

Biology 101 Lecture Exam 1 Question Pool**Multiple Choice**

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. Which of the following would NOT be a key characteristic of "life"?
- organization into cells
 - response to environmental change
 - reproduction
 - inability to change
 - using energy
- _____ 2. Life
- is difficult to define.
 - is viewed differently by different people.
 - may be characterized, but not fully understood.
 - has a history of several billion years.
 - all of these
- _____ 3. The study of biology is important because
- it provides an understanding of life.
 - it is essential for humans to understand how organisms survive.
 - it is the most difficult and comprehensive of the sciences.
 - it explains the nature of the universe.
- _____ 4. Nonliving entities would NOT possess
- energetic interactions.
 - DNA.
 - atoms.
 - elements.
 - any of these
- _____ 5. The DNA molecule is most similar functionally to a
- pair of scissors.
 - flashlight battery.
 - computer memory chip.
 - ballpoint pen.
 - craft kit of ceramic tiles.
- _____ 6. Which is the smallest unit of life that can exist as a separate entity?
- a cell
 - a molecule
 - an organ
 - a population
 - an ecosystem
- _____ 7. Living organisms are different from inanimate objects because they
- react to environmental stimuli.
 - exhibit massive complexity.
 - possess molecules of deoxyribonucleic acid.
 - exhibit multiple levels of organization.
 - all of these

- _____ 8. The flow of energy among living organisms is best characterized as a
- circle.
 - ladder.
 - lattice.
 - web.
 - funnel.
- _____ 9. During metabolism, ATP (adenosine triphosphate) is an energy source for which of the following processes?
- reproduction
 - growth
 - development
- I and II
 - I and III
 - II only
 - II and III
 - I, II, and III
- _____ 10. The ability to acquire, store, transfer, or utilize energy is called
- biochemistry.
 - photosynthesis.
 - metabolism.
 - respiration.
 - phosphorylation.
- _____ 11. Energy transfers take place at what organizational level?
- molecule
 - organelle
 - cell
 - organ
 - organism
- _____ 12. Homeostasis provides what kind of environment?
- positive
 - constant
 - limiting
 - changing
 - chemical and physical
- _____ 13. Metabolic reactions would most likely be described during a discussion of
- energy transduction.
 - cellular organization.
 - responses to environmental stimuli.
 - perpetuation of the species.
 - none of the above
- _____ 14. Each cell is able to maintain a constant internal environment. This is called
- metabolism.
 - homeostasis.
 - physiology.
 - adaptation.
 - evolution.

- _____ 15. About twelve to twenty-four hours after the previous meal, a person's blood-sugar level normally varies from 60 to 90 milligrams per 100 milliliters of blood, though it may rise to 130 mg/100 ml after meals high in carbohydrates. That the blood-sugar level is maintained within a fairly narrow range despite uneven intake of sugar is due to the body's ability to carry out
- adaptation.
 - inheritance.
 - metabolism.
 - homeostasis.
 - all of these
- _____ 16. For a cell to take up sugar from the bloodstream,
- receptors for insulin on the cells must be activated.
 - a person must have had a meal with sugar within the last twenty-four hours.
 - homeostatic mechanisms must activate the blood-brain barrier.
 - glycogen must be broken down to provide a supply of glucose.
 - the pancreas must supply the appropriate enzymes to make sugar available.
- _____ 17. A fertilized moth egg passes through which stages of development before becoming an adult?
- larval
 - pupal
 - reproductive
- I only
 - II only
 - I and II
 - I and III
 - II and III
- _____ 18. A new life cycle begins with
- death.
 - pupation.
 - formation of a larva.
 - fertilization of an egg.
 - hatching of an egg.
- _____ 19. All organisms are alike in
- their requirements for energy.
 - their participation in one or more nutrient cycles.
 - their ultimate dependence on the sun.
 - their interaction with other forms of life.
 - all of these
- _____ 20. Which of the following would NOT be characteristic of living organisms?
- complex structural organization
 - dependence on other organisms for energy and resources
 - reproductive capacity
 - uniformity of size and form
 - capacity to evolve

- _____ 21. A scientific name consists of which of the following?
- I. family name
 - II. genus name
 - III. species name
- a. I only
 - b. II only
 - c. III only
 - d. I and II
 - e. II and III
- _____ 22. The plural for genus is
- a. genus.
 - b. geni.
 - c. genera.
 - d. genuses.
 - e. genae.
- _____ 23. The least inclusive of the taxonomic categories listed here is
- a. family.
 - b. phylum.
 - c. class.
 - d. order.
 - e. genus.
- _____ 24. Which group includes all of the other groups?
- a. phylum
 - b. order
 - c. family
 - d. genus
 - e. species
- _____ 25. The hierarchical system of nomenclature
- a. allows diversity to be catalogued.
 - b. shows the evolutionary relationships among organisms.
 - c. permits organisms to be identified.
 - d. clarifies confusion produced by tremendous variation.
 - e. all of these
- _____ 26. Members of what kingdom are single cells of considerable internal complexity?
- a. Animalia
 - b. Protista
 - c. Fungi
 - d. Plantae
 - e. Eubacteria
- _____ 27. Members of what kingdom are multicellular producers?
- a. Animalia
 - b. Protista
 - c. Fungi
 - d. Plantae
 - e. Monera

- _____ 28. Which of the following are decomposers?
- Plantae
 - Fungi
 - Animalia
 - Monera
 - Protista
- _____ 29. Which of the following is NOT a eukaryote?
- fungi
 - bacteria
 - plants
 - animals
 - protistans
- _____ 30. A mutation is a change in
- homeostasis.
 - the developmental pattern in an organism.
 - metabolism.
 - hereditary instructions.
 - the life cycle of an organism.
- _____ 31. A color mutation in a moth from light to dark
- is an advantage in industrial environments.
 - may be beneficial under changing environmental conditions.
 - produces a form of moth that will have a better chance for survival in some environments.
 - may be easily spotted by predators in some environments.
 - all of these
- _____ 32. Evolution occurs at what level of organization?
- organism
 - molecule
 - organ
 - population
 - ecosystem
- _____ 33. Which of the following statements is NOT true?
- Diversity is the result of evolution.
 - The characteristics of any living organism are under the control of a chemical.
 - The diversity of living organisms makes life unpredictable, even using scientific methods.
 - All organisms are alike in that their structure, organization, and interactions arise from matter and energy.
 - The behavior of individual organisms is dependent upon their evolutionary history.
- _____ 34. The diversity of structure, function, and behavior in living organisms is primarily the result of
- reproduction.
 - heredity.
 - evolution.
 - chance variations in living organisms.

- _____ 35. Which of the following ultimately accounts for variation in genetic traits?
- replication of DNA molecules
 - genetic mutation
 - asexual reproduction
 - ecological succession
 - homeostatic mechanisms
- _____ 36. An adaptive trait is a trait that has
- mutated.
 - survival value.
 - decreased in frequency in a population.
 - deleterious biological effects.
 - the potential to produce variation.
- _____ 37. The animals used by Darwin to show variation in domesticated forms were
- pigeons.
 - chickens.
 - pigs.
 - dogs.
 - cats.
- _____ 38. The principal point of Darwin's theory of evolution by natural selection was that
- long-term heritable changes in organisms are caused by use and disuse.
 - mutations that adapt an organism to a given environment always arise in the greatest frequency in the organisms that occupy that environment.
 - mutations are caused by all sorts of environmental influences.
 - survival of characteristics in a population depends on competition between organisms, especially between members of the same species.
- _____ 39. Which premise used by Darwin in his theory is INCORRECTLY stated below?
- More offspring are produced than can survive to reproduce.
 - Members of populations show heritable variation.
 - Some varieties have a better chance to survive and reproduce.
 - Organisms that possess advantageous traits have a decreased chance of producing offspring.
 - Some traits become more common because their bearers contribute more offspring to the next generation.
- _____ 40. The explanation for the diversity seen in nature is
- sexual dimorphism; that is, different characteristics are based upon sexual differences.
 - divine creation of the many different forms of life.
 - found in the science of taxonomy.
 - natural selection.
- _____ 41. In the example in the text, the change in moth populations from predominantly white- to black-winged forms was the result of
- environmental changes.
 - natural selection.
 - food choices by predators.
 - the ability of birds to find the prey.
 - all of these

- _____ 42. Which of the following statements is NOT true?
- Natural selection is based upon differential reproduction and survival.
 - For evolution to occur in a population, there must be some variation.
 - All variations found in a population are heritable.
 - A population undergoes evolution when the frequency of its genes change.
 - Over time, some genetic traits are more adaptive than others.
- _____ 43. Of the following, which is the first explanation of a problem? (It is sometimes called an "educated guess.")
- principle
 - law
 - theory
 - fact
 - hypothesis
- _____ 44. Hypotheses are
- often in the form of a statement.
 - often expressed negatively.
 - sometimes crude attempts to offer a possible explanation for observations.
 - testable predictions.
 - all of these
- _____ 45. In order to arrive at a solution to a problem, a scientist usually conducts one or more
- laws.
 - theories.
 - experiments.
 - principles.
 - facts.
- _____ 46. Which represents the lowest degree of certainty?
- hypothesis
 - conclusion
 - fact
 - principle
 - theory
- _____ 47. Which represents the highest degree of certainty?
- hypothesis
 - fact
 - principle
 - law
 - theory
- _____ 48. The control in an experiment
- makes the experiment valid.
 - is an additional replicate for statistical purposes.
 - reduces the experimental errors.
 - minimizes experimental inaccuracy.
 - allows a standard of comparison for the experimental group.
- _____ 49. As a result of experimentation,
- more hypotheses may be developed.
 - more questions may be asked.
 - a new biological principle could emerge.
 - entire theories may be modified or discarded.
 - all of these

- _____ 50. In an experiment, the control group
- is not subjected to experimental error.
 - is exposed to experimental treatments.
 - is maintained under strict laboratory conditions.
 - is treated exactly the same as the experimental group, except for the one independent variable.
 - is statistically the most important part of the experiment.
- _____ 51. The choice of whether a particular organism belongs to the experimental group or the control group should be based on
- age.
 - size.
 - chance.
 - designation by the experimenter.
 - sex.
- _____ 52. Science is based on
- faith.
 - authority.
 - evidence.
 - force.
 - consensus.
- _____ 53. Which of the following can be changed based on new evidence?
- hypothesis
 - theory
 - prediction
 - experiment
 - all of these
- _____ 54. All of the following will strengthen a theory EXCEPT
- repetitions of experiments.
 - increased observations.
 - time.
 - faith.
 - confirmation by many scientists.
- _____ 55. The validity of scientific discoveries cannot be based on
- morality.
 - aesthetics.
 - philosophy.
 - economics.
 - any of these
- _____ 56. Four of the five answers listed below are necessary characteristics to the life of an individual. Select the exception.
- metabolism
 - homeostasis
 - development
 - heredity
 - diversity

- ___ 57. Four of the five answers listed below are characteristics of life. Select the exception.
- ionization
 - metabolism
 - reproduction
 - growth
 - cellular organization
- ___ 58. Four of the five answers listed below are aspects of the scientific method. Select the exception.
- observation
 - hypothesis
 - experimentation
 - philosophy
 - conclusion
- ___ 59. Four of the five answers listed below are taxonomic categories. Select the exception.
- family
 - kind
 - species
 - order
 - genus
- ___ 60. Four of the five answers listed below are names of kingdoms. Select the exception.
- Animalia
 - Protista
 - Bacteria
 - Fungi
 - Plantae
- ___ 61. Which is the smallest portion of a substance that retains the properties of an element?
- atom
 - compound
 - ion
 - molecule
 - mixture
- ___ 62. The atom that represents the greatest weight in the human body is
- hydrogen.
 - carbon.
 - nitrogen.
 - oxygen.
 - phosphorus.
- ___ 63. The atomic number refers to the
- mass of an atom.
 - number of protons in an atom.
 - number of both protons and neutrons in an atom.
 - number of neutrons in an atom.
 - number of electrons in an atom.
- ___ 64. Radioactive isotopes
- are electrically unbalanced.
 - behave the same chemically and physically but differ biologically from other isotopes.
 - are the same physically and biologically but differ from other isotopes chemically.
 - have an excess number of neutrons.
 - are produced when substances are exposed to radiation.

- _____ 65. Which is NOT a compound?
- salt
 - a carbohydrate
 - carbon
 - a nucleotide
 - methane
- _____ 66. The negative subatomic particle is the
- neutron.
 - proton.
 - electron.
 - both the neutron and proton.
 - both the proton and electron.
- _____ 67. The positive subatomic particle is the
- neutron.
 - proton.
 - electron.
 - both the neutron and proton.
 - both the proton and electron.
- _____ 68. The neutral subatomic particle is the
- neutron.
 - proton.
 - electron.
 - both the neutron and proton.
 - both the proton and electron.
- _____ 69. The nucleus of an atom contains
- neutrons and protons.
 - neutrons and electrons.
 - protons and electrons.
 - protons only.
 - neutrons only.
- _____ 70. Which components of an atom are negatively charged?
- electrons
 - protons
 - neutrons
- I only
 - II only
 - III only
 - I and II
 - II and III

- ___ 71. Which components of an atom do not have a charge?
- I. electrons
 - II. protons
 - III. neutrons
- a. I only
 - b. II only
 - c. III only
 - d. I and II
 - e. II and III
- ___ 72. The atomic number is determined by the number of
- a. neutrons and protons.
 - b. neutrons and electrons.
 - c. protons and electrons.
 - d. protons only.
 - e. neutrons only.
- ___ 73. All atoms of an element have the same number of
- a. ions.
 - b. protons.
 - c. neutrons.
 - d. electrons.
 - e. protons and neutrons.
- ___ 74. Trace elements
- a. are used in minute amounts in plants.
 - b. can be monitored through biochemical reactions.
 - c. must be radioactive.
 - d. have an unbalanced electrical charge.
- ___ 75. Which of the following statements is NOT true?
- a. All isotopes of an element have the same number of electrons.
 - b. All isotopes of an element have the same number of protons.
 - c. All isotopes of an element have the same number of neutrons.
 - d. All radioactive isotopes are unstable.
- ___ 76. Radioactive isotopes have
- a. excess electrons.
 - b. excess protons.
 - c. excess neutrons.
 - d. insufficient neutrons.
 - e. insufficient protons.
- ___ 77. In the chemical shorthand ^{14}C , the fourteen represents the number of
- a. excess neutrons.
 - b. protons plus neutrons.
 - c. electrons.
 - d. protons plus electrons.
 - e. radioactive particles.

- ___ 78. In a chemical equation, the chemicals to the left of the arrow are
- products.
 - in greater abundance.
 - at higher energy levels.
 - reactants.
 - all of these
- ___ 79. Radioactive iodine tends to concentrate in the
- heart.
 - lungs.
 - gonads.
 - bones.
 - thyroid glands.
- ___ 80. Which statement concerning radioisotope ^{14}C is LEAST accurate?
- It will substitute for ^{12}C in glucose.
 - It will kill cells in which it occurs.
 - It has more neutrons than ^{12}C .
 - It behaves the same chemically as ^{12}C .
 - It has six carbons and eight neutrons.
- ___ 81. When carbon 14 undergoes radioactive decay, _____ is produced.
- carbon 12
 - carbon 13
 - carbon 14
 - nitrogen 14
 - oxygen 14
- ___ 82. By analogy, the orbitals and atomic nucleus may be said to most resemble a
- merry-go-round.
 - sundial.
 - solar system.
 - nest of mixing bowls.
 - wave of water currents.
- ___ 83. Magnesium has 12 protons. How many electrons are in its third energy level?
- 2
 - 4
 - 6
 - 8
 - 10
- ___ 84. Magnesium has 12 protons. How many electrons are in its first energy level?
- 2
 - 4
 - 6
 - 8
 - 10
- ___ 85. Magnesium has 12 protons. How many electrons are in its second energy level?
- 2
 - 4
 - 6
 - 8
 - 10

- _____ 86. Nitrogen has an atomic number of 7. How many hydrogen atoms are necessary to join with the nitrogen to form a stable compound?
- 1
 - 2
 - 3
 - 4
 - 5
- _____ 87. Oxygen, with an atomic number of 8, has _____ electrons in the first energy level and _____ electrons in the second energy level.
- 1, 7
 - 2, 6
 - 3, 5
 - 4, 4
 - 5, 3
- _____ 88. Water is an example of a(n)
- atom.
 - ion.
 - compound.
 - mixture.
 - element.
- _____ 89. Which includes the other four?
- atoms
 - molecules
 - electrons
 - elements
 - protons
- _____ 90. Which statement is false?
- A molecule is made of at least two atoms.
 - Compounds are made of elements.
 - Two atoms of oxygen make a molecule of oxygen.
 - Proportions of elements in compounds vary according to their source in nature.
 - Elements are found in compounds and molecules.
- _____ 91. What is formed when an atom loses or gains an electron?
- mole
 - ion
 - molecule
 - bond
 - reaction
- _____ 92. Which of the following is NOT accurate concerning ionization?
- When one atom loses an electron, another must gain.
 - When an atom loses an electron, it becomes negatively charged.
 - Ionic bonds form between ionized atoms.
 - In the compound NaCl, Na loses an electron to become positive.
 - In an ion, the number of protons and electrons is unequal.

- ___ 93. The bond in table salt (NaCl) is
- polar.
 - ionic.
 - covalent.
 - double.
 - nonpolar.
- ___ 94. In _____ bonds, both atoms exert the same pull on shared electrons.
- nonpolar covalent
 - polar covalent
 - double covalent
 - triple covalent
- ___ 95. Which of these statements is false concerning covalent bonds?
- Atoms share electrons.
 - Proteins possess many covalent bonds.
 - Water contains polar covalent bonds.
 - Covalent bonds may be "double bonds."
 - Polar covalent bonds share electrons equally.
- ___ 96. Electrons are shared in bonds called
- covalent.
 - polar.
 - nonpolar.
 - all of these
- ___ 97. The shape (or tertiary form) of large molecules is often controlled by what kind of bonds?
- hydrogen
 - ionic
 - covalent
 - inert
 - single
- ___ 98. A hydrogen bond is
- a sharing of a pair of electrons between a hydrogen and an oxygen nucleus.
 - a sharing of a pair of electrons between a hydrogen nucleus and either an oxygen or a nitrogen nucleus.
 - an attractive force that involves a hydrogen atom and an oxygen or a nitrogen atom that are either in two different molecules or within the same molecule.
 - none of these
 - all of these
- ___ 99. Which of the following is NOT true of hydrogen bonds?
- They are quite weak.
 - The hydrogen is slightly positive.
 - They are common in macromolecules.
 - They form in salts such as NaCl.
 - They always involve hydrogen.
- ___ 100. Water is important to the interactions of biological molecules because
- water molecules are attracted to the charged regions of molecules such as proteins.
 - it forms a cushion around the macromolecules.
 - it helps disperse the macromolecules for reactivity.
 - it prevents settling of the molecules in places where they would be unavailable.
 - all of these

- ___ 101. Hydrophobic molecules are _____ water.
- attracted to
 - absorbed by
 - repelled by
 - mixed with
 - polarized by
- ___ 102. Which of the following is true of water?
- The oxygen end is slightly electropositive.
 - Hydrogen bonds hold water molecules together.
 - Water covers about one-half of the earth's surface.
 - Hydrophobic interactions attract water molecules.
 - Solvent properties are greatest with nonpolar molecules.
- ___ 103. Water is an excellent solvent because
- it forms spheres of hydration around charged substances and can form hydrogen bonds with many substances.
 - it has a high heat-containing property.
 - of its cohesive properties.
 - it is a liquid at room temperature.
 - all of these
- ___ 104. In a lipid bilayer, the _____ phospholipid tails point inward and form a region that excludes water.
- acidic
 - basic
 - hydrophilic
 - hydrophobic
 - none of these
- ___ 105. Glucose dissolves in water because it
- ionizes.
 - is a polysaccharide.
 - is polar and forms many hydrogen bonds with the water molecules.
 - has a very reactive primary structure.
 - none of these
- ___ 106. Water has the ability to retard heat gain and loss due to its
- hydrophilic interactions.
 - evaporation.
 - hydrogen bonds.
 - crystal structure.
 - liquidity.
- ___ 107. The column of water extending in tubes from plant roots to leaves is due mostly to
- cohesion.
 - evaporation.
 - ionization.
 - hydrophobic interactions.
 - all of these
- ___ 108. Sodium chloride (NaCl) in water could be described by any of the following EXCEPT:
- Na^+ and Cl^- form
 - a solute
 - ionized
 - forms spheres of hydration
 - dissolved

- ___ 109. A salt will dissolve in water to form
- acids.
 - gases.
 - ions.
 - bases.
 - polar solvents.
- ___ 110. A reaction of an acid and a base will produce water and
- a buffer.
 - a salt.
 - gas.
 - solid precipitate.
 - solute.
- ___ 111. Which of the following is a naked proton?
- hydrogen ion
 - acid
 - base
 - hydroxyl ion
 - acceptor
- ___ 112. Which of the following would NOT be used in connection with the word *acid*?
- excess hydrogen ions
 - contents of the stomach
 - magnesium hydroxide
 - HCl
 - pH less than 7
- ___ 113. A pH of 10 is how many times as basic as a pH of 7?
- 2
 - 3
 - 10
 - 100
 - 1,000
- ___ 114. A solution with a pH of 8 has how many times fewer hydrogen ions than a solution with a pH of 6?
- 2
 - 4
 - 10
 - 100
 - 1,000
- ___ 115. Which of the following is NOT true?
- Acids release hydrogen ions.
 - In a neutral solution, the amounts of hydrogen and hydroxyl ions are almost equal.
 - Salts precipitate out of solution and have no function in cells.
 - Polar water molecules are attracted to water.
 - Hydrogen bonding between water molecules gives water its temperature-stabilizing and cohesive properties.
- ___ 116. Cellular pH is kept near a value of 7 because of
- salts.
 - buffers.
 - acids.
 - bases.
 - water.

- ___ 117. Four of the five answers listed below possess electrons in the third energy level. Select the exception.
- sodium
 - magnesium
 - chlorine
 - nitrogen
 - sulfur
- ___ 118. Four of the five answers listed below are related by a unifying characteristic. Select the exception.
- ionic bond
 - covalent bond
 - polar bond
 - hydrogen bond
 - cluster of nonpolar groups
- ___ 119. Four of the five answers listed below are alkaline (pH above 7). Select the exception.
- milk of magnesia
 - household ammonia
 - Tums
 - phosphate detergent
 - wine
- ___ 120. Four of the five answers listed below are positively charged ions. Select the exception.
- potassium ion
 - hydrogen ion
 - calcium ion
 - magnesium ion
 - chlorine ion
- ___ 121. Four of the five answers listed below are characteristics of water. Select the exception.
- stabilizes temperature
 - is a common solvent
 - has cohesion and surface tension
 - produces salts
 - changes shape of hydrophilic and hydrophobic substances
- ___ 122. The three most common atoms in your body are
- hydrogen, oxygen, and carbon.
 - carbon, hydrogen, and nitrogen.
 - carbon, nitrogen, and oxygen.
 - nitrogen, hydrogen, and oxygen.
 - carbon, oxygen, and sulfur.
- ___ 123. Carbon usually forms how many bonds with other atoms?
- 2
 - 3
 - 4
 - 5
 - 6
- ___ 124. The atom diagnostically associated with organic compounds is
- carbon.
 - oxygen.
 - nitrogen.
 - sulfur.
 - hydrogen.

- ____ 125. Carbon has an atomic number of 6 and oxygen has an atomic number of 8. Which combination of carbon and oxygen atoms is most stable?
- 1 carbon, 2 oxygen
 - 1 carbon, 3 oxygen
 - 2 carbon, 1 oxygen
 - 2 carbon, 2 oxygen
 - 3 carbon, 1 oxygen
- ____ 126. Although carbon dioxide contains carbon, it is not considered an "organic" compound because
- it is not found in the earth.
 - it is not present in living cells.
 - no hydrogen is present.
 - the carbons are not in chains or rings.
 - it is too small.
- ____ 127. Which compound is hydrophobic?
- ethyl alcohol
 - simple sugar
 - hydrocarbon
 - glycerol
 - amino acid
- ____ 128. An -OH group is a(n) _____ group.
- carboxyl
 - hydroxyl
 - amino
 - methyl
 - ketone
- ____ 129. A -CH₃ group is a(n) _____ group.
- carboxyl
 - hydroxyl
 - amino
 - methyl
 - ketone
- ____ 130. An -NH₂ group is a(n) _____ group.
- carboxyl
 - hydroxyl
 - amino
 - methyl
 - ketone
- ____ 131. A -COOH group is a(n) _____ group.
- carboxyl
 - hydroxyl
 - amino
 - methyl
 - ketone
- ____ 132. Which are NOT macromolecules?
- proteins
 - polysaccharides
 - nucleotides
 - lipids
 - nucleic acids

- ___ 133. Which of the following would NOT be classified as a polymer?
- starch
 - nucleic acid
 - triglyceride
 - protein
 - polysaccharide
- ___ 134. The formation of large molecules from small repeating units is known as what kind of reaction?
- oxidation
 - reduction
 - condensation
 - hydrolysis
 - decarboxylation
- ___ 135. The breakdown of large molecules by the enzymatic addition of water is an example of what kind of reaction?
- oxidation
 - reduction
 - condensation
 - hydrolysis
 - decarboxylation
- ___ 136. A condensation reaction typically produces
- monomers.
 - salts.
 - polymers.
 - simple sugars.
 - amino acids.
- ___ 137. Which of the following demonstrates a condensation reaction?
- photosynthesis
 - digestion
 - lipid synthesis
 - photosynthesis and lipid synthesis
 - photosynthesis, digestion, and lipid synthesis
- ___ 138. Which reaction results in the breakdown of a chemical into simpler substances?
- synthesis
 - cleavage
 - condensation
 - polymerization
 - both cleavage and condensation
- ___ 139. Condensation and hydrolysis are accomplished in cells by
- bonding attraction.
 - the action of enzymes.
 - spontaneous action.
 - functional group interactions.
 - all of these
- ___ 140. The relatively unimportant by-product(s) of many condensation reactions is (are)
- carbon dioxide.
 - aldehyde groups.
 - enzymes.
 - alcohols.
 - water.

- ___ 141. Which is a monomer of carbohydrates?
- glycogen
 - nucleotide
 - simple sugar
 - monosaccharide
 - both simple sugar and monosaccharide
- ___ 142. Which substance is the most common in cells?
- carbohydrates
 - salts and minerals
 - proteins
 - fats
 - nucleic acids
- ___ 143. A macromolecule is composed of smaller units called
- polymers.
 - isomers.
 - monomers.
 - isotopes.
 - dimers.
- ___ 144. Which of the following is composed of a 1:2:1 ratio of carbon to hydrogen to oxygen?
- carbohydrate
 - protein
 - lipid
 - nucleic acid
 - steroid
- ___ 145. Monosaccharides are characterized by all EXCEPT which of the following?
- a carboxyl group
 - carbon, hydrogen, and oxygen in a 1:2:1 ratio
 - a molecule of three to seven carbon atoms
 - possession of one or more hydroxyl groups
 - the presence of glycerol and fatty acids
- ___ 146. Fructose and glucose are
- isotopes.
 - monosaccharides.
 - disaccharides.
 - six-carbon sugars.
 - both monosaccharides and six-carbon sugars.
- ___ 147. Glucose and fructose are different
- in the number of carbons they possess.
 - in their relationship to the sucrose molecules.
 - in the way that their atoms are arranged.
 - in the number of double bonds they possess.
 - both in the way that their atoms are arranged and in the number of double bonds they possess.
- ___ 148. Glucose and fructose
- form rings with the same number of carbon atoms.
 - both have an oxygen atom as part of their ring structure.
 - are alike in that both are aldehydes.
 - contain the same number of hydrogens and hydroxyl groups.
 - are disaccharides.

- ___ 149. Fructose and glucose are
- hexoses.
 - structurally different.
 - monosaccharides.
 - simple sugars.
 - all of these
- ___ 150. Glucose and ribose
- have the same number of carbon atoms.
 - have the same structural formulas.
 - are the two components of sucrose.
 - are monosaccharides.
 - are molecules whose atoms are arranged the same way.
- ___ 151. Sucrose is composed of
- two molecules of fructose.
 - two molecules of glucose.
 - a molecule of fructose and a molecule of glucose.
 - a molecule of fructose and a molecule of galactose.
 - two molecules of fructose.
- ___ 152. The combination of glucose and galactose forms
- fructose.
 - maltose.
 - lactose.
 - sucrose.
 - mannose.
- ___ 153. Sugars are characterized by all but which one of the following functional groups?
- hydroxyl
 - carboxyl
 - ketone
 - aldehyde
 - methyl
- ___ 154. Glycogen is a polysaccharide used for energy storage by
- animals.
 - plants.
 - protistans.
 - monerans.
 - both animals and protistans.
- ___ 155. Cellulose is
- a material found in cell walls.
 - a component of cell membranes.
 - a plant protein.
 - formed by photosynthesis.
 - the most complex of the organic compounds.
- ___ 156. Which of these components of a tossed salad will pass through the human digestive tract with the least digestion?
- sugar (in the dressing)
 - oil (lipid)
 - starch (in the croutons)
 - cellulose (lettuce leaves)
 - protein (in bacon bits)

- ___ 157. Which is NOT a monosaccharide?
- glucose
 - fructose
 - deoxyribose
 - starch
 - ribose
- ___ 158. Which of the following includes all the others?
- sucrose
 - glucose
 - cellulose
 - glycogen
 - carbohydrate
- ___ 159. Which of the following cannot be used to describe some aspect of polysaccharides?
- energy storage
 - straight or branched chain
 - glucose subunits
 - insoluble in water
- ___ 160. A polysaccharide
- is composed of many monosaccharides that have been linked together.
 - may be straight and unbranched or highly branched.
 - is most likely made of glucose molecules if it is one of the natural polysaccharides.
 - may be insoluble because of its large size and structure.
 - all of these
- ___ 161. Chitin is a polysaccharide with _____ atoms attached to the glucose backbone.
- magnesium
 - phosphorus
 - potassium
 - nitrogen
 - sulfur
- ___ 162. Which of the following is more soluble in a nonpolar solvent (such as acetone) than in water?
- lipids
 - polysaccharides
 - fats
 - sterols
 - all of these except polysaccharides
- ___ 163. Triglycerides are
- carbohydrates.
 - nucleotides.
 - proteins.
 - neutral fats.
 - amino acids.
- ___ 164. Oils are
- liquid at room temperatures.
 - unsaturated fats.
 - found only in animals.
 - complex carbohydrates.
 - both liquid at room temperature and unsaturated fats.

- ___ 165. Which of the following are lipids?
- sterols
 - triglycerides
 - oils
 - waxes
 - all of these
- ___ 166. Sterols
- are used in the synthesis of amino acids.
 - consist of four rings.
 - may have different numbers, types, and positions of functional groups attached to them.
 - are a specialized type of lipid.
 - All of the choices are true except "are used in the synthesis of amino acids."
- ___ 167. Sterols
- contribute to atherosclerosis.
 - are not found in plants.
 - are fats characterized by fatty-acid tails.
 - are needed to produce sexual development and maturity.
 - both contribute to atherosclerosis and are needed to produce sexual development and maturity.
- ___ 168. Cholesterol
- is synthesized in the large intestine.
 - floats free in the bloodstream.
 - is used in the construction of biomembranes.
 - levels in the bloodstream can be increased by eating plant fats.
 - is much greater in the bloodstream of rats than humans.
- ___ 169. Which of the following is secreted by specific glands?
- waxes
 - triglycerides
 - bone and cartilage
 - hemoglobin
 - keratin
- ___ 170. Long-chain fatty acids attached to long-chain alcohols is characteristic of
- triglycerides.
 - phospholipids.
 - sterols.
 - waxes.
 - glycoproteins.
- ___ 171. Polyunsaturated fats
- have fewer hydrogens than saturated fats.
 - are more characteristic of animal fats than plant fats.
 - contribute to the possibility of arteriosclerosis.
 - have no double bonds.
 - are solid at room temperature.
- ___ 172. If the cuticle were removed from an apple while leaving the skin intact,
- the apple would lose water and dehydrate.
 - the apple would undergo fungal decomposition.
 - nothing would happen.
 - the apple would begin to swell as it absorbs moisture from the air.
 - all of these

- ___ 173. An example of a saturated fat is
- olive oil.
 - corn oil.
 - butter.
 - oleo.
 - soybean oil.
- ___ 174. Lipids
- serve as food reserves in many organisms.
 - include cartilage and chitin.
 - include fats consisting of one fatty acid molecule and three glycerol molecules.
 - are composed of monosaccharides.
 - none of these
- ___ 175. Plasma membranes are characterized by the presence of
- triglycerides.
 - phospholipids.
 - unsaturated fats.
 - steroids.
 - fatty acids.
- ___ 176. All sterols have
- the same number of double bonds.
 - double bonds in the same positions.
 - four rings of carbon to which are attached other atoms.
 - the same functional groups.
 - the same number and positions of double bonds.
- ___ 177. Sterols are
- compounds that are related to lipids.
 - sex hormones.
 - components of membranes.
 - troublesome on artery walls.
 - all of these
- ___ 178. Proteins may function as
- structural units.
 - hormones.
 - storage molecules.
 - transport molecules.
 - all of these
- ___ 179. Which amino acid possesses the least extensive R group?
- proline
 - serine
 - tryptophan
 - cysteine
 - glycine
- ___ 180. Which of the following is structurally the simplest of the amino acids?
- proline
 - serine
 - tryptophan
 - cysteine
 - glycine

- ___ 181. The R group found in amino acids consists of
- an amine group.
 - a hydroxyl group.
 - a carboxyl group.
 - additional atoms.
 - an amine group and a carboxyl group.
- ___ 182. Amino acids are the building blocks for
- proteins.
 - steroids.
 - lipids.
 - nucleic acids.
 - carbohydrates.
- ___ 183. What kind of bond exists between two amino acids in a protein?
- peptide
 - ionic
 - hydrogen
 - amino
 - sulfhydroxyl
- ___ 184. The sequence of amino acids is the _____ structure of proteins.
- primary
 - secondary
 - tertiary
 - quaternary
 - stereo
- ___ 185. Amino acids are linked by what kind of bonds to form the primary structure of a protein?
- disulfide
 - hydrogen
 - ionic
 - peptide
 - none of these
- ___ 186. The secondary structure of proteins is
- helical.
 - sheetlike.
 - globular.
 - the sequence of amino acids.
 - both helical and sheetlike.
- ___ 187. The interaction of four polypeptide chains in a hemoglobin molecule is _____ structure.
- quaternary
 - secondary
 - primary
 - tertiary
 - quintinary
- ___ 188. Glycoproteins are NOT used for which of the following?
- outer cell membranes
 - cell secretions
 - blood proteins
 - transport of cholesterol
 - cell identification

- ___ 189. Denaturation of proteins may result in all but one of the following. Which one is it?
- breakage of hydrogen bonds
 - loss of three-dimensional structure
 - removal of R groups from amino acids
 - alteration of enzyme activity
 - endangerment of cell's life
- ___ 190. The sixth amino acid in normal hemoglobin is glutamate, but it is replaced by _____ in sickle-cell anemia.
- histidine
 - proline
 - leucine
 - valine
 - threonine
- ___ 191. Which of the following is NOT a known dysfunction in the expression of sickle-cell anemia?
- loss of shape of red blood cells with insufficient oxygen
 - rheumatism
 - overactive bone marrow
 - excessive absorption of oxygen causing the cell to swell
 - enlarged spleen
- ___ 192. Nucleotides are the building blocks for
- proteins.
 - steroids.
 - lipids.
 - ATP, NAD⁺, and FAD.
 - carbohydrates.
- ___ 193. Which of the following is NOT found in every nucleic acid?
- ribose
 - phosphate group
 - single-ring base
 - double-ring base
 - All of these are characteristic of every nucleotide.
- ___ 194. The nucleotide associated with chemical messages is
- cyclic AMP.
 - FAD.
 - NAD⁺.
 - ATP.
 - all of these
- ___ 195. Flavin adenine dinucleotide and nicotinamide adenine dinucleotide are examples of
- functional nucleotides.
 - transport nucleotides.
 - structural nucleotides.
 - nuclear proteins.
 - chemical messengers.
- ___ 196. The nucleotide most closely associated with energy is
- cyclic AMP.
 - FAD.
 - NAD⁺.
 - ATP.
 - all of these

- ___ 197. Nucleotides contain what kind of sugars?
- three-carbon
 - four-carbon
 - five-carbon
 - six-carbon
 - seven-carbon
- ___ 198. DNA
- is one of the adenosine phosphates.
 - is one of the nucleotide coenzymes.
 - contains protein-building instructions.
 - translates protein-building instructions into actual protein structures.
 - none of these
- ___ 199. Which molecule is incorrectly matched with its component parts?
- fat: fatty acids
 - starch: riboses
 - protein: amino acids
 - glycogen: glucoses
 - nucleic acids: nucleotides
- ___ 200. Four of the five answers listed below are related by a common chemical similarity. Select the exception.
- cellulose
 - hydrochloric acid
 - amino acid
 - protein
 - nucleic acid
- ___ 201. Four of the five answers listed below are related as members of the same group. Select the exception.
- glucose
 - fructose
 - cellulose
 - ribose
 - deoxyribose
- ___ 202. Four of the five answers listed below are related as members of the same group. Select the exception.
- lactose
 - sucrose
 - maltose
 - table sugar
 - fructose
- ___ 203. Four of the five answers listed below are carbohydrates. Select the exception.
- glycerol
 - cellulose
 - starch
 - sucrose
 - glycogen
- ___ 204. Four of the five answers listed below are polysaccharides. Select the exception.
- chitin
 - cellulose
 - collagen
 - starch
 - glycogen

- ____ 205. Four of the five answers listed below are lipids. Select the exception.
- triglyceride
 - wax
 - butter
 - insulin
 - steroid
- ____ 206. Three of the four answers listed below are saturated fats. Select the exception.
- butter
 - bacon
 - peanut oil
 - animal fat
- ____ 207. Four of the five answers listed below are amino acids. Select the exception.
- glycine
 - adenine
 - phenylalanine
 - valine
 - tyrosine
- ____ 208. Four of the five answers listed below are functional groups. Select the exception.
- R group
 - amino group
 - carboxyl group
 - hydroxyl group
 - aldehyde group

Matching

Answer questions by matching the descriptions to the most appropriate function, process, or trait listed below.

- metabolism
 - reproduction
 - photosynthesis
 - growth
 - homeostasis
- ____ 209. A process found only in plants and some bacteria
- ____ 210. Most organisms exhibit this characteristic that tends to buffer the effects of environmental change.
- ____ 211. The capacity to acquire, store, and use energy
- ____ 212. Process in which one generation replaces another

Answer questions by matching the descriptions with the most appropriate kingdom listed below.

- Eubacteria
 - Protista
 - Plantae
 - Fungi
 - Animalia
- ____ 213. Multicellular producers
- ____ 214. Prokaryotic
- ____ 215. Unicellular organisms of considerable internal complexity
- ____ 216. Multicellular consumers

- ___ 217. Oldest living organisms
- ___ 218. Unicellular producers
- ___ 219. Multicellular decomposers

The various energy levels in an atom of magnesium have different numbers of electrons. Use the following numbers to answer the questions.

- a. 1
 - b. 2
 - c. 3
 - d. 6
 - e. 8
- ___ 220. Number of electrons in the first energy level
 - ___ 221. Number of electrons in the second energy level
 - ___ 222. Number of electrons in the third energy level

The following are types of chemical bonds. Answer the questions by matching the descriptions with the most appropriate bond type.

- a. hydrogen
 - b. ionic
 - c. covalent
 - d. disulfide
 - e. peptide
- ___ 223. The bond between the atoms of table salt
 - ___ 224. The bond type holding several molecules of water together
 - ___ 225. The bond between the oxygen atoms of gaseous oxygen
 - ___ 226. The bond that breaks when salts dissolve in water
 - ___ 227. Atoms connected by this kind of bond share electrons.

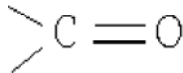
Choose the one most appropriate answer for each.

- a. a six-carbon sugar
 - b. energy carriers such as NAD⁺ and FAD
 - c. principal components of cell membranes
 - d. speed up metabolic reactions
 - e. DNA and RNA
- ___ 228. enzymes
 - ___ 229. glucose
 - ___ 230. nucleotide coenzymes
 - ___ 231. phospholipids

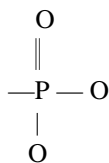
The following are chemical functional groups that may be part of a biologically active molecule. Answer the questions by matching the items with the most appropriate group.

- a. -COOH
- b. -CH₃
- c. -NH₂
- d. -OH

e.



f.



g. -CHO

- ___ 232. The amine group
- ___ 233. The carboxyl group
- ___ 234. The group that is acidic
- ___ 235. The group that occurs repeatedly in sugars; composed of two elements
- ___ 236. The methyl group
- ___ 237. The hydroxyl group
- ___ 238. The ketone group
- ___ 239. The group on the amino-terminal end of proteins
- ___ 240. The group on the carboxyl-terminal end of proteins
- ___ 241. A group composed of three different elements; found in sugars
- ___ 242. The group typical of energy carriers such as ATP

The following questions are basic building blocks of biopolymers. Answer by matching the items with the most appropriate building block.

- a. amino acids
- b. glucose
- c. glycerol
- d. fatty acids
- e. nucleotides

- ___ 243. The basic unit of proteins
- ___ 244. The basic unit of DNA
- ___ 245. The basic unit of messenger RNA
- ___ 246. The basic unit of cellulose
- ___ 247. The basic unit of glycogen
- ___ 248. The basic unit of starch
- ___ 249. The monomeric unit of a polypeptide chain

Name: _____

ID: A

- ____ 250. Which two units combine in various ways to form lipids?
- a. a and d
 - b. a and c
 - c. b and c
 - d. b and d
 - e. c and d