Name: Student Number:
Date:
Period:

Biomolecules and Enzyme Quiz

1. What biomolecule is composed of the elements CHON?
    a. Lipids
    b. Proteins
    c. Nucleic Acids
    d. Carbohydrates

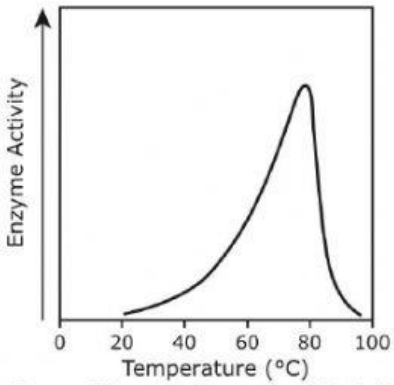
2. What biomolecule can you find in beans and meats?
    a. Lipids
    b. Proteins
    c. Nucleic Acids
    d. Carbohydrates

3. For an enzyme to be able to catalyze a reaction, the active site must —
    a. be occupied by an inhibitor
    b. increase the activation energy level
    c. have a complementary shape to the substrate
    d. cause the enzyme to be destroyed in the reaction

4. A _____ is any substance which speeds up the rate of a chemical reaction.
    e. Active Site
    f. Activation
    g. Enzymes
    h. Catalyst

5. An enzyme binds to a substrate at the _____
    i. Denature
    j. Coenzymes
    k. Active Site
    l. Activation

Taq polymerase is an enzyme used in the polymerase chain reaction (PCR) to replicate fragments of DNA. A study published in 1976 examined the properties of Taq polymerase after the enzyme was isolated from *Thermus aquaticus*, a thermophilic bacterium that lives in the hot springs of Yellowstone National Park. The graph shows one of the results of the study.



Source: Chien et al., "Deoxyribonucleic Acid Polymerase from the Extreme Thermophile *Thermus aquaticus*," *Journal of Biology*, 1976

Which statement about enzyme activity is best supported by this graph?

F An enzyme must be composed of multiple polypeptides, or subunits, to be active.

G An enzyme's rate of activity increases with time until it becomes inactive.

H An enzyme functions best under specific temperature conditions.

J An enzyme works equally well in bacteria that are adapted to high temperatures and in eukaryotic cells such as human cells.

A table of four types of carbohydrates is shown.

Type of Carbohydrate	Description
Cellulose	Major component of plant cell walls
Chitin	Major component of fungal cell walls and arthropod exoskeletons
Glycogen	Stored in liver and muscle cells, broken down to glucose when blood glucose levels decrease
Starch	Stored in plant roots and seeds, provides food for seeds to germinate or for animal consumption

Which list correctly matches the functions to the types of carbohydrates?

F Energy: glycogen and starch
Structure: cellulose and chitin

G Energy: cellulose and chitin
Structure: glycogen and starch

H Energy: chitin and glycogen
Structure: cellulose and starch

J Energy: cellulose and starch
Structure: chitin and glycogen

8. True or False: All enzymes work at an optimal pH of 7
   a. True
   b. False

9. True or False: Increasing the concentration of an enzyme will typically speed up the reaction rate
   c. True
   d. False

10. True or False: All enzymes are part of the class of organic molecules called **carbohydrates**
   a. True
   b. False

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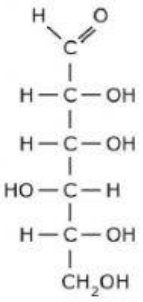
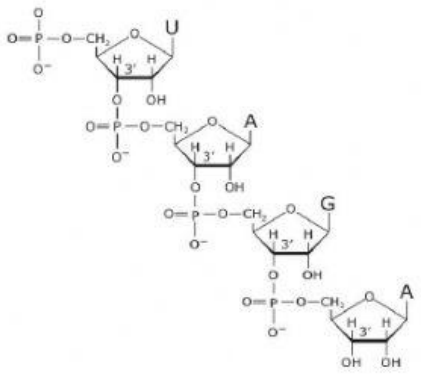
Structure: cellulose and starch

J Energy: cellulose and starch
Structure: chitin and glycogen

Two biomolecules are shown.



Molecule X



Molecule Y

Which of the following best describes these biomolecules?

A Molecule X and Molecule Y are both carbohydrates.

B Molecule X is a nucleic acid, and Molecule Y is a carbohydrate.

C Molecule X and Molecule Y are both nucleic acids.

D Molecule X is a carbohydrate, and Molecule Y is a nucleic acid.

13. Which biomolecule is responsible for long-term energy
    a. Lipids
    b. Proteins
    c. Nucleic acids
    d. Carbohydrates

14. When the temperature of pH gets too high, an enzyme will _____, or change shape.
    e. Cofactors
    f. Denature
    g. Substrate
    h. Active Site

15. A student makes a Venn diagram to compare the functions of carbohydrates and lipids
Which cellular function of carbohydrates and lipids should be placed in the shared section of the Venn diagram?
    a. Hormone production
    b. Structural support of cell walls
    c. Energy storage
    d. Catalyst for chemical reactions

16. An advertisement for a health supplement for dogs claims to build lean muscle and strengthen tendons and ligaments, as well as provide energy. Which two biomolecules must the supplement contain to provide these benefits?

a. Carbohydrates and lipids
b. Proteins and carbohydrates
c. Nucleic acids and carbohydrates
d. Lipids and nucleic acids

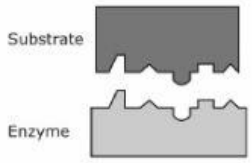
17. Which biomolecule is found in genetic material

a. Lipids
b. Proteins
c. Nucleic Acids
d. Carbohydrates

18. Enzymes are proteins that have a three-dimensional shape that is specific to a particular substrate. Environmental conditions can change the shape of the protein. What is the most likely result if the shape of the enzyme changes?

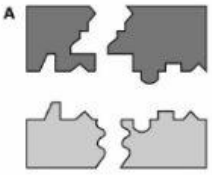
a. The substrate will change its shape to match the enzyme.
b. The enzyme will no longer be able to catalyze the reaction with the substrate.
c. The products made from the enzyme and the substrate will be changed.
d. The enzyme will be able to bind to more diverse substrates than before.

19. A model of an enzyme and its corresponding substrate is shown
Which model best represents the molecules at the end of the reaction?

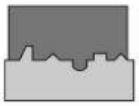


Which model best represents the molecules at the end of the reaction?

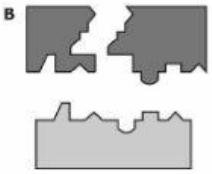
A



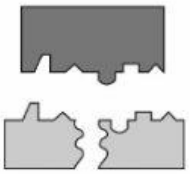
C



B



D



20. How's your day been? Tell me in a sentence or two.