Biochemistry Practice Questions

Name: _____ **Date:** _____

1. All living things contain which element?

   A. helium B. sodium

   C. copper D. carbon

2. Plants and animals are composed of organic compounds. Which of the following are the common elements found in organic compounds?

   A. iron, oxygen, nickel, copper

   B. sodium, potassium, gold, hydrogen

   C. helium, neon, argon, krypton

   D. carbon, hydrogen, oxygen, nitrogen

3. What characteristic of carbon (C) makes it essential to living organisms?

   A. Carbon forms crystal structures under certain conditions.

   B. Carbon can exist as a solid, liquid, or gas.

   C. Carbon bonds in many ways with itself to form chains.

   D. Carbon exists in radioactive forms.

4. There are many different enzymes located in the cytoplasm of a single cell. How is a specific enzyme able to catalyze a specific reaction?

   A. Different enzymes are synthesized in specific areas of the cytoplasm.

   B. Most enzymes can catalyze many different reactions.

   C. An enzyme binds to a specific substrate (reactant) for the reaction catalyzed.

   D. Enzymes are transported to specific substrates (reactants) by ribosomes.

5. Maltose can be broken down into glucose molecules by the enzyme maltase. Which of the following would slow the reaction rate?

   A. adding maltase B. adding maltose

   C. removing glucose D. diluting with water

6. Although there are a limited number of amino acids, many different types of proteins exist because the

   A. size of a given amino acid can vary.

   B. chemical composition of a given amino acid can vary.

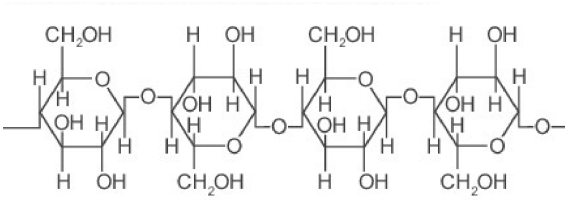
   C. sequence and number of amino acids is different.

   D. same amino acid can have many different properties.

7. What types of monomers form proteins?

   A. Glucose
   B. Nucleotides
   C. Amino acids
   D. Polyatomic ions

8. The structural formula of cellulose is shown.



   Which phrase correctly describes cellulose?

   A. A polymer made of glucose

   B. A branched form of sucrose

   C. A disaccharide

   D. A simple sugar

9. Which of the following is a primary function of carbohydrates?

   A. storage of energy

   B. transmission of genetic material

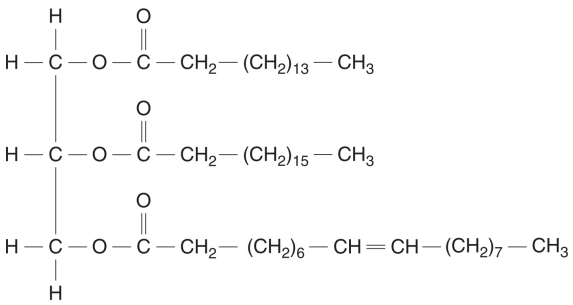
   C. acceleration of chemical reactions

   D. transport of molecules across membranes

10. Many aquatic birds secrete waxy organic substances that repel water. The birds use these substances to coat their feathers. An analysis of these substances would reveal that they are composed mostly of

    A. lipids.
    B. proteins.
    C. carbohydrates.
    D. nucleic acids.

11. The diagram below represents a fat molecule.



    A fat molecule belongs to which category of organic molecules?

    A. proteins
    B. lipids
    C. nucleic acids
    D. carbohydrates

12. Some bacteria contain a substance called nitrogenase. Nitrogenase catalyzes the chemical reaction that converts atmospheric nitrogen (N_2) into ammonia (NH_3). Nitrogenase is an example of which of the following?

A. a sugar
B. an enzyme
C. a nucleotide
D. an amino acid

13. Which of the following categories of organic molecules is correctly paired with one of its functions?

A. nucleic acids—digest dead cells
B. lipids—give quick energy to cells
C. carbohydrates—store genetic information
D. proteins—provide structure in skin, hair, and nails

14. Which of the following *best* describes the composition of a nucleotide?

A. a pair of six-carbon rings attached to each other
B. a carbon atom joined to hydrogen and three functional groups
C. a chain of carbon atoms with a carboxyl group bonded to one end
D. a five-carbon sugar attached to a phosphate group and a nitrogenous base

15. Which of the following is the main reason that humans need to include carbohydrates in their diet?

A. Carbohydrates are broken down in cells for energy.
B. Carbohydrates combine to form many different proteins.
C. Carbohydrates act as catalysts to speed up chemical reactions.
D. Carbohydrates are the building blocks for cell growth and repair.

The following section focuses on different lemur species of Madagascar.

Madagascar is an island located off the east coast of Africa, as shown on the map below.

Madagascar has a unique animal community. Lemurs are one of the animal groups that have diversified extensively on Madagascar. Lemurs are primates, which is an order of mammals that also includes monkeys and apes. Lemur species vary widely in habitat, diet, size, and color. Lemurs only live on the island of Madagascar. However, fossil evidence shows that lemur ancestors existed on Africa's mainland. Scientists hypothesize that lemur ancestors reached Madagascar by floating across the Mozambique Channel on matted clumps of vegetation.

Four different lemur species are shown in figures 1–4 below.

Figure 1. Mouse lemur

Length: 12.5 cm

Habitat: Rain forest and deciduous forest

Figure 2. Verreaux's sifaka

Length: 45 cm–55 cm

Habitat: Spiny deciduous forest and evergreen forest

Figure 3. Ring-tailed lemur

Length: 38 cm–46 cm

Habitat: Deciduous forest and scrub forest

Figure 4. Red-bellied lemur

Length: 36 cm–54 cm

Habitat: Rain forest

16. Lemurs' bodies are adapted to efficiently store energy for times when food is scarce. This adaptation may help to explain how lemur ancestors survived the trip across the Mozambique Channel from mainland Africa to Madagascar.

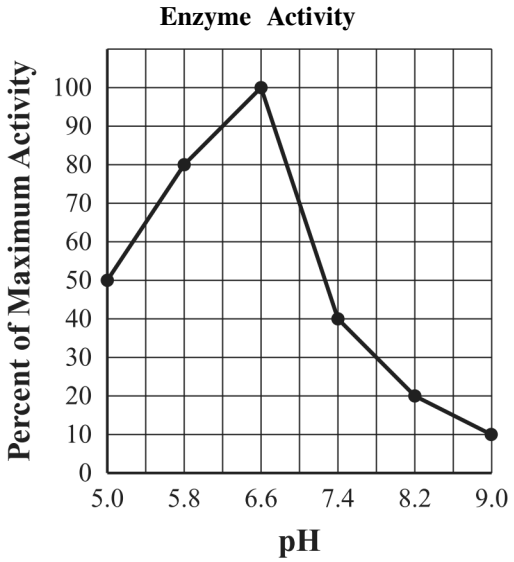
Which of the following types of molecules are primarily used for long-term energy storage in the lemur?

A. lipids
B. monosaccharides
C. nucleic acids
D. proteins

17. A student is preparing to run in a school track competition. For the quickest source of energy, the student should eat a food that contains a high percentage of

A. carbohydrates.
B. fat.
C. proteins.
D. sodium.

18. The graph below shows how the activity of an enzyme changes over a range of pH values.



Which of the following conclusions is supported by the data?

A. The optimum pH of the enzyme is 6.6.
B. The optimum pH of the enzyme is 5.8.
C. The enzyme's activity is greater around pH 8.0 than around pH 5.0.
D. The enzyme's activity continually increases as pH increases from 5.0 to 9.0.

19. Which of the following roles does an enzyme play when the body processes sucrose (table sugar) into glucose and fructose?

A. An enzyme decreases the body's need for sucrose.

B. An enzyme increases the amount of sucrose available.

C. An enzyme increases the rate at which the sucrose breaks down.

D. An enzyme decreases the amount of fructose and glucose product available.

20. The role of an enzyme in a chemical reaction is to change which of the following?

A. the type of reaction

B. the activation energy of the reaction

C. the pH at which the reaction occurs

D. the temperature at which the reaction occurs

21. The table below provides information about the composition and function of four important molecules in living organisms.

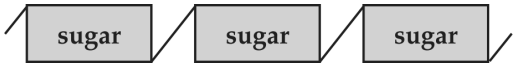
Molecule	Composition	Function
1	amino acids	reaction catalyst
2	fatty acids	membrane component
3	monosaccharides	energy source
4	nucleotides	genetic information

Which of the molecules in this table is a carbohydrate?

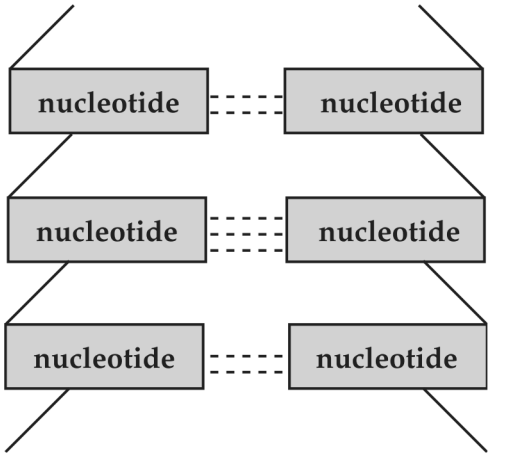
A. 1 B. 2 C. 3 D. 4

22. Amylase is an enzyme that allows the human body to digest starch. Which of these diagrams *best* represents part of the structure of amylase?

A.

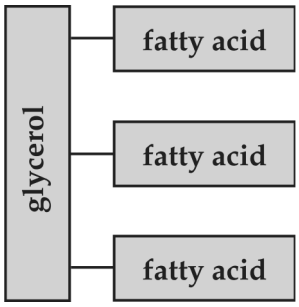


B.



C.

D.



23. Which of the following is a lipid?

A. Cholesterol B. Cellulose

C. Glucose D. Protein

24. All of the following are organic molecules *except*—

A. protein. B. lipid.

C. carbohydrate. D. salt.

25. RNA and DNA are which type of organic compound?

A. carbohydrate B. lipid

C. nucleic acid D. protein

26. What are the subunits of DNA and their function?

A. nucleotides that store information

B. monosaccharides that provide quick energy for the cell

C. lipids that store energy and provide insulation

D. proteins that provide the building blocks for the structural components of organisms

27. Which *best* represents a long-term energy storage molecule in animals?

A. cellulose B. cholesterol C. glycogen

28. Which statement correctly describes how carbon's ability to form four bonds makes it uniquely suited to form macromolecules?

A. It forms short, simple carbon chains.

B. It forms large, complex, diverse molecules.

C. It forms covalent bonds with other carbon atoms.

D. It forms covalent bonds that can exist in a single plane.

29. Which statement correctly compares a function of fats to a function of proteins in the body?

A. Fats cushion the organs, and proteins insulate the body.

B. Fats insulate the body, and proteins control contraction.

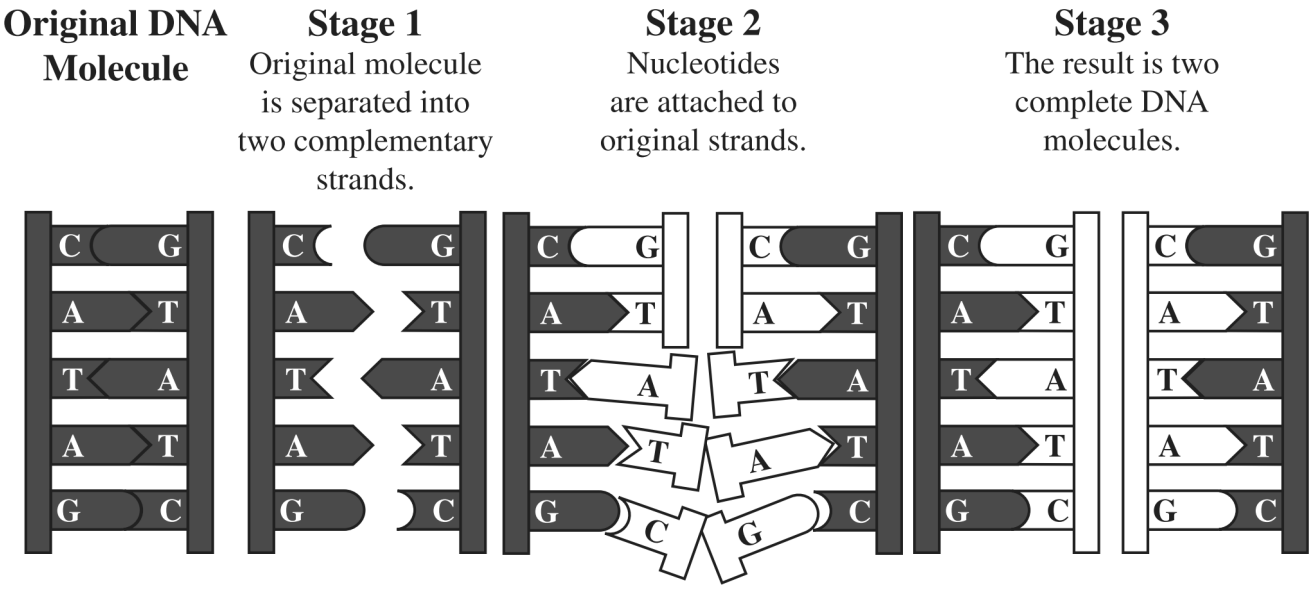
C. Fats store energy, and proteins provide the primary fuel for respiration.

D. Fats coordinate body activities, and proteins provide monosaccharides.

Use the information to answer the the following question(s).

DNA

Scientists study DNA to understand heredity, disease, and the evolutionary history of organisms. During these studies, DNA must first be separated into two complementary strands. Next, the appropriate nucleotides are attached to the nucleotides in each original strand to produce two new complete DNA strands. The diagram below shows a simple model of this process. The letters A, T, C, and G represent the four nucleotides.



30. Which molecule is synthesized using code carried in DNA?

A. fat
B. sugar
C. starch
D. protein

Biochemistry Practice Questions 05/18/2015

1.
Answer: D

2.
Answer: D

3.
Answer: C

4.
Answer: C

5.
Answer: D

6.
Answer: C

7.
Answer: C

8.
Answer: A

9.
Answer: A

10.
Answer: A

11.
Answer: B

12.
Answer: B

13.
Answer: D

14.
Answer: D

15.
Answer: A

16.
Answer: A

17.
Answer: A

18.
Answer: A

19.
Answer: C

20.
Answer: B

21.
Answer: C

22.
Answer: C

23.
Answer: A

24.
Answer: D

25.
Answer: C

26.
Answer: A

27.
Answer: C

28.
Answer: B

29.
Answer: B

30.
Answer: D