1. What is the appropriate term for an interacting group of individuals of a single type? (Concept 1.1)
   - species
   - population
   - ecosystem
   - community
   - habitat

2. Which of the following can be considered a biological system? (Concept 1.1)
   - a single liver cell
   - a pond
   - the biosphere
   - a salmon's cardiovascular system
   - all of the above

3. In an ecosystem nutrients _________ and energy _________. (Concept 1.1)
   - are wasted; is burned
   - cycle; flows through
   - flow through; is recycled
   - are created; is lost
   - disappear; can not be created nor destroyed

4. Which of the following is the fundamental unit of structure and function in living organisms? (Concept 1.1)
   - organelle
   - tissue
   - cell
   - organ
   - organism

5. In which kingdom can multicellular eukaryotic, photosynthetic organisms be found? (Concept 1.2)
   - Archaea
   - Fungi
   - Protista
   - Plantae
6 Which kingdom within the domain Eukarya is composed of organisms that are generally unicellular (single-celled)? (Concept 1.2)
- Animalia
- Plantae
- Fungi
- Animalia
- Protista
- Archaea

7 Which of the following observations and inferences led Charles Darwin to his theory of natural selection as the mechanism for evolution? (Concept 1.2)
- Individuals in a population of any species vary in many heritable traits.
- Individuals with heritable traits best-suited to the local environment will generally produce a disproportionate number of healthy, fertile offspring.
- A population of any species has the potential to produce far more offspring than will survive to produce offspring of their own.
- Individuals of a population are unequal in the likelihood of surviving and reproducing.
- Darwin synthesized his theory of natural selection from all of the above observations and inferences.

8 Two garden plots were planted with corn. The soil was similar in each, and equal amounts of water were applied to each plot. One plot was fertilized, and the other was not. The experimenters measured the yield as bushels of corn from each plot. The plot that did not receive the fertilizer was the _____. (Concept 1.3)
- experimental plot
- control plot
- controlled variable
- dependent variable
- emergent property

9 A theory is _____. (Concept 1.3)
- a poorly supported idea that has little backing but might be correct
- a well-supported concept that has broad explanatory power
- the same thing as a hypothesis
- not correct unless it is several years old
- a concept that, once established in the scientific literature, can be modified but never rejected, even when new scientific methods produce data that don’t fit
10 Which of the following is a trace element? (Concept 2.1)
   - hydrogen
   - copper
   - oxygen
   - nitrogen
   - carbon

11 Radioactive isotopes are useful in scientific research because _______. (Concept 2.2)
   - They are not readily incorporated into biological reactions.
   - They are difficult to detect in small amounts, but living cells cannot distinguish them from the corresponding stable isotopes.
   - They can be used as tracers to follow particular atoms and molecules through metabolic pathways.
   - They decay spontaneously and give off energy and sub-atomic particles.
   - all of the above

12 Cells are surrounded by water, and cells themselves consist of about 70% to 95% water. As a result _____. (Concept 3.1)
   - the temperature of living things tends to change relatively slowly
   - a variety of nutrient molecules are readily available as dissolved solutes
   - waste products produced by cell metabolism can be easily removed
   - dissolved substances can be easily transported within a cell or between cells in multicellular organisms
   - all of the above

13 The tendency of water molecules to stay close to each other as a result of hydrogen bonding _____. (Concept 3.2)
   - provides the surface tension that allows leaves to float on water
   - is called cohesion
   - keeps water moving through the vessels in a tree trunk
   - acts to moderate temperature
   - all of the above

14 Because molecules of water are farther apart in ice than in liquid water, _____. (Concept 3.2)
   - ice floats
   - ice is denser than liquid water
○ ice expands when it melts
○ ice vaporizes before liquid water does
○ all of the above

15 Hydrophobic molecules are _____ water. ([Concept 3.2])
○ attracted to
○ absorbed by
○ repelled by
○ neutralized by
○ polarized by

16 Adding acid tends to ____ of a solution. ([Concept 3.3])
○ increase the hydrogen ion concentration and raise the pH
○ increase the hydrogen ion concentration and lower the pH
○ decrease the hydrogen ion concentration and raise the pH
○ decrease the hydrogen ion concentration and lower the pH
○ either increase or decrease the pH, depending on the original acidity

17 A substance that minimizes changes in the concentration of H\(^+\) and OH\(^-\) in a solution is a(n) _____ . ([Concept 3.3])
○ hydrocarbon
○ buffer
○ NaCl
○ strong acid
○ strong base

18 Stanley Miller's experiments were significant because he demonstrated that _____. ([Concept 4.1])
○ the behavior of any molecule containing a carbon atom was fundamentally the same
○ under certain circumstances the theory of vitalism was valid
○ a variety of simple organic compounds could be spontaneously synthesized from components in Earth's primitive atmosphere
○ lightning discharges could produce the molecules previously presumed to have originated in volcanic outgassings
urea could be synthesized from entirely naturally occurring salts

19 Which is an organic molecule? (Concept 4.2)
- Ne
- O₂
- CH₄
- NaCl
- H₂O

20 The two compounds
\[
\begin{align*}
H & H & H & H & H \\
H-C=C-C-C=C-H & H & H & H & H \\
H-C=C-C-C=C-H & H
\end{align*}
\]
are related to each other by being _____. (Concept 4.2)
- hydrocarbons
- organic compounds
- isomers
- double-bonded compounds
- all of the above

21 Which one of the following molecules has a carboxyl functional group? (Concept 4.3)
- R-NH₂
- R-COH
- R-COOH
- R-OPO₃⁻²
- R-SH

22 On the basis of the principle of complementary base pairing, you would expect the percentage of ____ to be equal to the percentage of _____. (Concept 5.5)
- adenine; thymine
- adenine; guanine
- thymine; guanine
adenine; cytosine
thymine; cytosine

23A glucose molecule is to starch as _____.
- a steroid is to a lipid
- a protein is to an amino acid
- a nucleic acid is to a polypeptide
- a nucleotide is to a nucleic acid
- an amino acid is to a nucleic acid

24 The "primary structure" of a protein refers to _____.
- the α helix or β pleated sheets
- interactions among the side chains or R groups of the amino acids
- coiling due to hydrogen bonding between amino acids
- the weak aggregation of two or more polypeptide chains into one functional macromolecule
- the sequence of amino acids

25 Protein molecules are polymers (chains) of _____.
- DNA molecules
- fatty acid molecules
- sucrose molecules
- amino acid molecules
- purines and pyrimidines

26 The alpha helix and beta pleated sheet represent which level of protein structure?
- primary structure
- secondary structure
- tertiary structure
- quaternary structure
- pentiary structure

27 Which of the following lists ranks these molecules in the correct order by size?
- water, sucrose, glucose, protein
- protein, water, glucose, sucrose
□ water, protein, sucrose, glucose
□ protein, sucrose, glucose, water
□ glucose, water, sucrose, protein