

**AP® BIOLOGY SAMPLE FINAL EXAM QUESTIONS
(MULTIPLE CHOICE RESPONSE) BY OUTLINE
SECTIONS.**

SECTION IA

1. Which of the following is an example of a hydrogen bond?
- A) the peptide bond between amino acids in a protein
 - B) the bond between an oxygen atom and a hydrogen atom in the carboxyl group of a fatty acid
 - C) the bond between Na^+ and Cl^- in salt
 - D) the attraction between a hydrogen of one water molecule and the oxygen of another water molecule
 - E) the bond between carbon and hydrogen in methane

Questions 2-5

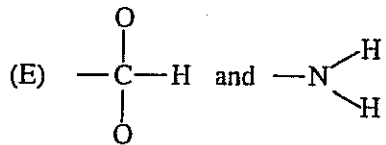
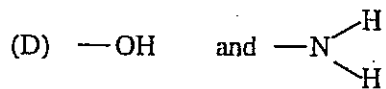
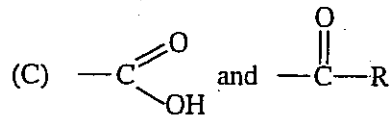
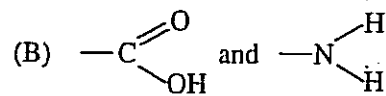
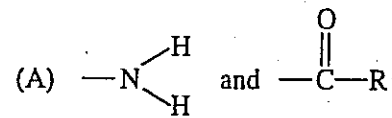
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|-------------|--------------|
| A) Glucose | F) Iron |
| B) Glycerol | G) Zinc |
| C) Glycogen | H) Magnesium |
| D) Glucagon | I) Calcium |
| E) Guanine | J) Sulfur |

2. Essential for the synthesis of neutral fats
3. A storage form of carbohydrate in muscle
4. A constituent of the chlorophyll molecule
5. Required in ionic form for the activity of many enzymes, the maintenance of bone, and the contraction of muscle fibers
6. A feature of organic compounds NOT found in inorganic compounds is the presence of:
- A) ionizing chemical groups
 - B) electrons
 - C) carbon atoms covalently bonded to each other
 - D) oxygen
 - E) hydrogen bonds
7. Which of the following can be used to determine the rate of enzyme-catalyzed reactions?
- A) rate of disappearance of the enzyme
 - B) rate of disappearance of the substrate
 - C) rate of disappearance of the product
 - D) change in volume of the solution
 - E) increase in activation energy

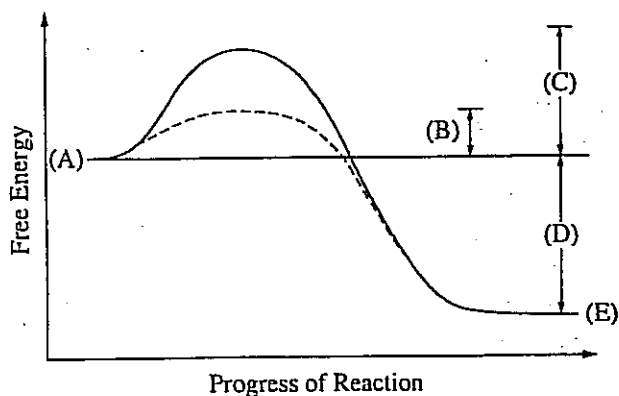


8. Which of the following best characterizes the reaction represented above?
- A) Hydrolysis
 - B) Catabolism
 - C) Oxidation-Reduction
 - D) Exergonic Reaction
 - E) Endergonic Reaction

9. Which of the following is a correct statement about the relationship between pH and the hydrogen-ion concentration of a solution?
- A) there are no H ions present in a solution with a basic pH
 - B) there are no H ions present in a solution with a neutral pH of 7.0
 - C) the concentration of H ions in a solution with a pH of 7.0 is 100X as great as that in a solution with a pH of 9.0
 - D) the concentration of H ions in a solution with a pH of 5.0 is twice that in a solution with a pH of 3.0
 - E) the concentration of H ions in a solution with a pH of 4.0 is 400X as great as that in a solution with a pH of 1.0
10. Which of the following pairs of functional groups characterizes the structure of an amino acid?



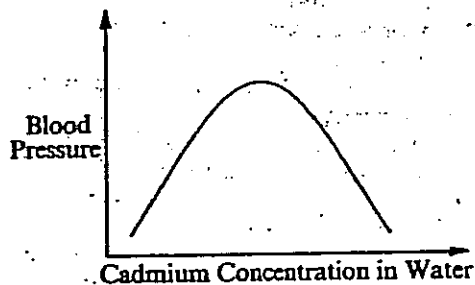
Questions 11-14 refer to the following graph. The solid curve and the dashed curve represent alternative pathways for the same reaction. One pathway is enzyme catalyzed.



11. Represents the activation energy of the enzyme-catalyzed reaction
12. Represents the net energy change of the reaction
13. Represents the energy state of the products of the enzyme-catalyzed pathway
14. Represents the energy state of the products of the pathway that is not enzyme-catalyzed

15. The graph below represents the relationship between the cadmium level in the drinking water of mice and their blood pressures. All of the following are accurate statements about the relationship shown in the graph EXCEPT:

- A) both high and low concentrations of cadmium are associated with low BP
- B) an intermediate level of cadmium produces the highest BP
- C) the lower the cadmium concentration in the water, the higher the BP
- D) up to a certain point, BP increases as cadmium intake increases
- E) after a certain point, BP decreases as cadmium intake increases



Questions 115-117

In a laboratory experiment using spectrophotometry, an enzyme is combined with its substrate at time zero. The absorbance of the resulting solution is measured at time zero and at five-minute intervals. In this procedure an increase in absorbance is related to the amount of product formed during the reaction. The experiment is conducted using the three preparations shown in the table below.

<u>Enzyme Preparation</u>	<u>Absorbance</u>				
	<u>0 min</u>	<u>5 min</u>	<u>10 min</u>	<u>15 min</u>	<u>20 min</u>
I. 3 mL of enzyme preparation 2 mL of substrate pH 5.0	0.0	0.22	0.33	0.38	0.37
II. 3 mL of boiled enzyme preparation 2 mL of substrate pH 5.0	0.0	0.06	0.04	0.03	0.04
III. 3 mL of enzyme preparation 2 mL of substrate pH 6.0	0.0	0.32	0.37	0.36	0.38

115. The most likely reason for the failure of the absorbance to increase significantly after 10 minutes in preparation III is that

- (A) the reaction is thermodynamically impossible at pH 6.0
- (B) the enzyme is not active at this pH
- (C) a pH of 6.0 prevents color development beyond an absorbance of 0.38
- (D) the enzyme is degraded more rapidly at pH 6.0 than it is at pH 5.0
- (E) most of the substrate was digested during the first 10 minutes

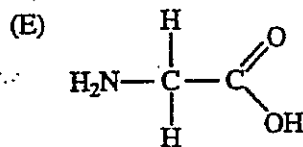
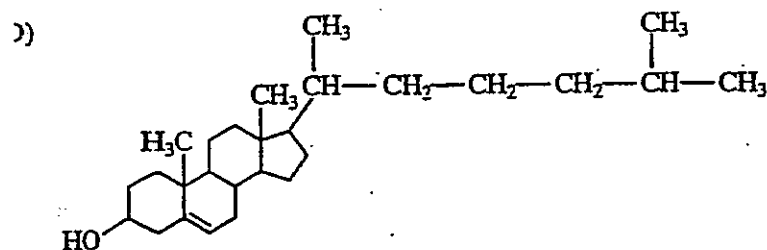
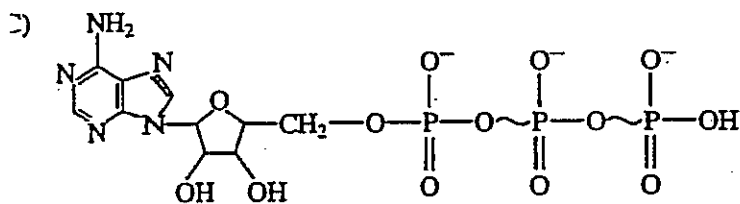
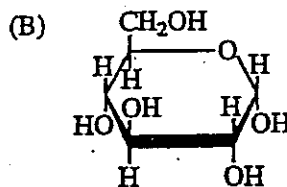
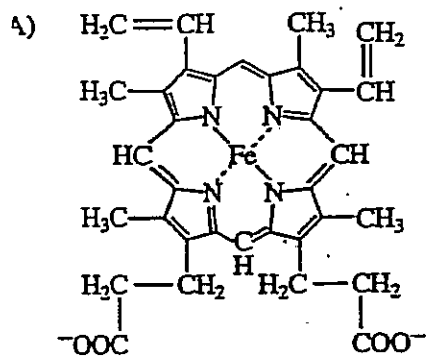
116. Which of the following statements is best supported by the data?

- (A) Increasing the pH to 7.0 would yield an absorbance higher than 0.30 after 5 minutes.
- (B) The enzyme demonstrates more activity at pH 6.0 than at pH 5.0.
- (C) The enzyme has no activity at pH 6.0.
- (D) A pH of 5.0 is the optimum for the activity of the enzyme.
- (E) The enzymatic activity is independent of pH.

117. Which of the following can best be concluded from a comparison of the results of preparation II with those of preparation I?

- (A) Heating the enzyme is required to increase the absorbance.
- (B) Boiling does not break down the substrate.
- (C) Most of the increase in the amount of product in preparation I was due to enzymatic degradation of the substrate.
- (D) Enzymatic reactions proceed at a faster rate after boiling the enzyme.
- (E) Products resulting from the breakdown of the enzyme are responsible for the absorbance increase in preparation II.

Questions 82-85 refer to the diagrams of organic molecules below.



82. This molecule is used to transport oxygen.

83. Starch is a polymer of this molecule.

84. This sterol is found in cell membranes and is associated with atherosclerosis.

85. This molecule could result from the hydrolysis of a protein.