Chemistry Midterm Review Answer Key

CHM 3120 Exam 1 **(Form Code A)** **September 20, 2012**

Instructions: On your scantron sheet enter your name, UF ID number (start on the first space and leave the last space blank), and Form Code (see above). This exam consists of 20 multiple choice questions each worth 10 points for a total maximum of 200 pts. You may retain your exam sheet. Turn in only the scantron. **Bubbling errors of any kind will count as an incorrect response or result in the loss of points.**

1. In Analytical Chemistry, we often use calibration curves. Which of the following statements is false concerning calibration curves?
   (A) Calibration curves permit the analysis of unknowns by comparison with standards
   (B) The slope of a calibration curve is a measure of a method's detection limit.
   (C) Non-zero y-intercepts arise from blank contributions.
   (D) Straight line calibration curves are desirable but not required

2. Which of the following Analytical Chemistry programs was not suggested as being among a top group in the US?
   (A) Arizona (B) Texas (C) Florida (D) Minnesota (E) North Carolina

3. A city's water supply is fluoridated by adding MgF_2. The desired concentration of F^- is 1.6 ppm. How many milligrams of MgF_2 should be added per gallon treated water if the water already is 0.2 ppm in F^-. (1gallon = 3.78 liters)
   (A) 8.6 mg (B) 5.3 mg (C) 11.7 mg (D) 18 mg (E) other

4. An analytical procedure required the preparation of a solution containing 150 ppm chromium. How many grams of potassium dichromate ($K_2Cr_2O_7$) would be required to prepare 500 mL of this solution?
   (A) 0.3173 grams (B) 0.1125 grams (C) 0.2635 grams (D) 0.2120 grams (E) other

5. Consider the reaction: $MnO_2 + HCl \rightarrow MnCl_2 + Cl_2 + H_2O$
   If 0.86 mol of MnO_2 and 65.3 g of HCl react, how many grams of Cl_2 will be produced?
   (A) 7.00 g (B) 23.4 g (C) 31.8 g (D) 85.4 g (E) 93.6 g

6. Which of the following could be considered a matrix effect?
   (A) Effect of solvent impurities on analytical results
   (B) Effect of temperature changes on analytical results
   (C) Effect of inaccurate standards
   (D) Effect of statistical calculation modes

7. Write the answer to the following, using the correct number of significant figures;
   $4.591 + 0.2309 + 67.10 = ?$
   (A) 71.9 (B) 71.92 (C) 72 (D) 71.922 (E) other

8. Which of the following is not true regarding "weak electrolytes"?
   (A) have primarily ionic bonding in solution
   (B) dissociate only partially in water to form ions
   (C) dissociate more completely as their concentration decreases
   (D) HF is an example of a weak acid.

9. The replicate analysis of a steel sample for %Cr yielded the following data:
   16.968 16.922 16.840 16.883 16.887 16.977 16.857 16.728
   What is the 95% confidence interval for these results?
   (A) mean +/- 0.093% (B) mean +/- 0.125% (C) mean +/- 0.066% (D) mean +/- 0.031% (E) other

10. To extract Al from glass, 100 mL of EDTA were mixed with 0.65g of glass particles and allowed to equilibrate over time. The Al concentration of the solution was found to be 8.25 µM. If the glass contained 0.65 wt% Al, what percent of the Al was extracted by the EDTA?
    (A) 0.53% (B) 0.35% (C) 1.40% (D) 0.86% (E) other

Chemistry midterm review answer key is an essential tool for students preparing for their chemistry exams. As students approach their midterms, they often seek comprehensive resources to help them review critical concepts, formulas, and problem-solving skills. This article will explore the components

of a chemistry midterm review, strategies for effective study, and examples of typical questions and answers commonly found in midterm exams.

Understanding the Format of a Chemistry Midterm

Before delving into the review process, it's crucial to understand the typical format of a chemistry midterm exam. Most midterms consist of various question types, including:

- Multiple choice questions
- Short answer questions
- Problem-solving questions
- Lab-related questions

These questions may cover a wide range of topics, including:

- Atomic structure
- Periodic table trends
- Chemical bonding
- Stoichiometry

- Thermodynamics
- Kinetics and equilibrium

Understanding these components helps students focus their study efforts effectively.

Key Topics for Review

To prepare efficiently, students should review the following key topics, which are often emphasized in midterm exams:

1. Atomic Structure

- Subatomic Particles: Understand the role of protons, neutrons, and electrons.
- Atomic Mass and Number: Be able to calculate the number of neutrons in an atom and define isotopes.
- Electron Configuration: Familiarize yourself with the Aufbau principle, Pauli exclusion principle, and Hund’s rule.

2. Periodic Table Trends

- Trends in Atomic Size: Learn how atomic radius changes across periods and down groups.
- Ionization Energy: Understand how ionization energy varies and what factors influence it.
- Electronegativity: Be able to describe how electronegativity affects bonding and molecular geometry.

3. Chemical Bonding

- Ionic vs. Covalent Bonds: Compare and contrast the characteristics of ionic and covalent bonds.
- Molecular Geometry: Use VSEPR theory to predict the shapes of molecules.
- Intermolecular Forces: Identify different types of intermolecular forces and their effects on physical properties.

4. Stoichiometry

- Mole Concept: Understand Avogadro's number and be able to convert between moles, grams, and molecules.
- Balancing Reactions: Practice balancing chemical equations and understanding reaction stoichiometry.
- Limiting Reactants: Learn how to identify limiting reactants in chemical reactions.

5. Thermodynamics

- Laws of Thermodynamics: Familiarize yourself with the first and second laws of thermodynamics.
- Enthalpy Changes: Be able to calculate changes in enthalpy during reactions.
- Spontaneity and Gibbs Free Energy: Understand how to predict the spontaneity of reactions using Gibbs free energy.

6. Kinetics and Equilibrium

- Reaction Rates: Know the factors that affect reaction rates and how to use rate laws.
- Equilibrium Constant (K): Be able to calculate the equilibrium constant for reversible reactions.
- Le Chatelier's Principle: Understand how changes in concentration, temperature, and pressure affect

equilibrium.

Effective Study Strategies

Once students have identified the key topics for review, they can adopt several study strategies to enhance their preparation:

1. Create a Study Schedule

Establish a timeline that allocates time for each topic based on its complexity and your familiarity with the material. Stick to this schedule to ensure all key areas are covered before the exam.

2. Utilize Practice Questions

Working through practice questions can significantly enhance understanding and retention. Consider the following sources for practice problems:

- Textbook end-of-chapter questions
- Online quizzes and resources
- Previous exams and answer keys

3. Form Study Groups

Collaborating with peers can provide new insights and enhance understanding. Discuss challenging concepts and quiz each other to reinforce learning.

4. Use Visual Aids

Visual aids such as flashcards, diagrams, and charts can help with memorization and understanding complex concepts. Create flashcards for key terms, formulas, and reaction mechanisms.

5. Teach Others

Explaining concepts to others can reinforce your understanding and identify areas that may need more attention. Consider tutoring a classmate or discussing topics with friends.

Sample Questions and Answer Key

To further assist in your preparation, here are some sample midterm questions along with their answer keys:

Sample Question 1: Atomic Structure

Question: What is the electron configuration of a chlorine atom (atomic number 17)?

Answer: \(1s^2 2s^2 2p^6 3s^2 3p^5\)

Sample Question 2: Stoichiometry

Question: If 4 moles of hydrogen gas react with oxygen gas to form water, how many moles of water are produced?

Answer: According to the balanced equation $2H_2 + O_2 \rightarrow 2H_2O$, 4 moles of hydrogen will produce 4 moles of water.

Sample Question 3: Thermodynamics

Question: What is the enthalpy change for the reaction $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$ given the standard enthalpy of formation values?

Answer: Calculate using the formula: $\Delta H = \Sigma \Delta H_f (products) - \Sigma \Delta H_f (reactants)$.

Sample Question 4: Kinetics

Question: Describe how increasing the temperature affects the rate of a chemical reaction.

Answer: Increasing the temperature typically increases the reaction rate due to greater kinetic energy, leading to more frequent and effective collisions between reactant molecules.

Conclusion

Preparing for a chemistry midterm can be a daunting task, but with the right tools and strategies, students can feel confident in their knowledge and problem-solving abilities. Utilizing a chemistry

midterm review answer key, understanding key topics, and adopting effective study methods will enhance preparation and improve performance on the exam. Always remember that consistent practice and a thorough understanding of concepts are key to success in chemistry. Good luck on your midterms!

Frequently Asked Questions

What topics are typically covered in a chemistry midterm review?

Common topics include atomic structure, chemical bonding, stoichiometry, thermochemistry, and basic organic chemistry.

How can I effectively prepare for my chemistry midterm?

Review lecture notes, complete practice problems, use flashcards for key terms, and form study groups for discussion.

What is the significance of the periodic table in chemistry?

The periodic table organizes elements by increasing atomic number and groups them based on similar chemical properties, which is essential for understanding chemical behavior.

What types of questions can I expect on my chemistry midterm?

You can expect multiple-choice questions, short answer questions, and problem-solving questions that require calculations.

How do I balance a chemical equation?

To balance a chemical equation, adjust the coefficients of the reactants and products so that the number of atoms of each element is the same on both sides.

What is the difference between an ionic and covalent bond?

Ionic bonds involve the transfer of electrons from one atom to another, resulting in charged ions, while covalent bonds involve the sharing of electrons between atoms.

What is molarity and how is it calculated?

Molarity is a measure of concentration defined as moles of solute per liter of solution. It is calculated using the formula M = moles of solute / liters of solution.

What is the role of catalysts in chemical reactions?

Catalysts speed up chemical reactions by lowering the activation energy, allowing the reaction to occur more easily and quickly without being consumed in the process.

What are some common lab techniques that may be tested?

Common lab techniques include titration, filtration, distillation, and chromatography, which are important for analysis and separation of substances.

How can I find a chemistry midterm review answer key?

Answer keys for chemistry midterm reviews can often be found through your textbook, online educational resources, or by asking your instructor for guidance.

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