

Exam 1 Review Sheet for Friday, February 6 Exam Chem 1120, Spring 2004, Robertson

Our exam will include material from chapters 10, 12 and part of 13. **Only material that I have covered in class, have assigned homework problems for , or have listed below will be tested.** On Friday, you should be able to:

Chapter 10 (review material)

- Name ionic and covalent compounds (names of common ions should be memorized)
- Draw Lewis structures for compounds
- Calculate the formal charge and oxidation numbers for each element in a molecule and use formal charge to predict the importance of resonance structures. Explain and give examples of the concept of localized and delocalized electron pair sharing.
- Discuss how VSEPR theory attempts to explain molecular shape and why it is important to know molecular shape
- Use VSEPR theory to predict electron group (structural pair) arrangement, molecular shape (appearance), bond angles, and molecular polarity for molecules and ions. Memorize the dictionary!

Chapter 12

- Describe the differences in the solid, liquid and gaseous state and how this affects our ability to predict properties
- List the different types of interparticle forces in order of strength
- Predict for any given substance what interparticle forces exist in that substance
- Define and explain vapor pressure, boiling point, melting point, surface tension, heat of vaporization
- Explain everyday phenomena using the concept of interparticle forces
- Work problems related to the amount of heat needed to change temperature or phase
- Define hydrogen bonding and identify compounds that may exhibit it
- Give changes in properties of compounds that have H-bonding (especially water)
- Explain what the term true solid means to a chemist and what two major characteristics determine the properties of solids
- List and explain the different types of interparticle forces which hold the different classes of solids together. Also predict the properties (high or low MP, heat of fusion and vaporization, surface tension, capillarity, viscosity) from these forces.
- List the 7 different types of unit cells and the relationships between length of unit cell axes and angles between the unit cell axes. List the three types of outlines for these unit cells. Recognize the unit cells and outlines by looking at models.
- Discuss the difference between FCC closest packed (also called cubic closest packed) and HCP closest packed. Recognize both from models.
- Explain how unit cell structure affects the property of iron.
- Comment and explain the differences between graphite and diamond.
- List the general properties of metals and explain metallic bonding. Be able to use the ideas of conduction band theory to explain the differences between metals, insulators, and semiconductors.
- Sketch the phase diagram for a water-like and non water-like substance and identify important points. Be able to sketch the graph of density versus temperature for water from above the boiling point to below the freezing point.

Chapter 13

- Predict and explain the solubility of different substances using intermolecular forces.
- Explain the energy changes when solution occurs using the processes of: (1) separating the substance from its like particles, and (2) surrounding it with water. Explain some common applications of ionic solid solubility. (hot and cold packs, ice melters, etc.) Explain why many ionic solids have a direct variation of solubility with temperature while gases have an inverse variation.
- Explain and work problems with Henry's Law.
- Define and work problems with molarity, molality, mole fraction, and weight and volume fractions.