Test Bank for

Campbell • Reece • Simon

Essential Biology

THIRD EDITION

&

Essential Biology with Physiology

SECOND EDITION

James R. Bray Jr.
Blackburn College

Eugene J. Fenster
Longview Community College

Dawn Keller
Hawkeye Community College

Mark Manteuffel
St. Louis Community College
Washington University

Richard L. Myers
Missouri State University

Cara Shillington
Eastern Michigan University

Edward J. Zalisko
Blackburn College

San Francisco Boston New York
Cape Town Hong Kong London Madrid Mexico City
Montreal Munich Paris Singapore Sydney Tokyo Toronto

Editor-In-Chief: Beth Wilbur
Senior Acquisitions Editor: Chalon Bridges
Senior Project Manager: Ginnie Simione Jutson
Supplements Project Editor: Susan Berge
Copy Editor: Rebecca J. McDearmon
Managing Editor: Michael Early
Supplements Production Supervisor: Jane Brundage
Marketing Managers: Christy Lawrence, Lauren Harp, Jeff Hester
Manufacturing Buyer: Stacy Wong
Production Services: Carlisle Publishing Services; Tamarack Software
Cover Images: Left: Photograph of a European mantid (*Mantis religiosa*). Courtesy Alamy Images.
Right: Photograph of a "devil's flower mantis" (*Blepharopsis medica*). Courtesy Getty Images, Inc./Image Bank

ISBN 0-8053-2148-9

1 2 3 4 5 6 7 8—OPM—10 09 08 07 06
www.aw-bc.com

Contents

Chapter 1 Introduction: Biology Today

1) In what way(s) is the science of biology influencing and changing our culture?

A) by providing new tools that can be used in forensics

B) by revolutionizing medicine and agriculture

C) by helping us evaluate environmental issues and the impacts of human actions

D) all of the above

E) none of the above

Answer: D
Page Ref: 2
Skill: Factual Recall

2) What is biology?

A) the study of life

B) the study of the environment

C) the study of genetics

D) DNA fingerprinting

E) the study of biomes

Answer: A
Page Ref: 2
Skill: Factual Recall

3) All of the organisms and nonliving components of a particular environment are referred to as a(n) _____.

A) cell

B) community

C) ecosystem

D) population

E) biome

Answer: C
Page Ref: 4
Skill: Factual Recall

4) What are the two main processes that ecosystems depend upon?

A) speciation and evolution

B) nutrient cycling and energy flow

C) photosynthesis and primary production

D) decomposition and nutrient recycling

E) sunlight and photosynthesis

Answer: B
Page Ref: 5
Skill: Factual Recall

5) Which of the following is not recycled but is lost from ecosystems?

A) nitrogen

B) energy

C) magnesium

D) carbon

E) sodium

Answer: B
Page Ref: 5
Skill: Conceptual Understanding

6) Which of the following is a producer?

A) house plant

B) earthworm

C) dog

D) sun

E) cat

Answer: A
Page Ref: 5
Skill: Conceptual Understanding

7) Humans are _____.

A) ecosystems

B) producers

C) cells

D) consumers

E) decomposers

Answer: D
Page Ref: 5
Skill: Conceptual Understanding

8) What are the basic units of life?

A) DNA molecules

B) cells

C) A, G, C, and T

D) organelles

E) nuclei

Answer: B
Page Ref: 5
Skill: Conceptual Understanding

9) Relative to prokaryotic cells, eukaryotic cells are _____.

A) larger and more complex

B) smaller and simpler

C) larger and equally complex

D) smaller and more complex

E) smaller and equally complex

Answer: A
Page Ref: 5
Skill: Factual Recall

10) Humans are composed of _____ cells.

A) bacterial

B) archaeal

C) eukaryotic

D) eubacterial

E) prokaryotic

Answer: C
Page Ref: 5
Skill: Conceptual Understanding

11) What name is given to the functional compartments of a cell?

A) mitochondria

B) chloroplasts

C) nuclei

D) lysosomes

E) organelles

Answer: E
Page Ref: 5
Skill: Factual Recall

12) The DNA of a eukaryotic cell is found within the _____.

A) biome

B) nucleus

C) cell membrane

D) ecosystem

E) lysosome

Answer: B
Page Ref: 5
Skill: Factual Recall

13) What are eukaryotic genes composed of?

A) RNA

B) A

C) G

D) DNA

E) C

Answer: D
Page Ref: 5
Skill: Factual Recall

14) What is a gene?

A) a type of eukaryotic cell

B) a type of animal cell

C) an organelle that houses DNA

D) a type of prokaryotic cell

E) a unit of heredity

Answer: E
Page Ref: 5
Skill: Factual Recall

15) Which of the following is a scientific conclusion based on knowing that humans and bacteria share a common genetic language?

A) Bacteria will eventually develop into humans.

B) Humans and bacteria have the same number of genes.

C) Humans and bacteria share a common ancestor.

D) The same genetic code was created for humans as for bacteria.

E) The cells of both humans and bacteria store their DNA in a nucleus.

Answer: C
Page Ref: 5
Skill: Application

16) Which of the following provides evidence that humans and bacteria share a common genetic code?

A) Bacteria are able to express human genes.

B) Bacteria contain DNA.

C) Bacterial DNA is composed of the same four letters as human DNA.

D) A bacterial cell has a nucleus.

E) Bacterial cells are about the same size as mitochondria.

Answer: A
Page Ref: 5
Skill: Conceptual Understanding

17) The human genome consists of about _____ chemical letters.

A) 3.2 billion

B) 1.2 million

C) 120,000

D) 1.2 billion

E) 3.2 million

Answer: A
Page Ref: 6
Skill: Factual Recall

18) About half of all known species are _____.

A) plants

B) fish

C) insects

D) animals

E) vertebrates

Answer: C
Page Ref: 6
Skill: Factual Recall

19) Taxonomy is the _____.

A) study of cells

B) naming and classifying of species

C) study of organisms and their interaction with the environment

D) study of natural selection

E) study of genetics

Answer: B
Page Ref: 7
Skill: Factual Recall

20) How does taxonomy assist biologists?

A) by providing easily remembered scientific names for organisms

B) by explaining why life exists

C) by categorizing diverse items into smaller and smaller numbers of groups

D) by reducing life to its smallest common denominator, the cell

E) all of the above

Answer: C
Page Ref: 7
Skill: Factual Recall

21) The level of classification of life that is *more* inclusive than kingdom is _____.

A) domain

B) order

C) class

D) family

E) phylum

Answer: A
Page Ref: 7
Skill: Factual Recall

22) Which domain(s) consist(s) of prokaryotic cells?

A) Bacteria only

B) Eukarya only

C) Archaea and Eukarya

D) Archaea only

E) Bacteria and Archaea

Answer: E
Page Ref: 7
Skill: Factual Recall

23) Which of the following kingdoms of Eukarya consists primarily of unicellular organisms?

A) Plantae

B) Monera

C) Fungi

D) Protista

E) Animalia

Answer: D
Page Ref: 7
Skill: Factual Recall

24) A newly discovered multicellular organism feeds on organic waste. Such an organism is most likely a member of the kingdom _____.

A) Plantae

B) Eukarya

C) Fungi

D) Protista

E) Animalia

Answer: C
Page Ref: 7
Skill: Application

25) Members of the kingdom Plantae differ from members of the other kingdoms of Eukarya in that most members of the kingdom Plantae _____.

A) are decomposers

B) are unicellular

C) are consumers

D) obtain food by ingestion

E) produce their own food

Answer: E
Page Ref: 7
Skill: Factual Recall

26) The branch of biology that explains both the diversity and the unity of life is _____.

A) evolution

B) microbiology

C) physiology

D) taxonomy

E) genetics

Answer: A
Page Ref: 8
Skill: Application

27) The animals in which of the following pairs are most closely related?

A) dog and cat

B) human and chimpanzee

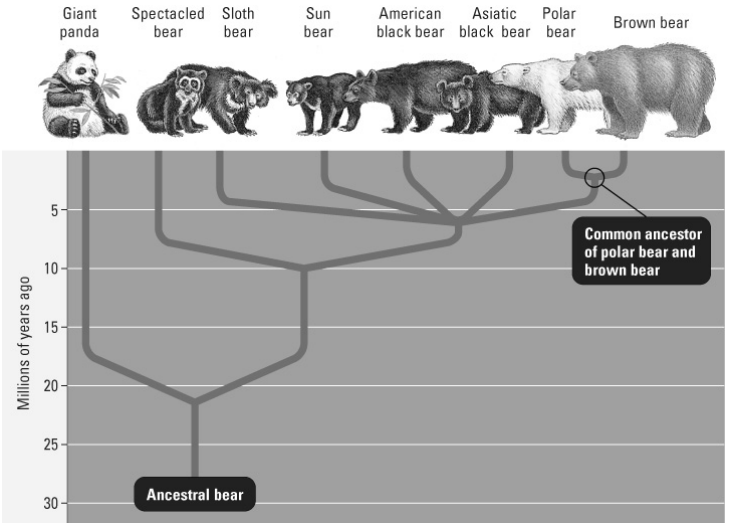
C) goldfish and shark

D) alligator and bird

E) bird and squirrel

Answer: B
Page Ref: 8
Skill: Factual Recall

Please refer to the accompanying figure to answer the following question(s).



28) Using the branching tree of life for bears depicted in the accompanying figure, choose from among the following bear species the one that is most distantly related to the sun bear.

A) brown bear

B) sloth bear

C) spectacled bear

D) Asiatic bear

E) giant panda

Answer: E
Page Ref: 8
Skill: Application

29) Using the branching tree of life for bears depicted in the accompanying figure, choose from among the following bear species the one that is most recently related to the polar bear.

A) brown bear

B) giant panda

C) sun bear

D) spectacled bear

E) American black bear

Answer: A
Page Ref: 8
Skill: Application

30) The aspect of biology that unites all of the diverse fields of biology as a single science is _____.

A) ecology

B) genetics

C) histology

D) evolution

E) microbiology

Answer: D
Page Ref: 8
Skill: Factual Recall

31) Which of these is most closely associated with Darwin?

A) DNA structure

B) ecosystem structure

C) cell theory

D) genetic code

E) natural selection

Answer: E
Page Ref: 9
Skill: Factual Recall

32) Which of these is required for natural selection to occur?

A) inheritance

B) unequal reproductive success

C) individual variation

D) overreproduction

E) all of the above

Answer: E
Page Ref: 10
Skill: Factual Recall

33) Unequal reproductive success _____.

A) leads to a population being less well adapted to its environment

B) increases variation

C) always decreases the size of a population

D) does not affect the frequency of expression of traits in succeeding generations of a population

E) is natural selection

Answer: E
Page Ref: 11
Skill: Conceptual Understanding

34) What does adaptation mean in a biological context?

A) the physiological process by which individuals adjust to their environment

B) the accumulation of favorable variations in a population over time

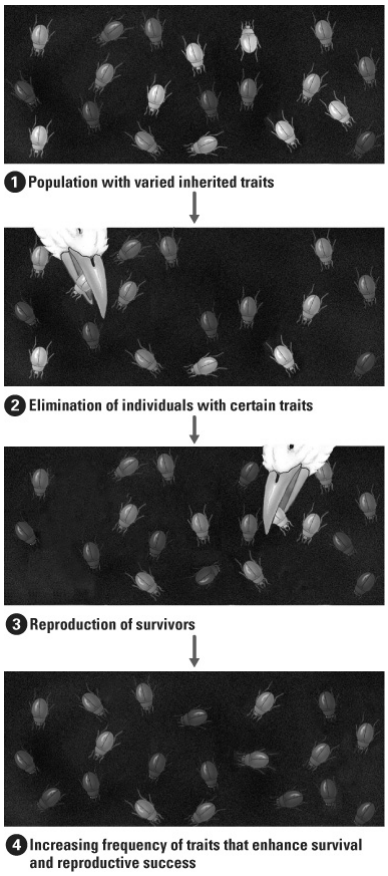
C) the morphological changes that occur in individuals as they grow and develop

D) the ability of organisms to alter their appearance under changing environmental conditions

E) all of the above

Answer: B
Page Ref: 11
Skill: Conceptual Understanding

35) In the process of evolution by natural selection illustrated in the accompanying figure, which of the following is the mechanism or agent of natural selection?



A) selective mutations

B) selective dispersal

C) selective predation

D) selective beetles

E) selective trees

Answer: C
Page Ref: 11
Skill: Application

36) What accounts for the different breeds of domesticated dogs?

A) overreproduction

B) natural selection

C) creation

D) artificial selection

E) genetic drift

Answer: D
Page Ref: 12
Skill: Factual Recall

37) What will happen if you do NOT (properly) finish your antibiotic prescription?

A) You will save money by saving the pills for future use.

B) You will promote the evolution of bacteria resistant to that antibiotic.

C) You will become sick again within one or two weeks.

D) You will become immune to that antibiotic.

E) Nothing will happen.

Answer: B
Page Ref: 12
Skill: Factual Recall

38) Science is _____.

A) the explanation of phenomena based on supernatural causation

B) the explanation of structures and processes based on verifiable observations and measurements

C) the search for truth

D) an organized set of principles for how to ethically and morally behave

E) all of the above

Answer: B
Page Ref: 13
Skill: Conceptual Understanding

39) What is the difference between discovery science and hypothesis-driven science?

A) There is no difference between them.

B) Discovery science "discovers" new knowledge, whereas hypothesis-driven science does not.

C) Discovery science is based on deductive reasoning, whereas hypothesis-driven science is based on inductive reasoning.

D) Discovery science leads from the specific to the general, whereas hypothesis-driven science leads from the general to the specific.

E) Discovery science involves predictions about outcomes, whereas hypothesis-driven science involves tentative answers to specific questions.

Answer: D
Page Ref: 14
Skill: Conceptual Understanding

40) Which of these statements is correct?

A) Scientific ideas are subjected to rigorous and repeated testing.

B) Science and religion are equally valid explanations of natural phenomena.

C) Science does not require verifiable observations.

D) In science, hypotheses need not be testable.

E) In science there are absolute truths.

Answer: A
Page Ref: 14
Skill: Conceptual Understanding

41) Discovery science is primarily based on _____.

A) hypothesis testing

B) deduction

C) experimentation

D) theory

E) observation

Answer: E
Page Ref: 14
Skill: Factual Recall

42) How does inductive reasoning differ from deductive reasoning?

A) Discovery science utilizes deductive reasoning, not inductive reasoning, to establish conclusions.

B) Deductive reasoning involves going from the specific to the general, whereas inductive reasoning involves going from the general to the specific.

C) Inductive reasoning is based on hypotheses, and deductive reasoning is not.

D) Inductive reasoning is based on experimentation, and deductive reasoning is based on observation.

E) Inductive reasoning involves going from the specific to the general, whereas deductive reasoning involves going from the general to the specific.

Answer: E
Page Ref: 14
Skill: Factual Recall

43) Which of these would be a valid hypothesis?

A) Humans were created by a supernatural event.

B) Humans should preserve other animals.

C) Humans are controlled by forces beyond our understanding.

D) Humans are responsible for sustainable use of resources.

E) Humans and bacteria share a common genetic code.

Answer: A
Page Ref: 14
Skill: Conceptual Understanding

44) A hypothesis is a(n) _____.

A) tentative explanation

B) guess

C) fact

D) observation

E) theory

Answer: A
Page Ref: 14
Skill: Conceptual Understanding

45) Which of these is a hypothesis?

A) My car will not start.

B) My car's battery is dead.

C) If my car does not start and I recharge the battery, then my car will start.

D) My car is too old to function properly.

E) What is wrong with my car?

Answer: B
Page Ref: 14
Skill: Application

46) Which of these is deductive testing?

A) My car will not start.

B) My car's battery is dead.

C) If my car does not start and I recharge the battery, then my car will start.

D) My car is too old to function properly.

E) What is wrong with my car?

Answer: C
Page Ref: 14
Skill: Application

47) In a scientific experiment, the control group _____.

A) serves as a basis of comparison with the experimental group

B) is the sample that is subjected to the factor whose effect is being tested

C) allows for the simultaneous testing of multiple factors

D) is required for the validity of discovery science

E) serves to increase the sample size of the experiment

Answer: A
Page Ref: 16
Skill: Factual Recall

48) How do hypotheses differ from theories?

A) Theories are more comprehensive than hypotheses.

B) Theories must be testable; hypotheses do not need to be testable.

C) Hypotheses are educated guesses, and theories are tentative explanations.

D) Hypotheses are derived from experimentation, whereas theories are derived from observation.

E) Hypotheses are more generally stated than theories.

Answer: A
Page Ref: 18
Skill: Factual Recall

Please use the following information to answer the following question(s).

Your textbook describes a case study involving warning coloration and mimicry in snakes. Many species, not just snakes, exhibit various patterns of coloration. Biologists seek to determine the function, if any, of these color patterns. Might coloration function in ways other than warning or camouflage? Certain lizard species found in the Desert Southwest have extensive color variation in one or both sexes. One such species, the collared lizard, has been observed to have males that exhibit considerable color variation, ranging from brightly colored to a very dull pattern. There are only two species of venomous lizards in the world, and they are quite large in comparison to collared lizards. It is therefore unlikely that the coloration of male collared lizards functions as a warning to predators. Your goal is to determine the function, if any, of male color patterns in collared lizards, using the scientific method. Your tentative explanation as to the function of male coloration in collared lizards is that it plays a role in attracting females for mating purposes. You predict that females will preferentially choose brightly colored males over dull-colored ones. To test this prediction, you observed the interactions of female collared lizards with their male counterparts. You selected males that were the same age and size, and differed only in their coloration pattern. You placed equal numbers of the two types of male lizards, bright and dull, in aquariums, along with one female lizard per aquarium. Out of 350 aquariums observed, the female chose to mate with the brightly colored male 277 times, and the dull-colored male 70 times. In 3 instances, the females did not mate with either type.

Create a bar graph of your data, plotting the type of male (dull or brightly colored) on the x-axis. On the y-axis, plot the frequency with which each type of male was chosen by females. Using this graph, answer the following question(s).

49) Is it reasonable to conclude (i.e., is it supported by the data) that female collared lizards prefer more brightly colored male lizards over dull-colored males?

A) Yes, this conclusion is supported by the data.

B) No, this conclusion is not supported by the data.

C) The data do not clearly indicate a preference one way or the other.

D) There is no way to conclude anything from this data.

E) None of the above choices are correct.

Answer: A
Page Ref: 15
Skill: Application

50) Which of the following are the proper components of the scientific method?

A) experiment, conclusion, application

B) question, observation, experiment, analysis, prediction

C) observation, question, hypothesis, prediction, experiment, results, conclusion

D) prediction, hypothesis, experiment, conclusion

E) observation, question, opinion, conclusion, hypothesis

Answer: C
Page Ref: 15
Skill: Factual Recall

51) Identify the experimental group of this case study.

A) brightly colored female lizards

B) brightly colored male lizards

C) dull–colored female lizards

D) dull–colored male lizards

E) all of the above

Answer: B
Page Ref: 15
Skill: Application

52) Dull–colored males were part of the _____.

A) observation group

B) control group

C) experimental group

D) predicted group

E) hypothesized group

Answer: B
Page Ref: 15
Skill: Application

53) Which of the following is the hypothesis of this case study?

A) Male lizards are brightly colored.

B) Male collared lizards exhibit color variation.

C) Male coloration functions only as a warning.

D) A function of male coloration is to attract females.

E) Males prefer brightly colored females.

Answer: D
Page Ref: 15
Skill: Application

54) "Collared lizard males exhibit a wide range of color variations." This is a(n) _____.

A) hypothesis

B) conclusion

C) observation

D) opinion

E) result

Answer: C
Page Ref: 15
Skill: Application

55) What is the difference between a tissue and an organ system?

A) The tissue level of organization is more inclusive than the organ system level.

B) Tissues are not composed of cells; organ systems are composed of cells.

C) A tissue cannot exist unless it is a component of an organ system, whereas an organ system can exist independently of tissues.

D) An organ system includes tissues.

E) Tissues are not considered to be living, whereas organ systems are considered to be living.

Answer: D
Topic: Web/CD Activity: The Levels of Life Card Game

56) What feature is common to prokaryotes, fungi, and plants?

A) a nucleus

B) single cells

C) at one time, membership in the kingdom Monera

D) cell walls

E) photosynthesis

Answer: D
Topic: Web/CD Activity: Classification Schemes

Chapter 2 Essential Chemistry for Biology

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

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

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

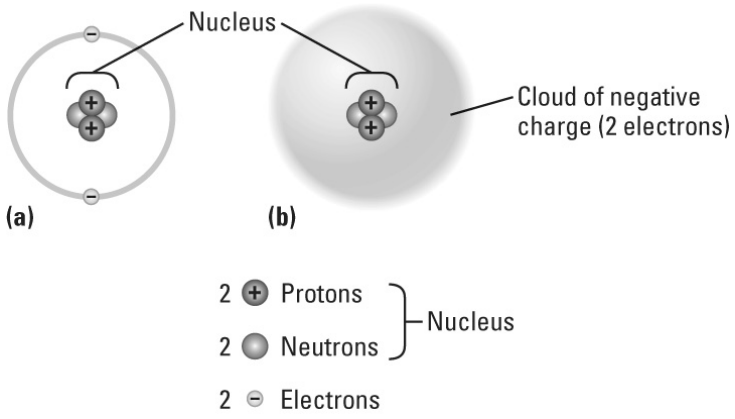
C) an electron moving around the nucleus of an atom

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

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

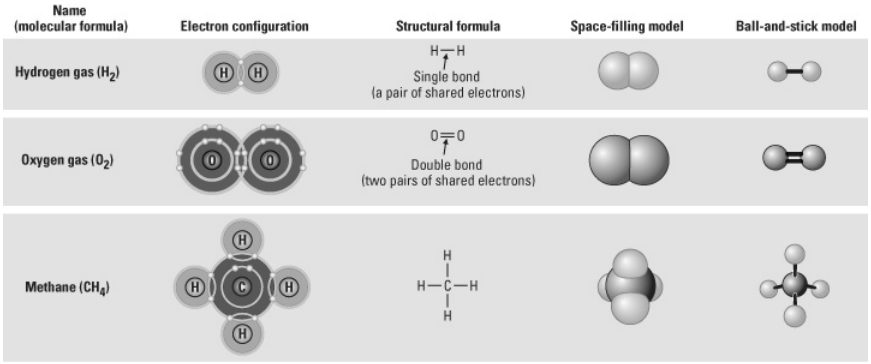
C) hydrogen

D) isotonic

E) covalent

Answer: A
Page Ref: 25
Skill: Factual Recall

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



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?
$K + Cl \rightarrow K^+ + Cl^- \rightarrow KCl$

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

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

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?
$C_6H_{12}O_6 + 6\ H_2O + 6\ O_2 \rightarrow 6\ CO_2 + 12\ H_2O$

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

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) H_2O

E) CH_4

Answer: C
Page Ref: 31
Skill: Application

33) A base _____.

A) removes H_2O 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

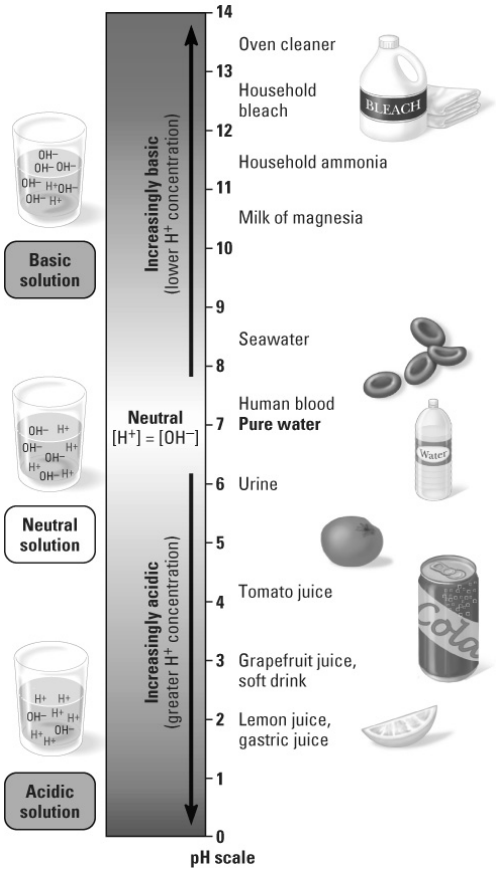
C) 20 times higher H^+ concentration

D) 20 times lower H^+ concentration

E) 100 times lower H^+ concentration

Answer: B
Page Ref: 31
Skill: Application

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

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

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

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

Chapter 3 The Molecules of Life

1) The sleepiness that one might feel after a large Thanksgiving dinner of turkey is likely due to _____.

   A) the general lethargy felt after a large meal

   B) high amounts of carbon in turkey

   C) high amounts of tryptophan in turkey

   D) high amounts of serotonin in gravy

   E) the combined effects of turkey and pumpkin pie

Answer: A
Page Ref: 36
Skill: Application

2) A single carbon atom can form a maximum of _____ covalent bond(s).

   A) none; carbon only participates in ionic bonds

   B) 1

   C) 2

   D) 3

   E) 4

Answer: E
Page Ref: 36
Skill: Factual Recall

3) The following molecule is best described as a _____.
$CH_3—CH_2—CH_2—CH_2$

   A) protein

   B) carbohydrate

   C) hydrocarbon

   D) nucleic acid

   E) lipid

Answer: C
Page Ref: 37
Skill: Application

4) _____ is a hydroxyl group.

A) —SH

B) $—NH_2$

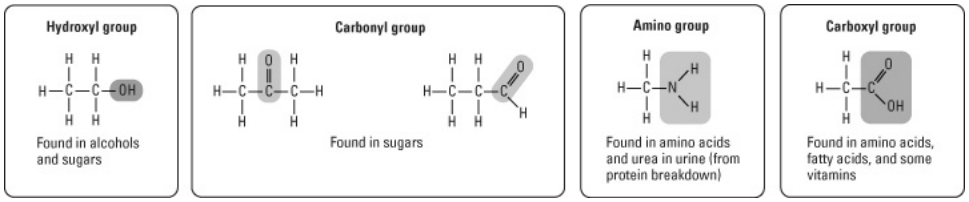
C) —OH

D) —COOH

E) —H

Answer: C
Page Ref: 38
Skill: Factual Recall

5) Examine the functional groups in the following figure. Which functional groups include nitrogen?



A) hydroxyl groups

B) carbonyl groups

C) amino groups

D) carboxyl groups

E) all of the above

Answer: C
Page Ref: 38
Skill: Application

6) In the following reaction, galactose is a _____.
galactose + glucose → lactose + water

A) polysaccharide

B) monomer

C) lipid

D) polymer

E) protein

Answer: B
Page Ref: 38
Skill: Factual Recall