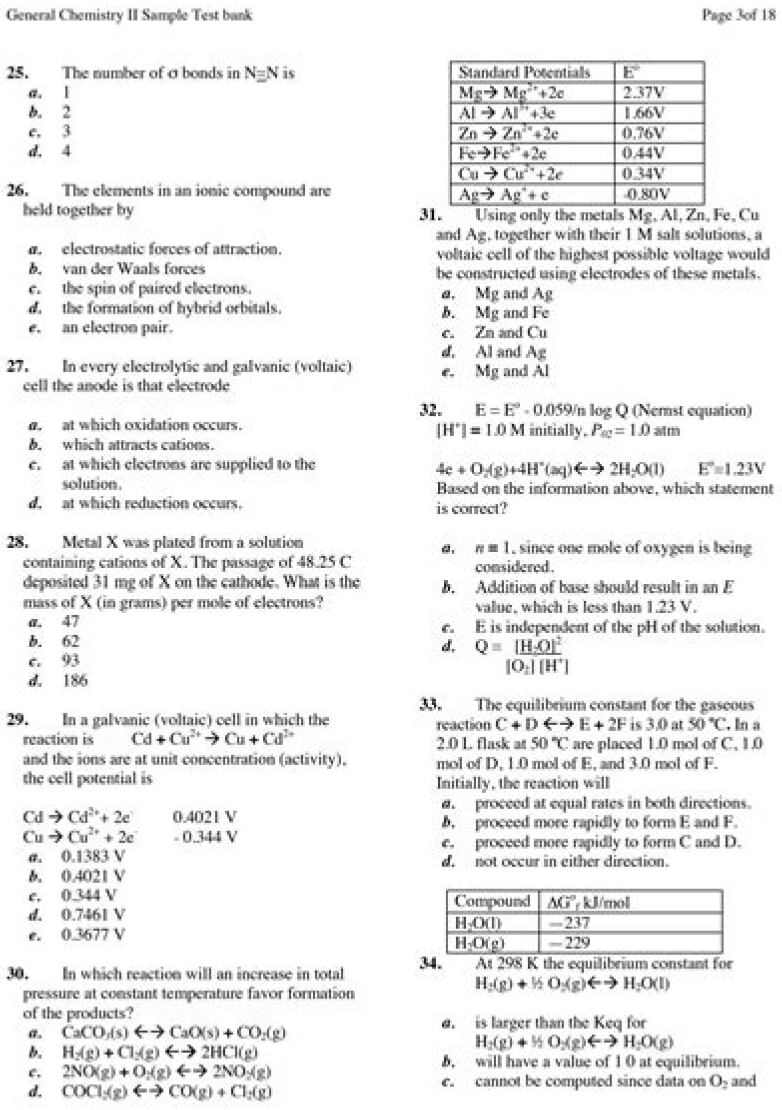
General Chemistry Acs Exam



General Chemistry II Sample Test bank

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25. The number of σ bonds in N≡N is
a. 1
b. 2
c. 3
d. 4

26. The elements in an ionic compound are held together by

a. electrostatic forces of attraction.
b. van der Waals forces
c. the spin of paired electrons.
d. the formation of hybrid orbitals.
e. an electron pair.

27. In every electrolytic and galvanic (voltaic) cell the anode is that electrode

a. at which oxidation occurs.
b. which attracts cations.
c. at which electrons are supplied to the solution.
d. at which reduction occurs.

28. Metal X was plated from a solution containing cations of X. The passage of 48.25 C deposited 31 mg of X on the cathode. What is the mass of X (in grams) per mole of electrons?
a. 47
b. 62
c. 93
d. 186

29. In a galvanic (voltaic) cell in which the reaction is $Cd + Cu^{2+} \rightarrow Cu + Cd^{2+}$
and the ions are at unit concentration (activity), the cell potential is

$Cd \rightarrow Cd^{2+} + 2e^-$ 0.4021 V
$Cu \rightarrow Cu^{2+} + 2e^-$ - 0.344 V
a. 0.1383 V
b. 0.4021 V
c. 0.344 V
d. 0.7461 V
e. 0.3677 V

30. In which reaction will an increase in total pressure at constant temperature favor formation of the products?
a. $CaCO_3(s) \leftrightarrow CaO(s) + CO_2(g)$
b. $H_2(g) + Cl_2(g) \leftrightarrow 2HCl(g)$
c. $2NO(g) + O_2(g) \leftrightarrow 2NO_2(g)$
d. $COCl_2(g) \leftrightarrow CO(g) + Cl_2(g)$

Standard Potentials	E°
$Mg \rightarrow Mg^{2+}+2e$	2.37V
$Al \rightarrow Al^{3+}+3e$	1.66V
$Zn \rightarrow Zn^{2+}+2e$	0.76V
$Fe \rightarrow Fe^{2+}+2e$	0.44V
$Cu \rightarrow Cu^{2+}+2e$	0.34V
$Ag \rightarrow Ag^{+}+e$	-0.80V

31. Using only the metals Mg, Al, Zn, Fe, Cu and Ag, together with their 1 M salt solutions, a voltaic cell of the highest possible voltage would be constructed using electrodes of these metals.
a. Mg and Ag
b. Mg and Fe
c. Zn and Cu
d. Al and Ag
e. Mg and Al

32. $E = E° - 0.059/n \log Q$ (Nernst equation)
$[H^+] = 1.0$ M initially, $P_{O2} = 1.0$ atm

$4e + O_2(g) + 4H^+(aq) \leftrightarrow 2H_2O(l)$ $E° = 1.23V$
Based on the information above, which statement is correct?

a. $n = 1$, since one mole of oxygen is being considered.
b. Addition of base should result in an *E* value, which is less than 1.23 V.
c. E is independent of the pH of the solution.
d. $Q = \dfrac{[H_2O]^2}{[O_2]\,[H^+]}$

33. The equilibrium constant for the gaseous reaction $C + D \leftrightarrow E + 2F$ is 3.0 at 50 °C. In a 2.0 L flask at 50 °C are placed 1.0 mol of C, 1.0 mol of D, 1.0 mol of E, and 3.0 mol of F. Initially, the reaction will
a. proceed at equal rates in both directions.
b. proceed more rapidly to form E and F.
c. proceed more rapidly to form C and D.
d. not occur in either direction.

Compound	$\Delta G°_f$ kJ/mol
$H_2O(l)$	−237
$H_2O(g)$	−229

34. At 298 K the equilibrium constant for $H_2(g) + ½ O_2(g) \leftrightarrow H_2O(l)$

a. is larger than the Keq for $H_2(g) + ½ O_2(g) \leftrightarrow H_2O(g)$
b. will have a value of 1.0 at equilibrium.
c. cannot be computed since data on O_2 and

General Chemistry ACS Exam is a standardized assessment developed by the American Chemical Society (ACS) to evaluate the knowledge and understanding of undergraduate students in general chemistry. This exam is widely used in educational institutions across the United States and serves as a crucial tool for both students and educators. It assesses a student's mastery of fundamental concepts, principles, and problem-solving skills in chemistry, providing a benchmark for academic performance and readiness for advanced studies in the field.

Overview of the Exam

The General Chemistry ACS Exam is designed to cover a broad range of topics in general chemistry. It typically consists of multiple-choice questions that test students' understanding of theoretical concepts as well as their ability to apply these concepts in practical scenarios. The exam is usually given at the end of a general chemistry course, serving as a final assessment of the students' learning outcomes.

Format and Structure

The exam consists of approximately 70 multiple-choice questions, which students are required to complete within a designated time frame, usually around 110 minutes. The questions are categorized into several content areas, which include:

1. Atomic Structure and Properties
2. Chemical Bonding and Molecular Structure
3. Stoichiometry and Chemical Reactions
4. Thermochemistry and Thermodynamics
5. Chemical Kinetics
6. Chemical Equilibrium
7. Acids and Bases
8. Electrochemistry
9. Solutions and Their Properties
10. Descriptive Chemistry

Scoring and Reporting

The scoring for the ACS exam is based on the number of correct answers, with no penalties for incorrect answers. Each student's performance is compared to a national average, allowing educators to gauge where their students stand relative to peers across the country. The results are typically reported as percentile rankings, providing insight into how well a student performed compared to others who took the exam in the same testing period.

Preparation for the General Chemistry ACS Exam

Proper preparation for the General Chemistry ACS Exam is crucial for success. Here are several strategies that students can employ to enhance their understanding and performance:

1. Review Course Material

Students should begin by thoroughly reviewing their course materials, including lectures, textbooks, and lab notes. Focus on key concepts, definitions, and problem-solving techniques that were emphasized throughout the course.

2. Utilize Practice Exams

Taking practice exams is one of the most effective ways to prepare for the ACS exam. The ACS provides official practice exams that mimic the structure and content of the actual test. These practice exams can help students:

- Familiarize themselves with the format of the questions
- Identify areas of strength and weakness
- Develop time management skills for the exam

3. Form Study Groups

Collaborating with peers can enhance understanding of complex topics. Study groups allow students to:

- Share knowledge and resources
- Discuss challenging concepts
- Take turns quizzing each other on important material

4. Consult Additional Resources

In addition to course materials, students may benefit from utilizing supplementary resources such as:

- Chemistry review books
- Online tutorials and videos
- Interactive chemistry software and simulations

5. Meet with Instructors or Tutors

Seeking assistance from instructors or tutors can provide clarity on difficult subjects. Students should not hesitate to ask questions or request additional help on topics they find challenging.

Content Areas in Detail

A comprehensive understanding of the content areas covered in the ACS exam is essential for success. Below is a more in-depth look at some of the key topics:

Atomic Structure and Properties

This section covers the fundamental concepts of atomic theory, including:

- Structure of atoms (protons, neutrons, electrons)
- Atomic mass and isotopes
- Electron configuration and orbital theory
- Periodic properties (trends in ionization energy, electronegativity, etc.)

Chemical Bonding and Molecular Structure

Students should understand:

- Types of chemical bonds (ionic, covalent, metallic)
- Lewis structures and resonance
- VSEPR theory and molecular geometry
- Hybridization and molecular orbital theory

Stoichiometry and Chemical Reactions

Key concepts include:

- Balancing chemical equations
- Calculating moles, mass, and volume in reactions
- Understanding limiting reactants and percent yield
- Types of chemical reactions (synthesis, decomposition, combustion, etc.)

Thermochemistry and Thermodynamics

This area focuses on:

- Laws of thermodynamics
- Enthalpy, entropy, and Gibbs free energy
- Heat capacity and calorimetry
- Spontaneity of reactions

Chemical Kinetics

Students should be familiar with:

- Rate of reaction and factors affecting it
- Rate laws and reaction mechanisms
- Catalysis and its effect on reaction rates

Chemical Equilibrium

Students need to understand:

- Dynamic nature of equilibrium
- Le Chatelier's principle
- Equilibrium constants and their applications

Acids and Bases

Key topics include:

- Definitions (Arrhenius, Brønsted-Lowry, and Lewis)
- pH, pOH, and the pH scale
- Acid-base titrations and indicators
- Buffer solutions and their applications

Electrochemistry

This section covers:

- Redox reactions
- Galvanic and electrolytic cells
- Standard reduction potentials

Conclusion

The General Chemistry ACS Exam serves as a significant evaluation tool for undergraduate chemistry students, assessing their grasp of fundamental concepts and principles. To excel in this exam, students must engage in thorough preparation that encompasses a review of course materials, practice exams, collaborative study groups, and additional resources. By understanding the content areas and focusing on key topics, students can enhance their ability to perform well on the exam and set a solid foundation for future studies in chemistry. With dedication and strategic preparation, students can navigate the challenges of the ACS exam and achieve academic success in the field of chemistry.

Frequently Asked Questions

What topics are primarily covered in the General

Chemistry ACS Exam?

The General Chemistry ACS Exam primarily covers topics such as atomic structure, chemical bonding, stoichiometry, thermodynamics, kinetics, equilibrium, and acid-base chemistry.

How is the General Chemistry ACS Exam structured?

The General Chemistry ACS Exam typically consists of multiple-choice questions, with a total of 70 questions to be completed in a 3-hour time frame.

What is the purpose of the General Chemistry ACS Exam?

The purpose of the General Chemistry ACS Exam is to assess students' understanding and mastery of general chemistry concepts and to provide a standardized measure of achievement for undergraduate chemistry courses.

How can students prepare for the General Chemistry ACS Exam?

Students can prepare for the General Chemistry ACS Exam by reviewing course materials, taking practice exams, studying with peers, and using ACS study guides and resources.

What is the passing score for the General Chemistry ACS Exam?

There is no official passing score for the General Chemistry ACS Exam, as scores are often used for comparative purposes; however, scores are typically reported as percentiles relative to other test-takers.

Are there any recommended study materials for the General Chemistry ACS Exam?

Recommended study materials include the ACS Study Guide for General Chemistry, practice exams available from the ACS website, and textbooks that cover general chemistry topics.

What is the average score for students taking the General Chemistry ACS Exam?

The average score can vary from year to year, but it generally hovers around the 50th percentile, indicating that half of the students score above and half below this mark.

Can the General Chemistry ACS Exam be taken multiple times?

Yes, students can take the General Chemistry ACS Exam multiple times, but they should check with their institution for any specific policies regarding retakes.

What is the significance of the General Chemistry ACS Exam for chemistry majors?

For chemistry majors, the General Chemistry ACS Exam can provide valuable feedback on their understanding of fundamental concepts, which can be beneficial for further studies in chemistry and related fields.

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