

Enzyme Energetics

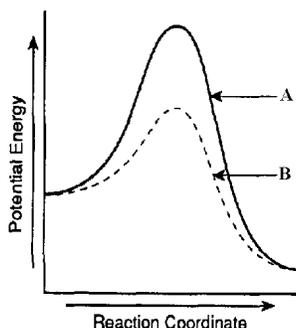
1. In a laboratory, Enzyme *Y* is produced through dehydration synthesis involving the addition of ATP. When *Y* is hydrolyzed to recover amino acids, heat is released. This illustrates

- A) the 1st law of thermodynamics
- B) the 2nd law of thermodynamics
- C) the law of enthalpy
- D) the recovery principle
- E) none of the above

2. The process of dehydration synthesis is both

- A) anabolic and endergonic
- B) anabolic and exergonic
- C) catabolic and endergonic
- D) catabolic and exergonic
- E) none of the above

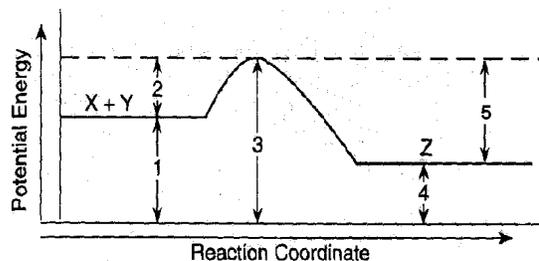
3. Base your answer to the following question on the graph below.



The reaction labeled *B* is

- A) endergonic and catalyzed
- B) endergonic and uncatalyzed
- C) exergonic and catalyzed
- D) exergonic and uncatalyzed
- E) irreversible and spontaneous

Base your answers to questions 4 and 5 on the following diagram:



4. The activation energy of the reverse reaction is indicated by

- A) 1 B) 2 C) 3 D) 4 E) 5

5. The activation energy of the above reaction is indicated by

- A) 1 B) 2 C) 3 D) 4 E) 5

6. In a reaction, the spark plug of an engine can best be classified as

- A) a catalyst
- B) a supplier of activation energy
- C) the rate determining step
- D) the activated complex
- E) the volatile reactant

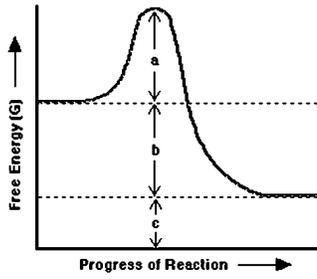
7. Which of the following is NOT a mechanism by which enzymes lower the activation energy?

- A) By increasing the speed of the reaction
- B) By allowing for proper orientation of enzyme-substrate complex
- C) By allowing for more collisions
- D) By supplying the energy for the reaction
- E) By forming temporary bonds

8. In which of the following reaction types is the activation energy of the forward reaction greater than the activation energy of the reverse reaction?

- A) Exothermic B) Endothermic
- C) Displacement D) Combination
- E) None of the above

Base your answers to questions 9 through 11 on the free energy diagram below.



9. The ΔG of this reaction is

- A) a B) b C) c D) a + c E) b + c

10. The free energy of the products is

- A) a B) b C) c D) a + b E) b + c

11. The free energy of the reactants is

- A) a B) b C) c D) a + b E) c + b
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