived delays.

Finally, I wasn't going to do any more depressing poetry this year, but then one of your class mates asked me to include part of Eliot's The Waste Land, which got me to thinking about how in college I hung around with a guy that spent his time walking around reciting the entire poem, which is like 400 lines long. And as I reread the poem, which I think has to do with the hopelessness of your future, I noticed that not only is it April, but he also talks about tubers—talk about being relevant to our class. Here is the first section.

The Burial of the Dead
by T. S. Eliot

April is the cruelest month, breeding
Lilacs out of the dead land, mixing
Memory and desire, stirring
Dull roots with spring rain.
Winter kept us warm, covering
Earth in forgetful snow, feeding
A little life with dried tubers.
Summer surprised us, coming over the Starnbergersee
With a shower of rain; we stopped in the colonnade,
And went on in sunlight, into the Hofgarten,
And drank coffee, and talked for an hour.
Bin gar keine Russin, stamm' aus Litauen, echt deutsch.[1]

And when we were children, staying at the archduke's,
My cousin's, he took me out on a sled,
And I was frightened. He said, Marie,
Marie, hold on tight. And down we went.
In the mountains, there you feel free.
I read, much of the night, and go south in the winter.

What are the roots that clutch, what branches grow
Out of this stony rubbish? Son of man,[2]
You cannot say, or guess, for you know only
A heap of broken images, where the sun beats,
And the dead tree gives no shelter, the cricket no relief,[3]
And the dry stone no sound of water. Only
There is shadow under this red rock,
(Come in under the shadow of this red rock),
And I will show you something different from either
Your shadow at morning striding behind you
Or your shadow at evening rising to meet you;
I will show you fear in a handful of dust.
    Frisch weht der Wind
    Der Heimat zu
    Mein Irisch Kind,
    Wo weilest du?[4]
"You gave me hyacinths first a year ago;
They called me the hyacinth girl."
—
Yet when we came back, late, from the Hyacinth garden,
Your arms full, and your hair wet, I could not
Speak, and my eyes failed, I was neither
Living nor dead, and I knew nothing,
Looking into the heart of light, the silence.
Od'[5] und leer das Meer.[6]

Madame Sosostris, famous clairvoyante,
Had a bad cold, nevertheless
Is known to be the wisest woman in Europe,
With a wicked pack of cards. Here, said she,[7]
Is your card, the drowned Phoenician Sailor,
(Those are pearls that were his eyes. Look!)
Here is Belladonna, the Lady of the Rocks,
The lady of situations.
Here is the man with three staves, and here the Wheel,
And here is the one-eyed merchant, and this card,
Which is blank, is something he carries on his back,
Which I am forbidden to see. I do not find
The Hanged Man. Fear death by water.
I see crowds of people, walking round in a ring.
Thank you. If you see dear Mrs. Equitone,
Tell her I bring the horoscope myself:
One must be so careful these days.

Unreal City,[8]
Under the brown fog of a winter dawn,
A crowd flowed over London Bridge, so many,
I had not thought death had undone so many.[9]
Sighs, short and infrequent, were exhaled,[10]
And each man fixed his eyes before his feet.
Flowed up the hill and down King William Street,
To where Saint Mary Woolnoth kept the hours
With a dead sound on the final stroke of nine.[11]
There I saw one I knew, and stopped him, crying "Stetson!
"You who were with me in the ships at Mylae!
"That corpse you planted last year in your garden,
"Has it begun to sprout? Will it bloom this year?
"Or has the sudden frost disturbed its bed?

"Oh keep the Dog far hence, that's friend to men,[12]
"Or with his nails he'll dig it up again!
"You! hypocrite lecteur!—mon semblable,—
mon frere!"[13]

60 final exam question types

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. Ranking: Van't Hoff and solution conc.
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
15. Van't Hoff Equation and T vs K

Chapter 10,11
16. Temperature dependence of Kw
17. Ranking A/B strength from K values
18. Approximations of A/B equations
19. Simple A/B calculation (strong, weak, buffer)
20. Simple A/B calculation (strong, weak, buffer)
21. Identifying buffers (after neutralization)
22. Buffer neutralization calculation
23. Identifying features of a titration curve
24. Titration weak A/B with strong A/B
25. Titration weak A/B with strong A/B
26. Estimating solubility from Ksp values
27. Calculating molar solubility from Ksp
28. Common ion calculation, Ksp
29. Equilibrium expressions for a polyprotic acid
30. Ranking of polyprotic acid species concentrations in solution
31. Polyprotic acid calculations
32. Equilibrium Calculations: polyprotic acids
33. Mass and charge balance
34. Equilibria Calculations: dilute solutions

Chapter 12
35. relating E, ΔG and K
36. balancing redox equations
37. ranking oxidizing and reducing agents
38. stoichiometry calculation from current
39. interpreting electrochemical cell diagrams
40. cell convention: electrolysis versus voltaic
41. understanding standard reduction potentials
42. calculating cell potentials (not Nernst)
43. calculating cell potentials (Nernst)
44. famous batteries

Chapter 13
45. assigning rate expressions
46. factors affecting reaction rates
47. method of initial rates
48. integrated rate law calculation
49. extracting kinetics info from straight line plots
50. kinetic theory
51. Arrhenius calculation
52. reaction mechanisms
53. E_a and potential energy surfaces
54. famous catalysts

Survey of Chapters 14-16 and 18, 19
55. properties and reactivity of main group elements
56. properties and reactivity of main group elements
57. properties and reactivity of main group elements
58. organic nomenclature
59. organic nomenclature
60. biopolymer nomenclature and function