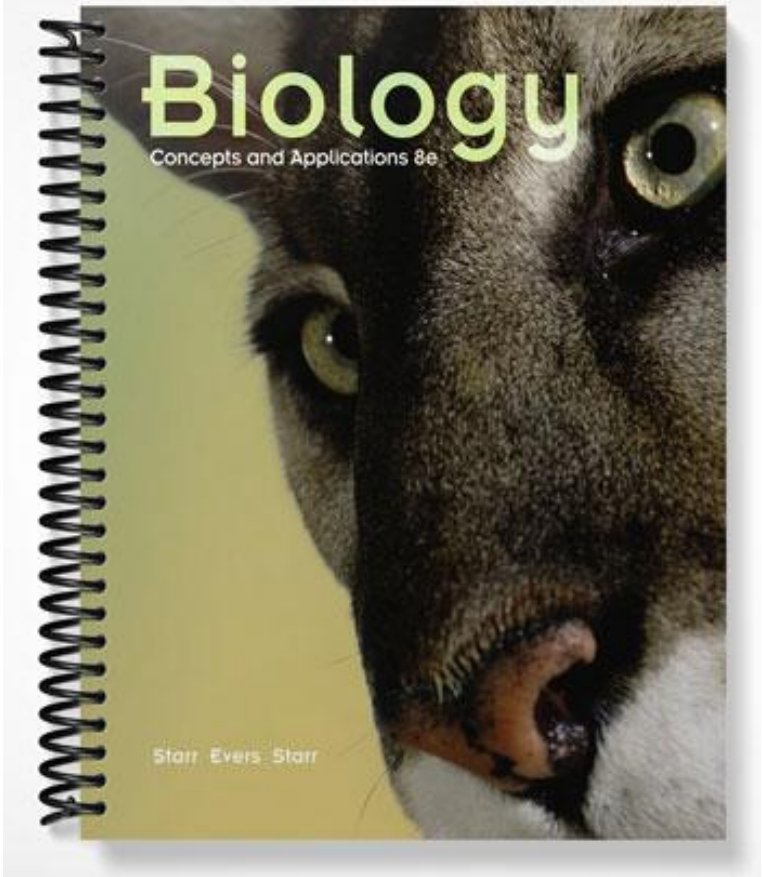
TEST BANK



CHAPTER 2--LIFE'S CHEMICAL BASIS

Student: _____

1. People are most likely to ingest large amounts of mercury by eating

   A. soy products.
   B. chicken.
   C. beef.
   D. large predatory fish.
   E. small herbivorous fish.

2. Particles that are fundamental building blocks of all matter are

   A. atoms.
   B. compounds.
   C. ions.
   D. molecules.
   E. mixtures.

3. Which term includes the other four?

   A. atoms
   B. molecules
   C. electrons
   D. elements
   E. protons

4. The negative subatomic particle is the

   A. neutron.
   B. proton.
   C. electron.
   D. neutron and proton.
   E. proton and electron.

5. Which substance is NOT an element?

   A. water
   B. oxygen
   C. carbon
   D. chlorine
   E. hydrogen

6. The positive subatomic particle is the

   A. neutron.
   B. proton.
   C. electron.
   D. neutron and proton.
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7. The neutral subatomic particle is the

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8. The atomic number refers to the

    A. mass of an atom.
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    C. number of both protons and neutrons in an atom.
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    B. protons.
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11. The nucleus of an atom contains

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13. An atom of sodium has an atomic number of 11 and a mass of 23. How many neutrons does it have?

    A. 11
    B. 12
    C. 23
    D. 34
    E. 35

14. If the atomic weight of hydrogen is 1, of carbon is 12, and of oxygen is 16, the molecular weight of glucose, $C_6H_{12}O_6$, expressed in grams is

    A. 24 grams.
    B. 28 grams.
    C. 52 grams.
    D. 168 grams.
    E. 180 grams.

15. Isotopes of the same element differ in the number of

    A. electrons.
    B. neutrons.
    C. protons.
    D. electrons and protons.
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16. Radioactive isotopes

    A. are electrically unbalanced.
    B. behave the same chemically, physically, and biologically as other isotopes.
    C. have an excess number of electrons.
    D. have an excess number of neutrons.
    E. are produced when substances are exposed to radiation.

17. When ^{14}C goes through radioactive decay, one of its neutrons splits into a proton and an electron. What does ^{14}C become?

    A. $^{13}C_6$
    B. $^{14}N_7$
    C. $^{13}N_7$
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18. In the shell model, the second shell can hold up to _____ electrons.

    A. 1
    B. 2
    C. 4
    D. 6
    E. 8

19. For an atom to be neutral, it must have the same number of

    A. electrons and neutrons.
    B. electrons and protons.
    C. neutrons and protons.
    D. electrons, neutrons, and protons.
    E. none of these.

20. Which components of an atom are arranged in various energy levels or orbitals?

    A. electrons
    B. protons
    C. neutrons
    D. electrons and protons
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21. Which statement is NOT true?

A. Electrons closest to the nucleus are at the lowest energy level.
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D. The innermost orbital holds two electrons.
E. At the second energy level there are four possible orbitals with a total of eight electrons.

22. Water is an example of a(n)

A. atom.
B. ion.
C. compound.
D. mixture.
E. element.

23. Which substance is NOT a compound?

A. salt
B. a carbohydrate
C. carbon
D. a nucleotide
E. methane

24. A molecule is

A. a combination of two or more atoms.
B. less stable than its constituent atoms separated.
C. electrically charged.
D. a carrier of one or more extra neutrons.
E. none of these.

25. Magnesium has 12 protons. How many electrons are in its third energy level?

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B. 4
C. 6
D. 8
E. 10

26. Magnesium has 12 protons. How many electrons are in its first energy level?

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D. 8
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28. Of the following, an atom with the atomic number ____ would be the least reactive.

A. 1
B. 3
C. 17
D. 18
E. 21

29. What is formed when an atom loses or gains an electron?

A. a new element
B. ion
C. molecule
D. bond
E. isotope

30. The bond in table salt (NaCl) is

A. polar
B. ionic
C. covalent
D. double
E. nonpolar

31. What type of bond is formed whenever atoms share a pair of electrons?

A. covalent
B. hydrogen
C. ionic
D. double
E. peptide

32. What type of bond is(are) individually weakest?

A. hydrogen
B. ionic
C. covalent
D. hydrogen and covalent are equal
E. ionic and covalent are equal

33. A chemical bond in which electrons are shared unequally is called

A. ionic.
B. nonpolar.
C. polar.
D. all of these.
E. none of these.

34. What bonds usually stabilize large biological molecules?

A. hydrogen
B. ionic
C. covalent
D. inert
E. single

35. A hydrogen bond is

A. a sharing of a pair of electrons between a hydrogen and an oxygen nucleus.
B. a sharing of a pair of electrons between a hydrogen nucleus and either an oxygen or a nitrogen nucleus.
C. a weak attraction between a covalently bonded hydrogen atom and another atom taking part in a separate polar covalent bond.
D. the loss of an electron by hydrogen to a highly electronegative atom.
E. none of these.

36. Which of the following is(are) classified as true chemical bonds?

A. hydrogen
B. ionic
C. covalent
D. both ionic and covalent
E. all of these

37. How do hydrophobic molecules react with water?

A. attracted to
B. absorbed by
C. repelled by
D. mixed with
E. polarized by

38. Water is important to living organisms because

A. of its cohesive properties.
B. of its temperature stabilizing effect.
C. it is a liquid at room temperature.
D. it has the capacity to dissolve many substances.
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39. Sugar dissolves in water because it

A. ionizes.
B. is a polysaccharide.
C. is polar and forms many hydrogen bonds with the water molecules.
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40. Why does ice float on water?

A. Ice is hydrophobic and repels water.
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C. Water molecules are spaced farther apart in ice than in liquid water.
D. Vibrating electrons in liquid water push ice to the surface.
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41. A pH of 10 is how many times as basic as a pH of 7?

A. 2
B. 3
C. 10
D. 100
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42. A solution with a pH of 8 has how many times fewer hydrogen ions than a solution with a pH of 6?

A. 2
B. 4
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43. A salt will dissolve in water to form

A. acids.
B. gases.
C. ions.
D. bases.
E. polar solvents.

44. A reaction of an acid and a base will produce water and

A. a buffer.
B. a salt.
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45. Of the following, pH ____ is the most acidic.

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46. Cellular pH is kept near a value of seven, due to the action of

A. salts.
B. buffers.
C. acids.
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E. water.

47. Substances that are _____ give up hydrogen ions when they dissolve in water.

A. basic
B. acidic
C. neutral
D. hydrophobic
E. buffered

48. **Selecting the Exception**

Four of the five answers listed below possess electrons in the third energy level. Select the exception.

A. sodium (11)
B. magnesium (12)
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49. **Selecting the Exception**

Four of the five answers listed below are alkaline (pH above seven). Select the exception.

A. milk of magnesia
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53. *The various energy levels in an atom of chlorine (atomic number 17) have different numbers of electrons. Use the following numbers to answer the question(s).*

1. Number of electrons in the third energy level	2	____
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C. acids.
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47. Substances that are _____ give up hydrogen ions when they dissolve in water.

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2. Number of electrons in the first energy level	8	**3**
3. Number of electrons in the second energy level	7	**1**

54. Why does carbon dioxide dissolved in water act as a buffer?

The equation below shows what happens when CO_2 dissolves in water:

$H_2O + CO_2 \neg® H_2CO_3 \neg® H^+ + HCO_3^-$

H^+ produced when carbonic acid neutralizes excess OH^-. If there is excess H^+, HCO_3^- absorbs it to form carbonic acid, and if excess carbonic acid forms, CO_2 bubbles out of solution.

55. Explain why atoms such as helium, neon, and argon do not react with other atoms.

In these atoms, the outermost energy level has no vacancies, thus they do not have to take, share, or lose electrons to fill any vacancies.

56. How do ectothermic (cold-blooded) animals make use of water's temperature-stabilizing effects?

These animals will bask in the sun to increase their temperature, as water in their bodies heats enough to perform their daily functions. Once they are warm enough, they can move about in either sun or shade, feeding, mating, etc. Their bodies will cool off slowly because water is a good heat sink. Since temperature changes of water are rather slow, they are also slow to overheat in the sun.