Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) According to the rules of complementary base pairing in nucleic acids, cytosine would pair with the base 1) _____
A) uracil. B) thymine. C) guanine. D) adenine. E) cytosine.

Answer: C
Explanation: A)
B)
C)
D)
E)

2) A side chain on an amino acid is sometimes called _____. 2) _____
A) an R group.
B) nucleic acid.
C) a polypeptide chain.
D) fibrous or globular.
E) an isozyme.

Answer: A
Explanation: A)
B)
C)
D)
E)

3) A nucleotide consists of 3) _____
A) a five-carbon sugar and an amino acid.
B) a five-carbon sugar and phosphate group.
C) a five-carbon sugar and a nitrogenous base.
D) a phosphate group and a nitrogenous base.
E) a five-carbon sugar, a nitrogenous base, and a phosphate group.

Answer: E
Explanation: A)
B)
C)
D)
E)

4) A high-energy bond in ATP is present 4) _____
A) between adenine and a phosphate group.
B) between adenine and ribose.
C) between the first and second phosphate group.
D) between the second and third phosphate group.
E) both C and D

Answer: E
Explanation: A)
B)
C)
D)
E)

5) When placed in water, an inorganic compound dissociates 99 percent, forming hydrogen ions and anions. This compound would be 5) _____
A) a salt.
B) a strong base.
C) a weak base.
D) a weak acid.
E) a strong acid.

Answer: E
Explanation: A)
B)
C)
D)
E)

6) A shortage of cholesterol in the body could interfere with the formation of 6) _____
A) plasma membranes.
B) sex hormones.
C) glycogen.
D) proteins.
E) both A and C

Answer: E
Explanation: A)
B)
C)
D)
E)

7) The mass number represents the number of 7) _____
A) protons in an atom.
B) electrons in an ion.
C) protons + neutrons.
D) neutrons + electrons.
E) neutrons in an atom.

Answer: C
Explanation: A)
B)
C)
D)
E)

8) AB → A + B is to decomposition as A + B → AB is to 8) _____
A) exchange.
B) synthesis.
C) replacement.
D) metabolism.
E) combustion.

Answer: B
Explanation: A)
B)
C)
D)
E)

9) Identify the product formed from the phosphorylation of ADP. 9) _____
A) adenosine triphosphate
B) ribose
C) adenine
D) deoxyribonucleic acid
E) adenosine diphosphate

Answer: A
Explanation: A)
B)
C)
D)
E)

10) The molecule O_2 is known as 10) _____
A) oxygen.
B) organic.
C) oxide.
D) B or C
E) none of the above

Answer: A
Explanation: A)
B)
C)
D)
E)

11) AMP + P → 11) _____
A) adenine B) DNA C) ADP D) ATP E) 2ADP

Answer: C
Explanation: A)
B)
C)
D)
E)

12) In an aqueous solution, cations are attracted toward 12) _____
A) hydrogen ions.
B) buffers.
C) anions.
D) water.
E) salt.

Answer: C
Explanation: A)
B)
C)
D)
E)

13) The "atomic number" of an atom is determined by the number of _____ it has. 13) _____
A) protons
B) electrons
C) protons + electrons
D) neutrons
E) protons + neutrons

Answer: A
Explanation: A)
B)
C)
D)
E)

14) Continuous breakdown and replacement of cellular molecules is termed 14) _____
A) metabolic turnover.
B) metabolism.
C) anabolic turnover.
D) catabolic turnover.
E) both A and C

Answer: A
Explanation: A)
B)
C)
D)
E)

15) Cholesterol, phospholipids, and glycolipids are examples of 15) _____
A) structural lipids.
B) steroids.
C) dietary fats.
D) lipid drugs.
E) prostaglandins.

Answer: A
Explanation: A)
B)
C)
D)
E)

16) Which of the following statements about hydrogen bonds is false? 16) _____

A) Hydrogen bonds are responsible for many of the properties of water.
B) Hydrogen bonds are important for holding large molecules together.
C) Hydrogen bonds can occur within a single molecule.
D) Hydrogen bonds can form between neighboring molecules.
E) Hydrogen bonds are strong attractive forces between hydrogen atoms and negatively charged atoms.

Answer: E
Explanation: A)
B)
C)
D)
E)

17) The "atomic weight" of an atom reflects the average number of 17) _____

A) protons + neutrons + electrons.
B) protons.
C) neutrons.
D) protons + neutrons.
E) electrons.

Answer: A
Explanation: A)
B)
C)
D)
E)

18) An important buffer in body fluids is 18) _____

A) H_2O.
B) NaOH.
C) NaCl.
D) HCl.
E) $NaHCO_3$.

Answer: E
Explanation: A)
B)
C)
D)
E)

19) Chemical reactions that yield energy, such as heat, are said to be 19) _____
A) exergonic.
B) thermonuclear.
C) endergonic.
D) activated.
E) neutral.

Answer: A
Explanation: A)
B)
C)
D)
E)

20) In hydrolysis reactions, compounds react with 20) _____
A) water, causing synthesis.
B) hydrogen, causing decomposition.
C) carbon, causing decomposition.
D) glucose, causing decomposition.
E) water, causing decomposition.

Answer: E
Explanation: A)
B)
C)
D)
E)

21) Hydrophilic molecules readily associate with 21) _____
A) hydrophobic molecules.
B) water molecules.
C) lipid molecules.
D) both A and B
E) all of the above

Answer: B
Explanation: A)
B)
C)
D)
E)

22) The mass of an atom is largely determined by the number of _____ it has. 22) _____
A) electrons
B) protons + neutrons
C) protons
D) protons + electrons
E) neutrons

Answer: B
Explanation: A)
B)
C)
D)
E)

23) Of the following choices, the pH of the least acidic solution is 23) _____

A) 2.3. B) 4.5. C) 1.0. D) 6.0. E) 12.0.

Answer: E

Explanation: A)
B)
C)
D)
E)

24) Elements that have atoms with full outer shells of electrons 24) _____

A) are inert gases.
B) will normally form cations.
C) frequently form hydrogen bonds.
D) will form many compounds.
E) will normally form anions.

Answer: A

Explanation: A)
B)
C)
D)
E)

25) The most abundant high-energy compound in cells is 25) _____

A) DNA.
B) adenosine triphosphate.
C) RNA.
D) adenosine diphosphate.
E) adenosine monophosphate.

Answer: B

Explanation: A)
B)
C)
D)
E)

26) Ionic bonds are formed when 26) _____

A) a pair of electrons is shared unequally by two atoms.
B) two or more atoms lose electrons at the same time.
C) electrons are completely transferred from one atom to another.
D) atoms share electrons.
E) hydrogen forms bonds with negatively charged atoms.

Answer: C

Explanation: A)
B)
C)
D)
E)

27) Which of the following is the symbol for an amino group? 27) _____

A) –AMO B) $-PO_3$ C) –OH D) $-NH_2$ E) –COOH

Answer: D

Explanation: A)
B)
C)
D)
E)

28) Artificial sweeteners 28) _____

A) are inorganic sugar substitutes.
B) are generally many times sweeter than sucrose.
C) are naturally similar to sugars.
D) provide the same number of calories as an equivalent amount of sucrose.
E) are always some form of carbohydrate.

Answer: B

Explanation: A)
B)
C)
D)
E)

29) The molecule NO is known as 29) _____

A) noxious oxygen.
B) noxious oxide.
C) nitrous oxide.
D) nitric oxide.
E) nitric oxygen.

Answer: D

Explanation: A)
B)
C)
D)
E)

30) The structure of RNA differs from DNA in that 30) _____

A) RNA contains pyrimidines but not purines.
B) DNA contains pyrimidines but not purines.
C) DNA contains purines but not pyrimidines.
D) the backbone of RNA contains ribose.
E) RNA contains purines but not pyrimidines.

Answer: D

Explanation: A)
B)
C)
D)
E)

31) Which pH is closest to normal body pH? 31) _____

A) pH 3 B) pH 4 C) pH 8 D) pH 7 E) pH 2

Answer: D

Explanation: A)
B)
C)
D)
E)

32) The chemical behavior of an atom is determined by 32) _____

A) the mass of the nucleus.
B) the size of the atom.
C) the outermost electron shell.
D) the number of protons.
E) the number of neutrons.

Answer: C

Explanation: A)
B)
C)
D)
E)

33) Which property of water helps keep body temperature stabilized? 33) _____

A) reactivity
B) thermal inertia
C) kinetic energy
D) surface tension
E) lubrication

Answer: B

Explanation: A)
B)
C)
D)
E)

34) Muscle proteins are destroyed after 17 days and then replaced. This is an example of 34) _____

A) surveillance.
B) metabolic turnover.
C) surface tension.
D) disease.
E) specificity.

Answer: B

Explanation: A)
B)
C)
D)
E)

35) A polysaccharide that is formed in liver and muscle cells to store glucose is 35) _____
A) fructose.
B) cellulose.
C) lactose.
D) glycogen.
E) sucrose.

Answer: D
Explanation: A)
B)
C)
D)
E)

36) Magnesium atoms have two electrons in the outermost shell. As a result, you would expect magnesium to form ions with a charge of 36) _____
A) +2.
B) +1.
C) -2.
D) -1.
E) either +2 or -2

Answer: A
Explanation: A)
B)
C)
D)
E)

37) If an isotope of oxygen has 8 protons, 10 neutrons, and 8 electrons, its mass number is 37) _____
A) 26. B) 18. C) 16. D) 8. E) 12.

Answer: B
Explanation: A)
B)
C)
D)
E)

38) The average time between synthesis and breakdown is known as the _____ time. 38) _____
A) anabolism
B) catabolism
C) turnover
D) metabolism
E) specificity

Answer: C
Explanation: A)
B)
C)
D)
E)

39) Which of the following statements about water is not correct? 39) _____

A) is responsible for much of the mass of the human body
B) is composed of polar molecules
C) has a relatively low heat capacity
D) contains hydrogen bonds
E) can dissolve many substances

Answer: C
Explanation: A)
B)
C)
D)
E)

40) Of the list below, which has the highest concentration of hydroxide ions? 40) _____

A) pH 14 B) pH 7 C) pH 1 D) pH 10 E) pH 2

Answer: A
Explanation: A)
B)
C)
D)
E)

41) Oxygen is required in biological systems for 41) _____

A) chemical messengers.
B) serving as catalysts.
C) storage of energy.
D) cellular metabolism.
E) serving as structural components of bone.

Answer: D
Explanation: A)
B)
C)
D)
E)

42) You would expect a peptide bond to link 42) _____

A) two nucleotides.
B) two simple sugars.
C) a peptide and a fatty acid.
D) two amino acids.
E) a sugar and a peptide.

Answer: D
Explanation: A)
B)
C)
D)
E)

43) A dust particle floating on a water surface illustrates 43) _____
A) static electricity.
B) surface tension.
C) hydrophilic attraction.
D) chemical tension.
E) heat capacity.

Answer: B
Explanation: A)
B)
C)
D)
E)

44) How would the lack of a cofactor for an enzyme affect that enzyme's function? 44) _____
A) The enzyme would not be able to function.
B) The enzyme would function more quickly.
C) The enzyme's function would not be altered.
D) The enzyme would cease to function after reaching a maximum rate.
E) The enzyme would function more slowly.

Answer: A
Explanation: A)
B)
C)
D)
E)

45) Indicate which of these lists contains only trace elements. 45) _____
A) sulfur, chlorine, oxygen
B) silicon, fluorine, tin
C) selenium, hydrogen, calcium
D) cobalt, calcium, sodium
E) boron, oxygen, carbon

Answer: B
Explanation: A)
B)
C)
D)
E)

46) Which element commonly has only a proton as its nucleus? 46) _____
A) neon
B) hydrogen
C) helium
D) argon
E) none of the above

Answer: B
Explanation: A)
B)
C)
D)
E)

47) Each amino acid differs from another in the 47) _____

A) number of peptide bonds in the molecule.
B) number of central carbon atoms.
C) nature of the side chain.
D) number of carboxyl groups.
E) size of the amino group.

Answer: C
Explanation: A)
B)
C)
D)
E)

48) Identify which of the following is both an anion and a compound: 48) _____

A) HCO_3^- B) Na^+ C) Cl^- D) NaCl E) K^+

Answer: A
Explanation: A)
B)
C)
D)
E)

49) Each of the following is an example of an inorganic compound, except 49) _____

A) water. B) rocks. C) bases. D) salts. E) acids.

Answer: B
Explanation: A)
B)
C)
D)
E)

50) Glycoproteins and proteoglycans are combinations of amino acids and 50) _____

A) lipids.
B) fatty acids.
C) nucleic acids.
D) carbohydrates.
E) none of the above

Answer: D
Explanation: A)
B)
C)
D)
E)

51) In the reaction listed below, what coefficient needs to be added to balance the equation? 6 CO_2 + 6 $H_2O \rightarrow C_6H_{12}O_6$ + _____ O_2 51) _____

A) 2 B) 4 C) 6 D) 8 E) 10

Answer: C

Explanation: A)
B)
C)
D)
E)

52) Which of the following is/are needed to form a triglyceride molecule? 52) _____

A) 3 glycerol molecules
B) 3 fatty acid molecules
C) 1 glycerol molecule
D) both A and C
E) both B and C

Answer: E

Explanation: A)
B)
C)
D)
E)

53) Carbohydrates, lipids, and proteins are classified as 53) _____

A) inorganic molecules.
B) acids.
C) salts.
D) bases.
E) organic molecules.

Answer: E

Explanation: A)
B)
C)
D)
E)

54) Magnesium atoms have two electrons in the outermost shell and chlorine atoms have seven. The compound magnesium chloride would contain 54) _____

A) 1 magnesium and 2 chlorine.
B) 2 magnesium and 7 chlorine.
C) 1 magnesium and 1 chlorine.
D) 2 magnesium and 1 chlorine.
E) impossible to tell without more information

Answer: A

Explanation: A)
B)
C)
D)
E)

55) By weight, which element is the second most abundant in the human body? 55) _____

A) carbon
B) calcium
C) hydrogen
D) oxygen
E) nitrogen

Answer: A
Explanation: A)
B)
C)
D)
E)

56) A functional group is best described as reoccurring clusters of 56) _____

A) elements that occur in a salt.
B) amino acids in a globular protein.
C) atoms that greatly influence the chemical properties of molecules they are part of.
D) atoms that function in the body.
E) elements that form at high pH.

Answer: C
Explanation: A)
B)
C)
D)
E)

57) When a small amount of HCl or NaOH is added to a solution of Na_2HPO_4, the pH of the solution barely changes. Based on these observations, all of the following are true concerning the compound Na_2HPO_4, except 57) _____

A) Na_2HPO_4 is able to accept extra hydrogen ions from the HCl.
B) Na_2HPO_4 adsorbs excess H^+ and OH^- directly onto the surface of its crystalline structure.
C) Na_2HPO_4 is able to donate hydrogen ions to the OH^- from NaOH.
D) Na_2HPO_4 acts as a buffer.
E) Na_2HPO_4 is a salt formed from reacting a strong base with a weak acid.

Answer: B
Explanation: A)
B)
C)
D)
E)

58) H_2O is an example of a(n) 58) _____

A) water molecule.
B) glucose molecule.
C) covalent formula.
D) molecular formula.
E) ionic formula.

Answer: D
Explanation: A)
B)
C)
D)
E)

59) When electrons are transferred from one atom to another, and the two atoms unite as a result of the opposite charges, 59) _____

A) a molecule is formed.
B) a hydrogen bond is formed.
C) an ion is formed.
D) an ionic bond is formed.
E) a covalent bond is formed.

Answer: D
Explanation: A)
B)
C)
D)
E)

60) Most of the fat found in the human body is in the form of 60) _____

A) prostaglandins.
B) cholesterol.
C) monoglycerides.
D) phospholipids.
E) triglycerides.

Answer: E
Explanation: A)
B)
C)
D)
E)

61) The reaction A + B + energy →AB is an example of a(n) 61) _____
A) endergonic reaction.
B) equilibrium reaction.
C) exchange reaction.
D) exergonic reaction.
E) decomposition reaction.

Answer: A
Explanation: A)
B)
C)
D)
E)

62) An example of an organic substance is 62) _____
A) sucrose.
B) sodium chloride.
C) oxygen.
D) carbonic acid.
E) nitric oxide.

Answer: A
Explanation: A)
B)
C)
D)
E)

63) Ions with a + charge are called 63) _____
A) isotopes.
B) cations.
C) positrons.
D) anions.
E) radicals.

Answer: B
Explanation: A)
B)
C)
D)
E)

64) The maximum rate of an enzyme reaction occurs at 64) _____
A) hydrolysis.
B) dehydration.
C) synthesis.
D) saturation limit.
E) reversible.

Answer: D
Explanation: A)
B)
C)
D)
E)

65) In dehydration reactions, compounds 65) _____
A) convert water molecules to hydrogen and oxygen.
B) lose water molecules.
C) convert hydrogen and oxygen to water.
D) gain electrons.
E) gain water molecules.

Answer: B
Explanation: A)
B)
C)
D)
E)

66) The nucleus of an atom consists of 66) _____
A) protons.
B) electrons.
C) protons + electrons.
D) protons + neutrons.
E) neutrons.

Answer: D
Explanation: A)
B)
C)
D)
E)

67) Substrate molecules bind to enzymes at the _____ sites. 67) _____
A) carboxyl B) amino C) neutral D) reactant E) active

Answer: E
Explanation: A)
B)
C)
D)
E)

68) When two monosaccharides undergo a dehydration synthesis, 68) _____
A) hydrolysis occurs.
B) two new monosaccharides are formed.
C) a starch is formed.
D) a polysaccharide is formed.
E) a disaccharide is formed.

Answer: E
Explanation: A)
B)
C)
D)
E)

69) Which one of the following statements is not correct about the reaction $H_2 + Cl_2 \rightarrow 2\ HCl$? 69) _____

A) One molecule of hydrogen contains two atoms.
B) H_2 and Cl_2 are the reactants.
C) This reaction is easily reversible.
D) HCl is the product.
E) Two molecules of HCl are formed in the reaction.

Answer: C
Explanation: A)
B)
C)
D)
E)

70) Interaction between individual polypeptide chains to form a protein complex is _____ structure. 70) _____

A) tertiary
B) pentagonal
C) primary
D) quaternary
E) secondary

Answer: D
Explanation: A)
B)
C)
D)
E)

71) The molecule CO_2 is known as 71) _____

A) carbonated oxygen.
B) carbon dioxide.
C) carbonized oxygen.
D) carbon monoxide.
E) carbon oxide.

Answer: B
Explanation: A)
B)
C)
D)
E)

72) The smallest stable units of matter are 72) _____

A) electrons.
B) protons.
C) molecules.
D) atoms.
E) neutrons.

Answer: D
Explanation: A)
B)
C)
D)
E)

73) Fructose 73) _____

A) is a hexose.
B) is found in male reproductive fluids.
C) is an isomer of glucose.
D) all of the above
E) A and B only

Answer: D
Explanation: A)
B)
C)
D)
E)

74) Oppositely charged ions in solution are prevented from combining by 74) _____

A) heat capacity of water.
B) hydration spheres.
C) hydrogen bonding.
D) free radicals.
E) water's nonpolar nature.

Answer: B
Explanation: A)
B)
C)
D)
E)

75) In the body, inorganic compounds 75) _____

A) can serve as buffers.
B) are structural components of cells.
C) may be held together by ionic bonds.
D) can make up proteins.
E) both A and C

Answer: E
Explanation: A)
B)
C)
D)
E)

76) If a pair of electrons is unequally shared between two atoms, a(n) _____ occurs. 76) _____

A) hydrogen bond
B) double covalent bond
C) single covalent bond
D) triple covalent bond
E) polar covalent bond

Answer: E
Explanation: A)
B)
C)
D)
E)

77) Carbohydrate molecules 77) _____

A) are composed of C, H, O, and N atoms.
B) form the regulatory molecules known as enzymes.
C) contain the genetic information found in cells.
D) are the building blocks of cellular membranes.
E) are the body's most readily available source of energy.

Answer: E
Explanation: A)
B)
C)
D)
E)

78) Which of the following is not a cation? 78) _____

A) Mg^{2+} B) K^{+} C) Cl^{-} D) Na^{+} E) Ca^{2+}

Answer: C
Explanation: A)
B)
C)
D)
E)

79) A nanometer is 79) _____

A) 10^{-6} meter.
B) 10^{-12} meter.
C) 10^{-8} meter.
D) 10^{-9} meter.
E) 10^{-10} meter.

Answer: D
Explanation: A)
B)
C)
D)
E)

80) Molecules that store and process genetic information are the 80) _____

A) proteins.
B) steroids.
C) nucleic acids.
D) carbohydrates.
E) lipids.

Answer: C
Explanation: A)
B)
C)
D)
E)

81) When atoms complete their outer electron shell by sharing electrons, they form 81) _____
A) anions.
B) ionic bonds.
C) covalent bonds.
D) cations.
E) hydrogen bonds.

Answer: C
Explanation: A)
B)
C)
D)
E)

82) In an aqueous solution, sodium ions would move toward 82) _____
A) the bottom.
B) a positive terminal.
C) a pH terminal.
D) an organic terminal.
E) a negative terminal.

Answer: E
Explanation: A)
B)
C)
D)
E)

83) Radioisotopes have unstable 83) _____
A) nuclei.
B) ions.
C) electron clouds.
D) isotopes.
E) protons.

Answer: A
Explanation: A)
B)
C)
D)
E)

84) Isotopes of an element differ in the number of 84) _____
A) electrons in the nucleus.
B) neutrons in the nucleus.
C) electron clouds.
D) electrons in energy shells.
E) protons in the nucleus.

Answer: B
Explanation: A)
B)
C)
D)
E)

85) Lipids 85) _____

A) provide roughly twice the energy as carbohydrates.
B) cushion organs against shocks.
C) help to maintain body temperature.
D) form essential structural components of cells.
E) all of the above

Answer: E
Explanation: A)
B)
C)
D)
E)

86) The alpha-helix and pleated sheet are examples of _____ protein structure. 86) _____

A) tertiary
B) pentanary
C) primary
D) quaternary
E) secondary

Answer: E
Explanation: A)
B)
C)
D)
E)

87) The reaction $N_2 + 3\ H_2 \rightarrow 2\ NH_3$ is an example of a(n) 87) _____

A) enzyme reaction.
B) synthesis reaction.
C) decomposition reaction.
D) metabolic reaction.
E) exchange reaction.

Answer: B
Explanation: A)
B)
C)
D)
E)

88) Which of the following substances would be most acidic? 88) _____

A) white wine, pH = 3
B) stomach secretions, pH = 1
C) lemon juice, pH = 2
D) urine, pH = 6
E) tomato juice, pH = 4

Answer: B
Explanation: A)
B)
C)
D)
E)

89) If a substance has a pH that is greater than 7, it is 89) _____
A) alkaline. B) acidic. C) neutral. D) a salt. E) a buffer.

Answer: A
Explanation: A)
B)
C)
D)
E)

90) Nonpolar organic molecules are good examples of 90) _____
A) electrolytes.
B) molecules that will dissociate when placed into water.
C) hydrophobic compounds.
D) solutes.
E) hydrophilic compounds.

Answer: C
Explanation: A)
B)
C)
D)
E)

91) Which has the greater concentration of hydrogen ions, a substance with a pH of 5 or a substance with a pH of 4? 91) _____
A) A pH of 4 is greater.
B) A pH of 5 is greater.
C) They are both equal; 4 and 5 are relative values.
D) pH 9, if you mixed the solutions .
E) Not enough information to say.

Answer: A
Explanation: A)
B)
C)
D)
E)

92) The phosphorylation of adenosine forms 92) _____
A) AMP. B) 2ATP. C) ADP. D) ATP. E) ribose.

Answer: A
Explanation: A)
B)
C)
D)
E)

93) Adenine and guanine are 93) _____
A) purines represented by T and C.
B) pyrimidines represented by T and C.
C) nucleotides represented by A and G.
D) purines represented by A and G.
E) pyrimidines represented by A and G.

Answer: D
Explanation: A)
B)
C)
D)
E)

94) An amino acid is to a protein as _____ is to a nucleic acid. 94) _____
A) a proton
B) a neutron
C) a nucleotide
D) a purine
E) a protein

Answer: C
Explanation: A)
B)
C)
D)
E)

95) In a molecule of nitrogen, three pairs of electrons are shared by two nitrogen atoms. The type of bond that is formed is an example of a(n) 95) _____
A) double divalent bond.
B) hydrogen bond.
C) triple covalent bond.
D) polar covalent bond.
E) single trivalent bond.

Answer: C
Explanation: A)
B)
C)
D)
E)

96) All of the following are true concerning enzymes, except that they 96) _____
A) affect only the rate of a chemical reaction.
B) function as biological catalysts.
C) lower the activation energy required for a reaction.
D) are consumed during the reaction.
E) are proteins.

Answer: D
Explanation: A)
B)
C)
D)
E)

97) The innermost electron shell in an atom holds up to _____ electrons. 97) _____
A) 6 B) 4 C) 2 D) 8 E) 1

Answer: C
Explanation: A)
B)
C)
D)
E)

98) An example of an inorganic substance is 98) _____
A) fructose.
B) water.
C) glycerol.
D) carbon dioxide.
E) both B and D

Answer: E
Explanation: A)
B)
C)
D)
E)

99) The term _____ means each enzyme catalyzes only one type of reaction. 99) _____
A) monoreactive
B) activation
C) saturation
D) inertia
E) specificity

Answer: E
Explanation: A)
B)
C)
D)
E)

100) The group of organic compounds containing carbon, hydrogen, and oxygen in a near 1:2:1 ratio is defined as a 100) _____
A) protein.
B) nucleic acid.
C) carbohydrate.
D) lipid.
E) either A or B

Answer: C
Explanation: A)
B)
C)
D)
E)

101) Molecules that have the same molecular formula but different structural formulas are called 101) _____
A) isomers.
B) isomoles.
C) isotypes.
D) isotopes.
E) isozymes.

Answer: A
Explanation: A)
B)
C)
D)
E)

102) A fatty acid that contains two or more double covalent bonds is said to be 102) _____
A) hydrogenated.
B) polyunsaturated.
C) monounsaturated.
D) carboxylated.
E) saturated.

Answer: B
Explanation: A)
B)
C)
D)
E)

103) The molecule H_2 is known as 103) _____
A) helium.
B) semi-water.
C) hydrohydrogen.
D) hydroxide.
E) hydrogen.

Answer: E
Explanation: A)
B)
C)
D)
E)

104) If an element is composed of atoms with an atomic number of 6 and a mass number of 14, then a neutral atom of this element contains 104) _____

A) 8 neutrons.
B) 6 protons.
C) 8 electrons.
D) both A and B
E) both A and C

Answer: E
Explanation: A)
B)
C)
D)
E)

105) A(n) _____ removes hydrogen ions and a(n) _____ releases hydrogen ions. 105) _____

A) base; acid
B) acid; base
C) element; compound
D) compound; element
E) molecule; acid

Answer: A
Explanation: A)
B)
C)
D)
E)

106) An excess of hydrogen ions in the body fluids can have fatal results because this can 106) _____

A) disrupt tissue functions.
B) block ion movements.
C) change the shape of large complex molecules, rendering them nonfunctional.
D) all of the above
E) A and C only

Answer: D
Explanation: A)
B)
C)
D)
E)

107) Compounds that can be synthesized or broken down by chemical reactions inside the body are called 107) _____
A) inorganic compounds.
B) enzymes.
C) nutrients.
D) metabolites.
E) organic compounds.

Answer: D
Explanation: A)
B)
C)
D)
E)

108) During ionization, water molecules disrupt the ionic bonds of a salt to produce a mixture of ions. These ions can carry a current and so are called 108) _____
A) anions.
B) cations.
C) counterions.
D) acids.
E) electrolytes.

Answer: E
Explanation: A)
B)
C)
D)
E)

109) The most important metabolic fuel molecule in the body is 109) _____
A) glucose. B) vitamins. C) sucrose. D) caffeine. E) protein.

Answer: A
Explanation: A)
B)
C)
D)
E)

110) Lipids that are produced by nearly every tissue in the body and that act as local regulators of metabolism are the 110) _____
A) phospholipids.
B) monoglycerides.
C) prostaglandins.
D) glycolipids.
E) steroids.

Answer: C
Explanation: A)
B)
C)
D)
E)

111) The weakest bond between two atoms is the _____ bond. 111) _____

A) covalent
B) hydrogen
C) ionic
D) nonpolar
E) polar

Answer: B
Explanation: A)
B)
C)
D)
E)

112) By weight, which element is the most plentiful in the human body? 112) _____

A) carbon
B) oxygen
C) potassium
D) sulfur
E) sodium

Answer: B
Explanation: A)
B)
C)
D)
E)

113) A solution containing equal numbers of hydrogen ions and hydroxide ions is 113) _____

A) neutral.
B) alkaline.
C) acidic.
D) in equilibrium.
E) basic.

Answer: A
Explanation: A)
B)
C)
D)
E)

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

114) The hydrolysis of ATP yields ADP, phosphate ion, and _____. 114) _____

Answer: energy
Explanation:

115) The _____ of a radioactive substance is the time required for a 50 percent reduction in the rate of radiation emission. 115) _____

Answer: half-life
Explanation:

116) A(n) _____ is a pure substance composed of atoms. 116) _____

Answer: element
Explanation:

117) Chemical reactions that absorb energy are called _____. 117) _____

Answer: endergonic
Explanation:

118) The purines found in DNA are _____ and _____. 118) _____

Answer: adenine; guanine
Explanation:

119) Individual steroids differ in the _____ attached to the carbon rings. 119) _____

Answer: side chains
Explanation:

120) _____ are soluble inorganic compounds whose solutions will conduct an electric current. 120) _____

Answer: Electrolytes
Explanation:

121) In living cells, complex metabolic reactions proceed in a series of steps called a(n) _____. 121) _____

Answer: pathway
Explanation:

122) Chemical reactions that release energy are called _____. 122) _____

Answer: exergonic
Explanation:

123) In the process of _____ a phosphate group is transferred to a molecule. 123) _____

Answer: phosphorylation
Explanation:

124) Electrons in an atom occupy an orderly series of electron shells or _____. 124) _____

Answer: energy levels
Explanation:

125) _____ are molecules with two fatty acid chains and a phosphate group that form biological membranes. 125) _____

Answer: Phospholipids
Explanation:

126) The pyrimidine bases found in DNA are _____ and _____. 126) _____

Answer: thymine; cytosine
Explanation:

127) All fatty acids contain a functional group at one end called the _____. 127) _____

Answer: carboxylic acid group
Explanation:

128) The three familiar states of matter are solids, liquids, and _____. 128) _____

Answer: gases
Explanation:

129) Atoms of the same element whose nuclei contain the same number of protons, but different numbers of neutrons, are called _____. 129) _____

Answer: isotopes
Explanation:

130) The center of an atom is called the _____. 130) _____

Answer: nucleus
Explanation:

131) Ions with a positive charge are called _____. 131) _____

Answer: cations
Explanation:

132) Ions with a negative charge are called _____. 132) _____

Answer: anions
Explanation:

133) _____ molecules are compounds that contain carbon as the primary structural atom. 133) _____

Answer: Organic
Explanation:

134) The _____ of a solution is the negative logarithm of the hydrogen ion concentration expressed in moles per liter. 134) _____

Answer: pH
Explanation:

135) Identify the three structural components of a nucleotide. 135) _____

Answer: pentose; phosphate group; nitrogenous base
Explanation:

136) Electrons whirl around the center of the atom at high speed, forming a(n) _____. 136) _____

Answer: electron cloud
Explanation:

137) The actual mass of an atom is known as its _____. 137) _____

Answer: atomic weight
Explanation:

138) Molecules that do not readily dissolve in water are called _____. 138) _____

Answer: hydrophobic
Explanation:

139) In water, fatty acids tend to form tiny droplets with hydrophobic tails buried inside called _____. 139) _____

Answer: micelles
Explanation:

140) _____ accelerate chemical reactions that occur in the human body. 140) _____

Answer: Enzymes
Explanation:

141) The molecule DNA contains a five-carbon sugar called _____. 141) _____

Answer: deoxyribose
Explanation:

142) A(n) _____ is a homogeneous mixture containing a solvent and a solute. 142) _____

Answer: solution
Explanation:

143) _____ compounds do not usually contain carbon as a primary structural atom. 143) _____

Answer: Inorganic
Explanation:

144) A(n) _____ is a covalent bond that stores an unusually large amount of energy. 144) _____

Answer: high-energy bond
Explanation:

145) Kinetic energy is stored as _____ energy when a spring is stretched. 145) _____

Answer: potential
Explanation:

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

146) The element sulfur has an atomic number of 16 and mass number of 32. How many neutrons are in the nucleus of a sulfur atom? If sulfur forms covalent bonds with hydrogen, how many hydrogen atoms can bond to one sulfur atom?

Answer: The number of neutrons in an atom is equal to the mass number minus the atomic number. Thus, sulfur has 32 — 16 = 16 neutrons. The atomic number indicates the number of protons, so a neutral sulfur atom contains 16 protons plus 16 electrons to balance the protons electrically. The electrons would be distributed as follows: 2 in the first electron shell, 8 in the second, and the remaining 6 in the third. To achieve a full 8 electrons in the third (outermost) electron shell, the sulfur atom can accept 2 electrons in an ionic bond or can share 2 electrons in a covalent bond. Because hydrogen atoms can share one electron in a covalent bond, the sulfur atom can form two covalent bonds with hydrogen, one with each of two hydrogen atoms. In chemical notation, this is H_2S.

147) What role do buffer systems play in the human body?

Answer: Buffer systems help maintain pH within normal limits by removing or replacing hydrogen ions as needed.

148) How does the DNA molecule control the appearance and function of a cell?

Answer: The DNA molecule controls the synthesis of enzymes and structural proteins. By controlling the synthesis of structural proteins, the DNA is able to influence the physical appearance of a cell. By controlling the production of enzymes, the DNA is able to control all aspects of cellular metabolism and thus control the activity and biological functions of the cell.

149) Blood has a very narrow normal pH range but urine has a very broad normal pH range. What does that indicate about the physiology of pH?

Answer: Homeostasis requires that the pH of body fluids be maintained almost constant to avoid disruptions of healthy function. To accomplish this, the urinary system eliminates or retains hydrogen ion as needed. These actions cause the pH of urine to vary widely, depending on whether there is too much or not enough hydrogen ion in the body.

150) Explain the role of water molecules in polysaccharide formation.

Answer: Water molecules are removed in the dehydration synthesis of polysaccharides.

Answer Key
Testname: C2

1) C
2) A
3) E
4) E
5) E
6) E
7) C
8) B
9) A
10) A
11) C
12) C
13) A
14) A
15) A
16) E
17) A
18) E
19) A
20) E
21) B
22) B
23) E
24) A
25) B
26) C
27) D
28) B
29) D
30) D
31) D
32) C
33) B
34) B
35) D
36) A
37) B
38) C
39) C
40) A
41) D
42) D
43) B
44) A
45) B
46) B
47) C
48) A
49) B
50) D

51) C
52) E
53) E
54) A
55) A
56) C
57) B
58) D
59) D
60) E
61) A
62) A
63) B
64) D
65) B
66) D
67) E
68) E
69) C
70) D
71) B
72) D
73) D
74) B
75) E
76) E
77) E
78) C
79) D
80) C
81) C
82) E
83) A
84) B
85) E
86) E
87) B
88) B
89) A
90) C
91) A
92) A
93) D
94) C
95) C
96) D
97) C
98) E
99) E
100) C

101) A
102) B
103) E
104) E
105) A
106) D
107) D
108) E
109) A
110) C
111) B
112) B
113) A
114) energy
115) half-life
116) element
117) endergonic
118) adenine; guanine
119) side chains
120) Electrolytes
121) pathway
122) exergonic
123) phosphorylation
124) energy levels
125) Phospholipids
126) thymine; cytosine
127) carboxylic acid group
128) gases
129) isotopes
130) nucleus
131) cations
132) anions
133) Organic
134) pH
135) pentose; phosphate group; nitrogenous base
136) electron cloud
137) atomic weight
138) hydrophobic
139) micelles
140) Enzymes
141) deoxyribose
142) solution
143) Inorganic
144) high-energy bond
145) potential

Answer Key
Testname: C2

146) The number of neutrons in an atom is equal to the mass number minus the atomic number. Thus, sulfur has 32 — 16 = 16 neutrons. The atomic number indicates the number of protons, so a neutral sulfur atom contains 16 protons plus 16 electrons to balance the protons electrically. The electrons would be distributed as follows: 2 in the first electron shell, 8 in the second, and the remaining 6 in the third. To achieve a full 8 electrons in the third (outermost) electron shell, the sulfur atom can accept 2 electrons in an ionic bond or can share 2 electrons in a covalent bond. Because hydrogen atoms can share one electron in a covalent bond, the sulfur atom can form two covalent bonds with hydrogen, one with each of two hydrogen atoms. In chemical notation, this is H_2S.

147) Buffer systems help maintain pH within normal limits by removing or replacing hydrogen ions as needed.

148) The DNA molecule controls the synthesis of enzymes and structural proteins. By controlling the synthesis of structural proteins, the DNA is able to influence the physical appearance of a cell. By controlling the production of enzymes, the DNA is able to control all aspects of cellular metabolism and thus control the activity and biological functions of the cell.

149) Homeostasis requires that the pH of body fluids be maintained almost constant to avoid disruptions of healthy function. To accomplish this, the urinary system eliminates or retains hydrogen ion as needed. These actions cause the pH of urine to vary widely, depending on whether there is too much or not enough hydrogen ion in the body.

150) Water molecules are removed in the dehydration synthesis of polysaccharides.