

1.



The Kidney - cut away view

In a chemical analysis of a sample of animal tissue, which element would most likely be found in the largest quantity?

- 1) iron
- 2) carbon
- 3) iodine
- 4) sulphur

2. Which substance is an inorganic molecule?

- 1) starch
- 2) DNA
- 3) water
- 4) fat

3. Which statement describes starches, fats, proteins, and DNA?

- 1) They are used to store genetic information.
- 2) They are complex molecules made from smaller molecules.
- 3) They are used to assemble larger inorganic materials.
- 4) They are simple molecules used as energy sources.

4. Most organisms contain

- 1) organic compounds, only
- 2) inorganic compounds, only
- 3) both organic and inorganic compounds
- 4) neither organic nor inorganic compounds

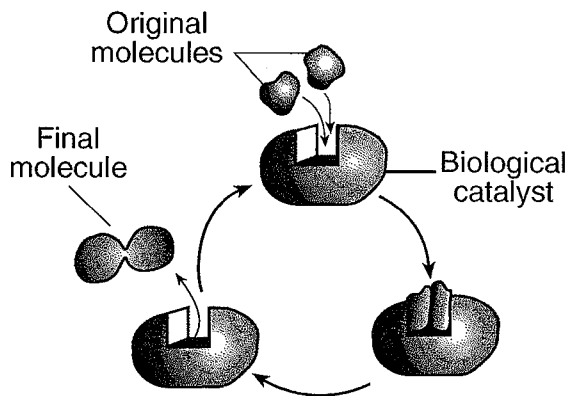
5. In plants, simple sugars are *least* likely to be

- 1) linked together to form proteins
- 2) broken down into carbon dioxide and water
- 3) used as a source of energy
- 4) stored in the form of starch molecules

6. Hemoglobin, insulin, antibodies, and enzymes are examples of

- 1) proteins
- 2) carbohydrates
- 3) lipids
- 4) nucleic acids

7. The diagram below represents a series of reactions that can occur in an organism.



This diagram best illustrates the relationship between

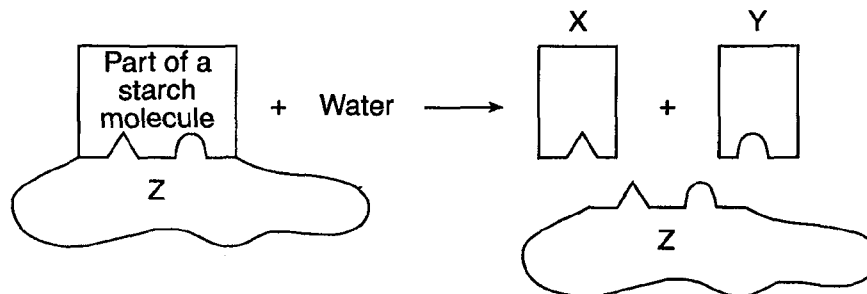
- 1) catalysts and synthesis
  - 2) amino acids and glucose
  - 3) enzymes and hydrolysis
  - 4) ribosomes and sugars
8. Base your answer to the following question on the information below and on your knowledge of biology.

Organisms living in a bog environment must be able to tolerate nitrogen-poor, acidic conditions. Bog plants such as the Venus flytrap and sundew are able to obtain their nitrogen by attracting and consuming insects. These plants produce chemicals that break down the insects into usable compounds.

The chemicals present in the plants that break down the insects are most likely

- 1) fats
- 2) hormones
- 3) enzymes
- 4) carbohydrates

Base your answers to questions 9 and 10 on the diagram below, which represents a chemical reaction that occurs in the human body, and on your knowledge of biology.



9. Which statement describes a characteristic of molecule Z?
- 1) Molecule Z will function at any temperature above 20°C.
  - 2) Molecule Z is composed of a string of molecular bases represented by A, T, G, and C.
  - 3) Molecule Z will function best at a specific pH.
  - 4) Molecule Z is not specific, so this reaction can be controlled by any other chemical in the body.
10. Substances X and Y are examples of which kind of molecule?
- 1) simple sugar
  - 2) amino acid
  - 3) fat
  - 4) hormone

11. Two chemical equations are shown below.



What do letters A and B represent?

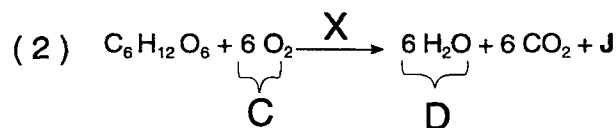
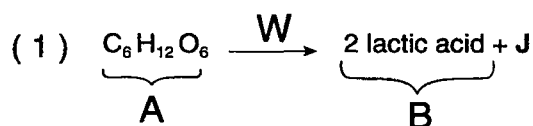
- 1) A - lipase; B - protease
  - 2) A - protease; B - maltase
  - 3) A - maltase; B - lipase
  - 4) A - maltase; B - protease
12. Most of the starch stored in the cells of a potato is composed of molecules that originally entered these cells as
- 1) enzymes
  - 2) simple sugars
  - 3) amino acids
  - 4) minerals
13. Which organic compound is produced when hydrophobic molecules (tails) bond to one hydrophilic molecule (head)?
- 1) glycogen
  - 2) ATP
  - 3) PGAL
  - 4) a lipid

14. The sweet taste of freshly picked corn is due to the high sugar content in the kernels. Enzyme action converts about 50% of the sugar to starch within one day after picking. To preserve its sweetness, the freshly picked corn is immersed in boiling water for a few minutes, and then cooled.

Which statement most likely explains why the boiled corn kernels remain sweet?

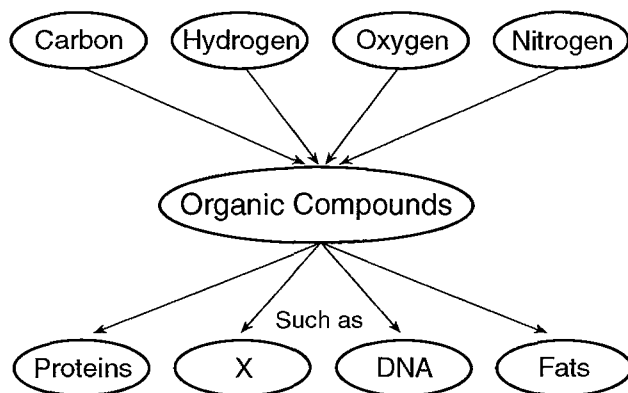
- 1) Boiling destroys sugar molecules so they cannot be converted to starch.
- 2) Boiling kills a fungus on the corn that is needed to convert sugar to starch.
- 3) Boiling activates the enzyme that converts amino acids to sugar.
- 4) Boiling deactivates the enzyme responsible for converting sugar to starch

15. Base your answer to the following question on the chemical reactions below and on your knowledge of biology.



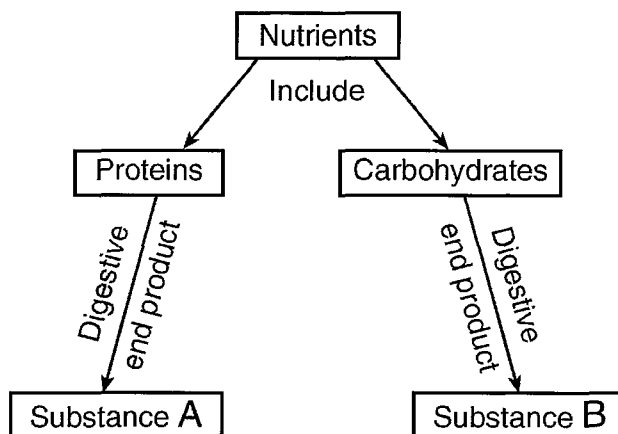
The enzymes needed for these chemical reactions are indicated by letters?

- 1) *W* and *X*                      3) *B* and *D*  
 2) *A* and *C*                        4) *B* and *C*
16. What substance could be represented by the letter *X* in the diagram below?



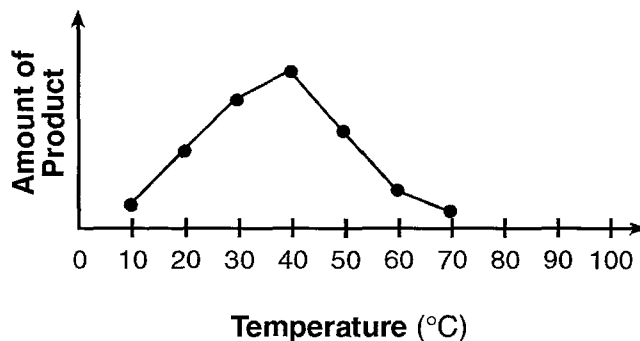
- 1) carbohydrates                  3) carbon dioxide  
 2) ozone                              4) water
17. Many biological catalysts, hormones, and receptor molecules are similar in that, in order to function properly, they must
- 1) interact with each other at a high pH
  - 2) interact with molecules that can alter their specific bonding patterns
  - 3) contain amino acid chains that fold into a specific shape
  - 4) contain identical DNA base sequences

- Base your answers to questions 18 and 19 on the information in the diagram below and on your knowledge of biology.



18. In a heterotrophic organism, substance *A* could be used directly for
- 1) photosynthesis
  - 2) synthesis of enzymes
  - 3) a building block of starch
  - 4) a genetic code
19. In an autotrophic organism, substance *B* functions as a
- 1) source of energy
  - 2) hormone
  - 3) vitamin
  - 4) biotic resource
20. The shape of a protein is most directly determined by the
- 1) amount of energy available for synthesis of the protein
  - 2) kind and sequence of amino acids in the protein
  - 3) type and number of DNA molecules in a cell
  - 4) mistakes made when the DNA is copied

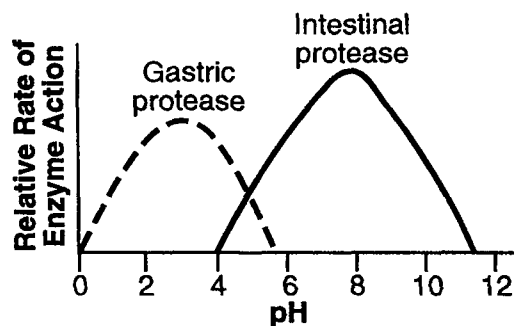
21. The graph below illustrates the relative amounts of product formed by the action of an enzyme in a solution with a pH of 6 at seven different temperatures.



Which statement best expresses the amount of product that will be formed at each temperature if the experiment is repeated at a pH of 4?

- 1) The amount of product formed will be equal to that produced at pH 6.
- 2) The amount of product formed will be greater than that produced at pH 6.
- 3) The amount of product formed will be less than that produced at pH 6.
- 4) The amount of product formed can *not* be accurately predicted.

Base your answers to questions 22 and 23 on the graph below and on your knowledge of biology.



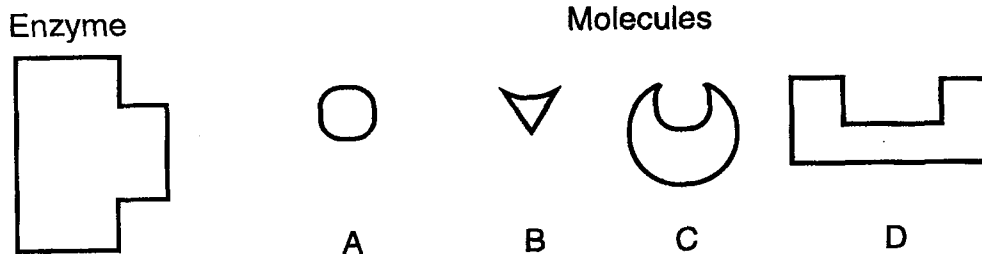
22. What is the optimum pH for the action of intestinal protease?

- 1) 5
- 2) 8
- 3) 10
- 4) 12

23. The contents of the small intestine have a basic pH. When gastric protease enters the small intestine, the activity of this enzyme will most likely

- 1) increase, only
- 2) increase and then decrease
- 3) decrease, only
- 4) remain the same

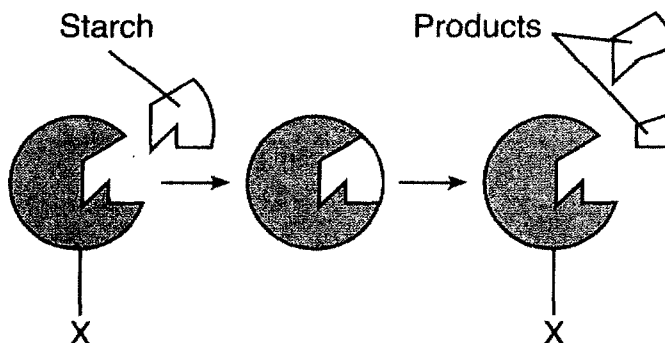
Base your answers to questions 27 and 28 on the diagram below that represents a human enzyme and four types of molecules present in a solution in a flask.



27. State what would most likely happen to the rate of reaction if the temperature of the solution in the flask were increased gradually from 10°C to 30°C.

28. Which molecule would most likely react with the enzyme? Why?

Base your answers to questions 29 and 30 on the diagram below, which represents stages in the digestion of a starch, and on your knowledge of biology.



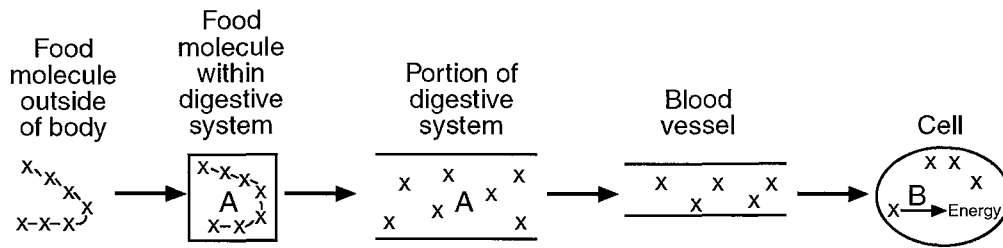
29. The structure labeled *X* most likely represents

- 1) an antibody                      2) a receptor molecule    3) an enzyme                      4) a hormone

30. The products would most likely contain

- 1) simple sugars                      2) fats                              3) amino acids                      4) minerals

24. The diagram below represents events involved as energy is ultimately released from food.

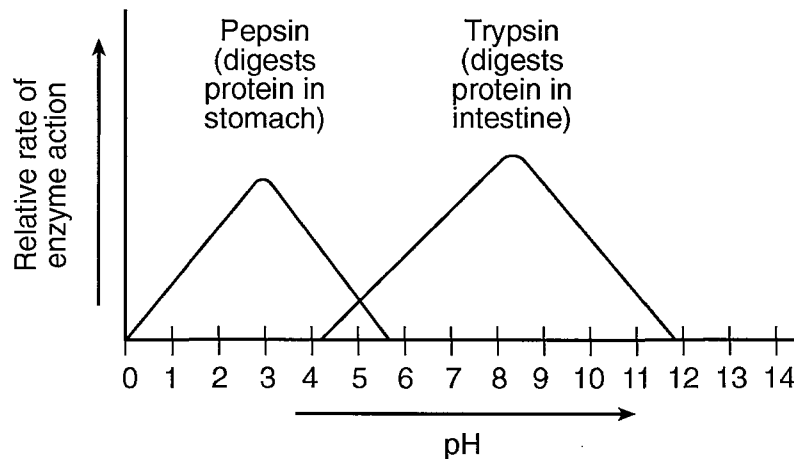


X-X-X-X-X-X-X	A and B
(1) nutrient	antibodies
(2) nutrient	enzymes
(3) hemoglobin	wastes
(4) hemoglobin	hormones

Which row in the table above best represents the chain of Xs and letters A and B in the diagram?

- 1) 1                      2) 2                      3) 3                      4) 4

Base your answers to questions 25 and 26 on the graph below and your knowledge of biology.



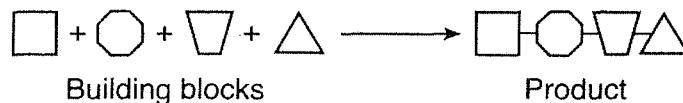
25. Neither enzyme works at a pH of

- 1) 1                      2) 5                      3) 3                      4) 13

26. Pepsin works best in which type of environment?

- 1) acidic, only                      3) neutral  
 2) basic, only                      4) sometimes acidic, sometimes basic

33. The diagram below represents the synthesis of a portion of a complex molecule in an organism.



Which row in the chart could be used to identify the building blocks and product in the diagram?

Row	Building Blocks	Product
(1)	starch molecules	glucose
(2)	amino acid molecules	part of protein
(3)	sugar molecules	ATP
(4)	DNA molecules	part of starch

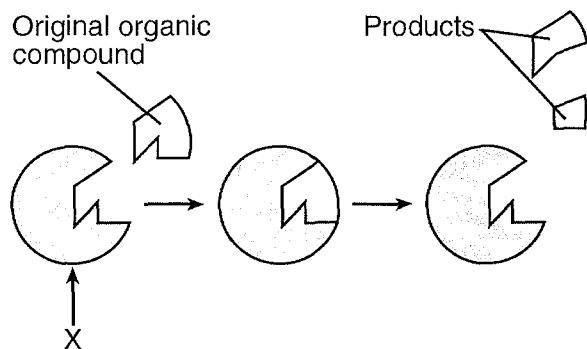
1) 1

2) 2

3) 3

4) 4

Base your answers to questions 34 and 35 on The diagram below represents stages in the digestion of an organic compound.



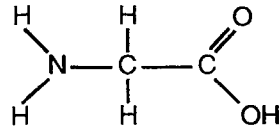
34. Explain why substance *X* would *not* be likely to digest a different organic compound.

35. State TWO internal environment factors that will affect the rate of this organic compounds function

\_\_\_\_\_

Base your answers to questions 31 and 32 on the information in the chart below and on your knowledge of biology.

Class of Compound	Characteristic
<i>A</i>	Has glycerol as a building block
<i>B</i>	Contains both acid groups and amino groups
<i>C</i>	Formed from subunits containing a nitrogenous base, a phosphate, and ribose
<i>D</i>	Includes sugars and starches



31. What is another characteristic of the compounds in class *D*?
- 1) They are composed of basic subunits known as nucleotides.
  - 2) They contain the atoms carbon, hydrogen, and oxygen, with the hydrogen and oxygen in a 2:1 ratio.
  - 3) They transfer amino acids to ribosomes during protein synthesis.
  - 4) They include chemical compounds such as insulin and hemoglobin.
32. Which class of compounds includes the compound represented in the diagram below the chart?
- 1) *A*
  - 2) *B*
  - 3) *C*
  - 4) *D*
-



**Answer Key**  
**biochemistry review [Oct 18, 2013]**

1.   2  

2.   3  

3.   2  

4.   3  

5.   1  

6.   1  

7.   1  

8.   3  

9.   3  

10.   1  

11.   3  

12.   2  

13.   4  

14.   4  

15.   1  

16.   1  

17.   3  

18.   2  

19.   1  

20.   2  

21.   4  

22.   2  

23.   3  

24.   2  

25.   4  

26.   1  

27. the rate would increase

28. Molecule *D* will most likely react with the enzyme because Molecule *D* is the only one that fits the shape of the enzyme.

29.   3  

30.   1  

31.   2  

32.   2  

33.   2  

34. *Examples.* – A different organic compound would have a different shape. – A different organic compound would not fit with substance X. – The active site of X does not fit a different substrate. – Substance X is specific to only certain materials.

35. Essay

