

**Multiple Choice Questions**

1. The weight of an object is determined by:
  - A. the arrangement of the atoms within the object
  - B.** the force of gravity pulling on or acting on its mass
  - C. its change in mass when placed in a vacuum
  - D. the amount of space it occupies
  - E. all of these

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.1d With respect to the structure of an atom: Distinguish among the terms atomic number, mass number and atomic weight.*

*Learning Objective: 2.01B. Define matter, mass, and weight.*

*Section: 02.01*

*Topic: Chemistry*

2. Which of the following is responsible for most of the mass of an atom?
  - A. neutron.
  - B. proton.
  - C. electron.
  - D.** both neutrons and protons
  - E. both electrons and neutrons

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.1d With respect to the structure of an atom: Distinguish among the terms atomic number, mass number and atomic weight.*

*Learning Objective: 2.01B. Define matter, mass, and weight.*

*Section: 02.01*

*Topic: Chemistry*

3. The mass number of an element is:
- A. the number of neutrons in the atom.
  - B. the number of protons in the atom.
  - C.** the sum of the number of protons plus the number of neutrons.
  - D. the sum of the number of protons plus the number of electrons.
  - E. the sum of the number of neutrons plus the number of electrons

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.1d With respect to the structure of an atom: Distinguish among the terms atomic number, mass number and atomic weight.*

*Learning Objective: 2.01D. Define atomic number and mass number.*

*Section: 02.01*

*Topic: Chemistry*

4. The chemical notation for Magnesium ions is  $\text{Mg}^{2+}$ . The designation  $2+$  indicates that:
- A.** two electrons have been lost
  - B. two protons have been gained
  - C. the ion is negatively charged
  - D. the atomic number is two
  - E. the number of electrons equals the number of protons.

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

5. The smallest particle of an element that has the chemical characteristics of that element is a(n)
- A. neutron.
  - B. proton.
  - C. electron.
  - D. atom.**
  - E. electron cloud.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01C. Distinguish between an element and an atom.*

*Section: 02.01*

*Topic: Chemistry*

6. Subatomic particles located in the nucleus of an atom are called
- A. protons.
  - B. neutrons.
  - C. electrons.
  - D. orbitals.
  - E. Both protons and neutrons are correct names.**

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.1a With respect to the structure of an atom: Describe the charge, mass, and relative location of electrons, protons and neutrons.*

*HAPS Learning Outcome: C01.1b With respect to the structure of an atom: Relate the number of electrons in an electron shell to an atoms chemical stability and its ability to form chemical bonds.*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01E. Name the subatomic particles of an atom, and indicate their location.*

*Section: 02.01*

*Topic: Chemistry*

7. Subatomic particles that possess a negative charge, and move around the nucleus of an atom are called

- A. protons.
- B.** electrons.
- C. neutrons.
- D. photons
- E. quarks

*Bloom's Level: 01. Remember*

*HAPS Learning Outcome: C01.1a With respect to the structure of an atom: Describe the charge, mass, and relative location of electrons, protons and neutrons.*

*HAPS Learning Outcome: C01.1b With respect to the structure of an atom: Relate the number of electrons in an electron shell to an atoms chemical stability and its ability to form chemical bonds.*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01E. Name the subatomic particles of an atom, and indicate their location.*

*Section: 02.01*

*Topic: Chemistry*

8. The atomic number of an atom is equal to

- A. the number of neutrons in the atom.
- B.** the number of protons in the atom.
- C. the sum of the number of protons plus the number of neutrons.
- D. the sum of the number of protons plus the number of electrons.
- E. the sum of the number of neutrons plus the number of electrons.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.1d With respect to the structure of an atom: Distinguish among the terms atomic number, mass number and atomic weight.*

*Learning Objective: 2.01D. Define atomic number and mass number.*

*Section: 02.01*

*Topic: Chemistry*

9. The amount of matter in an object is its

- A.** mass.
- B. weight.
- C. atomic number.
- D. element.
- E. ionic charge.

*Bloom's Level: 01. Remember*

*HAPS Learning Outcome: C01.1d With respect to the structure of an atom: Distinguish among the terms atomic number, mass number and atomic weight.*

*Learning Objective: 2.01B. Define matter, mass, and weight.*

*Section: 02.01*

*Topic: Chemistry*

10. The chemical behavior of an atom is largely determined by

- A. the number of neutrons it has.
- B. the size of its nucleus.
- C. the electrons closest to the nucleus.
- D. the size of neutrons it has.
- E.** its outermost electrons.

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C01.1a With respect to the structure of an atom: Describe the charge, mass, and relative location of electrons, protons and neutrons.*

*HAPS Learning Outcome: C01.1b With respect to the structure of an atom: Relate the number of electrons in an electron shell to an atoms chemical stability and its ability to form chemical bonds.*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01E. Name the subatomic particles of an atom, and indicate their location.*

*Section: 02.01*

*Topic: Chemistry*

11. Every atom of the element carbon has the same number of

- A. protons.
- B. neutrons.
- C. electrons.
- D. photons.
- E. quarks.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01C. Distinguish between an element and an atom.*

*Section: 02.01*

*Topic: Chemistry*

12. Atoms that have gained or lost electrons are called

- A. ions.
- B. covalents.
- C. nonpolars.
- D. molecules.
- E. neutrons.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

13. After a neutral atom accepts an additional electron, it becomes
- A. positively charged.
  - B. negatively charged.
  - C. an ion.
  - D. a molecule.
  - E.** both negatively charged and an ion at the same time.

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

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*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

14. Two atoms with the same number of protons and electrons, but different numbers of neutrons, are called
- A.** isotopes.
  - B. ions.
  - C. electrolytes.
  - D. compounds.
  - E. Both ions and electrolytes are correct names.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01C. Distinguish between an element and an atom.*

*Section: 02.01*

*Topic: Chemistry*

15. The chemical symbol  $\text{Ca}^{2+}$  indicates that a calcium atom has
- A. two protons in its nucleus.
  - B. lost two neutrons.
  - C. gained two protons.
  - D. lost two electrons.**
  - E. an atomic number greater than 2.

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

16. If an iron atom (Fe) lost three electrons, what would be the charge of the resulting ion?
- A.  $\text{Fe}^{-3}$
  - B.  $\text{Fe}^{+6}$
  - C.  $\text{Fe}^{+1}$
  - D.  $\text{Fe}^{+2}$
  - E.  $\text{Fe}^{+3}$**

*Bloom's Level: 06. Create*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*



17. Atom X has an atomic number of 20 and has a mass number of 40. The number of protons in atom X is equal to

- A. 10.
- B. 20.**
- C. 30.
- D. 40.
- E. 60.

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C01.1d With respect to the structure of an atom: Distinguish among the terms atomic number, mass number and atomic weight.*

*Learning Objective: 2.01D. Define atomic number and mass number.*

*Section: 02.01*

*Topic: Chemistry*

18. Atom Y has 11 protons, 11 electrons, and 12 neutrons. What is the atomic number of Atom Y?

- A. 11**
- B. 12
- C. 22
- D. 23
- E. 24

*Bloom's Level: 06. Create*

*HAPS Learning Outcome: C01.1d With respect to the structure of an atom: Distinguish among the terms atomic number, mass number and atomic weight.*

*Learning Objective: 2.01D. Define atomic number and mass number.*

*Section: 02.01*

*Topic: Chemistry*

19. Atom Y has 11 protons, 11 electrons, and 12 neutrons. What is the mass number of Atom Y?

- A. 11
- B. 12
- C. 22
- D. 23**
- E. 24

*Bloom's Level: 06. Create*

*HAPS Learning Outcome: C01.1d With respect to the structure of an atom: Distinguish among the terms atomic number, mass number and atomic weight.*

*Learning Objective: 2.01D. Define atomic number and mass number.*

*Section: 02.01*

*Topic: Chemistry*

20. \_\_\_\_\_ is a form of potential energy resulting from positions and interactions among subatomic particles.

- A. Chemical**
- B. Mechanical
- C. Radiant
- D. Electric
- E. Heat

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01H. Differentiate between a molecule and a compound.*

*Section: 02.01*

*Topic: Chemistry*

21. Energy

- A. is the capacity to do work.
- B. can neither be created nor destroyed.
- C. is constantly being converted into different forms by the body.
- D. can be stored in the chemical bonds between molecules/subatomic particles.
- E.** All of these choices are correct.

*Bloom's Level: 04. Analyze*

*Learning Objective: 2.02C. Distinguish between chemical reactions that release energy and those that take in energy.*

*Section: 02.02*

*Topic: Chemistry*

22. Which of the following analogies does not illustrate the energy type it is paired with?

- A. the cocking back of the trigger on a starters pistol before a race - potential energy
- B. picking up speed as you roll down a snow covered hill in winter - kinetic energy
- C.** the stretching of a bungee chord without releasing it - mechanical energy
- D. the spring up you get when you jump on a pogo stick - kinetic energy
- E. basketball players bending their knees before they do a lay-up - mechanical energy

*Bloom's Level: 04. Analyze*

*Learning Objective: 2.02C. Distinguish between chemical reactions that release energy and those that take in energy.*

*Section: 02.02*

*Topic: Chemistry*

23. If the products of a chemical reaction contain less potential energy than the reactants,
- A. energy has been stored in the molecular bonds of the product.
  - B.** energy has been released by the breaking of molecular bonds.
  - C. the reaction will be reversible without additional energy input.
  - D. a synthesis reaction is likely to have occurred.
  - E. All of these choices are correct.

*Bloom's Level: 03. Apply*

*Learning Objective: 2.02C. Distinguish between chemical reactions that release energy and those that take in energy.*

*Section: 02.02*

*Topic: Chemistry*

24. The conversion of ATP into ADP

- A. adds a phosphate group.
- B. stores energy in the release of an inorganic phosphate group.
- C. is an example of a exchange reaction.
- D.** is reversible.
- E. requires the input of energy.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

25. According to the law of conservation of energy, the total energy of the universe is:

- A.** constant
- B. increasing exponentially
- C. decreasing exponentially
- D. increasing linearly
- E. decreasing linearly.

*Bloom's Level: 02. Understand*

*Learning Objective: 2.02C. Distinguish between chemical reactions that release energy and those that take in energy.*

*Section: 02.02*

*Topic: Chemistry*

26. The conversion between different states of energy (e.g. potential energy to kinetic energy):

- A. is not 100% efficient
- B. is 100% efficient
- C. typically generates heat
- D. is not possible, energy can not change its state.
- E.** is not 100% efficient **and** typically generates heat

*Bloom's Level: 03. Apply*

*Learning Objective: 2.02C. Distinguish between chemical reactions that release energy and those that take in energy.*

*Section: 02.02*

*Topic: Chemistry*

27. When there is an equal sharing of electrons between atoms, the bond that is formed is called:

- A. an ionic bond.
- B. a polar covalent bond.
- C.** a non-polar covalent bond.
- D. a hydrogen bond.
- E. none of these

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

28. Non polar molecules:

- A.** are created when the bonding atoms share electrons equally between themselves.
- B. have an asymmetrical electrical charge.
- C. are also considered ions.
- D. result from polar covalent bonds.
- E. all of these

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Learning Objective: 2.01H. Differentiate between a molecule and a compound.*

*Section: 02.01*

*Topic: Chemistry*

29. Which of the following statements is FALSE about molecules?

- A. In order to be considered a molecule, a structure must be an independent unit.
- B.** All compounds are automatically considered molecules.
- C. Molecules are formed when two or more atoms chemically combine to form a structure that behaves as an independent unit.
- D. The atoms that make up a molecule can either be the same or different.
- E. The atoms that make up a molecule must be chemically bound to one another.

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01H. Differentiate between a molecule and a compound.*

*Section: 02.01*

*Topic: Chemistry*



30. Which of the following is considered a compound but not a molecule?

- A. water ( $\text{H}_2\text{O}$ ).
- B.** sodium chloride ( $\text{NaCl}$ ).
- C. calcium ( $\text{Ca}^{2+}$ )
- D. glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ )
- E. all of these are compounds and molecules.

*Bloom's Level: 05. Evaluate*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01H. Differentiate between a molecule and a compound.*

*Section: 02.01*

*Topic: Chemistry*

31. Which of the following is NOT considered a compound?

- A. water ( $\text{H}_2\text{O}$ ).
- B. sodium chloride ( $\text{NaCl}$ ).
- C. hydrogen chloride ( $\text{HCl}$ )
- D.** a hydrogen molecule ( $\text{H}_2$ )
- E. all of these are compounds.

*Bloom's Level: 05. Evaluate*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01H. Differentiate between a molecule and a compound.*

*Section: 02.01*

*Topic: Chemistry*

32. When one atom loses an electron and another atom accepts that electron a(n) \_\_\_\_\_ bond between the two atoms results.
- A. covalent
  - B. hydrogen
  - C. ionic**
  - D. explosive
  - E. radioactive

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

33. Covalent bonds occur when
- A. one atom loses an electron.
  - B. two substances dissociate in water.
  - C. two atoms share electrons.**
  - D. ions are formed.
  - E. one atom gains an electron.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

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*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

34. The unequal, asymmetric sharing of electrons which results in one end (pole) of the molecule having a small electrical charge opposite the other end is called

- A. hydrogen bonding.
- B. polar covalent bonding.**
- C. double covalent bonding.
- D. ionic bonding.
- E. non-polar covalent bonding.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

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*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

35. If a molecule consists of two or more different kinds of atoms, it is a(n)

- A. atom.
- B. ion.
- C. isotope.
- D. compound.**
- E. Both atom and ion are correct names.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01H. Differentiate between a molecule and a compound.*

*Section: 02.01*

*Topic: Chemistry*

36. Ionic compounds

- A. are held together by the force of attraction between oppositely charged ions.
- B. are not considered to be molecules.
- C. do not have distinct units.
- D.** All of these choices are correct.
- E. None of these choices are correct.

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

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*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

37. When the hydrogen bonds that maintain a protein's three-dimensional shape are broken, the protein becomes nonfunctional, and is said to be

- A. essential.
- B.** denatured.
- C. structural.
- D. unsaturated.
- E. saturated.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01G. Explain what creates a hydrogen bond and relate its importance.*

*Section: 02.01*

*Topic: Chemistry*

38. The chemical compound that is represented by the acronym DNA

- A. contains the sugar deoxyribose.
- B. has two chains that form a double helix.
- C. is composed of nucleotides.
- D. is responsible for controlling cell activities.
- E.** has all of the properties listed here.

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

39. Given that sodium bicarbonate dissociates to form  $\text{Na}^+$  and  $\text{HCO}_3^-$  when mixed with water, which of these would be part of the explanation for taking bicarbonate ( $\text{NaHCO}_3$ ) for excess stomach acid?
- A.  $\text{NaHCO}_3$  will not release hydrogen ions when mixed with water.
  - B.  $\text{HCO}_3^-$  will be a hydrogen ion acceptor.
  - C. Free hydrogen ions increase the acidity of a solution.
  - D. When bicarbonate ions combine with hydrogen ions, the pH increases.
  - E.** All of these are necessary to fully explain how sodium bicarbonate works to counter excess stomach acid.

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C03.4 Define the terms pH, acid, base, and buffer and give examples of physiological significance.*

*Learning Objective: 2.03B. Explain the importance of buffers in organisms.*

*Section: 02.03*

*Topic: Chemistry*

40. A(n) \_\_\_\_\_ is formed when one atom loses an electron and another atom accepts that electron.
- A. ion
  - B.** ionic bond
  - C. hydrogen bond
  - D. covalent bond
  - E. atom

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

41. A(n) \_\_\_\_\_ is formed when two atoms share electrons.

- A. ion
- B. ionic bond
- C. hydrogen bond
- D. covalent bond**
- E. atom

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C02.1a With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: List each type of bond in order by relative strength.*

*HAPS Learning Outcome: C02.1b With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Explain the mechanism of each type of bond.*

*HAPS Learning Outcome: C02.1c With respect to non-polar covalent, polar covalent, ionic, and hydrogen bonds: Provide biologically significant examples of each.*

*Learning Objective: 2.01F. Compare and contrast ionic and covalent bonds.*

*Section: 02.01*

*Topic: Chemistry*

42. Substances that donate hydrogen ions (protons) to a solution are called

- A. acids.**
- B. bases.
- C. alkaline.
- D. salts.

*Bloom's Level: 01. Remember*

*HAPS Learning Outcome: C03.4 Define the terms pH, acid, base, and buffer and give examples of physiological significance.*

*HAPS Learning Outcome: C03.5 State acidic, neutral, and alkaline pH values.*

*Learning Objective: 2.03A. Describe the pH scale and its relationship to acidic and basic solutions.*

*Section: 02.03*

*Topic: Chemistry*

43. A solution with a pH of 7 is considered to be
- A. acidic.
  - B. basic or alkaline.
  - C.** neutral.
  - D. in equilibrium.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C03.4 Define the terms pH, acid, base, and buffer and give examples of physiological significance.*

*HAPS Learning Outcome: C03.5 State acidic, neutral, and alkaline pH values.*

*Learning Objective: 2.03A. Describe the pH scale and its relationship to acidic and basic solutions.*

*Section: 02.03*

*Topic: Chemistry*

44. Chemicals that resist changes in pH when acids or bases are added to a solution are
- A. acids.
  - B. bases.
  - C. salts.
  - D.** buffers.

*Bloom's Level: 01. Remember*

*HAPS Learning Outcome: C03.4 Define the terms pH, acid, base, and buffer and give examples of physiological significance.*

*Learning Objective: 2.03B. Explain the importance of buffers in organisms.*

*Section: 02.03*

*Topic: Chemistry*



45. A solution with a greater concentration of hydroxide ions than hydrogen ions is
- A. a buffer.
  - B. a salt.
  - C. basic.**
  - D. acidic.
  - E. hydrophobic.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C03.4 Define the terms pH, acid, base, and buffer and give examples of physiological significance.*

*HAPS Learning Outcome: C03.5 State acidic, neutral, and alkaline pH values.*

*Learning Objective: 2.03A. Describe the pH scale and its relationship to acidic and basic solutions.*

*Section: 02.03*

*Topic: Chemistry*

46. Given that  $\text{MgCl}_2$  is composed of  $\text{Mg}^{+2}$  ions and  $\text{Cl}^-$  ions,  $\text{MgCl}_2$  would be considered to be
- A. an acid.
  - B. a base.
  - C. a salt.**
  - D. a buffer.

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C03.3 Define the term salt and give examples of physiological significance.*

*HAPS Learning Outcome: C03.4 Define the terms pH, acid, base, and buffer and give examples of physiological significance.*

*Learning Objective: 2.03A. Describe the pH scale and its relationship to acidic and basic solutions.*

*Section: 02.03*

*Topic: Chemistry*

47. \_\_\_\_\_ is formed by the reaction of an acid and a base.

- A. An acid
- B. A base
- C. A salt**
- D. A buffer

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C03.3 Define the term salt and give examples of physiological significance.*

*HAPS Learning Outcome: C03.4 Define the terms pH, acid, base, and buffer and give examples of physiological significance.*

*Learning Objective: 2.03A. Describe the pH scale and its relationship to acidic and basic solutions.*

*Section: 02.03*

*Topic: Chemistry*

48. A solution with a pH of 4 would have \_\_\_\_\_ hydrogen ions than a solution with a pH of 6.

- A. 2 times more
- B. 2 times fewer
- C. 20 times more
- D. 20 times fewer
- E. 100 times more**

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C03.4 Define the terms pH, acid, base, and buffer and give examples of physiological significance.*

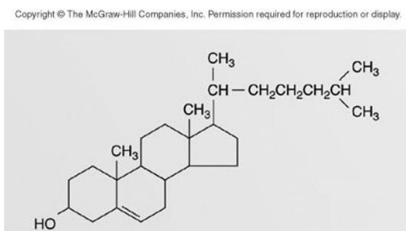
*HAPS Learning Outcome: C03.5 State acidic, neutral, and alkaline pH values.*

*Learning Objective: 2.03A. Describe the pH scale and its relationship to acidic and basic solutions.*

*Section: 02.03*

*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life



49.

This figure represents an example of a(n)

- A. steroid.
- B. triglyceride.
- C. phospholipids.
- D. wax.
- E. fatty acid.

*Bloom's Level: 05. Evaluate*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure. HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

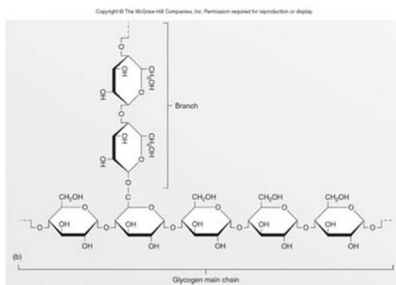
*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*



50.

This figure represents an example of a(n)

- A. protein.
- B. nucleic acid.
- C. lipid.
- D. carbohydrate.**
- E. ATP molecule.

*Bloom's Level: 05. Evaluate*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure. HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

51. Monosaccharides are the building blocks for
- A. carbohydrates.
  - B. fats (triglycerides).
  - C. nucleic acids.
  - D. proteins.

*Bloom's Level: 01. Remember*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

52. Glycerol and fatty acids are the building blocks for

- A. carbohydrates.
- B.** fats (triglycerides).
- C. nucleic acids.
- D. proteins.

*Bloom's Level: 01. Remember*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

53. Nucleotides are the building blocks for

- A. carbohydrates.
- B. fats (triglycerides).
- C. nucleic acids.**
- D. proteins.

*Bloom's Level: 01. Remember*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure. HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

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*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

54. The macromolecules that function as the genetic material and are involved in protein synthesis are

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

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

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*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*



55. \_\_\_\_\_ are a common fuel nutrient that has glycogen as a storage form.

- A. Carbohydrates
- B. Lipids
- C. Proteins
- D. Nucleic acids

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

56. A large organic molecule was analyzed and found to contain carbon, hydrogen, oxygen, nitrogen, and sulfur. Of these choices, which would most likely have been the type of molecule analyzed?

- A. carbohydrate
- B. lipid
- C. protein**
- D. nucleic acid
- E. steroid

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure. HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

57. The building blocks for proteins are

- A. monosaccharides.
- B. disaccharides.
- C. glycerol + fatty acids.
- D. nucleotides.
- E.** amino acids.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

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*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

58. Which of these statements is true?

- A. Carbohydrates are organic molecules formed from amino acid building blocks.
- B. Monosaccharides become bound together by hydrolysis reactions to form polysaccharides.
- C. Monosaccharides, disaccharides, and polysaccharides are large inorganic molecules.
- D. The building blocks for lipids are nucleotides.
- E. Essential amino acids are those that cannot be synthesized by the body.**

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

59. The chemical compound that is represented by the acronym ATP
- A. is synthesized using energy released during the breakdown of food molecules.
  - B. can be broken down to ADP and a fatty acid.
  - C. has nothing to do with stored energy.
  - D. is a common temporary storage form of immediately usable energy within cells.
  - E.** is synthesized using energy released during the breakdown of food molecules and is a common temporary storage form of immediately usable energy within cells.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

60. Sucrose is an example of
- A. a monosaccharide.
  - B. a lipid.
  - C.** a disaccharide.
  - D. an inorganic molecule.
  - E. a polysaccharide.

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

61. Glycogen and starch are examples of

- A. monosaccharides.
- B. nucleic acids.
- C. proteins.
- D. polysaccharides.**
- E. lipids.

*Bloom's Level: 03. Apply*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*

62. Which of these statements concerning lipids is NOT true?
- A. The building blocks of fats (triglycerides) are fatty acids and glycerol.
  - B.** A fatty acid that contains only single covalent bonds between the carbon atoms is called unsaturated.
  - C. Fats, phospholipids, and steroids are lipids.
  - D. Lipids are substances that dissolve in nonpolar solvents.

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C04.4a With respect to carbohydrates, proteins, lipids and nucleic acids: Identify the monomers and polymers.*

*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*  
*HAPS Learning Outcome: C04.4b With respect to carbohydrates, proteins, lipids and nucleic acids: Compare and contrast general molecular structure.*

*HAPS Learning Outcome: C04.4c With respect to carbohydrates, proteins, lipids and nucleic acids: Provide specific examples.*

*HAPS Learning Outcome: C04.4d With respect to carbohydrates, proteins, lipids and nucleic acids: Identify dietary sources.*

*HAPS Learning Outcome: C04.4e With respect to carbohydrates, proteins, lipids and nucleic acids: Discuss physiological and structural roles in the human body.*

*HAPS Learning Outcome: C04.5 Describe the four levels of protein structure and discuss the importance of protein shape for protein function.*

*Learning Objective: 2.05A. Describe the structural organization and major functions of carbohydrates, lipids, proteins, and nucleic acids.*

*Section: 02.05*

*Topic: Chemistry*



63. When two or more atoms, ions, or molecules combine to form a new and larger molecule, the process is called a

- A. decomposition reaction.
- B.** synthesis reaction.
- C. reversible reaction.
- D. buffer reaction.
- E. equilibrium reaction.

*Bloom's Level: 02. Understand*

*Learning Objective: 2.02A. Summarize the characteristics of synthesis, decomposition, and exchange reactions.*

*Section: 02.02*

*Topic: Chemistry*

64. Which of the following processes represents a synthesis reaction?

- A. glycolysis
- B.** the creation of a protein from amino acids
- C. glycogenolysis
- D. All of these are synthesis reactions.

*Bloom's Level: 04. Analyze*

*Learning Objective: 2.02A. Summarize the characteristics of synthesis, decomposition, and exchange reactions.*

*Section: 02.02*

*Topic: Chemistry*

65. Chemical reactions with the property of being able to proceed from reactants to products and from products to reactants are called

- A. exchange reactions.
- B. synthesis reactions.
- C. decomposition reactions.
- D.** reversible reactions.
- E. net reaction rates.

*Bloom's Level: 02. Understand*

*Learning Objective: 2.02B. Explain how reversible reactions produce chemical equilibrium.*

*Section: 02.02*

*Topic: Chemistry*

66. In a reversible reaction, when the rate of product formation is equal to the rate of reactant formation, the reaction is

- A. stopped.
- B.** at equilibrium.
- C. in danger of exploding.
- D. a net decomposition reaction.
- E. a net synthesis reaction.

*Bloom's Level: 02. Understand*

*Learning Objective: 2.02B. Explain how reversible reactions produce chemical equilibrium.*

*Section: 02.02*

*Topic: Chemistry*

67. A substance that increases the rate at which a reaction proceeds, without itself being changed or depleted is a

- A. catalyst.
- B. reactant.
- C. buffer.
- D. base.
- E. product.

*Bloom's Level: 02. Understand*

*HAPS Learning Outcome: C04.6 Demonstrate factors that affect enzyme activity, including denaturation, and interpret graphs showing the effects of various factors on the rate of enzyme-catalyzed reactions.*

*Learning Objective: 2.02D. Describe the factors that can affect the rate of chemical reactions.*

*Section: 02.02*

*Topic: Chemistry*

68. Enzymes

- A. are globular proteins.
- B. function as biological catalysts.
- C. lower the activation energy of a reaction.
- D. can be used to regulate chemical reactions.
- E. All of these choices are correct.

*Bloom's Level: 04. Analyze*

*Learning Objective: 2.05B. Explain how enzymes work.*

*Section: 02.05*

*Topic: Chemistry*

69. Which of the following will **decrease** the rate at which a reaction occurs?

- A. decreasing the concentration of reactants
- B. increasing the concentration of reactants
- C. increasing the temperature
- D. increasing the amount of the required catalyst
- E. All of these will decrease the rate at which the reaction occurs.

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C04.6 Demonstrate factors that affect enzyme activity, including denaturation, and interpret graphs showing the effects of various factors on the rate of enzyme-catalyzed reactions.*

*Learning Objective: 2.02D. Describe the factors that can affect the rate of chemical reactions.*

*Section: 02.02*

*Topic: Chemistry*

70. In living things, which of these is most important for regulating the rate of chemical reactions?

- A. changing concentration of reactants
- B. changing temperature
- C. changing concentration and activity of enzymes catalyzing the reactions
- D. nature of reacting substances - carbohydrates react faster than lipids, for example

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C04.6 Demonstrate factors that affect enzyme activity, including denaturation, and interpret graphs showing the effects of various factors on the rate of enzyme-catalyzed reactions.*

*Learning Objective: 2.02D. Describe the factors that can affect the rate of chemical reactions.*

*Section: 02.02*

*Topic: Chemistry*

71. Enzymes function by

- A. increasing the activation energy needed to start a chemical reaction.
- B.** having a specific shape that allows them to bind to particular reactants.
- C. each enzyme acting as a catalyst for many different reaction types.
- D. greatly decreasing reaction rates.
- E. doing all of these.

*Bloom's Level: 02. Understand*

*Learning Objective: 2.05B. Explain how enzymes work.*

*Section: 02.05*

*Topic: Chemistry*

72. Which of these is NOT a property of water that makes it useful for living organisms?

- A.** Water allows body temperature to increase or decrease rapidly.
- B. Water causes ionic substances to dissociate.
- C. Water acts as a lubricant.
- D. Water is necessary for the transport of nutrients, gases, and waste products.
- E. Water is necessary for many chemical reactions.

*Bloom's Level: 04. Analyze*

*HAPS Learning Outcome: C03.1 Discuss the physiologically important properties of water.*

*Learning Objective: 2.04B. Describe how the properties of oxygen, carbon dioxide, and water contribute to their physiological functions.*

*Section: 02.04*

*Topic: Chemistry*

Chapter 02 - Chemical Basis of Life

73. Which of these is an organic molecule?

- A. H<sub>2</sub>O
- B.** H<sub>2</sub>CO<sub>3</sub>
- C. CO<sub>2</sub>
- D. NaCl
- E. CaCl<sub>2</sub>

*Bloom's Level: 05. Evaluate*

*HAPS Learning Outcome: C04.1 Define the term organic molecule.*

*Learning Objective: 2.04A. Distinguish between inorganic and organic molecules.*

*Section: 02.04*

*Topic: Chemistry*

74. Which of the following pairs correctly matches the example with its classification?

- A. compound - two atoms of hydrogen combined
- B. molecule - sodium chloride
- C. molecule - two hydrogen atoms and one oxygen atom combined
- D. compound - two hydrogen atoms and one oxygen atom combined
- E.** molecule - two hydrogen atoms and one oxygen atom combined **and** compound - two hydrogen atoms and one oxygen atom combined

*Bloom's Level: 05. Evaluate*

*HAPS Learning Outcome: C01.3 Compare and contrast the terms atoms, molecules, elements, and compounds.*

*Learning Objective: 2.01H. Differentiate between a molecule and a compound.*

*Section: 02.01*

*Topic: Chemistry*