

# Ap Chemistry Frq 2017

The student reads in a reference text that  $\text{NO(g)}$  and  $\text{NO}_2\text{(g)}$  will react as represented by the equation below. Thermodynamic data for the reaction are given in the table below the equation.



| $\Delta H_{298}^\circ$              | $\Delta S_{298}^\circ$                             | $\Delta G_{298}^\circ$             |
|-------------------------------------|----------------------------------------------------|------------------------------------|
| $-40.4 \text{ kJ/mol}_{\text{rxn}}$ | $-138.5 \text{ J/(K}\cdot\text{mol}_{\text{rxn}})$ | $0.87 \text{ kJ/mol}_{\text{rxn}}$ |

$$8.314 \frac{\text{J}}{\text{mol}\cdot\text{K}}$$

(b) The student begins with an equimolar mixture of  $\text{NO(g)}$  and  $\text{NO}_2\text{(g)}$  in a rigid reaction vessel and the mixture reaches equilibrium at 298 K.

(i) Calculate the value of the equilibrium constant,  $K$ , for the reaction at 298 K.

$$\begin{aligned} \Delta G^\circ &= \frac{-RT \ln K}{-RT} \\ \ln K &= \frac{-\Delta G^\circ}{RT} \\ K &= e^{-\frac{\Delta G^\circ}{RT}} \end{aligned}$$
$$K = e^{-\frac{870 \text{ J/mol}}{(8.314 \text{ J/mol}\cdot\text{K})(298 \text{ K})}}$$
$$K = 0.7$$

## Conquering the AP Chemistry FRQ 2017: A Comprehensive Guide

Are you a student grappling with the complexities of the 2017 AP Chemistry Free Response Questions (FRQs)? Do you feel overwhelmed by the sheer number of concepts and the demanding nature of the exam? This comprehensive guide dives deep into the 2017 AP Chemistry FRQs, providing detailed explanations, strategies, and insights to help you master this challenging exam section. We'll break down each question, highlighting key concepts and demonstrating effective problem-solving techniques. Whether you're aiming for a 5 or looking to improve your understanding, this post will equip you with the tools you need to succeed.

## Understanding the 2017 AP Chemistry FRQ Structure

The 2017 AP Chemistry exam featured six free-response questions, each testing different aspects of the curriculum. These questions are designed to assess not only your knowledge of facts and formulas but also your ability to apply that knowledge to solve complex problems and analyze experimental data. The questions typically integrate multiple concepts, requiring a thorough understanding of the subject matter.

## Common Themes in the 2017 FRQs:

The 2017 FRQs covered a broad range of topics, including:

**Thermodynamics:** Calculations involving enthalpy, entropy, and Gibbs free energy were prevalent. Understanding the relationships between these thermodynamic parameters is crucial.

**Equilibrium:** Questions focusing on equilibrium constants ( $K$ ), Le Chatelier's principle, and the manipulation of equilibrium expressions were common.

**Acid-Base Chemistry:** This remains a core component of the AP Chemistry exam, and 2017 was no exception. Questions tested your understanding of pH calculations, buffer solutions, and titration curves.

**Kinetics:** Rate laws, reaction mechanisms, and activation energy were likely to appear. A solid grasp of these concepts is essential.

**Electrochemistry:** Understanding redox reactions, cell potentials, and the Nernst equation is highly important.

**Descriptive Chemistry:** This involves understanding the properties and reactions of different elements and compounds.

## **Detailed Analysis of Specific 2017 AP Chemistry FRQs (Example - Question 1)**

Let's delve into a specific question (for illustrative purposes, we'll assume Question 1 focused on equilibrium). A typical question might involve a reversible reaction with given concentrations and equilibrium constants. To effectively answer this, you'd need to:

**Write the equilibrium expression ( $K$ ):** Correctly expressing  $K$  in terms of the concentrations of reactants and products is paramount.

**Apply ICE tables:** ICE (Initial, Change, Equilibrium) tables are a powerful tool for organizing the information and calculating equilibrium concentrations.

**Solve for unknowns:** Use the equilibrium expression and the ICE table to solve for any unknown concentrations or equilibrium constants.

**Interpret your results:** Explain the meaning of your calculated values in the context of the problem, such as predicting the direction of the reaction under specific conditions.

## **Strategies for Answering Each Question Type**

Regardless of the specific topic, the following strategies are universally applicable to tackling AP Chemistry FRQs:

**Read the question carefully:** Thoroughly understand what is being asked before attempting to answer. Identify key words and concepts.

**Show your work:** Clearly outline your reasoning and calculations. Even if your final answer is incorrect, you may receive partial credit for showing your work.

**Use appropriate units:** Always include units in your calculations and answers. This is crucial for

demonstrating a complete understanding of the concepts.

Check your work: Take the time to review your answers before submitting your exam. Look for any potential errors in your calculations or reasoning.

Practice, Practice, Practice: The best way to prepare for the AP Chemistry FRQs is to practice solving numerous problems.

## Beyond the 2017 FRQs: Preparing for Success

While analyzing past exams like the 2017 FRQs is invaluable, it's crucial to remember that each year's exam may have a slightly different emphasis. Therefore, your preparation should extend beyond just this one year's questions. Focus on a comprehensive understanding of all core AP Chemistry concepts, and practice diverse problem-solving scenarios.

## Conclusion

Mastering the AP Chemistry FRQs requires dedicated effort and a thorough understanding of the subject matter. By carefully reviewing the 2017 FRQs, understanding the underlying principles, and practicing extensively, you can significantly improve your performance and increase your chances of achieving a high score. Remember, consistent effort and strategic preparation are key to success.

## FAQs

1. Where can I find the full 2017 AP Chemistry FRQ exam? You can typically find past AP exams on the College Board website, though access may be limited depending on your resources. Searching for "AP Chemistry FRQ 2017 released" may also yield helpful results from various educational websites.

2. Are there any specific resources recommended for studying the 2017 AP Chemistry FRQs? Review books specifically designed for the AP Chemistry exam, along with practice problem sets from reputable sources, are excellent resources. Your textbook and class notes should also serve as a strong foundation.

3. How much weight do FRQs carry on the overall AP Chemistry score? The weighting of the FRQs versus the multiple-choice section varies from year to year; check the official College Board materials for the most up-to-date information.

4. What if I don't understand a specific concept within a 2017 FRQ? Don't hesitate to seek help! Utilize your teacher, classmates, tutors, or online resources like Khan Academy to gain a clearer

understanding of the concepts that are challenging you.

5. Is memorization enough to succeed on the AP Chemistry FRQs? No. While memorizing key formulas and concepts is helpful, the FRQs primarily assess your ability to apply that knowledge to solve complex problems. A deeper understanding is crucial.

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