

## Section 17.4 Instantaneous Reaction Rates and Reaction Mechanisms

In your textbook, read about instantaneous reaction rates.

Circle the letter of the choice that best completes the statement.

- \_\_\_\_\_ is determined by finding the slope of the straight line tangent to the curve of a plot of the change in concentration of a reactant versus time.
  - Instantaneous rate
  - Change in temperature
  - Reaction mechanism
  - Reaction order
- A(n) \_\_\_\_\_ consists of two or more elementary steps.
  - complex reaction
  - elementary step
  - reaction mechanism
  - reaction order
- A(n) \_\_\_\_\_ is a substance produced in an elementary step and consumed in another elementary step.
  - instantaneous rate
  - intermediate
  - reaction mechanism
  - rate-determining step
- A(n) \_\_\_\_\_ is the complete sequence of elementary reactions that make up a complex reaction.
  - instantaneous rate
  - elementary step
  - reaction mechanism
  - reaction order
- The \_\_\_\_\_ is the slowest of the elementary steps in a complex reaction.
  - instantaneous rate
  - intermediate
  - rate-determining step
  - reaction order
- The \_\_\_\_\_ can be used to determine the instantaneous rate for a chemical reaction.
  - rate-determining step
  - intermediates
  - products
  - rate law
- An element or compound that reacts in one step of a complex reaction and reforms in another step of the complex reaction is
  - an intermediate.
  - a catalyst.
  - not part of the reaction mechanism.
  - shown in the net chemical equation for the reaction.

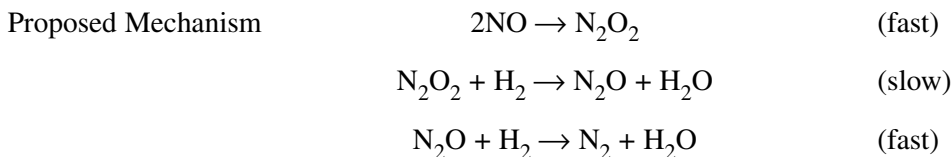
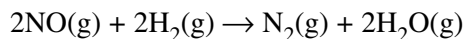
**Section 17.4** *continued*

In the space at the left, write *true* if the statement is true; if the statement is false, change the italicized word or phrase to make it true.

- \_\_\_\_\_ 8. To determine the *instantaneous rate*, you must know the specific rate constant, the concentrations of the reactants, and the reaction orders for the reaction.
- \_\_\_\_\_ 9. A reaction rate that is defined as  $k[A][B]$  and that has a specific rate constant of  $1.0 \times 10^1 \text{ L}/(\text{mol}\cdot\text{s})$ ,  $[A] = 0.1M$ , and  $[B] = 0.1M$  would have an instantaneous rate of  $0.01 \text{ mol}/(\text{L}\cdot\text{s})$ .

In your textbook, read about reaction mechanisms.

Answer the following questions about the proposed reaction mechanism for the complex reaction below.



10. How many elementary steps make up the complex reaction?

\_\_\_\_\_

11. What is the rate-determining step for this reaction?

\_\_\_\_\_

12. What are  $\text{N}_2\text{O}_2$  and  $\text{N}_2\text{O}$  in the reaction?

\_\_\_\_\_

13. Is there a catalyst involved in the reaction? Explain your answer.

\_\_\_\_\_

\_\_\_\_\_

14. What can you conclude about the activation energy for the rate-determining step?

\_\_\_\_\_

15. If you wanted to increase the rate of the overall reaction, what would you do?

\_\_\_\_\_