

Preview Sheet for Test 2
Periodic Trends in Atomic Properties and Chemical Bonding
Friday, October 23, 2009

Chapter 1 (pp. 40-46), Chapter 2 (pp. 60-83), Chapter 3 (pp. 95-123)
Lectures from 9/30 to 10/21 (1st half); Problem Sets 4, 5-Part 1, 5-Part 2;
Experiments 3, 4, and 5

Work on this test will start at 8:00 a.m.

Studying strategies:

- Focus on your lecture notes and homework first, then look at the textbook. Anticipate some conceptual questions not based on the homework.
- If a topic was not covered in homework or in lecture, you are not responsible for it! Please ask me if you are unsure about whether a particular topic is “fair game” for the exam.
- Some specific things you should know (not a comprehensive list!): radial distribution functions and atomic electron configurations (these constitute basic knowledge we should carry into the rest of the semester!), the chemical principles underlying Experiment 3, the in-class demonstrations, the basic ideas of VSEPR theory and shape names and bond angles for steric numbers 1-4 from Experiment 4, the molecular orbital energy level diagrams for diatomic molecules, interpreting and drawing the shapes of molecular orbitals from Experiment 5
- Do extra problems at the ends of the chapters. In particular, work the odd-numbered exercises paired with the even-numbered exercises you were assigned for homework. (The answers to the odd-numbered exercises are in Section C at the back of your textbook.) If you are stuck on a problem, please come talk with me or one of the student tutors.
- Because I’m a tad anal/compulsive about such things, here is an estimate of the test’s point breakdown (which is pretty congruent with the time we spent on them in lecture and lab):
 - Atomic properties, ionic bonding, and Experiment 3 ideas: 18 points
 - Lewis structures, VSEPR theory, and Experiment 4 ideas: 40 points
 - Molecular orbital theory and Experiment 5 ideas: 32 points
 - Hybridization: 10 points

[From the test booklet:]

Instructions before starting the test:

1. Your exam booklet should have **seven** pages total, with questions on pages 2-6, and a periodic table and other reference data on p. 7. Check to see you have seven pages now. If you do not, ask for another copy of the exam.
2. You may remove the last page.
3. Write your name in the space above and on the backs of pages 2-6.
4. This exam is closed-everything.
5. You may use programmable calculators, but chemical data should not be stored in them.

6. You do **not** need to justify your answers unless you are explicitly told to do so.
7. You have **90 minutes** to work on this exam. We will start at 8:00 a.m.

Information you will not have to memorize (it will be provided in the test booklet):

1. The periodic table.
2. The information below:

$$E_p \propto \frac{q_1 q_2}{r_{12}} \quad c = \lambda \nu \quad \frac{1}{\lambda} \equiv \tilde{\nu} \quad E = h \nu$$

$$N_A = 6.022 \times 10^{23} \text{ particle mol}^{-1} \quad h = 6.626 \times 10^{-34} \text{ J s particle}^{-1} \quad c = 2.998 \times 10^8 \text{ m s}^{-1}$$

$$1 \text{ m} = 10^9 \text{ nm} = 10^{10} \text{ \AA} \quad 1 \text{ J} = 1 \text{ kg m}^2 \text{ s}^{-2} \quad 1 \text{ kcal} = 4.184 \text{ kJ} \quad 1 \text{ kJ} = 10^3 \text{ J}$$

Test-Taking Tips

- Read the problems carefully. Note precisely what I am asking for.
- Pace yourself. Try to make your effort on a given problem proportional to the number of points that it is worth.
- If you can't figure out how to begin a problem after thinking about it for a couple of minutes, go on to the next problem.
- Please ask me if a question doesn't make sense.