CH302 Random Musings April 12, 2007

1. We are rolling downhill to the finish line. In these musings are the question types for Quiz 5, 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 need to think about how to achieve something close to perfection on exam 3 so you can be exempt. 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 be getting 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 and tell me about it.

3. One of my children is playing his junior year college piano recital, which is kind of a big deal, and being like me he waited till the last minute to reserve a performance hall and now if I am going to see it I have to be in Houston at 5:30 on Thursday the 19th, which means I have to miss class. So this is the reason I moved the Quiz 5 date. The day of the quiz I am going to ask Vanessa to give the introductory talk on organic nomenclature since she is an organic chemist and I most definitely am not. I haven't asked her yet, though, so I will now.

4. If you can't take the quiz on the 19th, I will give it to you on the 17th. E-mail to let me know and I will make arrangements with you but basically I will give it in my office from 1:30 to 2 pm before class and from 3:30 to 4 pm after class. E-mail to let me know that you will be taking it then and then show up in my office, WCH 2.222.

5. The question types for quiz 5, to be given April 19th, are shown below. They cover the more complicated material from electrochemistry and all of kinetics.

- relating E, ΔG and K
- stoichiometry calculation from current
- calculating cell potentials (Nernst)
- assigning rate expressions
- method of initial rates
- integrated rate law calculation
- Arrhenius calculation
- reaction mechanisms

6. Worksheet and lecture note uploads—Neal and I have been busy boys:
   - Neal has updated worksheet 11 to make a few more corrections (as of 4/11) and apologizes profusely for all transgressions.
   - I have posted a handout on how to determine the order of a reaction
   - I have posted a worksheet on how to perform real kinetics calculations from raw concentration time data. It is a nice worksheet but requires you really know your stuff.
   - This weekend Neal will post worksheet 12 which will sample kinetics problem types to be found on the quiz.
   - I have posted the lecture notes from class on how to perform integrated and differential rate law calculations (Tuesday's lecture)
   - With any luck I will post the final kinetics notes on theory and mechanisms this weekend. (Boy this class is a lot of work).

7. Question types for Exam 3 are found below:

Question Types from Electrochemistry 1 relating E, ΔG and K

2 stoichiometry calculation from charge or current
3 calculating cell potentials
4 famous batteries

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

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

8. I am posting the 60 questions for the final exam today. The source is pretty simple. I took the 3 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 15th that you know the material well enough for an A is good enough for me.

9. 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..

10. Public Service Announcements: A way to earn extra credit: Stem Cell War / Friday 4/13/2007 MEZ 1.306 / Science session 11am, Ethics 2pm, Policy 3pm http://cns.utexas.edu/ds/stem_cell/

The 2007 Stem Cell Symposium will feature lively debates of all perspectives from leaders in the stem cell debate. Each of the three sessions -science, ethics, and policy- will address the controversial questions of "What cures can stem cells promise?", "Do embryos have rights?", and "Should tax money fund embryonic stem cell research?". The format is moderated debate and open-floor Q&A so UT students –future leaders and voters– can get their questions answered and make *educated* decisions on this momentous issue, no matter their stance. Featured speakers include adult and embryonic stem cell researchers, member of President's Council on Bioethics, Executive Director of Texas Alliance for Life, and the activist who seeks to amend Florida's constitution to support embryonic stem cell research.

11. Poetry Corner. 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 cruellest 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

Chapter 10,11
15. Temperature dependence of Kw
16. Ranking A/B strength from K values
17. Approximations of A/B equations
18. Simple A/B calculation (strong, weak, buffer)
19. Simple A/B calculation (strong, weak, buffer)
20. Identifying buffers (after neutralization)
21. Buffer neutralization calculation
22. Identifying features of a titration curve
23. Titration strong A/B with strong A/B
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. Interpreting alpha diagrams
31. Amphiprotic 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 Nerst)
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. Ea 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. d-block chemical property trends
59. hydrocarbon nomenclature and reactivity
60. organic functional group nomenclature