2.4 Questions

1. Which are the catalysts of reactions in living things?
   a. enzymes
   b. lipids
   c. carbohydrates
   d. substrates

2. What changes during a chemical reaction between two compounds?
   a. number of atoms
   b. chemical bonds
   c. total mass
   d. total energy

3. Which type of chemical reaction tends to occur on its own, or spontaneously?

4. What is the name for the amount of energy that a reaction needs to get started?

5. How do enzymes act as catalysts in a chemical reaction?

6. What changes to the environment can affect the activity of enzymes?

Many cells make and use an enzyme called catalase to facilitate the decomposition of hydrogen peroxide ($\text{H}_2\text{O}_2$). The products of the decomposition are hydrogen and oxygen. Stephanie is investigating the structure and function of catalase, and she is comparing catalase to other proteins.

7. What can Stephanie predict with distinguish the structure of catalase from the structures of the other proteins she is studying?
   a. many regions made entirely of hydrogen and oxygen
   b. the chemical properties of the peptide bonds
   c. the types of amino acids it contains
   d. the sequence of amino acids it contains
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8. Stephanie increases the pH of catalase beyond its normal range. She observes a decrease in the rate of the decomposition of hydrogen peroxide. What is the most likely explanation for this result?
   a. a change in the chemical properties of the reactants
   b. a change in the chemical properties of the products
   c. a change in the shape of the catalase enzyme
   d. a change in the amino acid sequence of the catalase molecule

Use the graph to answer the following questions about the effect of enzymes on a chemical reaction.

9. Which curve shows the reaction pathway with the enzyme?

10. Which reaction has the higher activation energy?

11. Which arrow shows the activation energy with the enzyme? A or B?

12. Does this reaction absorb or release energy? How do you know?