

Biochemistry Review #2

1. Organic compounds are used as building blocks for

- A) water, DNA, and starches
- B) water, proteins, and oxygen
- C) proteins, DNA, and carbon dioxide
- D) proteins, starches, and fats**

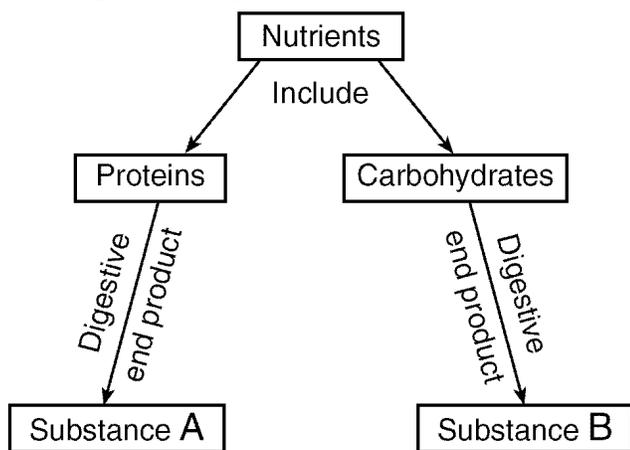
2. Which substance is an inorganic molecule?

- A) starch
- B) DNA
- C) water**
- D) fat

3. Which statement best describes enzymes?

- A) Every enzyme controls many different reactions.
- B) The rate of activity of an enzyme might change as pH changes.**
- C) Temperature changes do not affect enzymes.
- D) Enzymes are produced from the building blocks of carbohydrates.

4. Base your answer to the following question on the information in the diagram below and on your knowledge of biology.



In a heterotrophic organism, substance *A* could be used directly for

- A) photosynthesis
- B) synthesis of enzymes**
- C) a building block of starch
- D) a genetic code

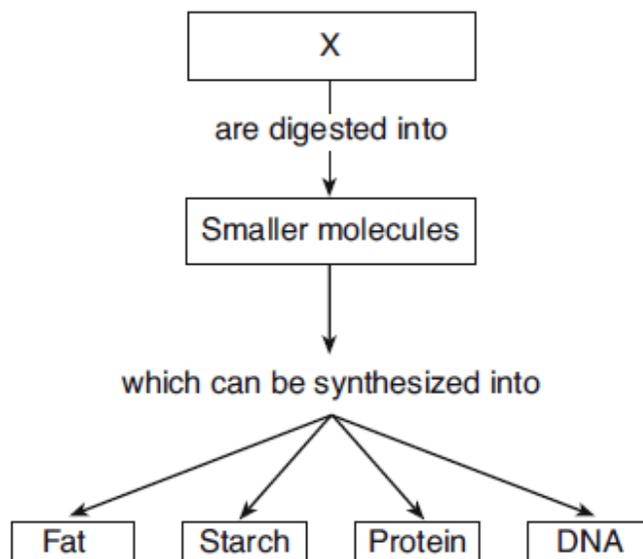
5. Which statement best describes enzymes?

- A) They slow down the rate of breathing.
- B) They are the building blocks of polymers.
- C) They speed up the conduction of impulses along a nerve cell.
- D) They influence the rate of chemical reactions.**

6. Chemicals that help chemical reactions occur at faster rates in living organisms are known as

- A) biotic resources
- B) simple sugars
- C) oxygen molecules
- D) organic catalysts**

7. The diagram below represents a sequence of events that occurs in living things.



Letter *X* represents

- A) inorganic molecules
- B) organic molecules**
- C) biological catalysts
- D) simple sugars

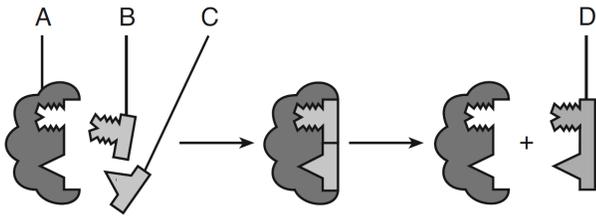
8. Which substances are produced by the hydrolysis of an oil?

- A) water and nucleic acids
- B) amino acids and dipeptides
- C) fatty acids and glycerol**
- D) glucose and water

9. What are the main atoms of a protein molecule?

- A) Carbon, hydrogen, nitrogen, and oxygen**
- B) Nitrogen, oxygen, and phosphorous
- C) Oxygen, sulfur, and nitrogen
- D) Carbon, phosphorous, and hydrogen

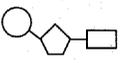
10. The diagram below represents a model of a biological process that occurs in humans at normal body temperature, 37°C.



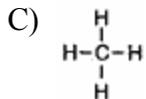
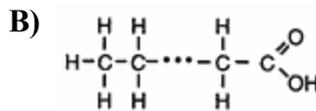
Increasing body temperature to 40°C would interfere most directly with the rate of function of structure

- A) *A* B) *B* C) *C* D) *D*

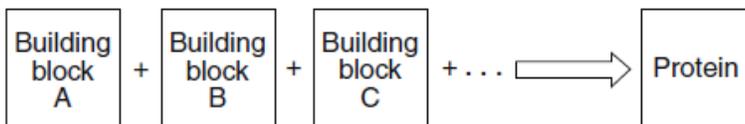
11. Base your answer to the following question on on the chart below and your knowledge of Biology.

Class of Substance	Basic Unit of Structure	One Possible Function	Examples
<i>A</i>	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H}-\text{N}-\text{C}-\text{C} \\ \quad / \quad \backslash \\ \text{R} \quad \text{O} \quad \text{OH} \end{array}$	<i>B</i>	<i>C</i>
Carbohydrate	<i>D</i>	Structural component of cell walls	<i>E</i>
<i>F</i>	<i>G</i>	Structural component of cell membranes	Fats, waxes
<i>H</i>		Protein synthesis	<i>I</i>

Which belongs in section **G** ?



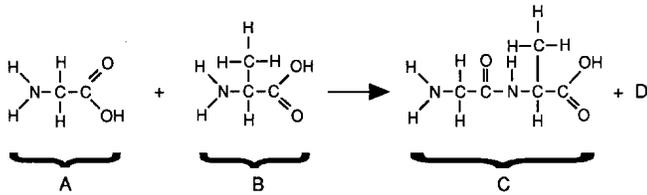
Base your answers to questions 12 and 13 on the diagram below and on your knowledge of biology.



12. If the sequence of building blocks were changed, what effect could it most likely have on the protein?

13. Identify the type of building block represented by the letters *A*, *B*, and *C*.

Base your answers to questions 14 and 15 on the diagram below and on your knowledge of biology.



14. The molecule represented by letter *D* is most likely

- A) water
B) carbon dioxide
C) oxygen
D) hydrogen

15. This equation represents a process known as

- A) digestion
B) hydrolysis
C) aerobic respiration
D) **dehydration synthesis**

16. Base your answer to the following question on the types of molecules in the list below and on your knowledge of biology.

Types of Molecules

- (A) Amino acid
(B) Fatty acid
(C) Monosaccharide
(D) Glycerol

Which types of molecules are used for the synthesis of a lipid?

- A) *A* and *B*
B) ***B* and *D***
C) *A* and *C*
D) *C* and *D*

17. Which substance plays a major role in most of the chemical reactions that occur in a living cell?

- A) **water**
B) glycogen
C) glycerol
D) maltose

18. Proteins, starch, and DNA are similar in that they are all

- A) **organic compounds**
B) parts of genes
C) made of amino acids
D) made of simple sugars

19. Which compound is inorganic?

- A) glucose (C₆H₁₂O₆)
B) **carbon dioxide (CO₂)**
C) ethane (C₂H₆)
D) stearic acid (C₁₈H₃₆O₂)

20. Base your answer to the following question on the chart below which gives incomplete information about certain biochemical reactions and on your knowledge of biology.

Reactants	Products	Enzyme Involved
maltose, water	<i>A</i>	maltase
<i>B</i>	amino acids	protease
lipids, water	fatty acids, glycerol	<i>C</i>

The reactants represented by letter *B* are

- A) glucose and water
B) ATP and water
C) **dipeptides and water**
D) alcohol and water
21. Which row in the chart below correctly pairs a food molecule with its building block?

Row	Food Molecule	Building Block
(1)	starch	amino acid
(2)	sugar	starch
(3)	protein	amino acid
(4)	amino acid	sugar

- A) 1
B) 2
C) **3**
D) 4
22. The table below lists enzymes that function in different locations in the human body, and the temperature and pH ranges of these locations.

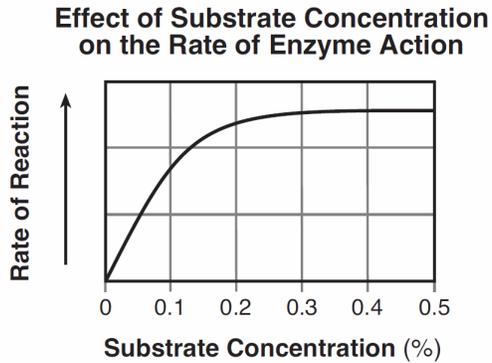
Enzyme	Location	Temperature (°C)	pH
ptyalin	mouth	36.7–37.0	6.5–7.0
pepsin	stomach	37.3–37.6	1.0–3.0
trypsin	small intestine	37.3–37.6	7.5–9.0

Different enzymes are secreted in each of the three locations. Ptyalin digests carbohydrates. Pepsin and trypsin both digest proteins. Discuss the activity of these enzymes. In your answer, be sure to:

- state how the activity of pepsin will most likely change after it moves with the food from the stomach to the small intestine
- support your answer using data from the table
- state how a fever of 40°C would most likely affect the activity of these enzymes and support your answer
- identify the characteristic of enzymes that prevents ptyalin and trypsin from digesting the same type of food

23. Base your answer to the following question on the information below and on your knowledge of biology.

The graph below shows the effect of substrate concentration on the action of enzyme *X*. This enzyme is functioning at its optimal temperature, 36°C, and at its optimal pH, 5.5.



State what would most likely happen to the rate of enzyme action if the temperature were reduced by 10 degrees. Support your answer.

Answer Key
Biochemistry review #2

1. **D**
 2. **C**
 3. **B**
 4. **B**
 5. **D**
 6. **D**
 7. **B**
 8. **C**
 9. **A**
 10. **A**
 11. **B**
 12. — The shape of the protein could change. — The function of the protein could be different. — It might form a different protein.
 13. amino acids *or* peptides
 14. **A**
 15. **D**
 16. **B**
 17. **A**
 18. **A**
 19. **B**
 20. **C**
 21. **C**
 22. —Pepsin will either stop functioning or slow down. —This is because the pH range in the small intestine is 7.5 to 9.0 and pepsin normally functions at 1.0 to 3.0. —A fever of 40°C could slow/stop enzyme functioning, since these enzymes work best at around 37°C. —Ptyalin and trypsin cannot both digest the same type of food because enzymes are specific. — They have different shapes.
 23. — The reaction will slow down because it is below the optimal temperature.
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