

# KEY

## Unit 9 Outline- Thermodynamics, Reaction Rates, & Chemical Equilibrium Chapters 17 & 18

### Essential Skills/ State Standards:

- 9-1. Describe how temperature and heat flow in terms of the motion of molecules (or atoms). (CSS: 7a)  
 9-2. Know that chemical processes & phase changes can either release energy (exothermic) or absorb energy (endothermic). (CSS: 7b, 7c)  
 9-3. Solve problems involving heat flow and temperature changes, using known values of specific heat ( $q = m \cdot c \cdot \Delta T$ ) & latent heat of phase change ( $q = m \cdot \Delta H$ ). (CSS: 7d)  
 9-4. Know the rate of reaction is the decrease in concentration of reactants or the increase in concentration of products with time & depends on such factors as: concentration, temperature, and pressure. (CSS: 8a, 8b)  
 9-5. Know the definition and role of activation energy & catalyst in a chemical reaction. (CSS: 8d\*, 8c)  
 9-6. Know how to use Le Chatelier's principle to predict the effect of changes in concentration, temperature, and pressure. (CSS: 9a)  
 9-7. Know that equilibrium is established when the forward and reverse reaction rates are equal. (CSS: 9b)

### Vocabulary

- |                |                   |  |                           |
|----------------|-------------------|--|---------------------------|
| • Condensation | • Deposition      | • Calorimeter                                  | • Heat of reaction        |
| • Freezing     | • Heat            | • Joule  | • Le Chatlier's principle |
| • Vaporization | • Temperature     | • Specific heat                                | • Equilibrium             |
| • Melting      | • Thermochemistry | • $q = m \cdot c \cdot \Delta T$               | • Activation Energy       |
| • Boiling      | • Exothermic      | • $q = m \cdot \Delta H_{\text{vaporization}}$ | • Catalyst                |
| • Sublimation  | • Endothermic     | • $q = m \cdot \Delta H_{\text{fusion}}$       |                           |

### Study Guide (Use notes, worksheets, and labs in addition to this study guide)

1. According to the collision theory, what 3 things must happen in order for two molecules to react?

*Must collide with each other, Must collide with enough energy, & in the correct orientation*

2. What is the importance of the activation energy in a chemical reaction?

*Amount of energy needed for a reaction to occur.*

3. Using the collision theory, explain if the following would increase/ decrease the rate of reaction:

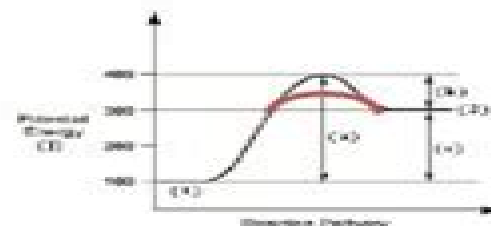


- Increase temp: *Increase, molecules collide more*
- Increase HCl: *Increase, more collisions because more reactants to collide*
- Increase pressure: *Hard to say, wouldn't affect the reactants directly because none of them are gases. One of the products is a gas, so it might cause the gas particles to collide more with the reactants and could slow it down. Tough call.. (this one won't be on the test).*
- Remove  $\text{MgCl}_2$ : *Increase, less products means less chance for them to interfere with reactant collisions*
- Add  $\text{H}_2$ : *Decrease, more products mean they interfere more with reactants and the reactants would collide less.*

4. Identify the following terms with their correct letter from the graphs:

- Reactants- **I**
- Products- **2**
- Activation energy (number/ letter & amount)-  
**A (300 Joules)**
- Is this reaction exothermic or endothermic?  
**Endothermic**

5. Explain how a catalyst affects the activation energy in a chemical reaction. (Also, show on the above graph what a catalyst might do). It lowers the activation energy (see on graph).  
*Speeds it up by lowering the activation energy.*



# 18 Reaction Rates And Equilibrium Test A Answers

**Neil D. Jespersen, Pamela Kerrigan**



## **18 Reaction Rates And Equilibrium Test A Answers:**

**CliffsNotes AP Chemistry** Bobrow Test Preparation Services, 2009-02-09 The book itself contains chapter length subject reviews on every subject tested on the AP Chemistry exam as well as both sample multiple choice and free response questions at each chapter's end Two full length practice tests with detailed answer explanations are included in the book

**Cracking the SAT Chemistry Subject Test, 2013-2014 Edition** Princeton Review, Theodore Silver, M.D., 2013-03-05 Offers test strategies reviews key concepts of chemistry and provides three full length practice tests with answers and explanations

**AP Chemistry For Dummies** Peter J. Mikulecky, Michelle Rose Gilman, Kate Brutlag, 2008-11-13 A practical and hands on guide for learning the practical science of AP chemistry and preparing for the AP chem exam Gearing up for the AP Chemistry exam AP Chemistry For Dummies is packed with all the resources and help you need to do your very best Focused on the chemistry concepts and problems the College Board wants you to know this AP Chemistry study guide gives you winning test taking tips multiple choice strategies and topic guidelines as well as great advice on optimizing your study time and hitting the top of your game on test day This user friendly guide helps you prepare without perspiration by developing a pre test plan organizing your study time and getting the most out of your AP course You'll get help understanding atomic structure and bonding grasping atomic geometry understanding how colliding particles produce states and so much more To provide students with hands on experience AP chemistry courses include extensive labwork as part of the standard curriculum This is why the book dedicates a chapter to providing a brief review of common laboratory equipment and techniques and another to a complete survey of recommended AP chemistry experiments Two full length practice exams help you build your confidence get comfortable with test formats identify your strengths and weaknesses and focus your studies You'll discover how to Create and follow a pretest plan Understand everything you must know about the exam Develop a multiple choice strategy Figure out displacement combustion and acid base reactions Get familiar with stoichiometry Describe patterns and predict properties Get a handle on organic chemistry nomenclature Know your way around laboratory concepts tasks equipment and safety Analyze laboratory data Use practice exams to maximize your score Additionally you'll have a chance to brush up on the math skills that will help you on the exam learn the critical types of chemistry problems and become familiar with the annoying exceptions to chemistry rules Get your own copy of AP Chemistry For Dummies to build your confidence and test taking know how so you can ace that exam

**NEET National Eligibility Cum Entrance Test Chemistry Class 12 Volume I** Priti Singhal, 2024-11-12 reflecting insights from previous years papers We have focused on high yield topics and included chapter summaries topic wise MCQs and mock tests to provide a structured approach to learning Whether it's mastering Biology tackling numerical in Physics or understanding the complexities of Organic Chemistry this book offers step by step solutions to help students at every stage of their preparation One of the unique features of this book is the integration of past year questions within chapters to show how theoretical

concepts are applied in actual NEET exams Full length mock tests have also been provided to simulate the exact exam environment building speed and confidence For students struggling with time management we offer strategies to plan daily schedules effectively and balance study and relaxation to avoid burnout **Cracking the AP Chemistry Exam, 2018**

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