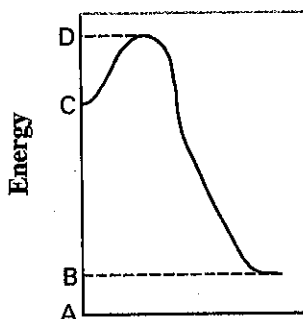


CHAPTER 17 REVIEW*Reaction Energy and Reaction Kinetics***SECTION 17-3****SHORT ANSWER** Answer the following questions in the space provided.**1.** Refer to the energy diagram at the bottom of this page to answer the following questions:

- _____ a. Which letter represents the energy of the activated complex?
- (a) A (c) C
(b) B (d) D
- _____ b. Which letter represents the energy of the reactants?
- (a) A (c) C
(b) B (d) D
- _____ c. Which of the following choices represents the quantity of activation energy for the forward reaction?
- (a) the amount of energy at C minus the amount of energy at B
(b) the amount of energy at D minus the amount of energy at A
(c) the amount of energy at D minus the amount of energy at B
(d) the amount of energy at D minus the amount of energy at C
- _____ d. Which of the following choices represents the quantity of activation energy for the reverse reaction?
- (a) the amount of energy at C minus the amount of energy at B
(b) the amount of energy at D minus the amount of energy at A
(c) the amount of energy at D minus the amount of energy at B
(d) the amount of energy at D minus the amount of energy at C
- _____ e. Which of the following choices represents the quantity of the heat of reaction for the forward reaction?
- (a) the amount of energy at C minus the amount of energy at B
(b) the amount of energy at B minus the amount of energy at C
(c) the amount of energy at D minus the amount of energy at B
(d) the amount of energy at B minus the amount of energy at A



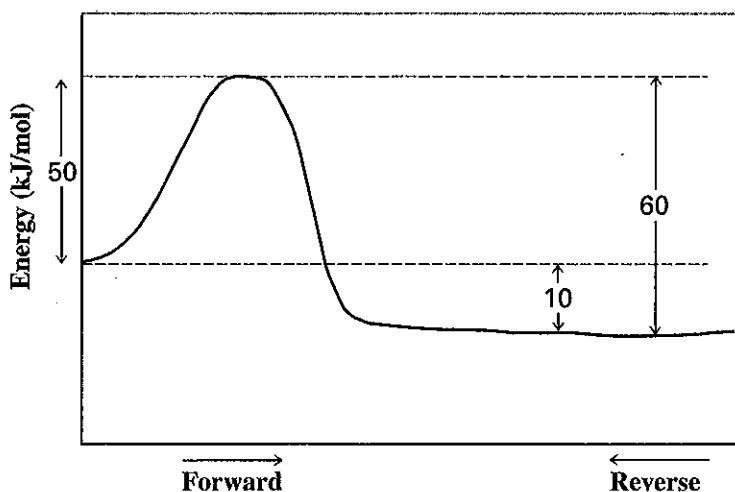
SECTION 17-3 continued

2. For the reaction $A + B \rightarrow X$, the activation energy for the forward direction equals 85 kJ/mol and the activation energy for the reverse direction equals 80 kJ/mol.

- _____ a. Which side has the greater energy content, the reactants or the product?
- _____ b. What is the heat of reaction in the forward direction?
- _____ c. The heat of reaction in the reverse direction is equal in magnitude but opposite in sign to the heat of reaction in the forward direction. True or False?

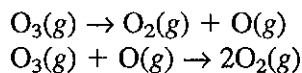
3. Below is an incomplete energy diagram.

a. Use the following data to complete the diagram: $E_a = +50$ kJ/mol; $\Delta E_{forward} = -10$ kJ/mol. Label the reactants, products, ΔE , E_a , E'_a , and the activated complex.



_____ b. What is the value of E'_a ?

4. It is proposed that ozone undergoes the following two-step mechanism in our upper atmosphere:



a. Identify any intermediates formed in the above equations.

_____ b. Write the net equation.

_____ c. If ΔH is negative for the reaction in part b, which is the more stable form of oxygen, O_3 or O_2 ?

CHAPTER 17 REVIEW*Reaction Energy and Reaction Kinetics***SECTION 17-4****SHORT ANSWER** Answer the following questions in the space provided.

1. Below is an energy diagram for a particular process. One curve represents the energy profile for the uncatalyzed reaction, and the other curve represents the energy profile for the catalyzed reaction.

_____ a. Which curve has the greater activation energy?

- (a) curve 1
- (b) curve 2
- (c) Both are equal.

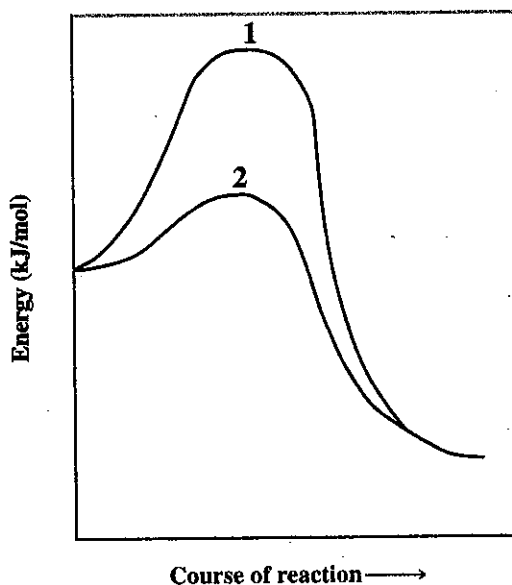
_____ b. Which curve has the greater heat of reaction?

- (a) curve 1
- (b) curve 2
- (c) Both are equal.

_____ c. Which curve represents the catalyzed process?

- (a) curve 1
- (b) curve 2

d. Explain your answer to part c.



SECTION 17-4 continued

2. Is it correct to say that a catalyst affects the speed of a reaction but does not take part in the reaction? Explain your answer.

3. The reaction $X + Y \rightarrow Z$ is shown to have the following rate law:

$$R = k[X]^3[Y]$$

- a. What is the effect on the rate if the concentration of Y is reduced by one-third?

- b. What is the effect on the rate if the concentration of X is doubled?

- c. What is the effect on the rate if a catalyst is added to the system?

4. Explain the following statements using collision theory:

- a. Gaseous reactants react faster under high pressure than under low pressure.

- b. Ionic compounds react faster when in solution than as solids.

- c. A class of heterogeneous catalysts called surface catalysts work best as a fine powder.
