

# AltMedASA

## Anatomy & Physiology

### Project Number 2

(July 2022 – Pass 50%)

Name: \_\_\_\_\_

Registration # (Optional): \_\_\_\_\_

Date Completed: \_\_\_\_\_

### Part A

#### INTERACTIVE LINK QUESTIONS

1. Visit this website (<http://openstaxcollege.org/l/ptable>) to view the periodic table. In the periodic table of the elements, elements in a single column have the same number of electrons that can participate in a chemical reaction. These electrons are known as “valence electrons.” For example, the elements in the first column all have a single valence electron—an electron that can be “donated” in a chemical reaction with another atom. What is the meaning of a mass number shown in parentheses?

2. Visit this website (<http://openstaxcollege.org/l/electenergy>) to learn about electrical energy and the attraction/repulsion of charges. What happens to the charged electroscope when a conductor is moved between its plastic sheets, and why?

3. Watch this video (<http://openstaxcollege.org/l/disaccharide>) to observe the formation of a disaccharide. What happens when water encounters a glycosidic bond?

## REVIEW QUESTIONS

### Part B

4. Together, just four elements make up more than 95 percent of the body's mass. These include \_\_\_\_\_.
- calcium, magnesium, iron, and carbon
  - oxygen, calcium, iron, and nitrogen
  - sodium, chlorine, carbon, and hydrogen
  - oxygen, carbon, hydrogen, and nitrogen
5. The smallest unit of an element that still retains the distinctive behavior of that element is an \_\_\_\_\_.
- electron
  - atom
  - elemental particle
  - isotope
6. The characteristic that gives an element its distinctive properties is its number of \_\_\_\_\_.
- protons
  - neutrons
  - electrons
  - atoms
7. On the periodic table of the elements, mercury (Hg) has an atomic number of 80 and a mass number of 200.59. It has seven stable isotopes. The most abundant of these probably have \_\_\_\_\_.
- about 80 neutrons each
  - fewer than 80 neutrons each
  - more than 80 neutrons each
  - more electrons than neutrons
8. Nitrogen has an atomic number of seven. How many electron shells does it likely have?
- one
  - two
  - three
  - four
9. Which of the following is a molecule, but not a compound?
- H<sub>2</sub>O
  - 2 H
  - H<sub>2</sub>
  - H<sup>+</sup>

10. A molecule of ammonia contains one atom of nitrogen and three atoms of hydrogen. These are linked with

\_\_\_\_\_.

- a. ionic bonds
- b. nonpolar covalent bonds
- c. polar covalent bonds
- d. hydrogen bonds

11. When an atom donates an electron to another atom, it becomes

- a. an ion
- b. an anion
- c. nonpolar
- d. all of the above

12. A substance formed of crystals of equal numbers of cations and anions held together by ionic bonds is called

a(n) \_\_\_\_\_.

- a. noble gas
- b. salt
- c. electrolyte
- d. dipole

13. Which of the following statements about chemical bonds is true?

- a. Covalent bonds are stronger than ionic bonds.
- b. Hydrogen bonds occur between two atoms of hydrogen.
- c. Bonding readily occurs between nonpolar and polar molecules.
- d. A molecule of water is unlikely to bond with an ion.

14. The energy stored in a foot of snow on a steep roof is

\_\_\_\_\_.

- a. potential energy
- b. kinetic energy
- c. radiant energy
- d. activation energy

15. The bonding of calcium, phosphorus, and other elements produces mineral crystals that are found in bone. This is an example of a(n) \_\_\_\_\_ reaction.

- a. catabolic
- b. synthesis
- c. decomposition
- d. exchange

16.  $AB \rightarrow A + B$  is a general notation for a(n) \_\_\_\_\_ reaction.

- a. anabolic
- b. endergonic
- c. decomposition
- d. exchange

17. \_\_\_\_\_ reactions release energy.

- a. Catabolic
- b. Exergonic
- c. Decomposition
- d. Catabolic, exergonic, and decomposition

18. Which of the following combinations of atoms is most likely to result in a chemical reaction?

- a. hydrogen and hydrogen
- b. hydrogen and helium
- c. helium and helium
- d. neon and helium

19. Chewing a bite of bread mixes it with saliva and facilitates its chemical breakdown. This is most likely due to the fact that \_\_\_\_\_.

- a. the inside of the mouth maintains a very high temperature
- b. chewing stores potential energy
- c. chewing facilitates synthesis reactions
- d. saliva contains enzymes

20.  $CH_4$  is methane. This compound is \_\_\_\_\_.

- a. inorganic
- b. organic
- c. reactive
- d. a crystal

21. Which of the following is most likely to be found evenly distributed in water in a homogeneous solution?
- sodium ions and chloride ions
  - NaCl molecules
  - salt crystals
  - red blood cells
22. Jenny mixes up a batch of pancake batter, then stirs in some chocolate chips. As she is waiting for the first few pancakes to cook, she notices the chocolate chips sinking to the bottom of the clear glass mixing bowl. The chocolate-chip batter is an example of a \_\_\_\_\_.
- solvent
  - solute
  - solution
  - suspension
23. A substance dissociates into  $K^+$  and  $Cl^-$  in solution. The substance is a(n) \_\_\_\_\_.
- acid
  - base
  - salt
  - buffer
24. Ty is three years old and as a result of a “stomach bug” has been vomiting for about 24 hours. His blood pH is 7.48. What does this mean?
- Ty’s blood is slightly acidic.
  - Ty’s blood is slightly alkaline.
  - Ty’s blood is highly acidic.
  - Ty’s blood is within the normal range
25.  $C_6H_{12}O_6$  is the chemical formula for a \_\_\_\_\_.
- polymer of carbohydrate
  - pentose monosaccharide
  - hexose monosaccharide
  - all of the above
26. What organic compound do brain cells primarily rely on for fuel?
- glucose
  - glycogen
  - galactose
  - glycerol

27. Which of the following is a functional group that is part of a building block of proteins?

- a. phosphate
- b. adenine
- c. amino
- d. ribose

28. A pentose sugar is a part of the monomer used to build which type of macromolecule?

- a. polysaccharides
- b. nucleic acids
- c. phosphorylated glucose
- d. glycogen

29. A phospholipid \_\_\_\_\_.

- a. has both polar and nonpolar regions
- b. is made up of a triglyceride bonded to a phosphate group
- c. is a building block of ATP
- d. can donate both cations and anions in solution

30. In DNA, nucleotide bonding forms a compound with a characteristic shape known as a(n) \_\_\_\_\_.

- a. beta chain
- b. pleated sheet
- c. alpha helix
- d. double helix

31. Uracil \_\_\_\_\_.

- a. contains nitrogen
- b. is a pyrimidine
- c. is found in RNA
- d. all of the above

32. The ability of an enzyme's active sites to bind only substrates of compatible shape and charge is known as \_\_\_\_\_.

- a. selectivity
- b. specificity
- c. subjectivity
- d. specialty

## Part C

### CRITICAL THINKING QUESTIONS

33. The most abundant elements in the foods and beverages you consume are oxygen, carbon, hydrogen, and nitrogen. Why might having these elements in consumables be useful?

34. Oxygen, whose atomic number is eight, has three stable isotopes:  $^{16}\text{O}$ ,  $^{17}\text{O}$ , and  $^{18}\text{O}$ . Explain what this means in terms of the number of protons and neutrons.

35. Magnesium is an important element in the human body, especially in bones. Magnesium's atomic number is 12. Is it stable or reactive? Why? If it were to react with another atom, would it be more likely to accept or to donate one or more electrons?

36. Explain why  $\text{CH}_4$  is one of the most common molecules found in nature. Are the bonds between the atoms ionic or covalent?

37. In a hurry one day, you merely rinse your lunch dishes with water. As you are drying your salad bowl, you notice that it still has an oily film. Why was the water alone not effective in cleaning the bowl?

38. Could two atoms of oxygen engage in ionic bonding? Why or why not?

39.  $\text{AB} + \text{CD} \rightarrow \text{AD} + \text{BE}$  Is this a legitimate example of an exchange reaction? Why or why not?

40. When you do a load of laundry, why do you not just drop a bar of soap into the washing machine? In other words, why is laundry detergent sold as a liquid or powder?

41. The pH of lemon juice is 2, and the pH of orange juice is 4. Which of these is more acidic, and by how much? What does this mean?

42. During a party, Eli loses a bet and is forced to drink a bottle of lemon juice. Not long thereafter, he begins complaining of having difficulty breathing, and his friends take him to the local emergency room. There, he is given an intravenous solution of bicarbonate. Why?

43. If the disaccharide maltose is formed from two glucose monosaccharides, which are hexose sugars, how many atoms of carbon, hydrogen, and oxygen does maltose contain and why?

44. Once dietary fats are digested and absorbed, why can they not be released directly into the bloodstream?