

CH301 Random Musings, October 18, 2007

1. The results from quiz 3 were solid with an average of 68%. Considering that I asked the TAs to make this a very difficult quiz with a lot of compound question types, I was really pleased. I had thought the average would be a 58% and Travis thought it would be a 62% and we are usually pretty good with our predictions. What does this mean? I think it means you all are pretty talented as a group.

2. Sorry for the delay in posting the adjustments to exam 1, but we have made the following modifications:

- Wednesday evening exam: Ranking ionic trends was killed and the new exam average went 81%.
- Sunday evening exam: Particle in a box and orbital filling questions were killed yielding a new average of 77%

3. I received the following e-mail from a student who sat in my office last fall after failing my first test—not too differently than the nearly 40 of you who have made appointments. And this is what she said:

Dr. Laude,

I don't know if you remember me or not, but I took your chemistry class my freshman year, both semesters. I'm currently taking and we recently took our first test. I just wanted to write to you and tell you how much I appreciate your class and how you taught it even though it was really tough for me at first. On my first organic test I got a 92. I am so happy and I attribute a lot of my success to you. If you hadn't taken the time out to meet with me in your office and personally go over my study skills, I don't think I would have gotten the grade I got. I also appreciate you incorporating organic in the course. If almost killed my grade in your class at first but I got through it and am now doing well in organic because of it. Thanks you so much again.

So if you haven't gotten in to see me, and even though it will be a few weeks before I have open times, do contact me. And if you haven't heard back from an e-mail, try again. With so many e-mails some slip through the cracks.

4. There is a quiz coming next Thursday and like clockwork, one week early, here are the 8 question types on the next quiz 4:

- Determining bond order for a homonuclear diatomic molecule or ion (worksheet 8)
- Determining paramagnetism for a homonuclear diatomic molecule or ion (worksheet 8)
- Ranking bond energy or length based on bond order (worksheet 8)
- Identifying delocalization in a molecule (worksheet 8)
- Ideal gas law calculation for a chemical reaction involving gases (worksheet 9)
- Ideal gas law calculation involving a state change in a gas system (worksheet 9)
- Kinetic Molecular Theory explains gas speed, diffusion or effusion (worksheet 9)
- Ranking non-ideality in gases (worksheet 9)

5. This evening I will post a 2008 Worksheet 8 on molecular orbitals and a 2007 Worksheet 8 on bonding. I will post a 2008 Worksheet 9 on Gases Sunday along with a ChemPortal practice quiz 4.

6. I will hold office hours in the classrooms next week leading up to the quiz.

7. Calculator Review. Believe it or not, the inability to efficiently and knowledgeably use a TI-83 or similar calculator will cost you a letter grade in both CH301 and CH302. This may not be evident right now, but soon you will be working multiple choice questions that almost exclusively require use of a calculator. If you are not able to simply place an equation on the screen of your calculator and push a button to solve it without algebraic manipulation, you are at a serious disadvantage.

So it is time to learn. I will have more details by this weekend but plan that next Wednesday night at 6:30 prior to the Jester Academic Community, someone like Daniel is going to teach you how to use a calculator.

8. Registration Information for Dr. Laude's CH301 Class in Spring 2009 Unique #52390

FIGs

If you are in a First-Year Interest Group, you will be able to register for the course through the FIG program during your normal registration time.

ESP

If you are in the Emerging Scholars Program, you will be registered automatically. Be sure to leave T/TH, 2-3:30 pm, open in your spring schedule.

Juniors, Seniors and Graduate Students

A sign-up sheet will be available in class. You will be automatically registered in CH302 if you sign that sheet letting us know that you want to continue in Dr. Laude's class.

Sophomores

Seats will be opened at exactly 4 pm (plus or minus a minute) on November 3 and November 4. You should be able to register for the class at this time depending on the day you have access for registration.

Freshmen

Seats will be opened at 4 pm (plus or minus a minute) on November 5. You should be able to register for the class on that day.

A waiting list will be started after registration is over. If you are not able to get into the class during normal registration, contact Judy Davis, jkdavis@mail.utexas.edu. Students presently in Dr. Laude's CH301 class will be given priority on that list.

9. After a few help sessions recently, I feel a need to include a little course content in my musings.

Definition corner: Here is some vocabulary to reinforce what you know as you put all the concepts about bonding together:

- **Electronic geometry** refers to the shapes of the electron rich regions. So erase the atoms and just look at the electron pairs and the five possible answers.
- **Molecular geometry** refers to the 13 possible shapes of the atoms in the molecule and ignores the electrons. So erase the electrons and just look at the shape the atoms take on. If you see a question that states: what is the shape of H₂O, for example, they want to know the shape of the molecule and the answer is "angular"
- **Dipole moment**: a vector describing the orientation of electron density. In this class the ΔEN is the dipole moment.
- **Ionic bond**: $\Delta EN > 1.5$ Example: Na—Cl
- **Covalent bond**: $\Delta EN < 1.5$ Example: C—O
- **Polar bond**: $\Delta EN > 0$ Example, Na—Cl or C—O
- **Non-polar bond**: $\Delta EN = 0$ Example, Br—Br or C—C
- **Polar molecule (asymmetry)**: $\Sigma \Delta EN > 0$ Example, H₂O or CHCl₃
- **Non-polar molecule (symmetry)**: $\Sigma \Delta EN = 0$ Example, Br—Br or CCl₄
- AOs are **atomic orbitals**. Two AOs are needed to make an MO and AOs are made from individual or combinations (hybrids) of s, p, d orbitals
- MOs are **molecular orbitals** (which is a fancy way of saying bonds) and take an electron from two AOs to make either a s or p bond.
- **Resonance** suggests that there are multiple identical Lewis structures that can be drawn when you have left over p bonds and too many locations on a molecule to put them.
- **Delocalization** is what we should really call resonance. As the name suggests, left over p orbitals tend to spread out (delocalize) over all the regions with identical Lewis structures. Every compound that has resonance actually has delocalized p electrons and so to sound like you know what you are saying, start inserting the word delocalized every time you want to say the word resonance.

10. Deep thought about bonds and molecules and why it makes your brain hurt:

- Polar bonds can be either covalent or ionic, but non-polar bonds are always covalent
- Non-polar molecules can be made of non-polar bonds (like Br₂) but more commonly are made of polar bonds that cancel out to make a non-polar molecule (like CCl₄ or BF₃)
- Ozone (O₃) is crazy backwards. It contains multiple non-polar bonds between O and O, but because of that electron pair bending the bond angle around the central atom, it is a polar molecule!! Something to tell the folks at Thanksgiving.

11. Public Service Announcements: Parent's Day: Most of you are freshmen and too naïve to realize you don't want your parents coming to visit on Parent's Day. So good news, Family Day in on November 1st and each of the Colleges puts on a nice event. In Natural Sciences we have an open house held from 9 am to noon on Saturday at the Texas Memorial Museum (the back of TMM is at the bottom of 24th and San Jacinto behind the mustang statue). There will be a brunch buffet, fun activities and the chance to meet faculty, look at some interesting research and program opportunities, and generally have your parent's snoop into your college life (at least the academic part of it.) As I mentioned, if you bring you parents and introduce them to me, I will act like you have gotten to know me really well and that I think the world of you as a student and human being.

12. And now, what I hope all of you have been waiting for, the question types on the second exam—15 questions from Chapter 3, 8 questions from Chapter 4 and 7 questions from Chapter 5.

number	chapter	Worksheet	Problem type
1	Chapter 3	Worksheet 6	Ranking bond polarity
2	Chapter 3	Worksheet 6	Assigning molecule polarity from VSEPR
3	Chapter 3	Worksheet 6	Assigning molecule polarity from VSEPR
4	Chapter 3	Worksheet 6	Bond angles from VSEPR
5	Chapter 3	Worksheet 6	VB theory of hybrid orbits
6	Chapter 3	Worksheet 6	Electronic geometry from VSEPR
7	Chapter 3	Worksheet 6	Molecular geometry from VSEPR
8	Chapter 3	Worksheet 7	Number of σ and π bonds in molecule
9	Chapter 3	Worksheet 7	AOs that comprise MOs in a bond
10	Chapter 3	Worksheet 7	MO theory
11	Chapter 3	Worksheet 7	Filling MOs of diatomic molecules
12	Chapter 3	Worksheet 7	Calculating bond order from MO
13	Chapter 3	Worksheet 7	Assigning paramagnetism from MO
14	Chapter 3	Worksheet 7	Ranking bond length from bond order
15	Chapter 3	Worksheet 6	Identifying delocalization (resonance)
16	Chapter 4	Worksheet 8	Ideal gas law history
17	Chapter 4	Worksheet 8	Gas law change of state calculation
18	Chapter 4	Worksheet 8	Calculating MW, M or ρ from $PV = nRT$
19	Chapter 4	Worksheet 8	Reaction stoichiometry and $PV = nRT$
20	Chapter 4	Worksheet 8	Calculation of relative ratio of gas speeds
21	Chapter 4	Worksheet 8	Ranking non-ideality of gases
22	Chapter 4	Worksheet 8	Gas non-ideality theory
23	Chapter 5	Worksheet 9	IMF theory
24	Chapter 5	Worksheet 9	Assigning IMF to molecules
25	Chapter 5	Worksheet 9	Assigning IMF to molecules
26	Chapter 5	Worksheet 9	Defining physical properties
27	Chapter 5	Worksheet 9	Ranking physical properties by IMF
28	Chapter 5	Worksheet 9	Ranking physical properties by IMF
29	Chapter 5	Worksheet 9	Ranking physical properties by IMF
30	Chapter 5	Worksheet 9	Assigning type of solid to compounds

13. Poetry Corner. It is the five year anniversary of a CH301 student giving me a kitten. This event followed my pathetic musing about how the humane societies wouldn't give me a cat because they took one look at Sam (age three at the time) and Maddie (age 1 at the time) and decided a cat would be better off euthanized. So the student kindly gave us Honey, a sweet kitten, with the one brief mention that he hadn't been fixed because the testicles hadn't dropped. So we waited and waited and waited for the testicles to drop, and then went to a vet who said that he had to have been fixed because there weren't any testicles, and when we swore he wasn't fixed, he did exploratory surgery and called us excitedly to say that we had a "double cryptotoc" cat, or something like that—I think it means something like double ingrown testicles. And this vet of 30 years had never seen a double cryptotoc cat and was excited beyond measure, though not enough to cut us some slack on the \$700 bill it took to find the testicles and cut them out. Anyway, with that experience Honey joined the legions of other animals that I call pets who serve no function other than to make my life all that much more difficult by using my house as their personal toilet.

And so, some angry cat poetry.

Cats by Ogden Nash

The trouble with kittens is that
They grow up to be cats.

**Ode on the Death of a Favorite Cat –
Drowned in a Tub of Goldfishes** by Thomas Gray

Her conscious tail her joy declared;
The fair round face, the snowy beard,
The velvet of her paws,
Her coat, that with the tortoise vies,
Her ears of jet, and emerald eyes,
She saw; and purred applause.
Still had she gazed; but 'midst the tide
Two angel forms were seen to glide,
The genii of the stream:
Their scaly armor's Tyrian hue
Through richest purple to the view
Betrayed a golden gleam.
The hapless nymph with wonder saw:
A whisker first and then a claw,
With many an ardent wish,
She stretched in vain to reach the prize.
What female heart can gold despise?
What cat's averse to fish?
Presumptuous maid! with looks intent
Again she stretched, again she bent,
Nor knew the gulf between.
(Malignant Fate sat by and smiled)
The slippery verge her feet beguiled,
She tumbled headlong in.

Cat Hair by author unknown

Cat hair on the bedspread,
Cat hair on the chair.
Cat hair in the casserole,
Cat hair EVERYWHERE
Cat hair on my best coat,
Even on the mouse!
You live and eat and breathe cat hair,
When cats live in your house.

Cats Sleep Anywhere by Eleanor Farjeon
Cats sleep anywhere, any table, any chair.
Top of piano, window-ledge, in the middle, on the edge.
Open draw, empty shoe, anybody's lap will do.
Fitted in a cardboard box, in the cupboard with your frocks.
Anywhere! They don't care! Cats sleep anywhere.

To Mrs Reynold's Cat by John Keats

Cat! Who hast past thy Grand Climacteric,
How many mice and Rats hast in thy days
Destroy'd - how many tit bits stolen? Gaze
With those bright languid segments green and prick
Those velvet ears - but pr'ythee do not stick
Thy latent talons in me - and upraise
Thy gentle mew - and tell me all thy frays
Of Fish and Mice, and Rats and tender chick.
Nay look not down, nor lick thy dainty wrists -
For all the wheezy Asthma, -and for all
Thy tail's tip is nicked off - and though the fists
Of many a maid have given thee many a maul,
Still is that fur as soft as when the lists
In youth thou enter'dst on glass- bottled wall.