Fundamentals of Anatomy and Physiology 11th edition Martini Test Bank

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Fundamentals of Anatomy and Physiology, 11e **(Martini)**
Chapter 2 The Chemical Level of Organization

Multiple Choice Questions

1) The smallest stable units of matter are
A) atoms.
B) molecules.
C) protons.
D) neutrons.
E) electrons.
Answer: A
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

2) The "atomic number" of an atom is determined by the number of _____ it has.
A) electrons
B) protons
C) neutrons
D) protons + neutrons
E) protons + electrons
Answer: B
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

3) The "atomic weight" of an atom reflects the average number of
A) protons.
B) neutrons.
C) electrons.
D) protons + neutrons.
E) protons + neutrons + electrons.
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

4) One mole of any element has the same
A) mass.
B) weight.
C) number of atoms.
D) number of electrons.
E) All of the answers are correct.
Answer: C
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

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5) The nucleus of an atom consists of
A) electrons.
B) protons.
C) neutrons.
D) protons + neutrons.
E) protons + electrons.
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

6) Isotopes of an element differ in the number of
A) protons in the nucleus.
B) electrons in the nucleus.
C) neutrons in the nucleus.
D) electron clouds.
E) electrons in energy shells.
Answer: C
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

7) The innermost electron shell in an atom holds up to _____ electrons.
A) 1
B) 2
C) 4
D) 6
E) 8
Answer: B
Learning Outcome: 2-1
Bloom's Taxonomy: Understanding

8) Radioisotopes have unstable
A) ions.
B) nuclei.
C) isotopes.
D) electron clouds.
E) protons.
Answer: B
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

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9) By weight, which element is the most plentiful in the human body?
A) sulfur
B) sodium
C) oxygen
D) potassium
E) carbon
Answer: C
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

10) Which of these lists contains only trace elements?
A) sulfur, chlorine, oxygen
B) selenium, hydrogen, calcium
C) boron, oxygen, carbon
D) silicon, fluorine, tin
E) cobalt, calcium, sodium
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

11) Helium (HE) has an atomic number of 2. It is chemically stable because it
A) is neutral in electrical charge.
B) readily ionizes to react with other atoms.
C) has a full outer electron shell.
D) will form a covalent bond with another He atom.
E) lacks electrons, thus the He atom is stable.
Answer: C
Learning Outcome: 2-1
Bloom's Taxonomy: Applying

12) Which element commonly has only a proton as its nucleus?
A) helium
B) neon
C) argon
D) hydrogen
E) carbon
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Understanding

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13) By weight, which element is the second most abundant in the human body?
A) oxygen
B) carbon
C) hydrogen
D) nitrogen
E) calcium
Answer: B
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

14) In any given molecule, the sum of the atomic weights of its component atoms is called
A) molecular mass.
B) molecular weight.
C) atomic mass.
D) atomic weight.
E) chemical mass.
Answer: B
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

15) Given the following approximate values, calculate the molecular weight for NaCl.
Atomic number for Na: 11, Atomic weight for Na: 23 g/mol, Atomic number for Cl: 17,Atomic weight for Cl: 35 g/mol, Boiling point for Cl: -34 °C
A) 11 g/mol
B) 28 g/mol
C) 34 g/mol
D) 40 g/mol
E) 58 g/mol
Answer: E
Learning Outcome: 2-1
Bloom's Taxonomy: Analyzing

16) If an isotope of oxygen has 8 protons, 10 neutrons, and 8 electrons, its mass number is
A) 26.
B) 16.
C) 18.
D) 8.
E) 12.
Answer: C
Learning Outcome: 2-1
Bloom's Taxonomy: Analyzing

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17) If an element is composed of atoms with an atomic number of 6 and a mass number of 14, then a non-isotopic atom of this element contains
A) 6 protons.
B) 8 electrons.
C) 8 neutrons.
D) 6 protons and 8 electrons.
E) 6 protons and 8 neurons.
Answer: E
Learning Outcome: 2-1
Bloom's Taxonomy: Analyzing

18) A(n) _____ is a pure substance composed of atoms of only one kind.
A) element
B) macromolecule
C) ion
D) isotope
E) compound
Answer: B
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

19) The center of an atom is called the
A) core.
B) hub.
C) middle point.
D) nucleus.
E) focus.
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

20) Electrons whirl around the center of the atom at high speed, forming a(n)
A) spiral.
B) figure 8.
C) cylinder.
D) electron cloud.
E) helix.
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

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21) Electrons in an atom occupy an orderly series of electron shells or
A) energy levels.
B) electron clouds.
C) energy circles.
D) electron lanes.
E) energy fields.
Answer: A
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

22) The actual mass of an atom is known as its
A) chemical weight.
B) atomic weight.
C) atomic mass.
D) chemical mass.
E) chemical force.
Answer: C
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

23) Atoms of the same element whose nuclei contain the same number of protons, but different numbers of neutrons, are called
A) isotonics.
B) heterotopes.
C) isotopes.
D) homotopes.
E) heterotonics.
Answer: C
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

24) The _____ of a radioactive substance is the time required for 50 percent of a given amount of radioisotope to decay.
A) decay-point
B) mid-life
C) deterioration point
D) half-life
E) entropy
Answer: D
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25) The molecule NO is known as
A) nitric oxide.
B) noxious oxide.
C) noxious oxygen.
D) nitric oxygen.
E) nitrous oxide.
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

26) The molecule CO_2 is known as
A) carbonized oxygen.
B) carbonated oxygen.
C) carbon monoxide.
D) carbon oxide.
E) carbon dioxide.
Answer: E
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

27) The molecule H_2 is known as
A) hydrohydrogen.
B) hydrogen.
C) hydroxide.
D) helium.
E) semi-water.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

28) When electrons are transferred from one atom to another, and the two atoms unite as a result of the opposite charges, a(n) _____ is formed.
A) ion
B) molecule
C) hydrogen bond
D) ionic bond
E) covalent bond
Answer: D
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

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29) Magnesium atoms have two electrons in the outermost shell. As a result, you would expect magnesium to form ions with a charge of
A) +1.
B) +2.
C) -1.
D) -2.
E) either +2 or -2.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

30) Which of the following statements about hydrogen bonds is **false**?
A) Hydrogen bonds are strong attractive forces between hydrogen atoms and negatively charged atoms.
B) Hydrogen bonds can occur within a single molecule.
C) Hydrogen bonds can form between neighboring molecules.
D) Hydrogen bonds are important for holding large molecules together.
E) Hydrogen bonds are responsible for many of the properties of water.
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

31) The molecule O_2 is known as
A) oxide.
B) oxygen.
C) organic.
D) oxate.
E) a salt.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

32) H_2O is an example of a(n)
A) ionic formula.
B) glucose molecule.
C) compound.
D) ion.
E) covalent formula.
Answer: C
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

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33) Which of the following is **not** a cation?
A) Na^+
B) Cl^-
C) K^+
D) Ca^{2+}
E) Mg^{2+}
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

34) A dust particle floating on a water surface illustrates
A) surface tension.
B) chemical tension.
C) static electricity.
D) heat capacity.
E) hydrophilic attraction.
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

35) In an aqueous solution, cations are attracted toward
A) sodium.
B) salt.
C) buffers.
D) anions.
E) hydrogen ions.
Answer: D
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

36) In an aqueous solution, sodium ions would move toward
A) a negative terminal.
B) a positive terminal.
C) a pH terminal.
D) an organic terminal.
E) the bottom.
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

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37) The chemical behavior of an atom is determined by the
A) number of protons.
B) number of neutrons.
C) outermost electron shell.
D) size of the atom.
E) mass of the nucleus.
Answer: C
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

38) Ions with a + charge are called
A) cations.
B) anions.
C) radicals.
D) positrons.
E) isotopes.
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

39) When atoms complete their outer electron shell by sharing electrons, they form
A) ionic bonds.
B) covalent bonds.
C) hydrogen bonds.
D) anions.
E) cations.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

40) Ionic bonds are formed when
A) atoms share electrons.
B) an electron or electrons are completely transferred from one atom to another.
C) a pair of electrons is shared unequally by two atoms.
D) hydrogen forms bonds with negatively charged atoms.
E) two or more atoms lose electrons at the same time.
Answer: B
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Bloom's Taxonomy: Remembering

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41) If a pair of electrons is unequally shared between two atoms, a(n) _____ bond occurs.
A) single covalent
B) double covalent
C) triple covalent
D) polar covalent
E) hydrogen
Answer: D
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

42) Elements that have atoms with full outer shells of electrons
A) will form many compounds.
B) will normally form anions.
C) will normally form cations.
D) frequently form hydrogen bonds.
E) are inert gases.
Answer: E
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

43) Ions in an ionic molecule are held together due to
A) the sharing of electrons.
B) the attraction of opposite electrical charges.
C) each electron orbiting all of the ions in the molecule.
D) the presence of water molecules.
E) the attraction of similar charges of the ions' protons.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

44) Sodium (NA) has an atomic number of 11. How many electrons are in the outer electron shell of a neutral sodium atom?
A) 1
B) 2
C) 3
D) 4
E) 8
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Analyzing

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45) Oxygen (atomic number 8) requires how many **additional** electrons to fill its outer electron shell?
A) 1
B) 2
C) 4
D) 6
E) 8
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Analyzing

46) The formula for methane gas is CH_4. What does the formula $4CH_4$ represent?
A) a molecule with 4 carbon atoms
B) a molecule with 4 carbon atoms and 16 hydrogen atoms
C) 4 molecules, each containing a carbon and a hydrogen atom
D) 4 molecules, each containing a carbon atom and 4 hydrogen atoms
E) an inorganic compound with ionic bonds
Answer: D
Learning Outcome: 2-2
Bloom's Taxonomy: Applying

47) In an ionic bond, the electron donor is the _____, whereas the electron acceptor is the _____.
A) acid; base
B) salt; ion
C) anion; cation
D) base; acid
E) cation; anion
Answer: E
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

48) In a molecule of nitrogen, three pairs of electrons are shared by two nitrogen atoms. The type of bond that is formed is an example of a _____ bond.
A) single trivalent
B) double divalent
C) triple covalent
D) polar covalent
E) hydrogen
Answer: C
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

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49) In chemical notation, the symbol Ca^{2+} means
A) two calcium atoms.
B) a calcium ion that has lost two electrons.
C) a calcium ion that has gained two protons.
D) a calcium ion that has gained two electrons.
E) a calcium ion that has lost two protons.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

50) Magnesium atoms have two electrons in the outermost shell and chlorine atoms have seven. The compound magnesium chloride would contain
A) 1 magnesium and 1 chlorine.
B) 1 magnesium and 2 chlorine.
C) 2 magnesium and 1 chlorine.
D) 2 magnesium and 7 chlorine.
E) impossible to tell without more information
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Applying

51) Ions with a negative charge are called
A) cations.
B) anions.
C) radicals.
D) positrons.
E) isotopes.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

52) The three familiar states of matter are solids, liquids, and
A) globules.
B) fibroids.
C) gases.
D) crystals.
E) vapors.
Answer: C
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

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53) A molecule that has unpaired electrons is a(n)
A) isotope.
B) free radical.
C) ion.
D) triple bonded molecule.
E) compound.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

54) Cumulative damage from reactive _____ is thought to be a major factor in aging.
A) nitrogen
B) double bonds
C) isotopes
D) free radicals
E) helium
Answer: D
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

55) Oxygen, which forms naturally as two atoms, are bonded together with what type of bond?
A) nonpolar covalent bond
B) single covalent bond
C) polar covalent bond
D) ionic bond
E) hydrogen bond
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

56) The electrostatic attraction between the slight positive charge of a hydrogen of one molecule and the slight negative charge of an oxygen, nitrogen, or fluorine of another molecule is called a(n)
A) nonpolar covalent bond.
B) single covalent bond.
C) polar covalent bond.
D) ionic bond.
E) hydrogen bond.
Answer: E
Learning Outcome: 2-2
Bloom's Taxonomy: Understanding

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57) AB → A + B is to decomposition as A + B → AB is to
A) exchange.
B) synthesis.
C) combustion.
D) replacement.
E) metabolism.
Answer: B
Learning Outcome: 2-3
Bloom's Taxonomy: Analyzing

58) The reaction A + B + energy → AB is an example of a(n) _____ reaction.
A) exergonic
B) endergonic
C) equilibrium
D) decomposition
E) exchange
Answer: B
Learning Outcome: 2-3
Bloom's Taxonomy: Understanding

59) In hydrolysis reactions, compounds react with
A) hydrogen, causing decomposition.
B) glucose, causing decomposition.
C) water, causing decomposition.
D) carbon, causing decomposition.
E) water, causing synthesis.
Answer: C
Learning Outcome: 2-3
Bloom's Taxonomy: Remembering

60) In dehydration synthesis reactions, compounds
A) lose water molecules.
B) gain water molecules.
C) convert water molecules to hydrogen and oxygen.
D) convert hydrogen and oxygen to water.
E) gain electrons.
Answer: A
Learning Outcome: 2-3
Bloom's Taxonomy: Remembering

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61) Kinetic energy is stored as _____ energy when a spring is stretched or compressed.
A) potential
B) possible
C) plausible
D) probable
E) positive
Answer: A
Learning Outcome: 2-3
Bloom's Taxonomy: Understanding

62) Stored energy that has the ability to do work is called
A) kinetic energy.
B) heat energy.
C) light energy.
D) potential energy.
E) dark energy.
Answer: D
Learning Outcome: 2-3
Bloom's Taxonomy: Understanding

63) The energy of motion is
A) kinetic energy.
B) heat energy.
C) light energy.
D) potential energy.
E) dark energy.
Answer: A
Learning Outcome: 2-3
Bloom's Taxonomy: Remembering

64) Collectively, reactions that break down molecules are known as
A) anabolism.
B) metabolism.
C) synthesis reactions.
D) exchange reactions.
E) catabolism.
Answer: E
Learning Outcome: 2-3
Bloom's Taxonomy: Remembering

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65) Collectively, reactions that build new molecules are known as
A) anabolic.
B) metabolic.
C) synthetic reactions.
D) exchange reactions.
E) catabolic.
Answer: A
Learning Outcome: 2-3
Bloom's Taxonomy: Remembering

66) The reaction HCl → H+ + Cl- is what type of reaction?
A) decomposition
B) exchange
C) hydrolysis
D) synthesis
E) reversible
Answer: A
Learning Outcome: 2-3
Bloom's Taxonomy: Applying

67) The reaction H2CO3 ↔ H+ + HCO3 is what type of reaction?
A) decomposition
B) exchange
C) hydrolysis
D) synthesis
E) reversible
Answer: E
Learning Outcome: 2-3
Bloom's Taxonomy: Applying

68) The reaction HCl + NaOH → H2O + NaCl is what type of reaction?
A) decomposition
B) exchange
C) hydrolysis
D) synthesis
E) reversible
Answer: B
Learning Outcome: 2-3
Bloom's Taxonomy: Applying

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69) Chemical reactions that yield energy, such as heat, are said to be
A) endergonic.
B) activated.
C) exergonic.
D) neutral.
E) thermonuclear.
Answer: C
Learning Outcome: 2-4
Bloom's Taxonomy: Remembering

70) Which of the following descriptors is **false** regarding enzymes?
A) They are proteins.
B) They function as biological catalysts.
C) They lower the activation energy required for a reaction.
D) They affect only the rate of a chemical reaction.
E) They are consumed during the reaction.
Answer: E
Learning Outcome: 2-4
Bloom's Taxonomy: Understanding

71) Chemical reactions that absorb energy are called
A) exergonic.
B) endergonic.
C) equilibrial.
D) decomposition.
E) exchange.
Answer: B
Learning Outcome: 2-4
Bloom's Taxonomy: Remembering

72) Chemical reactions that occur in the body are accelerated by
A) vitamins.
B) cofactors.
C) hormones.
D) electrons.
E) enzymes.
Answer: E
Learning Outcome: 2-4
Bloom's Taxonomy: Understanding

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73) In living cells, complex metabolic reactions proceed in a series of steps called
A) maneuvers.
B) degrees.
C) pathways.
D) increments.
E) cascades.
Answer: C
Learning Outcome: 2-4
Bloom's Taxonomy: Understanding

74) Activation energy is
A) the energy of motion.
B) stored energy.
C) the same as heat energy.
D) the energy in chemical bonds.
E) the energy needed to start a reaction.
Answer: E
Learning Outcome: 2-4
Bloom's Taxonomy: Remembering

75) Each of the following is an inorganic compound **except**
A) water.
B) acids.
C) bases.
D) salts.
E) carbohydrates.
Answer: E
Learning Outcome: 2-5
Bloom's Taxonomy: Understanding

76) Which of the following is **both** an anion and a compound?
A) Na^+
B) Cl^-
C) K^+
D) HCO_3^-
E) NaCl
Answer: D
Learning Outcome: 2-5
Bloom's Taxonomy: Applying

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77) Compounds that contain carbon as the primary structural atom are called _____ molecules.
A) carbonic
B) organic
C) inorganic
D) catabolic
E) anabolic
Answer: B
Learning Outcome: 2-5
Bloom's Taxonomy: Remembering

78) Compounds that do not usually contain carbon and hydrogen atoms as the primary structural ingredients are called _____ molecules.
A) non-carbonic
B) organic
C) hydro-carbonic
D) metabolic
E) inorganic
Answer: E
Learning Outcome: 2-5
Bloom's Taxonomy: Remembering

79) Nonpolar organic molecules are good examples of
A) electrolytes.
B) molecules that will dissociate when placed into water.
C) hydrophobic compounds.
D) hydrophilic compounds.
E) solutes.
Answer: C
Learning Outcome: 2-6
Bloom's Taxonomy: Understanding

80) During ionization, water molecules disrupt the ionic bonds of a salt to produce a mixture of ions. These ions can carry a current and so are called
A) cations.
B) anions.
C) acids.
D) electrolytes.
E) counterions.
Answer: D
Learning Outcome: 2-6
Bloom's Taxonomy: Remembering

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81) Oppositely charged ions in solution are prevented from combining by
A) heat capacity of water.
B) hydration spheres.
C) water's nonpolar nature.
D) free radicals.
E) hydrogen bonding.
Answer: B
Learning Outcome: 2-6
Bloom's Taxonomy: Remembering

82) Hydrophilic molecules readily associate with
A) lipid molecules.
B) hydrophobic molecules.
C) water molecules.
D) acids.
E) salts.
Answer: C
Learning Outcome: 2-6
Bloom's Taxonomy: Remembering

83) Which of the following statements about water is **false**?
A) It is composed of polar molecules.
B) It is responsible for much of the mass of the human body.
C) It has a relatively low heat capacity.
D) It can dissolve many substances.
E) It contains hydrogen bonds.
Answer: C
Learning Outcome: 2-6
Bloom's Taxonomy: Understanding

84) Which property of water helps keeps body temperature stabilized?
A) kinetic energy
B) lubrication
C) surface tension
D) reactivity
E) thermal inertia
Answer: E
Learning Outcome: 2-6
Bloom's Taxonomy: Understanding

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85) Soluble inorganic compounds whose solutions will conduct an electric current are called
A) electrolytes.
B) ions.
C) isotopes.
D) free radicals.
E) metabolites.
Answer: A
Learning Outcome: 2-6
Bloom's Taxonomy: Remembering

86) A(n) _____ is a homogeneous mixture containing a solvent and a solute.
A) emulsion
B) blend
C) compound
D) infusion
E) solution
Answer: E
Learning Outcome: 2-6
Bloom's Taxonomy: Remembering

87) Molecules that do not readily interact with water are called
A) inert.
B) stable.
C) hydrophobic.
D) unstable.
E) hydrophilic.
Answer: C
Learning Outcome: 2-6
Bloom's Taxonomy: Remembering

88) Muddy lake water is an example of a(n)
A) colloid.
B) suspension.
C) solute.
D) solvent.
E) solution.
Answer: B
Learning Outcome: 2-6
Bloom's Taxonomy: Remembering

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89) Water has the ability to dissolve polar covalent molecules like sucrose by
A) forming hydration spheres around the molecule.
B) pulling atoms out of the molecule and into solution.
C) creating crystals of positively and negatively charged atoms.
D) taking electrons from the polar covalent molecule.
E) ionization.
Answer: A
Learning Outcome: 2-6
Bloom's Taxonomy: Understanding

90) Which of the following has the highest concentration of hydroxide ions?
A) pH 1
B) pH 14
C) pH 7
D) pH 10
E) pH 2
Answer: B
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

91) Which pH is closest to normal body pH?
A) pH 7
B) pH 8
C) pH 4
D) pH 3
E) pH 2
Answer: A
Learning Outcome: 2-7
Bloom's Taxonomy: Remembering

92) An excess of hydrogen ions in the body fluids can have fatal results because this can
A) break chemical bonds.
B) change the shape of proteins, rendering them nonfunctional.
C) disrupt tissue functions.
D) change body fluid pH.
E) All of the answers are correct.
Answer: E
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

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93) A solution containing equal numbers of hydrogen ions and hydroxide ions is
A) acidic.
B) basic.
C) neutral.
D) alkaline.
E) in equilibrium.
Answer: C
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

94) The chemical notation that indicates concentration is represented as
A) ().
B) <>.
C) [ ].
D) { }.
E) ||.
Answer: C
Learning Outcome: 2-7
Bloom's Taxonomy: Remembering

95) If a substance has a pH that is greater than 7, it is
A) neutral.
B) acidic.
C) alkaline.
D) a buffer.
E) a salt.
Answer: C
Learning Outcome: 2-7
Bloom's Taxonomy: Remembering

96) An important buffer in body fluids is
A) NaCl.
B) NaOH.
C) HCl.
D) $NaHCO_3$.
E) H_2O.
Answer: D
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

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97) Which of the following substances would be **most** acidic?
A) lemon juice, pH = 2
B) urine, pH = 6
C) tomato juice, pH = 4
D) white wine, pH = 3
E) stomach secretions, pH = 1
Answer: E
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

98) Of the following choices, the pH of the **least** acidic solution is
A) 6.0.
B) 4.5.
C) 2.3.
D) 1.0.
E) 12.0.
Answer: E
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

99) Which has the **greater** concentration of hydrogen ions, a substance with a pH of 5 or a substance with a pH of 4?
A) A pH of 4 is greater.
B) A pH of 5 is greater.
C) They are both equal; 4 and 5 are relative values.
D) pH 9, if you mixed the solutions.
E) There is not enough information to determine the answer.
Answer: A
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

100) The _____ of a solution is the negative logarithm of the hydrogen ion concentration expressed in moles per liter.
A) charge
B) pH
C) solubility
D) acidity
E) basicity
Answer: B
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

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101) What is the $[H^+]$ in pure water?
A) $1X10^{-7}$ mol/L
B) $1X10^{-14}$ mol/L
C) 7 mol/L
D) $1X10^{7}$ mol/L
E) $1X10^{14}$ mol/L
Answer: A
Learning Outcome: 2-7
Bloom's Taxonomy: Understanding

102) What is the pH of a solution with a $[H^+]=1X10^{-7}$ mol/L?
A) 2
B) 7.4
C) 6
D) 7
E) 8.2
Answer: D
Learning Outcome: 2-7
Bloom's Taxonomy: Applying

103) If the pH of the stomach is 2 what is the $[H^+]$?
A) $1X10^{-2}$ mol/L
B) .2 mol/L
C) 200 mol/L
D) 2 mol/L
E) .10 mol/L
Answer: A
Learning Outcome: 2-7
Bloom's Taxonomy: Applying

104) A(n) _____ removes hydrogen ions and a(n) _____ releases hydrogen ions.
A) acid; base
B) base; acid
C) compound; element
D) element; compound
E) molecule; acid
Answer: B
Learning Outcome: 2-7
Bloom's Taxonomy: Remembering

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105) In the body, inorganic compounds
A) can serve as buffers.
B) can make up proteins.
C) are made from organic compounds.
D) are structural components of cells.
E) are metabolized for cellular energy.
Answer: A
Learning Outcome: 2-8
Bloom's Taxonomy: Understanding

106) When placed in water, an inorganic compound dissociates 99 percent, forming hydrogen ions and anions. This compound would be a
A) strong base.
B) weak base.
C) strong acid.
D) weak acid.
E) salt.
Answer: C
Learning Outcome: 2-8
Bloom's Taxonomy: Understanding

107) When a small amount of HCl or NaOH is added to a solution of Na_2HPO_4, the pH of the solution barely changes. Based on these observations, all of the following are true concerning the compound Na_2HPO_4, **except**
A) Na_2HPO_4 is able to accept extra hydrogen ions from the HCl.
B) Na_2HPO_4 is able to donate hydrogen ions to the OH^- from NaOH.
C) Na_2HPO_4 adsorbs excess H^+ and OH^- directly onto the surface of its crystalline structure.
D) Na_2HPO_4 is a salt formed from reacting a strong base with a weak acid.
E) Na_2HPO_4 acts as a buffer.
Answer: C
Learning Outcome: 2-8
Bloom's Taxonomy: Analyzing

108) Carbohydrates, lipids, and proteins are classified as
A) organic molecules.
B) inorganic molecules.
C) acids.
D) salts.
E) bases.
Answer: A
Learning Outcome: 2-9
Bloom's Taxonomy: Remembering

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109) A functional group is best described as reoccurring clusters of
A) elements that occur in a salt and that can neither be hydrolyzed nor dehydrated.
B) atoms that form the main reactive area for a particular compound.
C) atoms that function in the body even if temperatures and pH reach extreme values.
D) elements that form at high pH and who can successfully resist the action of buffers.
E) amino acids in a globular protein such as hemoglobin, immunoglobulins, and albumins.
Answer: B
Learning Outcome: 2-9
Bloom's Taxonomy: Remembering

110) To bond two monomers together, a molecule of water must be _____ to/from monomers. This process is called _____.
A) added; hydrolysis
B) removed; dehydration synthesis
C) removed; crenation
D) added; denaturation
E) added; ionization
Answer: B
Learning Outcome: 2-9
Bloom's Taxonomy: Remembering

111) Which of the following functional groups is the hydroxyl group?
A) $-NH_2$
B) $-PO_4$
C) -COOH
D) -SH
E) -OH
Answer: E
Learning Outcome: 2-9
Bloom's Taxonomy: Remembering

112) Which of the following functional groups is the carboxyl group?
A) $-NH_2$
B) $-PO_4$
C) -COOH
D) -SH
E) -OH
Answer: C
Learning Outcome: 2-9
Bloom's Taxonomy: Remembering

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113) Which of the following functional groups is the phosphate group?
A) $-NH_2$
B) $-PO_4$
C) -COOH
D) -SH
E) -OH
Answer: B
Learning Outcome: 2-9
Bloom's Taxonomy: Remembering

114) Fructose is
A) a hexose.
B) an isomer of glucose.
C) found in male reproductive fluids.
D) a carbohydrate.
E) All of the answers are correct.
Answer: E
Learning Outcome: 2-10
Bloom's Taxonomy: Remembering

115) Molecules that have the same molecular formula but different structural formulas are called
A) isotopes.
B) isomers.
C) isozymes.
D) isotypes.
E) isomoles.
Answer: B
Learning Outcome: 2-10
Bloom's Taxonomy: Remembering

116) The most important metabolic fuel molecule in the body is
A) sucrose.
B) caffeine.
C) protein.
D) vitamins.
E) glucose.
Answer: E
Learning Outcome: 2-10
Bloom's Taxonomy: Remembering

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117) A polysaccharide that is formed in liver and muscle cells to store glucose is
A) lactose.
B) cellulose.
C) glycogen.
D) sucrose.
E) fructose.
Answer: C
Learning Outcome: 2-10
Bloom's Taxonomy: Remembering

118) The group of organic compounds containing carbon, hydrogen, and oxygen in a near 1:2:1 ratio is defined as a
A) carbohydrate.
B) lipid.
C) protein.
D) nucleic acid.
E) saturated fat.
Answer: A
Learning Outcome: 2-10
Bloom's Taxonomy: Remembering

119) Carbohydrate molecules
A) are the building blocks of cellular membranes.
B) form the regulatory molecules known as enzymes.
C) are the body's most readily available source of energy.
D) are composed of C, H, O, and N atoms.
E) contain the genetic information found in cells.
Answer: C
Learning Outcome: 2-10
Bloom's Taxonomy: Remembering

120) When two monosaccharides undergo a dehydration synthesis,
A) two new monosaccharides are formed.
B) a disaccharide is formed.
C) a polysaccharide is formed.
D) a starch is formed.
E) hydrolysis occurs.
Answer: B
Learning Outcome: 2-10
Bloom's Taxonomy: Remembering

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121) _____ is a type of indigestible polysaccharide.
A) Glycogen
B) Starch
C) Cellulose
D) Sucrose
E) Galactose
Answer: C
Learning Outcome: 2-10
Bloom's Taxonomy: Understanding

122) Lipids
A) form essential structural components of cells.
B) provide a significant energy reserve.
C) help to maintain body temperature.
D) cushion organs against shocks.
E) All of the answers are correct.
Answer: E
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

123) A fatty acid that contains two or more double covalent bonds is said to be
A) saturated.
B) monounsaturated.
C) polyunsaturated.
D) hydrogenated.
E) carboxylated.
Answer: C
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

124) Which of the following is/are needed to form a triglyceride molecule?
A) 3 glycerol molecules
B) 1 glycerol molecule
C) 3 fatty acid molecules
D) 3 glycerol molecules and 3 fatty acid molecules
E) 3 fatty acid molecules and 1 glycerol molecule
Answer: E
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Bloom's Taxonomy: Remembering

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125) A shortage of steroids in the body would result in a shortage of
A) sex hormones.
B) proteins.
C) plasma membranes.
D) glycogen.
E) sex hormones and plasma membranes.
Answer: E
Learning Outcome: 2-11
Bloom's Taxonomy: Understanding

126) Lipids that are produced by nearly every tissue in the body and act as local regulators are the
A) prostaglandins.
B) steroids.
C) monoglycerides.
D) phospholipids.
E) glycolipids.
Answer: A
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

127) Cholesterol, phospholipids, and glycolipids are examples of
A) dietary fats.
B) prostaglandins.
C) structural lipids.
D) lipid drugs.
E) steroids.
Answer: C
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

128) A fatty acid with no double bonds between carbon atoms is
A) unsaturated.
B) polyunsaturated.
C) dehydrated.
D) saturated.
E) denatured.
Answer: D
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

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129) Many lipids are composed of fatty acids and
A) glycerol.
B) amino acids.
C) sugars.
D) monosaccharides.
E) polypeptides.
Answer: A
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

130) All fatty acids contain a functional group at one end called the _____ acid group.
A) linoleic
B) ribonucleic
C) hydroxyl
D) glycosidic
E) carboxylic
Answer: E
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

131) Molecules with two fatty acid chains and a phosphate group that form biological membranes are called
A) diglycerides.
B) disaccharides.
C) dipeptides.
D) prostaglandins.
E) phospholipids.
Answer: E
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

132) In water, phospholipids tend to form tiny droplets with hydrophobic tails buried inside called
A) micelles.
B) chylomicrons.
C) glycocalyces.
D) eicosanoids.
E) hydroceles.
Answer: A
Learning Outcome: 2-11
Bloom's Taxonomy: Understanding

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133) Which of the following is **not** a function of triglycerides?
A) They are a reserve and important source of energy.
B) They help insulate against heat loss in cold climates.
C) They help protect organs by creating a cushion around the organ.
D) They act as a reserve for lipid soluble vitamins.
E) They act as a structural component of plasma membranes.
Answer: E
Learning Outcome: 2-11
Bloom's Taxonomy: Understanding

134) Which of the following is **not** a function of steroids?
A) They are a significant energy reserve for the body.
B) They are structural components of the plasm membrane.
C) They are involved in regulation of sexual function.
D) They regulate tissue metabolism and mineral balance.
E) They are required for normal processing of dietary fats.
Answer: A
Learning Outcome: 2-11
Bloom's Taxonomy: Understanding

135) Which of the following are functions of proteins?
A) support
B) defense
C) metabolic regulation
D) buffering
E) All of these are functions of proteins.
Answer: E
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

136) The monomers of protein are
A) glucose.
B) fatty acids.
C) amino acids.
D) nucleotides.
E) nitrogen base.
Answer: C
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

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137) Substrate molecules bind to enzymes at the _____ sites.
A) amino
B) active
C) carboxyl
D) reactant
E) neutral
Answer: B
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

138) The term _____ refers to certain amino acids, which can have both a positive charge and a negative charge.
A) anion
B) cation
C) twinion
D) zwitterion
E) double ion
Answer: D
Learning Outcome: 2-12
Bloom's Taxonomy: Understanding

139) You would expect a peptide bond to link
A) two simple sugars.
B) two amino acids.
C) two nucleotides.
D) a sugar and a peptide.
E) a peptide and a fatty acid.
Answer: B
Learning Outcome: 2-12
Bloom's Taxonomy: Understanding

140) Each amino acid differs from another in the
A) number of central carbon atoms.
B) size of the amino group.
C) number of carboxyl groups.
D) nature of the side chain.
E) number of peptide bonds in the molecule.
Answer: D
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

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141) A side chain on an amino acid is sometimes called
A) fibrous or globular.
B) a polypeptide chain.
C) an R group.
D) an isozyme.
E) nucleic acid.
Answer: C
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

142) The alpha-helix and beta sheet are examples of _____ protein structure.
A) primary
B) secondary
C) tertiary
D) quaternary
E) pentanary
Answer: B
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

143) Interaction between individual polypeptide chains to form a protein complex is _____ structure.
A) primary
B) secondary
C) tertiary
D) quaternary
E) pentagonal
Answer: D
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

144) Glycoproteins and proteoglycans are combinations of amino acids and
A) carbohydrates.
B) fatty acids.
C) lipids.
D) nucleic acids.
E) inorganic compounds.
Answer: A
Learning Outcome: 2-12
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145) Which of the following is the symbol for an amino group?
A) -COOH
B) $-PO_3$
C) $-NH_2$
D) -AMO
E) -OH
Answer: C
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

146) The maximum rate of an enzyme reaction
A) occurs during dehydration.
B) occurs during hydrolysis.
C) occurs during synthesis.
D) is reversible.
E) occurs at the saturation limit.
Answer: E
Learning Outcome: 2-12
Bloom's Taxonomy: Understanding

147) How would the lack of a cofactor for an enzyme affect that enzyme's function?
A) The enzyme's function would not be altered.
B) The enzyme would function more slowly.
C) The enzyme would function more quickly.
D) The enzyme would not be able to function.
E) The enzyme would cease to function after reaching a maximum rate.
Answer: D
Learning Outcome: 2-12
Bloom's Taxonomy: Applying

148) Identify the correct statement regarding the process of denaturation.
A) It is affected by low temperatures.
B) It is unaffected by changes in pH.
C) It is the loss of protein structure.
D) It is an increase in enzyme activity.
E) It results in decreased substrate availability.
Answer: C
Learning Outcome: 2-12
Bloom's Taxonomy: Understanding

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149) _____ structure results primarily from hydrophobic and hydrophilic interactions between the R-groups of the polypeptide chain and water.
A) Primary
B) Secondary
C) Tertiary
D) Quaternary
E) Pentanary
Answer: C
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

150) In tertiary structure the _____ bond is formed between two cysteine amino acids.
A) hydrophilic
B) hydrophobic
C) hydrogen
D) ionic
E) disulfide
Answer: E
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

151) Mucins are a type of _____ that absorb water to form mucus.
A) glycolipid
B) glycoprotein
C) proteoglycan
D) glyceride
E) glycerol
Answer: B
Learning Outcome: 2-12
Bloom's Taxonomy: Remembering

152) Molecules that store and process genetic information are the
A) proteins.
B) nucleic acids.
C) carbohydrates.
D) lipids.
E) steroids.
Answer: B
Learning Outcome: 2-13
Bloom's Taxonomy: Remembering

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153) An amino acid is to a protein as a _____ is to a nucleic acid.
A) purine
B) nucleotide
C) protein
D) proton
E) neutron
Answer: B
Learning Outcome: 2-13
Bloom's Taxonomy: Understanding

154) A nucleotide consists of a
A) five-carbon sugar and phosphate group.
B) five-carbon sugar and a nitrogenous base.
C) phosphate group and a nitrogenous base.
D) five-carbon sugar, a nitrogenous base, and a phosphate group.
E) five-carbon sugar and an amino acid.
Answer: D
Learning Outcome: 2-13
Bloom's Taxonomy: Remembering

155) According to the rules of complementary base pairing in nucleic acids, cytosine would pair with the base
A) thymine.
B) adenine.
C) uracil.
D) cytosine.
E) guanine.
Answer: E
Learning Outcome: 2-13
Bloom's Taxonomy: Remembering

156) Adenine and guanine are
A) purines represented by T and C.
B) pyrimidines represented by A and G.
C) purines represented by A and G.
D) pyrimidines represented by T and C.
E) nucleotides represented by A and G.
Answer: C
Learning Outcome: 2-13
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157) The structure of RNA differs from DNA in that
A) the backbone of RNA contains ribose.
B) RNA contains pyrimidines but not purines.
C) RNA contains purines but not pyrimidines.
D) DNA contains pyrimidines but not purines.
E) DNA contains purines but not pyrimidines.
Answer: A
Learning Outcome: 2-13
Bloom's Taxonomy: Understanding

158) The molecule DNA contains a five-carbon sugar called
A) glucose.
B) fructose.
C) maltose.
D) ribose.
E) deoxyribose.
Answer: E
Learning Outcome: 2-13
Bloom's Taxonomy: Remembering

159) The three structural components of a nucleotide are a pentose, a phosphate group, and a _____ base.
A) nucleic
B) hydrophilic
C) hydrochloric
D) nitrogenous
E) sulfuric
Answer: D
Learning Outcome: 2-13
Bloom's Taxonomy: Remembering

160) The purines found in DNA are _____ and guanine.
A) cytosine
B) adenine
C) thymine
D) uracil
E) niacin
Answer: B
Learning Outcome: 2-13
Bloom's Taxonomy: Remembering

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161) The pyrimidine bases found in DNA are _____ and cytosine.
A) cytosine
B) adenine
C) thymine
D) uracil
E) niacin
Answer: C
Learning Outcome: 2-13
Bloom's Taxonomy: Remembering

162) The most abundant high-energy compound in cells is
A) DNA.
B) adenosine diphosphate.
C) adenosine monophosphate.
D) adenosine triphosphate.
E) RNA.
Answer: D
Learning Outcome: 2-14
Bloom's Taxonomy: Remembering

163) A high-energy bond in ATP is present between
A) adenine and ribose.
B) adenine and a phosphate group.
C) the first and second phosphate group.
D) the second and third phosphate group.
E) phosphate groups 1 and 2 and between phosphate groups 2 and 3.
Answer: E
Learning Outcome: 2-14
Bloom's Taxonomy: Understanding

164) The phosphorylation of adenosine forms
A) ADP.
B) ATP.
C) AMP.
D) 2ATP.
E) ribose.
Answer: C
Learning Outcome: 2-14
Bloom's Taxonomy: Understanding

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165) Identify the product formed from the phosphorylation of ADP.
A) adenosine diphosphate
B) adenine
C) adenosine triphosphate
D) deoxyribonucleic acid
E) ribose
Answer: C
Learning Outcome: 2-14
Bloom's Taxonomy: Understanding

166) AMP + P →
A) ADP.
B) 2ADP.
C) DNA.
D) ATP.
E) adenine.
Answer: A
Learning Outcome: 2-14
Bloom's Taxonomy: Analyzing

167) A(n) _____ bond is a covalent bond that stores an unusually large amount of energy.
A) forceful
B) charged
C) excitable
D) power
E) high-energy
Answer: E
Learning Outcome: 2-14
Bloom's Taxonomy: Remembering

168) In the process of _____ a phosphate group is transferred to a molecule.
A) ionization
B) buffering
C) amination
D) dissociation
E) phosphorylation
Answer: E
Learning Outcome: 2-14
Bloom's Taxonomy: Understanding

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169) The hydrolysis of ATP yields ADP, phosphate ion, and
A) AMP.
B) H2O.
C) energy.
D) adenosine.
E) nuclease.
Answer: C
Learning Outcome: 2-14
Bloom's Taxonomy: Remembering

In-Text Figure Based Questions

1) How many electrons can the second energy level hold when it is completely filled? (Figure 2-3)
A) 2
B) 4
C) 6
D) 8
E) 10
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Remembering

2) Hydrogen bonds do not form between two hydrogen atoms. Where do hydrogen bonds form? (Figure 2-8)
A) between the slight positive charge on the hydrogen atom and the slight negative charge on the oxygen atom
B) between the slight negative charge on the hydrogen atom and the slight positive charge on the oxygen atom
C) between the slight positive charge on the sodium atom and the slight negative charge on the chlorine atom
D) between the slight negative charge on the sodium atom and the slight negative charge on the chlorine atom
E) between two ions
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Remembering

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3) Which number represents the greatest amount of energy that must be overcome during the reaction? Which number represents the lowest amount of reaction energy? (Figure 2-9)
A) 1; 2
B) 1; 4
C) 4; 2
D) 2; 4
E) 4; 3
Answer: D
Learning Outcome: 2-4
Bloom's Taxonomy: Analyzing

4) How many atoms are shown in each glucose structure? (Figure 2-12)
A) 2
B) 4
C) 6
D) 8
E) 10
Answer: C
Learning Outcome: 2-10
Bloom's Taxonomy: Remembering

5) What type of bond does an unsaturated fatty acid contain that a saturated fatty acid does not? (Figure 2-15)
A) at least 4 single covalent bonds
B) at least one double covalent bond
C) an ionic bond
D) a hydrogen bond
E) at least one triple covalent bond
Answer: B
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

6) What makes fatty acid 3 an unsaturated fatty acid? (Figure 2-17)
A) the presence of only single covalent bonds
B) the presence of a double covalent bond
C) the presence of an ionic bond
D) the presence of a hydrogen bond
E) the presence of a triple covalent bond
Answer: B
Learning Outcome: 2-11
Bloom's Taxonomy: Remembering

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7) What structural differences make adenine and guanine different from cytosine, thymine, and uracil? (Figure 2-24)
A) Adenine and guanine have a phosphate group, while cytosine, thymine, and uracil do not.
B) Adenine and guanine do not have a phosphate group, while cytosine, thymine, and uracil do.
C) Adenine and guanine are double-ringed nitrogenous bases, while cytosine, thymine, and uracil are single-ringed.
D) Adenine and guanine are single-ringed nitrogenous bases, while cytosine, thymine, and uracil are double-ringed.
E) Adenine and guanine have ribose as the sugar, while cytosine, thymine, and uracil have deoxyribose.
Answer: C
Learning Outcome: 2-13
Bloom's Taxonomy: Remembering

8) How many phosphorylations does AMP undergo to become ATP? (Figure 2-26)
A) 1
B) 2
C) 3
D) 4
E) 5
Answer: B
Learning Outcome: 2-14
Bloom's Taxonomy: Remembering

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Essay Questions

1) The element sulfur has an atomic number of 16 and mass number of 32. How many neutrons are in the nucleus of a sulfur atom? If sulfur forms covalent bonds with hydrogen, how many hydrogen atoms can bond to one sulfur atom?
Answer: The number of neutrons in an atom is equal to the mass number minus the atomic number. Thus, sulfur has 32 - 16 = 16 neutrons. The atomic number indicates the number of protons, so a neutral sulfur atom contains 16 protons plus 16 electrons to balance the protons electrically. The electrons would be distributed as follows: 2 in the first electron shell, 8 in the second, and the remaining 6 in the third. To achieve a full 8 electrons in the third (outermost) electron shell, the sulfur atom can accept 2 electrons in an ionic bond or can share 2 electrons in a covalent bond. Because hydrogen atoms can share one electron in a covalent bond, the sulfur atom can form two covalent bonds with hydrogen, one with each of two hydrogen atoms. In chemical notation, this is H_2S.
Learning Outcome: 2-2
Bloom's Taxonomy: Analyzing

2) What role do buffer systems play in the human body?
Answer: Buffer systems help maintain pH within normal limits by removing or replacing hydrogen ions as needed.
Learning Outcome: 2-7
Bloom's Taxonomy: Applying

3) Blood has a very narrow normal pH range but urine has a very broad normal pH range. What does that indicate about the physiology of pH?
Answer: Homeostasis requires that the pH of body fluids be maintained almost constant to avoid disruptions of healthy function. To accomplish this, the urinary system eliminates or retains hydrogen ion as needed. These actions cause the pH of urine to vary widely, depending on whether there is too much or not enough hydrogen ion in the body.
Learning Outcome: 2-7
Bloom's Taxonomy: Applying

4) Explain the role of water molecules in polysaccharide formation.
Answer: Water molecules are removed in the dehydration synthesis of polysaccharides.
Learning Outcome: 2-9
Bloom's Taxonomy: Understanding

5) How does the DNA molecule control the appearance and function of a cell?
Answer: The DNA molecule controls the synthesis of enzymes and structural proteins. By controlling the synthesis of structural proteins, the DNA is able to influence the physical appearance of a cell. By controlling the production of enzymes, the DNA is able to control all aspects of cellular metabolism and thus control the activity and biological functions of the cell.
Learning Outcome: 2-12
Bloom's Taxonomy: Applying

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6) Explain three physiological benefits that are a result of the heat capacity of water.
Answer: First, because water requires a large amount of heat to break the hydrogens bonds and vaporize the resulting benefit is that water is a liquid over a broad range of temperatures allowing physiological reactions to function. Second, because water absorbs a lot of heat before it vaporizes, as perspiration evaporates from the skin it takes with it a lot of heat thereby providing us with a mechanism for cooling. Third, because water requires a large amount of heat to change temperature, large bodies of water will change temperature slowly. This means that the water in the body will be slow to change overall and will provide a thermally stabilizing effect around which we can maintain our core body temperature.
Learning Outcome: 2-6
Bloom's Taxonomy: Applying

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