

Test Bank for Biology The Unity and Diversity of Life 13th Edition by Starr Taggart and Evers ISBN 1111425698 9781111425692

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CHAPTER 2—LIFE'S CHEMICAL

BASIS MULTIPLE CHOICE

Mercury Rising

1. Toxic elements such as mercury are found in the human body because
 - a. of contamination from the environment.
 - b. trace amounts of these elements have vital biological functions.
 - c. they are needed to kill bacteria.
 - d. they may be ingested with food but
 - e. inactivated by cells.
 - f. in small amounts they are biologically inactive and tolerated by cells.ANS: A PTS: 1
DIF: Easy
OBJ: Bloom's Taxonomy: Comprehension

2. How much mercury can the average human safely consume per day?
 - a. 1 microgram.
 - b. 3 micrograms.
 - c. 7 micrograms.
 - d. 10 micrograms.
 - e. 100 micrograms.ANS: C PTS: 1
DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge

Start with Atoms

3. Which is the smallest unit of an element that retains the properties of the element?
 - a. atom
 - b. compound
 - c. ion
 - d. molecule
 - e. mixtureANS: A PTS: 1
DIF: Moderate
OBJ: Bloom's Taxonomy: Knowledge
4. Which is NOT an element?

- a. water
- b. oxygen
- c. carbon
- d. chlorine
- e. hydrogen

ANS: A

PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Comprehension | Bloom's Taxonomy: Analysis

5. The atomic number refers to the
- mass of an atom.
 - number of protons in an atom.
 - number of both protons and neutrons in an atom.
 - number of neutrons in an atom.
 - number of electrons in an atom.

ANS: B PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge

6. Isotopes of atoms
- are electrically unbalanced.
 - behave the same chemically and physically but differ biologically from other isotopes.
 - are the same physically and biologically but differ from other isotopes chemically.
 - have the same number of protons but a different number of neutrons.
 - are produced when atoms lose electrons. ANS: D

PTS: 1 DIF:

Moderate

OBJ: Bloom's Taxonomy: Knowledge

7. The subatomic particle(s) with a negative charge is(are)
- the neutron.
 - the proton.
 - the electron.
 - both the neutron and proton.
 - both the proton and electron. ANS: C PTS: 1

DIF:

Easy OBJ: Bloom's Taxonomy: Knowledge

8. The nucleus of an atom contains
- neutrons and protons.
 - neutrons and electrons.
 - protons and electrons.
 - protons only.
 - neutrons only.

ANS: A PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge

9. Which components of an atom have negative charges?
- electrons
 - protons
 - neutrons
- I only
 - II only
 - III only
 - I and II

e. II and III

ANS: A PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Analysis

10. Which components of an atom do not have a charge?

- I. electrons
- II. protons
- III. neutrons

- a. I only
- b. II only
- c. III only
- d. I and II
- e. II and III

ANS: C PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Analysis

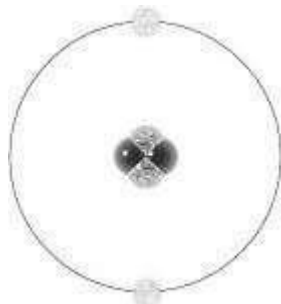
11. The atomic mass (mass number) of an atom is determined by the combined masses of its

- a. neutrons and protons.
- b. neutrons and electrons.
- c. protons and electrons.
- d. protons, neutrons, and electrons.
- e. neutrons, nucleus, and electrons.

ANS: A PTS: 1 DIF:

Moderate

OBJ: Bloom's Taxonomy: Knowledge



12. Which of the following is false concerning the atom in the figure?

- a. The number of protons and the number of electrons are equal.
- b. It has an atomic mass of 4.
- c. Electrons are moving around the nucleus.
- d. It has an atomic number of 2.
- e. The number of electrons exceeds the number of

protons. ANS: E PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Comprehension | Bloom's Taxonomy: Application |

Bloom's Taxonomy: Synthesis

13. Which of the following statements is NOT true?

- a. All isotopes of an element have the same number of electrons.
- b. All isotopes of an element have the same number of protons.
- c. All isotopes of an element have the same number of neutrons.
- d. We refer to isotopes by mass number.

e. ^{12}C and ^{13}C are isotopes. ANS: C PTS: 1

DIF: Difficult OBJ:

Bloom's Taxonomy: Comprehension |

Bloom's Taxonomy: Analysis

14. In the chemical shorthand ^{14}C , the 14 represents the number of
- excess neutrons.
 - protons plus neutrons.
 - electrons.

- d. protons plus electrons.
- e. radioactive particles.

ANS: B PTS:

1 DIF:

Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Application

15. In a chemical equation, the chemicals to the left of the arrow are
- a. products.
 - b. in greater abundance.
 - c. at higher energy levels.
 - d. reactants.
 - e. all of these.

ANS: D PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Application

16. Radioactive isotopes have
- a. excess electrons.
 - b. excess protons.
 - c. excess neutrons.
 - d. insufficient neutrons.
 - e. insufficient protons.

ANS: C PTS:

1 DIF:

Moderate

OBJ: Bloom's Taxonomy: Knowledge

17. Tracers are elements that
- a. are used in minute amounts in plants.
 - b. can be monitored through biochemical reactions
 - c. .
 - d. must be inert.
 - e. have an unbalanced electrical charge.
 - f. must have a stable nucleus.

ANS: BPTS: 1 DIF:

Difficult OBJ: Bloom's Taxonomy: Knowledge

18. Which statement concerning radioisotope ^{14}C is false?
- a. It can be substituted for ^{12}C in glucose and the body will still be able to use the compound.
 - b. It has a different number of protons than ^{12}C .
 - c. It has more neutrons than ^{12}C .
 - d. It behaves the same chemically as ^{12}C .
 - e. It has six carbons and eight neutrons.

ANS: B

PTS: 1 DIF:

Moderate

OBJ: Bloom's Taxonomy: Comprehension | Bloom's Taxonomy: Analysis

19. The radioactive decay of ^{14}C produces
- a. carbon 12.

- b. carbon 13.
- c. more carbon 14.
- d. nitrogen 14.
- e. oxygen 14.

ANS: D PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge

Why Electrons Matter

20. Argon has 18 protons. How many electrons are in its third energy level?
- 2
 - 4
 - 6
 - 8
 - 10

ANS: D PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Application

21. Which statement is NOT true?
- Electrons closest to the nucleus are at the lowest energy level.
 - No more than two electrons can occupy a single orbital.
 - Electrons are unable to move out of the assigned orbital space.
 - The innermost orbital holds two electrons.
 - At the second energy level there are four possible orbitals with a total of eight electrons.
- ANS: C PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Comprehension | Bloom's Taxonomy: Analysis

22. Which of the following is NOT accurate concerning ionization?
- When one atom loses electrons, another must gain electrons.
 - When an atom loses an electron, it becomes negatively charged.
 - Ionic bonds form between ionized atoms.
 - In the compound NaCl, Na loses an electron to become positive.
 - In an ion, the number of protons and electrons is

unequal. ANS: B PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Comprehension | Bloom's Taxonomy: Analysis

23. Nitrogen, with an atomic number of 7, has ___ electrons in the first energy level and ___ electrons in the second energy level.
- 1; 6
 - 2; 5
 - 3; 4
 - 4; 3
 - 5; 2

ANS: B PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Application

Chemical Bonds: From Atoms to Molecules

24. Carbon dioxide is an example of a(n)
- atom.
 - ion.
 - compound.

d. mixture.

e. element.

ANS: C PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge

25. Which statement is false?

- a. A molecule is made of at least two atoms.
- b. Compounds are made of elements.
- c. Two atoms of oxygen make a molecule of oxygen.
- d. Proportions of elements in compounds vary according to their source in nature.
- e. Elements are found in compounds and molecules.

ANS: D PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Comprehension | Bloom's Taxonomy: Analysis

26. A molecule is
- a. a combination of two or more atoms.
 - b. a mixture of atoms.
 - c. electrically charged.
 - d. a carrier of one or more extra neutrons.
 - e. none of these.

ANS: A PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge

27. The bond in table salt (NaCl) is
- a. polar.
 - b. ionic.
 - c. covalent.

d. doubl
e.

e. nonpolar.

ANS: B PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge

28. In ___ bonds, both atoms exert the same pull on shared electrons.
- a. nonpolar covalent
 - b. polar covalent
 - c. double covalent
 - d. triple covalent
 - e. coordinate covalent

ANS: A PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Knowledge

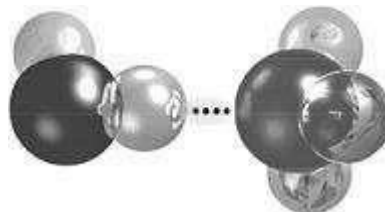
29. Which of these statements is false concerning covalent bonds?
- a. Atoms share electrons.
 - b. Molecules may possess many covalent bonds.
 - c. Water contains polar covalent bonds.
 - d. Covalent bonds may be "double bonds."
 - e. In polar covalent bonds, electrons are shared

equally. ANS: E PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Synthesis

Hydrogen Bonds and Water



Basis

1

30. The dots in the figure represent a(n)

- a. covalent bond.
- b. ionic bond.
- c. hydrogen bond.
- d. polar covalent bond.
- e. hydrophobic interaction. ANS: C

PTS: 1 DIF:

Easy OBJ:

Bloom's Taxonomy: Comprehension

31. A hydrogen bond is a(n)

- a. sharing of a pair of electrons between a hydrogen and an oxygen nucleus.
- b. sharing of a pair of electrons between a hydrogen nucleus and either an oxygen or a nitrogen nucleus.
- c. attractive force between a hydrogen atom and either an oxygen or a nitrogen atom that are in other molecules or within the same molecule.
- d. covalent bond between two hydrogen atoms.
- e. covalent bond between a hydrogen atom and either an oxygen atom or a nitrogen atom. ANS: C PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Knowledge

32. Water is important to the interactions of biological molecules because it

- a. promotes hydrophobic and hydrophilic interactions.
- b. stabilizes temperature.
- c. is an excellent solvent for polar and ionic substances.
- d. has strong cohesive properties.
- e. does all of these.

ANS: E

PTS: 1

DIF:

Modera

te OBJ: Bloom's Taxonomy: Comprehension

33. The most likely reason that glucose dissolves in water is that it is

- a. an ionic compound.
- b. a polysaccharide.
- c. polar and forms many hydrogen bonds with the water molecules.
- d. a very unstable molecule.
- e. highly nonpolar.

ANS: C

PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Comprehension

34. The solvent, cohesive, and temperature stabilization properties of water are due to its

- a. ability to promote hydrophilic interactions.
- b. ionic bonds.
- c. hydrogen bonds.
- d. ability to promote hydrophobic interactions.
- e. nonpolar nature.

ANS: C

PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Knowledge | Bloom's Taxonomy: Evaluation

35. The column of water extending in tubes from plant roots to leaves is maintained by
- a. cohesion among water molecules.
 - b. ionic bonds.

- c. covalent bonds.
 - d. hydrophobic interactions.
 - e. hydrophilic interactions. ANS: A PTS: 1
- DIF: Moderate OBJ:
Bloom's Taxonomy: Knowledge

36. Sodium chloride (KCl) in water can be described by any EXCEPT which of the following?

- a. K^+ and Cl^- form
- b. a solute
- c. ionized
- d. forms hydrophobic interactions
- e. dissolved

ANS: D PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Comprehension | Bloom's Taxonomy: Analysis

37. A salt will dissolve in water to form

- a. acids.
- b. hydrogen bonds.
- c. ions other than H^+ and OH^- .
- d. bases.
- e. buffers.

ANS: C PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Knowledge

Acids and Bases

38. "Acidic" is an appropriate description for all EXCEPT which one of the following?

- a. excess hydrogen ions
- b. the contents of the stomach
- c. magnesium hydroxide
- d. HCl
- e. a pH less than 7

ANS: C PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Comprehension | Bloom's Taxonomy: Analysis

39. A solution with a pH of 9 has how many times fewer hydrogen ions than a solution with a pH of 6?

- a. 2
- b. 4
- c. 10
- d. 100
- e. 1,000

ANS: E PTS: 1

DIF: Difficult

OBJ: Bloom's Taxonomy: Application

40. Blood pH is kept near a value of 7.3 - 7.5 because of

- a. salts.

- b. buffers.
- c. acids.
- d. bases.
- e. water.

ANS: B PTS: 1

DIF: Moderate

OBJ: Bloom's Taxonomy: Comprehension

1 : Chapter 2

OBJ: Bloom Taxonomy:

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47. ANS B PTS: 1 DIF: Moderate

: Bloom Taxonomy:

OBJ 's Comprehension

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48. ANS C PTS: 1 DIF: Moderate

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OBJ 's Comprehension

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SHORT ANSWER

49. Water surface tension is caused by_____bonds.

ANS: hydrogen

PTS: 1

DIF: Easy

OBJ: Bloom's Taxonomy: Knowledge

50. Two pairs of electrons shared between two atoms is called a__.

ANS: double bond

PTS: 1 DIF:
Moderate OBJ: Bloom's

Taxonomy: Knowledge

51. C¹⁴ is a radioactive isotope, and it turns into_____when it decays.

ANS: nitrogen

PTS: 1 DIF:
Easy OBJ: Bloom's

Taxonomy: Knowledge

52. An atom with more protons than electrons is called a(n)___.

ANS: cation

PTS: 1 DIF:
Moderate OBJ: Bloom's

Taxonomy: Knowledge

54. The ability of a solution to resist changes in pH depends on its_____.

ANS: buffering capacity

PTS: 1 DIF: Moderate OBJ: Bloom's Taxonomy:
Knowledge TOP: ACIDS AND BASES