Biology How Life Works 3rd edition Morris Test Bank

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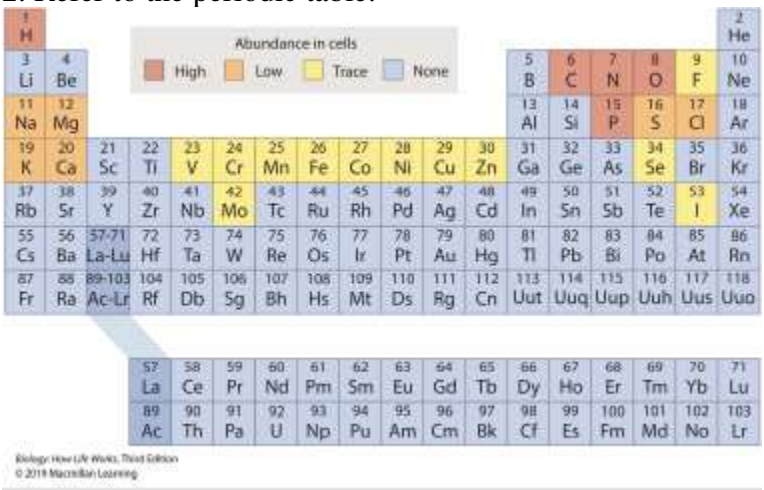
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Chapter 2

1. ^{14}C is an isotope of carbon that possesses:
   a. 6 protons, 8 neutrons, and 6 electrons.
   b. 6 protons, 6 neutrons, and 2 electrons.
   c. 8 protons, 6 neutrons, and 2 electrons.
   d. 6 protons, 2 neutrons, and 6 electrons.
   e. 6 protons, 8 neutrons, and 2 electrons.

ANSWER: a

2. Refer to the periodic table.



Using the periodic table provided, select the element that would be found in least abundance in a living cell.
   a. sodium (Na)
   b. silicon (Si)
   c. phosphorous (P)
   d. zinc (Zn)
   e. hydrogen (H)

ANSWER: b

3. How many electron orbitals does a carbon atom possess?
   a. 6
   b. 4
   c. 2
   d. 5
   e. 12

ANSWER: d

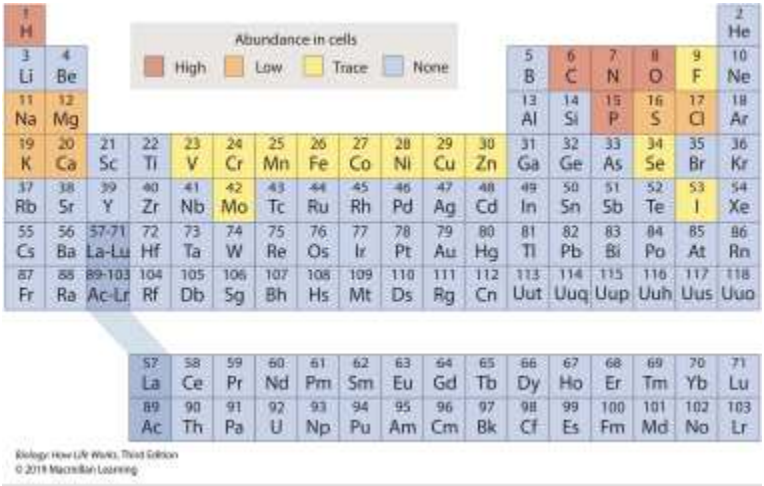
4. Consult the periodic table provided if necessary.

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Which of the elements would most likely have bonding properties similar to nitrogen (N)?

a. carbon (C)
b. silicon (Si)
c. phosphorus (P)
d. sulfur (S)
e. oxygen (O)

ANSWER: c

5. Which property of water causes ice to float?

a. Hydrogen bonds form between the water molecules.
b. The highly ordered crystal packing is less dense.
c. Its ability to dissolve many other substances.
d. Its ability to adhere to polar compounds.
e. Its partial positive and partial negative charges on each molecule.

ANSWER: b

6. Which statement best describes an effect of the low density of frozen water in a lake?

a. When water in a lake freezes, it floats, providing insulation for organisms below the ice.
b. Water in a lake freezes from the bottom up, killing most aquatic organisms.
c. When water freezes, it contracts, decreasing the water level in the lake.
d. Water removes thermal energy from the land around a lake, causing the lake to freeze.

ANSWER: a

7. Which number represents the pH of a solution with the highest concentration of hydrogen ions?

a. 11.5
b. 4.5
c. 7.0
d. 9.1
e. 1.0

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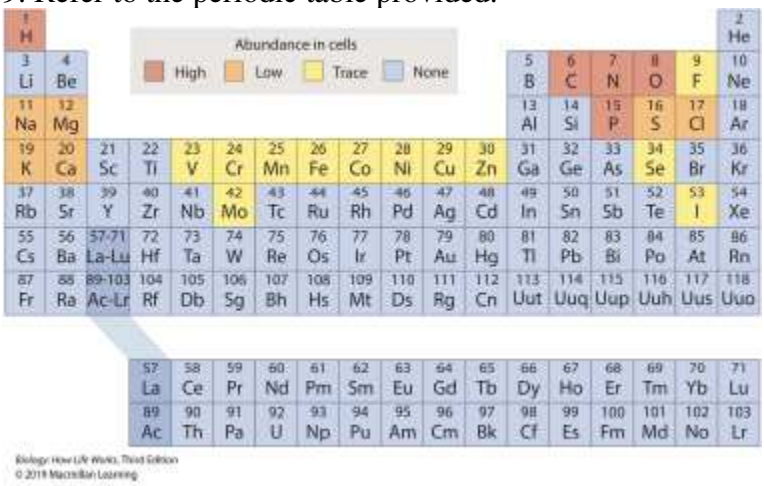
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ANSWER: e

8. In a solution that has pH = 7.0, the ratio of protons (H^+) to hydroxide ions (OH^-) equals
   a. 1
   b. 7
   c. 70
   d. 1/7
   e. 1/70

ANSWER: a

9. Refer to the periodic table provided.



Which group ranks the elements carbon, sodium, calcium, and iodine in order of decreasing number of protons?
   a. I→Ca→Na→C
   b. C→Na→Ca→I
   c. I→C→Ca→Na
   d. C→Ca→Na→I

ANSWER: a

10. The structural diversity of carbon-based molecules is determined by which properties? Select all the apply.
   a. the ability of carbon to form four covalent bonds
   b. the ability of carbon's covalent bonds to rotate freely
   c. the orientation of carbon's bonds in the form of a tetrahedron
   d. carbon's strong electronegativity results in polar covalent bonds
   e. the ability of carbon to ionize and interact with other ions

ANSWER: a, b, c

11. Which statement about a carbon-carbon double bond is correct?
   a. Each of the two carbons is capable of bonding to three other atoms.
   b. The double bond allows free rotation of the molecule at the bond position.

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c. The double bond is longer than a corresponding carbon-carbon single bond.
d. Double bonds can be found in both chain and ring structures.

ANSWER: d

12. How many hydrogen atoms are present in a hydrocarbon chain of five carbons joined to each other by single covalent bonds?
a. 8
b. 12
c. 10
d. 6

ANSWER: b

13. How many hydrogen atoms are present in a hydrocarbon chain of 8 carbon atoms with 3 double bonds and the rest single bonds?
a. 12
b. 10
c. 14
d. 16

ANSWER: a

14. Which choice is a pyrimidine found in DNA?
a. None of the other answer options is correct.
b. guanine
c. uracil
d. adenine
e. thymine

ANSWER: e

15. _____ are the subunits of nucleic acids, and _____ are the subunits of proteins.
a. Polypeptides; sugars
b. Bases; polypeptides
c. Nucleotides; amino acids
d. Amino acids; nucleic bases
e. Nucleoli; amino acids

ANSWER: c

16. Carbohydrates and proteins are two types of macromolecules. Which functional characteristic of proteins distinguishes them from carbohydrates?
a. large amount of stored information
b. efficient storage of usable chemical energy
c. tendency to make cell membranes hydrophobic

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d. ability to catalyze biochemical reactions
e. None of the other answer options is correct.

ANSWER: d

17. Which choice most accurately describes the ratio of oxygen to carbon to hydrogen in a simple 6-carbon sugar such as glucose?
a. 1:1:2
b. 1:2:1
c. 2:1:1
d. 1:2:3
e. 1:3:2

ANSWER: a

18. Sucrose is composed of:
a. glycerol and three fatty acids.
b. a six-carbon sugar and a five-carbon sugar.
c. a simple sugar and a nucleotide.
d. two ketose sugars.
e. an aldose and a ketose.

ANSWER: e

19. Which biomolecule is defined by a physical property instead of a chemical structure?
a. lipids
b. proteins
c. monosaccharides
d. nucleic acids
e. polysaccharides

ANSWER: a

20. Which type of fatty acid would be likely to have the lowest melting temperature?
a. long tails and low saturation
b. long tails and high saturation
c. short tails and low saturation
d. short tails and high saturation
e. All fatty acids have the same melting temperature, regardless of tail length or level of saturation.

ANSWER: c

21. Which type of fatty acids would be likely to participate in the greatest amount of van der Waals forces with other fatty acids? Fatty acids with:
a. short tails and high saturation.
b. long tails and low saturation.

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c. short tails and low saturation.
d. long tails and high saturation.

ANSWER: d

22. Miller and Urey's initial simulation resulted in the formation of which one of the molecules?
a. DNA
b. glucose
c. RNA
d. phospholipids
e. amino acids

ANSWER: e

23. Certain meteorites have been examined and found to carry samples of which molecules? Select all the apply.
a. amino acids
b. lipids
c. polypeptides
d. nucleotides
e. monosaccharides

ANSWER: a, b

24. Sutherland and colleagues demonstrated the synthesis of which molecules under conditions thought to resemble those of early Earth?
a. nucleotides
b. amino acids
c. phospholipids
d. nucleic acid chains
e. polypeptides

ANSWER: a

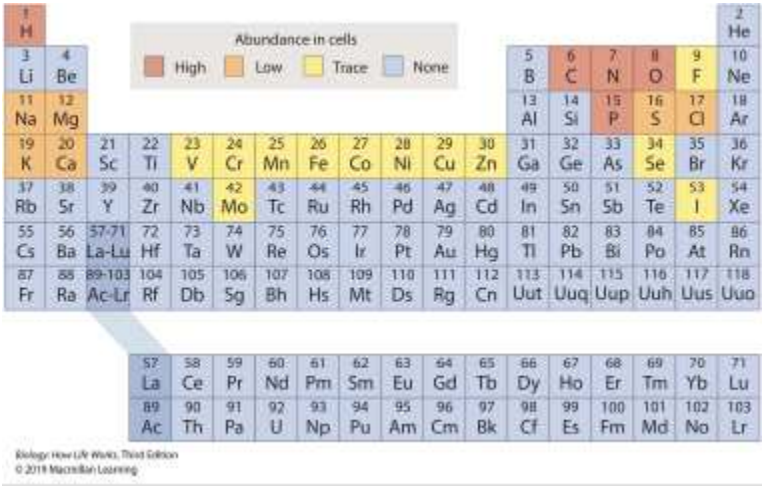
25. Refer to the periodic table.

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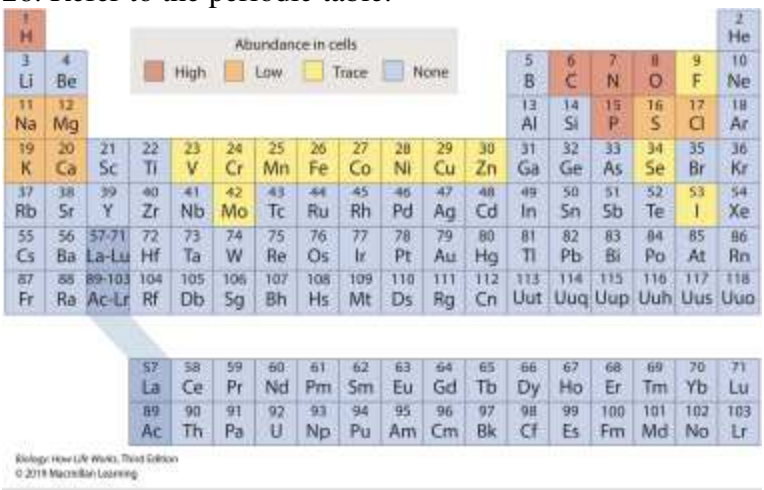


Which of these choices ranks the elements carbon, sodium, calcium, and iodine in order of decreasing number of protons?

a. I, Ca, Na, C
b. I, Na, Ca, C
c. C, Na, Ca, I
d. Ca, I, C, Na
e. Na, Ca, C, I

ANSWER: a

26. Refer to the periodic table.



Which of these choices ranks the elements carbon, phosphorus, calcium, and iodine in order of decreasing number of protons.

a. C, P, Ca, I
b. I, P, Ca, C
c. I, Ca, P, C
d. Ca, I, C, P
e. P, Ca, C, I

ANSWER: c

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27. Complete the description:
_____ can occur when a molecule has a hydrogen atom covalently linked to an electronegative atom, whereas _____ occurs between oppositely charged ions and _____ occurs when atoms share electrons.

a. A hydrogen bond; a covalent bond; an ionic bond
b. An ionic bond; a hydrogen bond; a covalent bond
c. A covalent bond, an ionic bond, a hydrogen bond
d. A covalent bond; a hydrogen bond; an ionic bond
e. A hydrogen bond; an ionic bond; a covalent bond

ANSWER: e

28. What differentiates isotopes of the same element?

a. protons
b. neutrons
c. electrons
d. charge

ANSWER: b

29. You discover an isotope of an element that has 6 electrons in its second and outermost shell, 8 protons, and 6 neutrons. What element is it?

a. nitrogen (N)
b. carbon (C)
c. oxygen (O)
d. fluorine (F)

ANSWER: c

30. Which statement accurately describes a polar covalent bond?

a. the unequal sharing of electrons between an atom with a partial positive charge and an atom with a partial negative charge
b. the interaction of an atom with very high electronegativity and an atom with very low electronegativity
c. the interaction of a hydrogen atom connected to an atom with a high electronegativity and an electronegative atom of another molecule
d. the equal sharing of electrons between atoms of identical or similar electronegativities
e. None of the other answer options is correct.

ANSWER: a

31. Which qualities are maintained during all chemical reactions? Select all that apply.

a. the identity of the atoms present in the reactants
b. the number of atoms present in the reactants
c. the arrangement of chemical bonds present in the reactants
d. the number of reactant molecules

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ANSWER: a, b

32. The oxygen and hydrogens of a water molecule contains what type of bond?
    a. polar covalent
    b. ionic
    c. hydrogen
    d. van der Waals interactions

ANSWER: a

33. Which choice correctly lists the five most abundant elements found in living organisms?
    a. carbon, hydrogen, oxygen, nitrogen, iron
    b. sodium, carbon, oxygen, nitrogen, phosphorus
    c. magnesium, carbon, hydrogen, oxygen, nitrogen
    d. carbon, hydrogen, oxygen, nitrogen, phosphorus

ANSWER: d

34. Which choice ranks the elements carbon, sodium, calcium, and iodine in order of decreasing number of valence electrons?
    a. I→C→Ca→Na
    b. I→Ca→Na→C
    c. C→Na→Ca→I
    d. C→Ca→Na→I

ANSWER: a

35. Which choice ranks the elements carbon, sodium, calcium, and iodine in order of decreasing number of energy shells/levels?
    a. C→Na→Ca→I
    b. I→Ca→Na→C
    c. I→C→Ca→Na
    d. C→Ca→N→I

ANSWER: b

36. Rank the elements carbon, phosphorus, calcium, and iodine in order of decreasing number of valence electrons.
    a. I→P→C→Ca
    b. I→Ca→P→C
    c. C→P→Ca→I
    d. P→C→Ca→I

ANSWER: a

37. Rank the elements carbon, phosphorus, calcium, and iodine in order of decreasing number of energy shells/levels.

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a. I→P→C→Ca
b. C→P→Ca→I
c. I→Ca→P→C
d. P→C→Ca→I

ANSWER: c

38. Helicase is an enzyme that separates the double helix of the DNA into two separate strands. How do you think helicase does this?

a. by breaking ionic bonds
b. by breaking phosphodiester bonds
c. by breaking peptide bonds
d. by breaking hydrogen bonds

ANSWER: d

39. Two of the main ingredients in plant fertilizer are phosphorus and nitrogen. These elements are found in which classes of biomolecules?

a. carbohydrates and DNA
b. proteins and carbohydrates
c. DNA and proteins
d. lipids and carbohydrates

ANSWER: c

40. Although monosaccharides can exist in linear form, virtually all cellular monosaccharides are found in circular form.

a. true
b. false

ANSWER: a

41. Imagine you were there when Stanley Miller performed his experiment to reproduce the building blocks of life. If Miller originally identified 5 different amino acids, how many polypeptides that are 10 amino acids long could be made from just these 5 amino acids?

a. The answer cannot be determined from the information provided.
b. $10^5 = 100{,}000$
c. $5 \times 10 = 50$
d. $5^{10} = 9{,}765{,}625$

ANSWER: d

42. Studies of the origin of life on Earth help us to consider what would be required for life elsewhere in the universe. What is most likely to be true of extraterrestrial life if it exists?

a. Carbon will act as the backbone for organic molecules.
b. Light from a nearby star will make photosynthesis possible.

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c. Oxygen will be used to convert energy in cells.
d. Water will not be required to sustain life.

ANSWER: a

43. Current theory about molecular systems in the very earliest evolution of living cells suggests that which of these types of biomolecules probably provided the stored genetic information?
a. DNA
b. RNA
c. proteins
d. carbohydrates
e. biomolecules unlike those in modern cells

ANSWER: b

44. Which gas was not a component of the simulated atmosphere in the Miller-Urey experiment?
a. ammonia
b. water vapor
c. hydrogen
d. methane
e. oxygen

ANSWER: e

45. Rank the elements carbon, sodium, calcium, and iodine in order of decreasing number of valence electrons.
a. C, I, Ca, Na
b. I, C, Ca, Na
c. Na, Ca, C, I
d. Ca, Na, I, C
e. I, C, Na, Ca

ANSWER: b

46. Rank the elements carbon, sodium, calcium, and iodine in order of decreasing number of energy shells/levels.
a. I, Ca, Na, C
b. C, I, Ca, Na
c. Na, Ca, C, I
d. Ca, Na, I, C
e. I, C, Ca, Na

ANSWER: a

47. Rank the elements carbon, phosphorus, calcium, and iodine in order of decreasing number of valence electrons.
a. Ca, P, I, C

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b. C, I, Ca, P
c. P, Ca, C, I
d. I, P, C, Ca
e. I, C, Ca, P

ANSWER: d

48. Rank the elements carbon, phosphorus, calcium, and iodine in order of decreasing number of energy shells/levels.
a. P, Ca, C, I
b. C, I, Ca, P
c. I, Ca, P, C
d. Ca, P, I, C
e. I, Ca, C, P

ANSWER: c

49. As part of their normal function, many proteins bind to DNA briefly and then release it again. Which types of interactions might be involved in these transient protein-DNA interactions? Select all that apply.
a. hydrogen bonds
b. ionic bonds
c. covalent bonds
d. van der Waals forces

ANSWER: a, b, d

50. An atom with three electrons has:
a. three occupied orbitals, each of which contains one electron.
b. one occupied orbital with three electrons.
c. two occupied orbitals, one of which has two electrons and the other has one.
d. three energy shells, each of which contains one electron.

ANSWER: c

51. For an atom that is not an ion, which statement must be true?
a. The number of electrons equals the number of protons.
b. The number of electrons equals the number of neutrons.
c. The number of protons equals the number of neutrons.
d. The number of neutrons must be less than the number of electrons.

ANSWER: a

52. Which choice correctly pairs the particles of an atom with their physical properties?
a. proton - positively charged; neutron - uncharged; electron - negatively charged
b. proton - negatively charged; neutron - uncharged; electron - positively charged
c. proton- positively charged; neutron - negatively charged; electron - uncharged

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d. proton - uncharged; neutron - negatively charged; electron - positively charged

ANSWER: a

53. Sometimes, atoms gain or lose particles. The loss of which particles results in a change of atomic mass? Select all that apply.

a. a neutron
b. a proton
c. an electron

ANSWER: a, b

54. Sometimes, atoms gain or lose particles. The loss of which particles would result in a change of overall electrical charge? Select all that apply.

a. a neutron
b. an electron
c. a proton

ANSWER: b, c

55. The most common isotope of oxygen has 8 protons and an atomic mass of 16. How many neutrons are present in the oxygen nucleus?

a. 8
b. 4
c. 6
d. 2
e. 10

ANSWER: a

56. The most common isotope of oxygen has 8 protons and an atomic mass of 16. How many electrons are present in the orbitals around an atom of oxygen?

a. 2
b. 4
c. 6
d. 8
e. 10

ANSWER: d

57. The most common isotope of oxygen has an atomic mass of 16 (^{16}O). An isotope with an atomic mass of 18 (^{18}O) is also stable. How many valence electrons are present in ^{18}O?

a. the same as in ^{16}O
b. more than in ^{16}O
c. fewer than ^{16}O
d. None of the other answer options is correct.

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ANSWER: a

58. Which bonds rely on the attraction of positive and negative charges? Select all that apply.
    a. ionic bonds
    b. hydrogen bonds
    c. covalent bonds

ANSWER: a, b

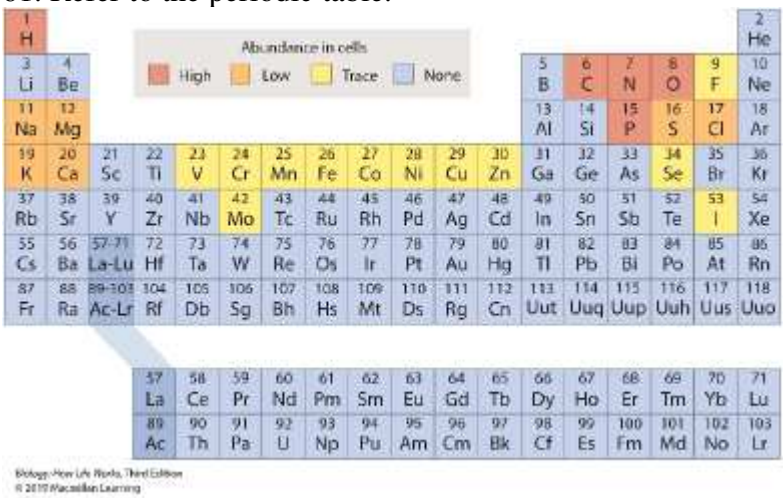
59. The description "two of the outermost atomic orbitals of two atoms, each containing one electron, merge into a single orbital containing a full complement of two electrons" refers to which type of bonds? Select all that apply.
    a. hydrogen bonds
    b. ionic bonds
    c. covalent bonds

ANSWER: c

60. Which bonds occur between two atoms in each of which the number of protons does not equal the number of electrons? Select all that apply.
    a. ionic bonds
    b. covalent bonds
    c. hydrogen bonds

ANSWER: a

61. Refer to the periodic table.



Decide which molecule is held together by ionic bonds.
    a. CO_2
    b. KCl
    c. NH_3
    d. NO

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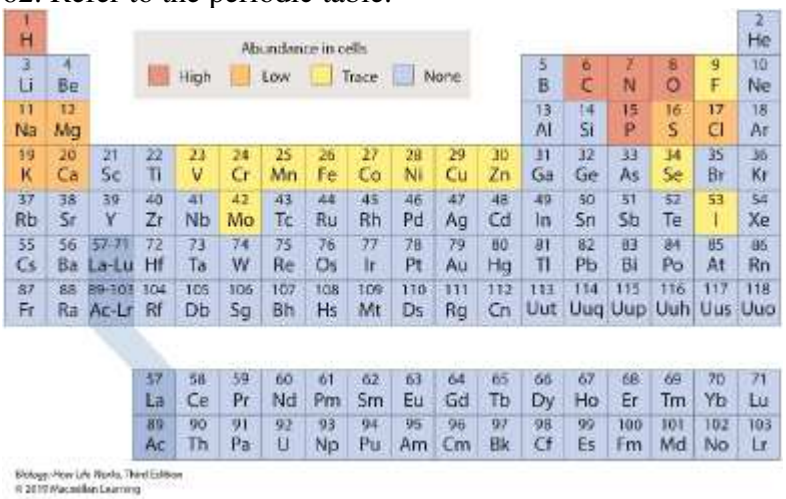
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e. CH_4

ANSWER: b

62. Refer to the periodic table.



Decide which molecule is held together by polar covalent bonds.

a. NH_3

b. CO_2

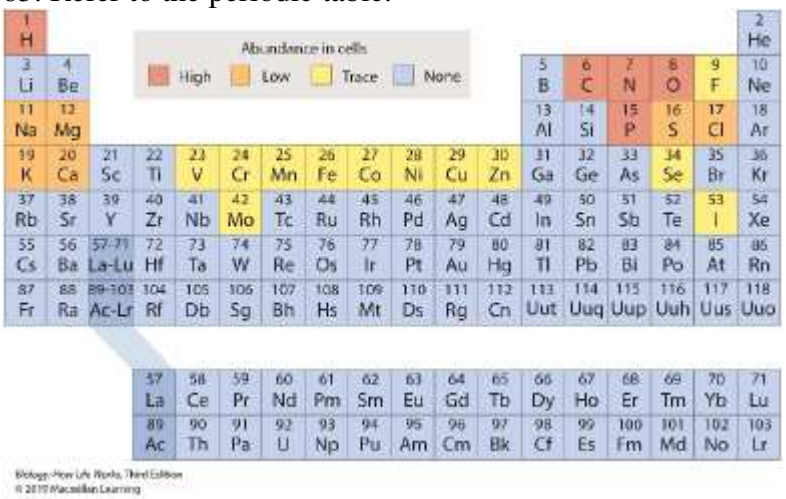
c. KCl

d. NO

e. CH_4

ANSWER: a

63. Refer to the periodic table.



Decide which molecule is held together by nonpolar covalent bonds.

a. H_2O

b. NH_3

c. KCl

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d. CO_2

ANSWER: d

64. Of the given types of bonds between atoms, which is the strongest?
a. van der Waals forces
b. hydrogen bond
c. ionic bond
d. covalent bond

ANSWER: d

65. A pair of atoms joined by a polar covalent bond:
a. is unlikely to form hydrogen bonds with water.
b. has the charge spread evenly across both atoms.
c. has a slight positive charge on one atom and a slight negative charge on the other.
d. mixes well with nonpolar solvents.

ANSWER: c

66. Several chemical properties make water uniquely suited for its role as a central "molecule of life". Which statements are true?
a. Hydrogen bonding leads to high cohesiveness between water molecules.
b. Water resists temperature changes.
c. Water molecules are always polar.
d. Water is a good solvent of polar molecules and ions.
e. The structure of a water molecule is stabilized by hydrogen bonds.

ANSWER: a, b, c, d

67. The association of individual water molecules with other water molecules is called _____ and occurs through _____ bonds between water molecules.
a. adhesion; hydrogen
b. cohesion; polar covalent
c. adhesion; polar covalent
d. cohesion; hydrogen

ANSWER: d

68. The unique properties of water are due to the _____ of water molecules and the ability of water to form _____ with other water molecules and with other polar molecules.
a. polarity; polar covalent bonds
b. polarity; hydrogen bonds
c. electronegativity; polar covalent bonds
d. hydrophobicity; hydrogen bonds

ANSWER: b

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69. You have an aqueous solution with a pH of exactly 7.0. What would you add to make the solution more acidic?
a. hydrogen chloride (HCl)
b. sodium hydroxide (NaOH)
c. sodium chloride (NaCl)
d. deionized water (H_2O)

ANSWER: a

70. You have an aqueous solution with a pH of 6.0. What would you add to make the solution more basic?
a. hydrogen chloride (HCI)
b. sodium hydroxide (NaOH)
c. sodium chloride (NaCl)
d. deionized water (H_2O)

ANSWER: b

71. You have an aqueous solution with a pH of 8.0. You add sodium chloride to a concentration of 1 gram per 100 milliliters. What happens to the pH?
a. It stays the same.
b. It goes down.
c. It goes up.
d. It depends on the temperature.

ANSWER: a

72. A _____ substance could contain _____ bonds which allow it to interact with water.
a. hydrophobic; non-polar covalent
b. hydrophilic; non-polar covalent
c. hydrophobic; hydrogen
d. hydrophilic; hydrogen
e. hydrophilic; polar covalent

ANSWER: e

73. A _____ substance could contain _____ bonds which cause it not to interact with water.
a. hydrophobic; nonpolar covalent
b. hydrophilic; nonpolar covalent
c. hydrophobic; hydrogen
d. hydrophilic; hydrogen
e. hydrophilic; polar covalent

ANSWER: a

74. Which choice ranks the elements carbon, sodium, calcium, and iodine in order of decreasing number of

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electrons?

a. C→Ca→Na→I
b. C→Na→Ca→I
c. I→C→Ca→Na
d. I→Ca→Na→C

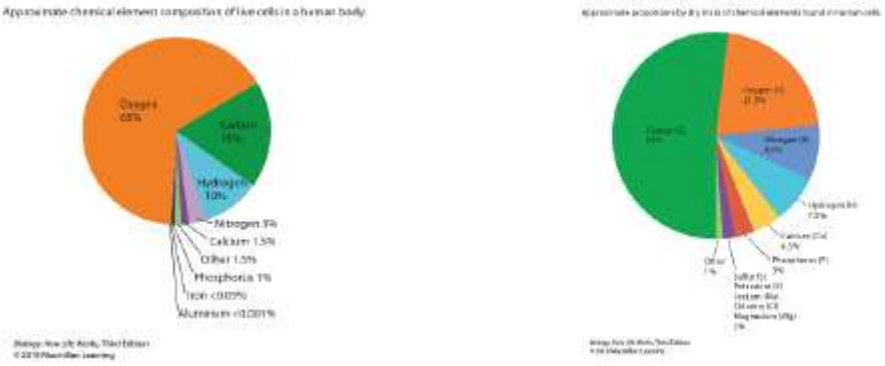
ANSWER: d

75. Which of these choices ranks the elements hydrogen, carbon, nitrogen, and oxygen in order of decreasing dry mass in living organisms?

a. O→C→H→N
b. C→O→H→N
c. O→H→C→N
d. C→N→O→H

ANSWER: b

76. Consider the two pie-graph representations of the composition of the human body and human cells presented in the figure shown.



Why is oxygen so prevalent in live cells of the human body compared to oxygen in the dry mass of human cells?

a. The "dry biomass" does not include the 60-80% of water, mostly oxygen mass, that is present in a typical, live human.
b. The human body is composed of much more than just the cells that make up the tissues and organs.
c. The human body stores a large amount of oxygen within its tissues and organs for use when oxygen is low.
d. These represent two different experimental analyses, so there is natural variation.

ANSWER: a

77. Rank the elements carbon, nitrogen, phosphorus, and oxygen in order of decreasing proportion of human cell dry mass.

a. C→O→N→P
b. O→C→N→P
c. C→N→P→O
d. P→N→O→C

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e. N→O→P→C

ANSWER: a

78. Rank the elements carbon, phosphorus, calcium, and iodine in order of greatest dry mass in human cells.

a. I→P→C→Ca
b. I→Ca→P→C
c. C→P→Ca→I
d. P→C→Ca→I

ANSWER: c

79. Single covalent bonds between carbon atoms:

a. allow free rotation of the carbon atoms around the bond.
b. are strong enough to support long chains of carbon atoms.
c. allow a molecule to twist and turn into many different arrangements.
d. All of these choices are correct.

ANSWER: d

80. Three carbon atoms are linked by single covalent bond such that those carbon atoms and bonds together form the shape of a V. All of the unshared electrons form covalent bonds with hydrogen. How many hydrogen atoms does this molecule contain?

a. 10
b. 4
c. 6
d. 2
e. 8

ANSWER: e

81. Because of hydrogen bonding, water is uniquely suited for its central role in life. Many hydrophilic molecules interact freely with water, but a number of hydrophobic molecules are important for life, too. How does the interaction between water and hydrophobic molecules help to organize biological systems?

a. Because water molecules preferentially associate with each other, they force hydrophobic molecules to associate with each other and not with water molecules.
b. The ionic bonds between water molecules cause hydrophobic molecules to associate with each other and not with water molecules.
c. Because cells are not pure water—in that they have many substances dissolved within them—the hydrophilic/hydrophobic effect has a limited role in biological organization.
d. None of the other answer options is correct.

ANSWER: a

82. Which bonds are covalent bonds?

a. peptide bonds
b. glycosidic bonds

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c. phosphodiester bonds
d. All of these choices are correct.

ANSWER: d

83. In general, colder temperatures would tend to reduce the fluidity of membranes. In response, cells can adjust the composition of their membranes to maintain the proper degree of fluidity. How would the membrane change in response to colder temperatures?

a. The amount of saturated triacylglycerols would increase.
b. The amount of unsaturated fatty acids would increase.
c. The length of the fatty acid chains in the phospholipids would increase.
d. The amount of unsaturated fatty acids would decrease.
e. The amount of saturated triacylglycerols would decrease.

ANSWER: b

84. Consider the structure and function of DNA. Which statement is true?

a. Because DNA contains carbohydrates, it provides structural support to the cells.
b. The phosphodiester bonds that stabilize the association of the two strands are easily broken and reformed.
c. If the sequence of one DNA strand is known, then the sequence of the other strand can be determined.
d. Because DNA is made of phosphate groups that are ionized, it could easily pass through a cell membrane.

ANSWER: c

85. In DNA molecules, complementary base pairs always include one purine nucleotide and one pyrimidine nucleotide. Suppose you analyzed the DNA from some bacterial cells and you found that 16% of the nucleotides are adenine nucleotides. What are the percentages of the other nucleotides in the bacterial DNA?

a. 16% thymine, 34% guanine, 34% cytosine
b. 34% uracil, 16% guanine, 16% cytosine
c. 34% thymine, 34% guanine, 16% cytosine
d. 34% thymine, 16% guanine, 34% cytosine
e. None of the other answer options is correct.

ANSWER: a

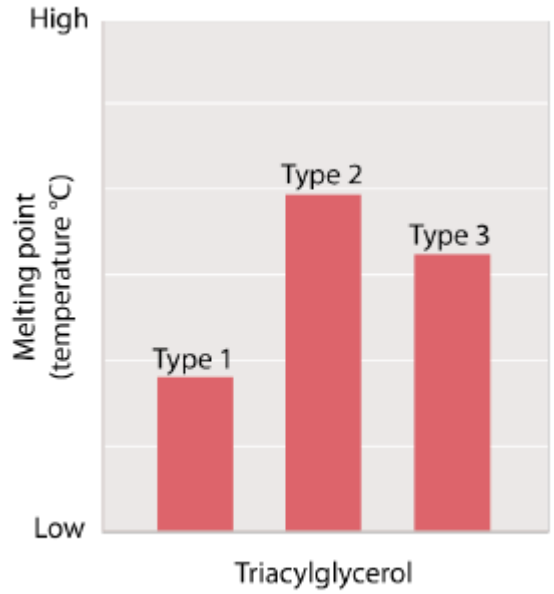
86. Samples of three different triacylglycerol types were tested to determine the melting point of each one. The results of the tests are shown in the graph.

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The length of the fatty acids A, B, and C is the same. Which of the three triacylglycerols is likely to have the most double bonds in the fatty acids?

a. type 1
b. type 2
c. type 3
d. There is no way of knowing which of the three triacylglycerols would likely have the most double bonds based on the information available.

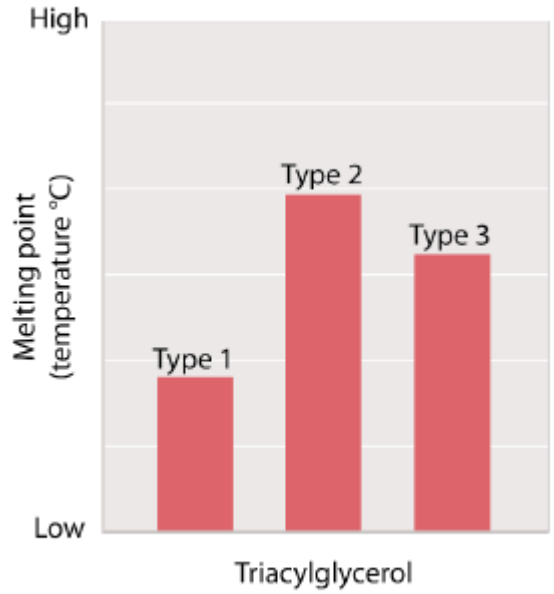
ANSWER: a

87. Samples of three different triacylglycerols were tested to determine the melting point of each one. The results of the tests are shown in the graph.

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The length of the fatty acids in A, B, and C is the same. Which of the three triacylglycerols is likely to have the fewest number of double bonds in the fatty acids?

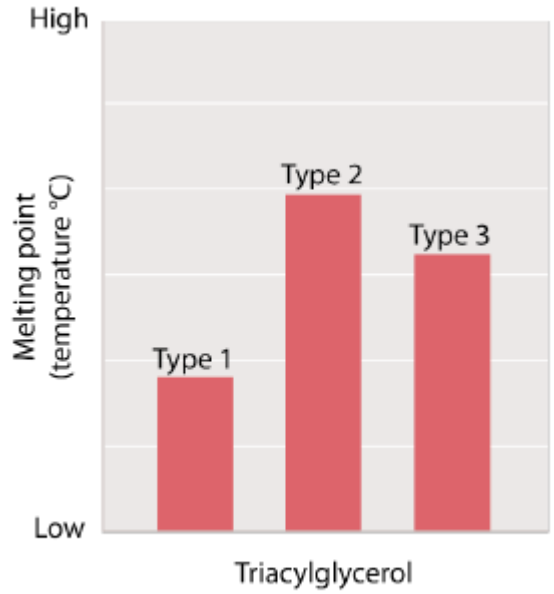
a. type 2
b. type 1
c. type 3
d. There is no way of knowing which of the three triacylglycerols would likely have the fewest double bonds based on the information available.

ANSWER: a

88. Samples of three different triacylglycerols were tested to determine the melting point of each one. The results of the tests are shown in the graph.

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The length of the fatty acids in A, B, and C is the same. Which of the three fatty acids is likely to have the most saturated fatty acids?

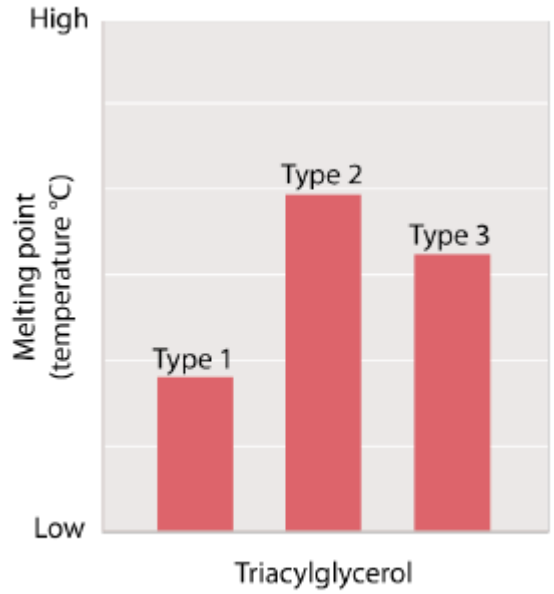
a. type 2
b. type 1
c. type 3
d. There is no way of knowing which of the three triacylglycerols would likely have the most saturated fatty acids based on the information available.

ANSWER: a

89. Samples of three different triacylglycerols were tested to determine the melting point of each one. The results of the tests are shown in the graph.

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The length of the fatty acids in A, B, and C is the same. Which of the three fatty acids is likely to have the most unsaturated fatty acids?

a. type 3
b. type 2
c. type 1
d. There is no way of knowing which of the three triacylglycerols would likely have the most unsaturated fatty acids based on the information available.

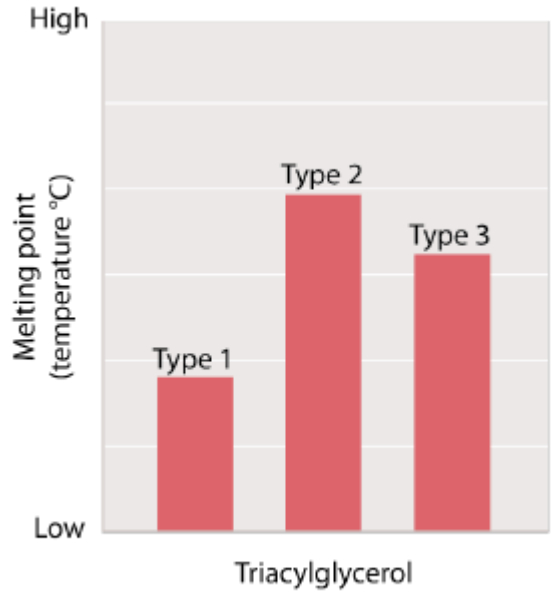
ANSWER: c

90. Samples of three different triacylglycerols were tested to determine the melting point of each one. The results of the tests are shown in the graph.

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The number of double bonds in each of the fatty acids A, B, and C is the same. Which of the three triacylglycerols is likely to have the fatty acids with the longest hydrocarbon chains?

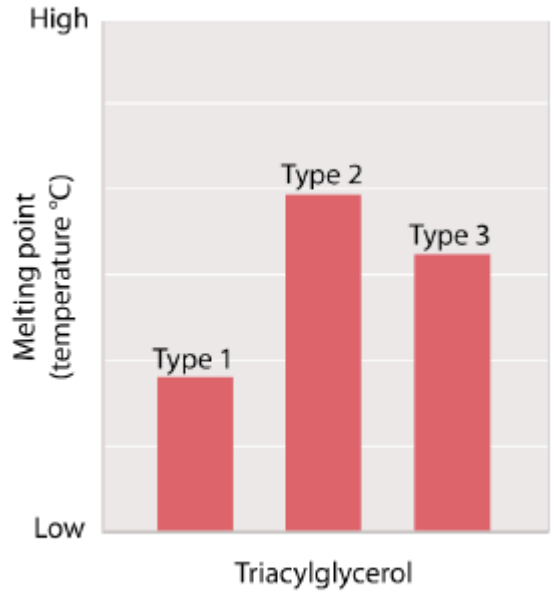
a. type 1
b. type 2
c. type 3
d. There is no way of knowing which of the three triacylglycerols would likely have the fatty acids with the longest hydrocarbon chains based on the information available.

ANSWER: b

91. Samples of three different triacylglycerols were tested to determine the melting point of each one. The results of the tests are shown in the graph.

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The number of double bonds in each of the fatty acids in A, B, and C is the same. Which of the three triacylglycerols is likely to have the fatty acids with the shortest hydrocarbon chains?

a. There is no way of knowing which of the three triacylglycerols would likely have the fatty acids with the shortest hydrocarbon chains based on the information available.
b. type 2
c. type 3
d. type 1

ANSWER: d

92. How many hydrogen atoms are present in a hydrocarbon chain of five carbon atoms with one double bond and the rest single bonds?

a. 8
b. 10
c. 6
d. 12

ANSWER: b

93. How many hydrogen atoms are present in a hydrocarbon chain of five carbon atoms with two double bonds and two single bonds?

a. 10
b. 6
c. 8
d. 12

ANSWER: c

94. How many hydrogen atoms are present in a five-carbon hydrocarbon molecule with four of the carbons

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linked in a chain by single covalent bonds and with the fifth carbon atom attached by a single bond as a branch to the second carbon in the chain?

a. 6
b. 8
c. 10
d. 12

ANSWER: d

95. How many hydrogen atoms are present in a ring of six carbon atoms held together by alternating single and double bonds?

a. 6
b. 8
c. 10
d. 12

ANSWER: a

96. What important feature of noncovalent molecular interactions makes them so important to life?

a. They can only occur in cells.
b. They are strong in a cellular environment that holds atoms together tightly.
c. They are weak in a cellular environment, so they can be made, broken, and reformed easily.
d. None of the other answer options is correct.

ANSWER: c

97. Peptide bonds are characteristic of:

a. nucleic acids.
b. carbohydrates.
c. lipids.
d. fatty acids.
e. proteins.

ANSWER: e

98. Pyrimidine and purine bases are found in:

a. carbohydrates.
b. nucleic acids.
c. lipids.
d. fatty acids.
e. proteins.

ANSWER: b

99. Aldoses and ketoses are examples of:

a. lipids.

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b. nucleic acids.
c. proteins.
d. carbohydrates.
e. fatty acids.

ANSWER: d

100. An unsaturated fatty acid contains:
a. one or more double bonds between carbon atoms.
b. only single covalent bonds between carbon atoms.
c. only carbon and hydrogen.
d. one or more double bonds between hydrogen atoms.

ANSWER: a

101. A phosphodiester bond in nucleic acid polymers is formed between:
a. two amino acids.
b. a 5' phosphate and a 3' hydroxyl group.
c. a base and a sugar.
d. a 3' phosphate and a 5' hydroxyl group.
e. a fatty acid and a glycerol molecule.

ANSWER: b

102. Which component of an amino acid differs from one amino acid to another?
a. the hydrogen atom opposite the R group
b. the carboxyl group
c. the α-carbon atom
d. the amino group
e. the side chain

ANSWER: e

103. Which components of an amino acid participate in the formation of the peptide bonds that join amino acids into a chain to form proteins? Select all that apply.
a. the amino group
b. the carboxyl group
c. the α-carbon atom
d. the side chain
e. the hydrogen atom opposite the R group

ANSWER: a, b

104. If you isolate a single nucleotide from a nucleic acid chain and determine that the nitrogenous ring structure is cytosine, you could say with certainty that the nucleotide may have come from:
a. either DNA or RNA.

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b. RNA but not DNA.
c. DNA but not RNA.
d. neither DNA nor RNA.

ANSWER: a

105. Which choices can combine to form a triacylglycerol molecule? Select all that apply.
a. glycerol
b. unsaturated fatty acid
c. saturated fatty acid
d. cholesterol
e. phosphate

ANSWER: a, b, c

106. If an atom has three electrons, it will have ____ occupied orbitals _____ of which is/are full.
a. three; one
b. three; all
c. two; both
d. three; two
e. two; one

ANSWER: e

107. An atom that is not an ion is electrically neutral because the number of _____ charged _____ always equals the number of _____ charged _____.
a. negatively; protons; positively; electrons
b. negatively; electrons; positively; neutrons
c. un-; neutrons; positively; protons
d. positively; protons; negatively; electrons
e. negatively; neutrons; positively; protons

ANSWER: d

108. Which choice correctly pairs the particles in an atom with its electrical charge?
a. proton–positively charged; neutron–uncharged; electron–negatively charged
b. proton–uncharged; neutron–uncharged; electron–negatively charged
c. proton–positively charged; neutron–negatively charged; electron–negatively charged
d. proton–negatively charged; neutron–uncharged; electron–negatively charged

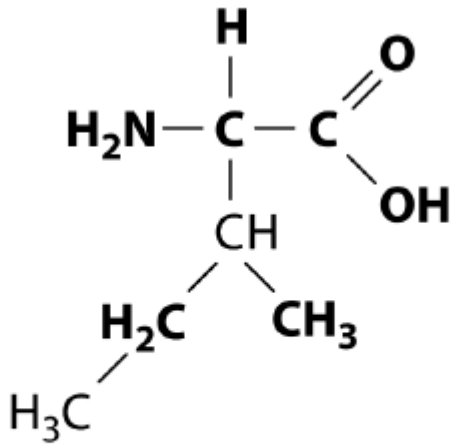
ANSWER: a

109. Refer to the image.

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The molecule shown here is:

a. a protein.
b. an amino acid.
c. a nucleotide.
d. a monosaccharide.
e. a triacylglycerol.

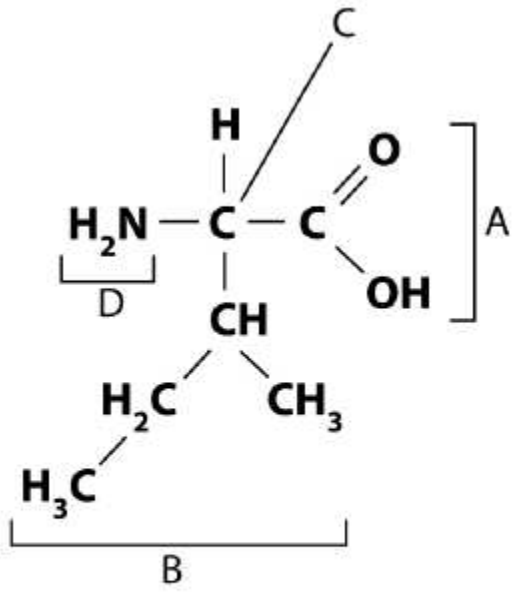
ANSWER: b

110. Refer to the image.

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In the molecule shown here, label C points to the _____ and label B points to the _____.

a. amino group; carboxyl group
b. carboxyl group; R group
c. R group; carboxyl group
d. glycerol; fatty acid
e. alpha carbon; R group

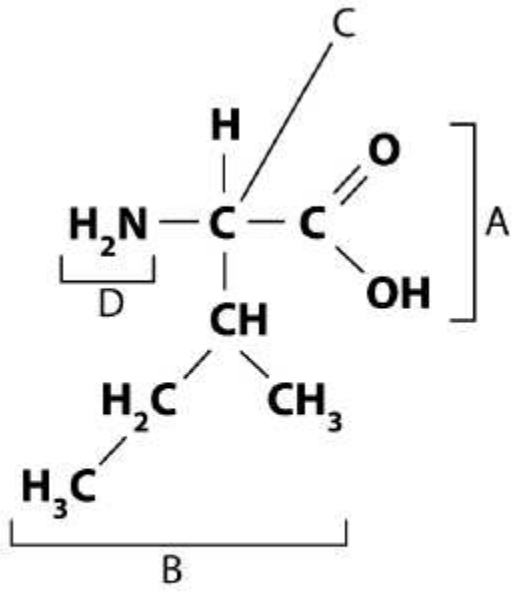
ANSWER: e

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In the molecule shown here, label A points to the _____ and label D points to the _____.

a. R group; carboxyl group
b. carboxyl group; R group
c. carboxyl group; amino group
d. glycerol; fatty acid
e. alpha carbon; R group

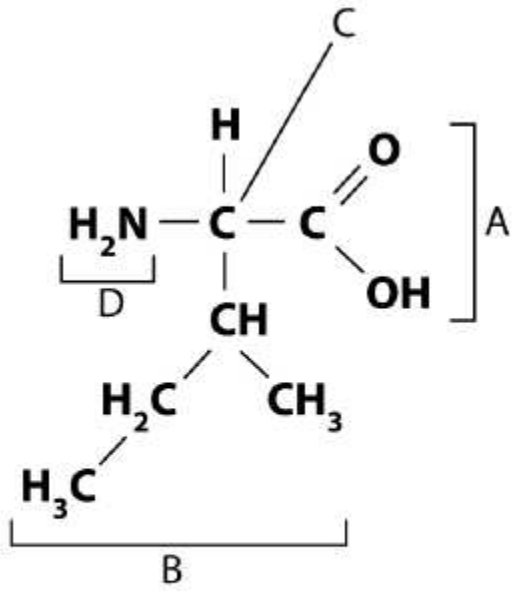
ANSWER: c

112. Refer to the image.

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In the molecule shown here, which labeled parts would form peptide bonds?

a. B and D
b. A and B
c. B and C
d. A and D
e. C and D

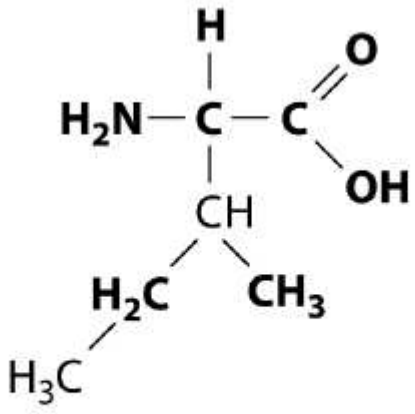
ANSWER: d

113. Refer to the image.

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A polymer consisting of many subunits similar to the molecule shown would be what kind of biomolecule?

a. a protein
b. an amino acid
c. a nucleic acid
d. a lipid
e. a carbohydrate

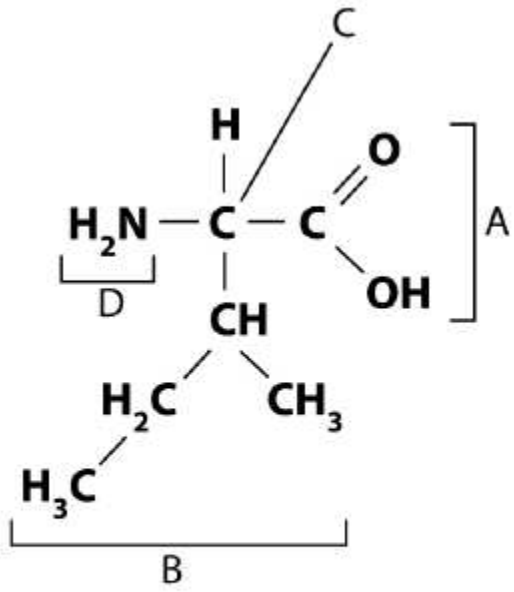
ANSWER: a

114. Refer to the image.

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In the molecule shown, which labeled parts would be ionized in the environment of the cell?

a. C and D
b. A and B
c. B and C
d. B and D
e. A and D

ANSWER: e

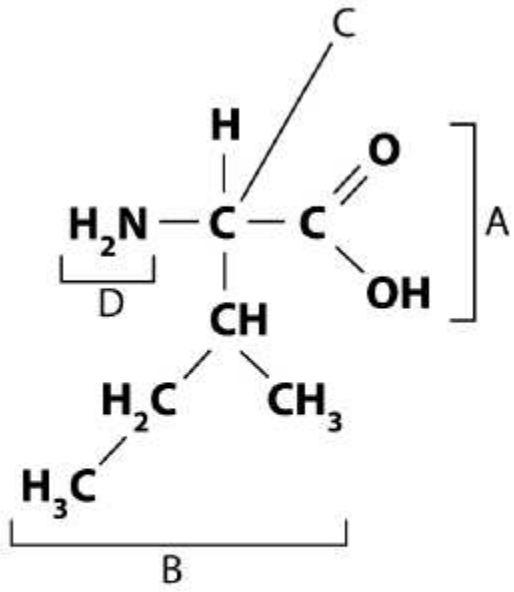
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In the molecule shown, which labeled part or parts would be different in each of the other 19 amino acids?

a. B
b. D
c. B and D
d. A and D
e. C and D

ANSWER: a

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