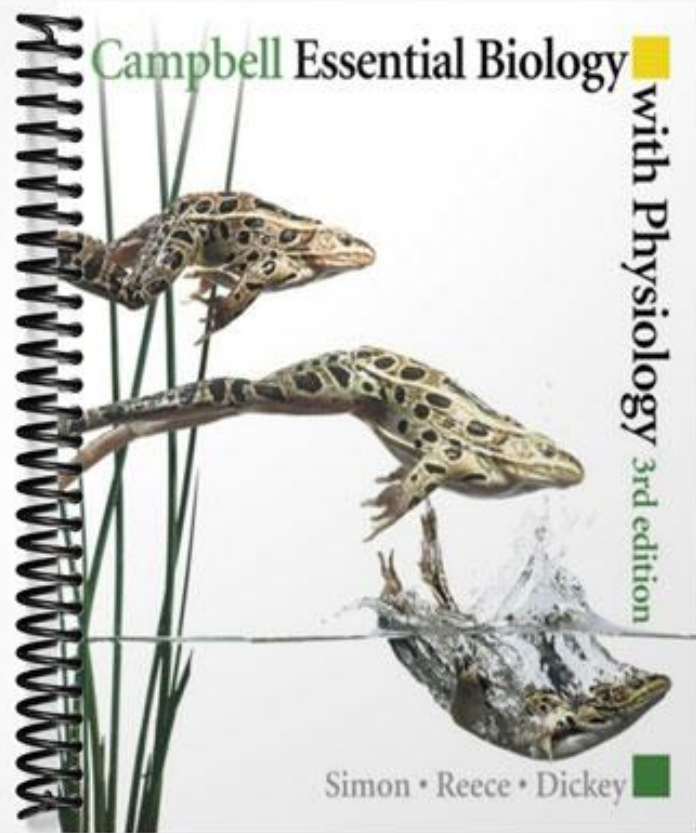


TEST BANK



Chapter 2

1) _____ is an example of an element.

- A) Water
- B) Carbon
- C) Glucose
- D) Salt
- E) Methane

Answer: B

Page Ref: 22

Skill: Factual Recall

2) Which of the following elements is NOT one of the four most common elements in living systems?

- A) nitrogen
- B) zinc
- C) carbon
- D) oxygen
- E) hydrogen

Answer: B

Page Ref: 22

Skill: Factual Recall

3) Which of the following elements, essential to life, is a trace element?

- A) phosphorus
- B) sulfur
- C) iodine
- D) calcium
- E) hydrogen

Answer: C

Page Ref: 22

Skill: Factual Recall

4) An atom with a positive charge has _____.

- A) more protons than electrons
- B) more electrons than protons
- C) more neutrons than protons
- D) more protons than neutrons
- E) equal numbers of protons, electrons, and neutrons

Answer: A

Page Ref: 23

Skill: Conceptual Understanding

Chapter 2

5) All atoms of an element have the same number of _____.

- A) protons plus neutrons
- B) protons
- C) electrons plus neutrons
- D) electrons
- E) neutrons

Answer: B

Page Ref: 23

Skill: Factual Recall

6) An atom's protons are found in its _____.

- A) nucleus
- B) orbital
- C) molecule
- D) neutron
- E) shell

Answer: A

Page Ref: 23

Skill: Factual Recall

7) Beryllium's atomic mass is 9 and its atomic number is 4. How many neutrons are found in a beryllium atom?

- A) 9
- B) 2
- C) 13
- D) 4
- E) 5

Answer: E

Page Ref: 23

Skill: Application

8) An uncharged atom of gold has an atomic number of 79 and an atomic mass of 197. This atom has _____ protons, _____ neutrons, and _____ electrons.

- A) 79 . . . 118 . . . 79
- B) 118 . . . 79 . . . 118
- C) 276 . . . 118 . . . 79
- D) 118 . . . 276 . . . 118
- E) 79 . . . 276 . . . 79

Answer: A

Page Ref: 23

Skill: Application

9) Isotopes of an element have the same number of _____ and different numbers of _____.

- A) protons . . . neutrons
- B) protons . . . electrons
- C) neutrons . . . protons
- D) neutrons . . . electrons
- E) electrons . . . protons

Answer: A

Page Ref: 23

Skill: Factual Recall

Chapter 2

- 10) How do radioactive isotopes differ from isotopes?
- A) Radioactive isotopes have more neutrons than do isotopes.
 - B) Radioactive isotopes are stable; isotopes are unstable.
 - C) Radioactive isotopes have fewer neutrons than do isotopes.
 - D) They are atoms of different elements.
 - E) Radioactive isotopes are unstable; isotopes are stable.

Answer: E

Page Ref: 23

Skill: Factual Recall

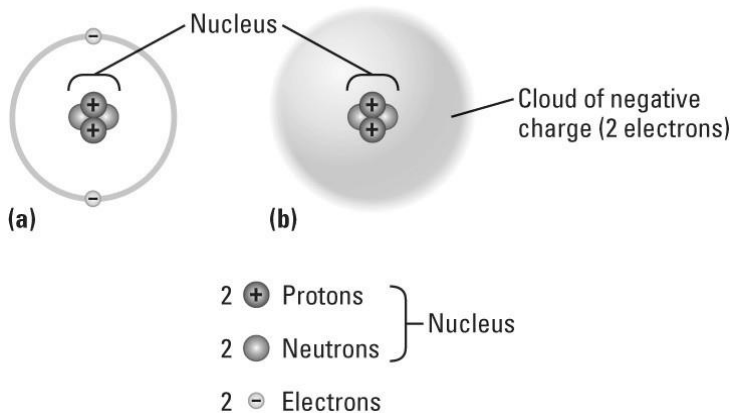
- 11) The way Earth moves about the sun is most like _____.
- A) a neutron and electron moving around a proton
 - B) a proton and neutron moving around an electron
 - C) an electron moving around the nucleus of an atom
 - D) a proton moving about an electron
 - E) a neutron moving about a proton

Answer: C

Page Ref: 23

Skill: Application

- 12) Examine the drawing of an atom below. The art is technically incorrect in that _____.



- A) protons are not located in the nucleus
- B) neutrons are not located in the nucleus
- C) the electrons should be much farther away from the nucleus
- D) electrons do not orbit the nucleus
- E) electrons do not have a negative charge

Answer: C

Page Ref: 23

Skill: Conceptual Understanding

Chapter 2

13) The second electron shell of an atom can hold a maximum of _____ electron(s).

- A) 1
- B) 2
- C) 3
- D) 6
- E) 8

Answer: E

Page Ref: 23

Skill: Factual Recall

14) Nitrogen has an atomic number of 7; therefore, it has _____ electrons in its outermost electron shell.

- A) 1
- B) 10
- C) 18
- D) 5
- E) 2

Answer: D

Page Ref: 23

Skill: Application

15) An atom with an electrical charge is a(n) _____.

- A) isotope
- B) molecule
- C) ion
- D) radioisotope
- E) compound

Answer: C

Page Ref: 25

Skill: Factual Recall

16) The bond between oppositely charged ions is a(n) _____ bond.

- A) ionic
- B) polar covalent
- C) hydrogen
- D) isotonic
- E) covalent

Answer: A

Page Ref: 25

Skill: Factual Recall

Chapter 2

17) Examine the following figure. Which of the representations of molecules does NOT reveal double bonds?

Name (molecular formula)	Electron configuration	Structural formula	Space-filling model	Ball-and-stick model
Hydrogen gas (H ₂)		$\text{H}-\text{H}$ Single bond (a pair of shared electrons)		
Oxygen gas (O ₂)		$\text{O}=\text{O}$ Double bond (two pairs of shared electrons)		
Methane (CH ₄)		$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$		

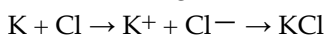
- A) electron configuration
- B) structural formula
- C) space-filling model
- D) ball-and-stick model
- E) All of the representations of molecules reveal double bonds.

Answer: C

Page Ref: 26

Skill: Conceptual Understanding

18) In the following reaction, what type of bond is holding the two atoms together?



- A) hydrophilic
- B) ionic
- C) hydrophobic
- D) hypertonic
- E) covalent

Answer: B

Page Ref: 25

Skill: Application

19) What name is given to bonds that involve the sharing of electrons?

- A) isotonic
- B) covalent
- C) hydrogen
- D) ionic
- E) van der Waals

Answer: B

Page Ref: 25

Skill: Factual Recall

Chapter 2

20) Sulfur has an atomic number of 16. How many covalent bonds can sulfur form?

- A) 1
- B) 2
- C) 3
- D) 4
- E) 0

Answer: B

Page Ref: 26

Skill: Application

21) The hydrogens and oxygen of a water molecule are held together by _____ bonds.

- A) hydrolytic
- B) hydrogen
- C) covalent
- D) osmotic
- E) ionic

Answer: C

Page Ref: 26

Skill: Factual Recall

22) Why is water considered a polar molecule?

- A) The oxygen is found between the two hydrogens.
- B) The negatively charged oxygen atom attracts the positively charged hydrogen atoms.
- C) It remains liquid even at very low temperatures.
- D) Its electrons spend more time with its oxygen than with either hydrogen.
- E) Both hydrogens are at one end of the molecule, and oxygen is at the other end.

Answer: D

Page Ref: 27

Skill: Conceptual Understanding

23) Adjacent water molecules are joined by _____ bonds.

- A) trivalent
- B) covalent only
- C) ionic
- D) polar and covalent
- E) hydrogen

Answer: E

Page Ref: 27

Skill: Factual Recall

Chapter 2

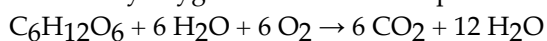
- 24) Adjacent water molecules are connected by the _____.
- A) sharing of electrons between the hydrogen of one water molecule and the oxygen of another water molecule
 - B) electrical attraction between the hydrogen of one water molecule and the oxygen of another water molecule
 - C) sharing of electrons between adjacent oxygen molecules
 - D) electrical attraction between the hydrogens of adjacent water molecules
 - E) sharing of electrons between hydrogens of adjacent water molecules

Answer: B

Page Ref: 27

Skill: Factual Recall

- 25) How many oxygen atoms are in the products of the following reaction?



- A) 18
- B) 2
- C) 6
- D) 12
- E) 24

Answer: E

Page Ref: 27

Skill: Application

- 26) Human body cells are approximately _____ water.

- A) 10□25%
- B) 95□99%
- C) 25□35%
- D) 55%
- E) 70□95%

Answer: E

Page Ref: 29

Skill: Factual Recall

- 27) The tendency of molecules to stick together is called _____.

- A) bonding
- B) cohesion
- C) polarity
- D) adhesion
- E) interactivity

Answer: B

Page Ref: 29

Skill: Factual Recall

Chapter 2

- 28) Why (if you are careful) are you able to float a needle on the surface of water?
- A) Water exhibits adhesive properties.
 - B) The surface tension that is a result of water's cohesive properties makes this possible.
 - C) The covalent bonds that hold a water molecule together are responsible for this ability.
 - D) A single needle is less dense than water.
 - E) The polarity of individual water molecules makes this happen.

Answer: B

Page Ref: 29

Skill: Conceptual Understanding

- 29) Sweating cools your body by _____.
- A) irradiation
 - B) radiation
 - C) conduction
 - D) evaporative cooling
 - E) convection

Answer: D

Page Ref: 29

Skill: Factual Recall

- 30) As water freezes _____.
- A) its atoms move farther apart
 - B) it absorbs energy from the surrounding environment
 - C) it cools the surrounding environment
 - D) its hydrogen bonds break apart
 - E) it loses its polarity

Answer: A

Page Ref: 30

Skill: Factual Recall

- 31) Sugar dissolves when stirred into water. The sugar is the _____, the water is the _____, and the sweetened water is the _____.
- A) solution . . . solvent . . . solute
 - B) solute . . . solvent . . . solution
 - C) solvent . . . solute . . . solution
 - D) solution . . . solute . . . solvent
 - E) solvent . . . solution . . . solute

Answer: B

Page Ref: 30

Skill: Application

- 32) Which of the following is an acid?
- A) NaOH
 - B) NaCl
 - C) HCl
 - D) H₂O
 - E) CH₄

Answer: C

Page Ref: 31

Skill: Application

Chapter 2

- 33) A base _____.
- A) removes H₂O molecules from a solution
 - B) decreases the pH of a solution
 - C) adds HOH molecules to a solution
 - D) removes OH⁻ ions from a solution
 - E) removes H⁺ ions from a solution

Answer: E

Page Ref: 31

Skill: Factual Recall

- 34) The lower the pH of a solution, the _____.
- A) greater the number of oxygen atoms
 - B) more acidic the solution
 - C) less toxic the solution
 - D) higher the OH⁻ concentration
 - E) more basic the solution

Answer: B

Page Ref: 31

Skill: Factual Recall

- 35) Relative to a pH of 6, a pH of 4 has a _____.
- A) 200 times higher H⁺ concentration
 - B) 100 times higher H⁺ concentration
 - C) 20 times higher H⁺ concentration
 - D) 20 times lower H⁺ concentration
 - E) 100 times lower H⁺ concentration

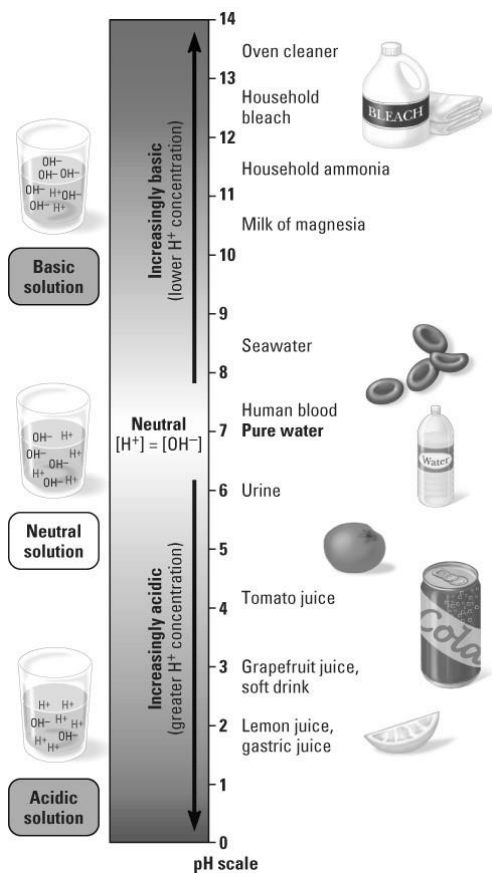
Answer: B

Page Ref: 31

Skill: Application

Chapter 2

36) Examine the pH scale below. How does the pH of household bleach compare to the pH of household ammonia?



- A) Household bleach is more acidic than household ammonia.
- B) Household bleach has 10 times higher H^+ concentration than household ammonia.
- C) Household bleach has 100 times higher H^+ concentration than household ammonia.
- D) Household ammonia has 10 times higher H^+ concentration.
- E) Household ammonia has 100 times higher H^+ concentration.

Answer: D

Page Ref: 31

Skill: Application

37) What name is given to substances that resist changes in pH?

- A) buffers
- B) sugar
- C) salt
- D) acids
- E) bases

Answer: A

Page Ref: 31

Skill: Factual Recall

Chapter 2

38) When a base is added to a buffered solution, the buffer will _____.

- A) donate OH^- ions
- B) accept water molecules
- C) donate H^+ ions
- D) form covalent bonds with the base
- E) accept H^+ ions

Answer: C

Page Ref: 31

Skill: Conceptual Understanding

39) Geological evidence indicates that Earth formed about _____ years ago.

- A) 156 million
- B) 4.5 billion
- C) 8.3 million
- D) 3.6 billion
- E) 500,000

Answer: B

Page Ref: 32

Skill: Factual Recall

40) Which of the following was most abundant in Earth's first atmosphere?

- A) H_2S gas
- B) N_2 gas
- C) CO_2 gas
- D) H_2O vapor
- E) H_2 gas

Answer: E

Page Ref: 32

Skill: Factual Recall

41) It is significant that _____ is not mentioned as having been abundant in either Earth's first or second primitive atmosphere.

- A) oxygen gas
- B) methane
- C) carbon monoxide
- D) carbon dioxide
- E) ammonia

Answer: A

Page Ref: 32

Skill: Conceptual Understanding

Chapter 2

Please read the following scenario to answer the following question(s).

The last few miles of the marathon are the most difficult for Heather, her hair plastered to her head, sweat clinging to her arms, and her legs already feeling as if they had nothing left, just dead weight. After grabbing a cup of ice water, she feels the ice cubes smash against her nose as she gulps some cool refreshment and keeps on running. In these last few miles, the breeze kicks up and she finally feels some coolness against her skin. Drips of sweat, once clinging to her forehead, now spill down, and Heather feels more pain as the sweat flows into her eyes.

- 42) Which of the following is the most likely reason why the ice struck Heather's nose when she took a drink?
- A) Water can function as a solvent.
 - B) Water can store large amounts of heat.
 - C) Water can moderate temperatures through evaporative cooling.
 - D) The density of water decreases when it freezes.
 - E) Water has a cohesive nature.

Answer: D

Page Ref: 30

Skill: Application

- 43) Sweat remained on Heather's forehead and arms because of the _____.
- A) high salt content of sweat
 - B) cohesive nature of water
 - C) ability of water to moderate heat
 - D) high evaporative cooling effect of water
 - E) ability of water to act as a solvent

Answer: B

Page Ref: 30

Skill: Application

- 44) What is the atomic mass of an atom that has 6 protons, 6 neutrons, and 6 electrons?
- A) 6
 - B) 8
 - C) +1
 - D) 12
 - E) 18

Answer: D

Topic: Web/CD Activity: The Structure of Atoms

- 45) A hydrogen atom has 1 electron. How many bonds can hydrogen form?
- A) 1
 - B) 2
 - C) 3
 - D) 4
 - E) 5

Answer: A

Topic: Web/CD Activity: Covalent Bonds

Chapter 2

46) In a water molecule, hydrogen and oxygen are held together by a(an) _____ bond.

- A) double covalent
- B) ionic
- C) nonpolar covalent
- D) hydrogen
- E) polar covalent

Answer: E

Topic: Web/CD Activity: The Structure of Water

47) Water's surface tension and heat storage capacity are accounted for by its _____.

- A) orbitals
- B) weight
- C) hydrogen bonds
- D) mass
- E) size

Answer: C

Topic: Web/CD Activity: The Structure of Water

48) The tendency of water molecules to stick together is referred to as _____.

- A) adhesion
- B) polarity
- C) cohesion
- D) transpiration
- E) evaporation

Answer: C

Topic: Web/CD Activity: The Cohesion of Water in Trees

49) When water dissociates, each water molecule splits into a hydroxide ion and _____.

- A) H_3O^+
- B) a hydrogen atom
- C) a hydrogen ion
- D) H_2O
- E) OH^-

Answer: C

Topic: Web/CD Activity: Acids, Bases, and pH

