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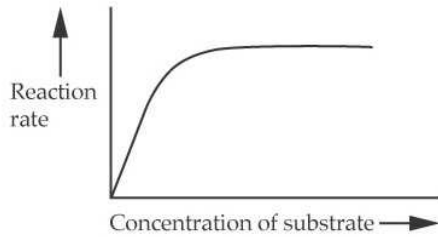
Delve: AP Biology
Problem Set 1
Due September 23, 2012

Multiple Choice Questions

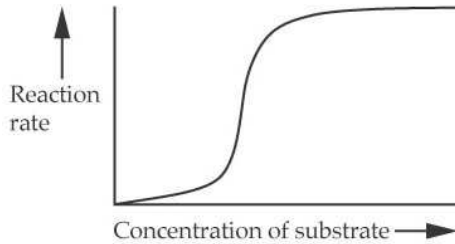
1. Before ATP is split into ADP and Pi, it holds what type of energy?
A) Potential
B) Kinetic
C) Entropic
D) Enthalpic
2. Which of the following statements concerning energy transformations is true?
A) Increases in entropy reduce usable energy.
B) Energy may be created during transformation.
C) Potential energy increases with each transformation.
D) Increases in temperature decreases total amount of energy available.
3. A reaction has a ΔG of -20 kcal/mol. This reaction is
A) endergonic, and equilibrium is far toward completion.
B) exergonic, and equilibrium is far toward completion.
C) endergonic, and the forward reaction occurs at the same rate as the reverse reaction.
D) exergonic, and the forward reaction occurs at the same rate as the reverse reaction.
4. Physicists have defined a formal measure of disorder, called
A) randomness
B) displacement
C) entropy
D) disorganization
5. Which of the following contribute to the specificity of enzymes?
A) Each enzyme has a narrow range of temperature and pH optimal.
B) Each enzyme has a specific active site that interacts with a particular substrate.
C) Substrates themselves may alter the active site slightly for optimum catalysis.
D) All of the above
6. Coenzymes and cofactors, as well as prosthetic groups, assist enzyme function by
A) stabilizing three-dimensional shape and maintaining active sites.
B) assisting with the binding of enzyme and substrate.
C) Both A and B
D) None of the above
7. Which of the following are characteristics of enzymes?
A) They are consumed by the enzyme-mediated reaction.
B) They are not altered by the enzyme-mediated reaction.
C) They raise activation energy.
D) All of the above
8. Which of the following graphs of enzyme-mediated reactions represents an allosteric enzyme? (Please see the next page.)

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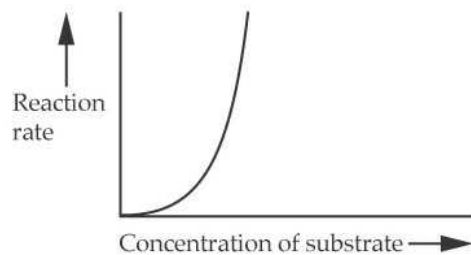
A)



B)



C)



9. pH is a measure of the acidity of a solution, based on the solution's hydronium ion concentration. Solution A has a pH of 4, and Solution B has a pH of 6. Which of the following statements is true?
- A) The $[H^+]$ of Solution A is 2 times that of Solution B
 - B) The $[H^+]$ of Solution A is 10 times that of Solution B
 - C) The $[H^+]$ of Solution A is 100 times that of Solution B
 - D) None of the above

10. You are studying a new species never before studied. It lives in acidic pools in volcanic craters where temperatures reach $100^{\circ}C$. You determine that it has a surface enzyme that catalyzes a reaction leading to its protective coating. You decide to study this enzyme in the laboratory. Under what conditions would you most likely find optimum activity of this enzyme?
- A) $0^{\circ}C$
 - B) $37^{\circ}C$
 - C) $55^{\circ}C$
 - D) $95^{\circ}C$

11. Which of the following is NOT an emergent property of water?
- A) Cohesion
 - B) Low specific heat
 - C) Ice is less dense than water
 - D) Evaporative cooling

12. Which statement is NOT true about enzyme inhibition?
- A) In competitive inhibition, the inhibitor binds to the active site of the enzyme.
 - B) In noncompetitive inhibition, the inhibitor binds to the allosteric site of the substrate.
 - C) In irreversible inhibition, a poison binds to the enzyme so that it can never work again.
 - D) Most inhibitors act in a reversible fashion.
 - E) All of the above statements are true.

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3. Explain how substrate concentration affects the rate of an enzyme-mediated reaction.

Just For Fun

Give an example of something (not necessary biology-related) that has emergent properties, and describe how you could use reductionism to study it.