Student name:_____

**TRUE/FALSE - Write 'T' if the statement is true and 'F' if the statement is false.**

**1)** Over 90% of the body is composed of four elements: carbon, nitrogen, chlorine, and hydrogen.

- ◎ true
- ◎ false

**2)** Chemically, a radioactive isotope behaves the same way as the stable isotopes of a given element.

- ◎ true
- ◎ false

**3)** A weak base will accept many hydrogen ions, while a strong base will accept only a few hydrogen ions.

- ◎ true
- ◎ false

**4)** Fats are usually liquid at room temperature and oils are solids.

- ◎ true
- ◎ false

**5)** Enzymes catalyze degradation reactions but not synthesis reactions.

- ◎ true
- ◎ false

**CHECK ALL THAT APPLY. Choose all options that best completes the statement or answers the question.**

**6)** Which four are the main macromolecules found in cells?

A) Proteins
B) Water
C) Carbohydrates
D) Nucleic acids
E) Lipids

**7)** Which are characteristics of starch? Choose all that apply.

A) It is a polysaccharide.
B) It is a disaccharide.
C) It is found in plants.
D) It is found in animals.

**8)** Which are characteristics of cholesterol? Choose all that apply.

A) It is a type of protein.
B) It is hydrophobic.
C) It is an important component of cell membranes.
D) It is an energy-storage molecule.

**9)** Which of the following can denature proteins? Choose all that apply.

A) High salt concentration
B) High temperature
C) Low calcium concentration
D) Low pH

**10)** Which are examples of nucleic acids? Choose all that apply.

A) Deoxyribonucleic acid
B) Amino acid
C) Ribonucleic acid
D) Glucose

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

**11)** The smallest unit of matter that enters into chemical reactions is the

A) molecule.
B) atom.
C) compound.
D) neutrino.

**12)** An element is any substance that contains one type of

A) molecule.
B) isotope.
C) atom.
D) proton.

**13)** The positively charged particles in the nucleus of an atom are

A) neutrons.
B) electrons.
C) protons.
D) isotopes.

**14)** The atomic mass of a proton is

A) 0 atomic mass units.
B) 2 atomic mass units.
C) 1 atomic mass unit.
D) −1 atomic mass unit.

**15)** Which of the following subatomic particles are found in the nucleus of an atom?

A) Protons and electrons
B) Electrons and neutrons
C) Protons and shells
D) Neutrons and protons

**16)** The number of protons in an atom is called the

A) atomic number.
B) atomic weight.
C) mass number.
D) combining weight.

**17)** The shells or orbitals around the nucleus of an atom are also known as

A) energy levels.
B) Golgi radii.
C) satellites.
D) resonance particles.

**18)** The number of _____ determines the identity of an atom.

A) neutrons
B) protons
C) electrons
D) prions

**19)** The number of _____ determines the chemical activity of an atom.

A) neutrons
B) protons
C) electrons
D) prions

**20)** Which best describes an ion?

A) Contains an unequal number of electrons and protons
B) Contains a different number of neutrons
C) Contains more protons than neutrons
D) Contains equal numbers of protons, electrons, and neutrons

**21)** The mass number of an element is equal to the number of

A) protons plus the number of neutrons.
B) protons plus the number of electrons.
C) protons.
D) electrons plus the number of neutrons.

**22)** An atom or group of atoms with a charge is called a(n)

A) molecule.
B) isotope.
C) compound.
D) ion.

**23)** Irregular heartbeats (arrhythmias) have been known to be related to abnormal levels of which ion?

A) Bicarbonate
B) Peroxide
C) Chloride
D) Potassium

**24)** Atoms with more than one shell are most stable when the outermost shell contains _____ electrons.

A) 10
B) 1
C) 8
D) 6

**25)** Exactly $6.02 \times 10^{23}$ atoms of any element is called one ____ of that element.

A) atomic mass unit
B) isotope
C) mole
D) mouse

**26)** Different forms of the same element with different numbers of neutrons are called

A) molecules.
B) compounds.
C) isotopes.
D) lattices.

**27)** If the atomic number of an element is 9 and the mass number is 19, how many neutrons does the atom have?

A) 10
B) 9
C) 19
D) 28

**28)** If the atomic number of an element is 27 and the mass number is 60, how many neutrons does the atom have?

A) 27
B) 33
C) 87
D) 60

**29)** Compared to stable isotopes, radioactive isotopes

A) emit energy.
B) lose or gain neutrons.
C) lose or gain electrons.

**30)** Low levels of radiation can effectively

A) sterilize dental products.
B) destroy cancer cells.
C) serve as tracers to detect cellular changes.
D) sterilize postal deliveries.

**31)** What makes an isotope radioactive?

A) It has moreprotons than electrons.
B) It releases energyto become stable.
C) It releaseshydrogen ions into solution.
D) It breaks downinto hydrogen and electrons.

**32)** The chemical unit formed when atoms bond together is called a(n)

A) molecule.
B) ion.
C) isotope.
D) buffer.

**33)** High levels of radiation are NOT used

A) to sterilizemedical equipment.
B) to kill cancercells.
C) as tracers todetect molecular changes.

**34)** Molecules often form from

A) the shape of the individual atoms.
B) the attraction between electrons.
C) the sharing of electrons.
D) a drive toward solubility.

**35)** A molecule made of two or more different atoms bonded together is called a(n)

A) ion.
B) isotope.
C) atom.
D) compound.

**36)** An anion is an atom or molecule that

A) is positively charged.
B) is negatively charged.
C) emits radioactive energy.

**37)** A bond created from the attraction between positively and negatively charged ions is a(n) _____ bond.

A) covalent
B) hydrogen
C) ionic
D) metallic

**38)** Sodium chloride dissociates when dissolved in water. Therefore, it is considered a _____.

A) salt
B) compound
C) acid
D) base

**39)** A bond created from the sharing of electrons between two atoms is a(n) _____ bond.

A) covalent
B) hydrogen
C) ionic
D) metallic

**40)** When two pairs of electrons are shared between two atoms, a _____ bond is formed.

A) single covalent
B) double covalent
C) quadruple ionic
D) double ionic

**41)** When one atom has a stronger attraction for shared electrons than the other atom, a(n) _____ covalent bond is formed.

A) polar
B) nonpolar
C) ionic
D) metallic

**42)** Ionic bonds involve _____, while covalent bonds involve _____.

A) the transfer of electrons; the sharing of electrons
B) the sharing of electrons; the donation of electrons
C) weak attractions; the donation of electrons
D) swapping of electrons for protons; weak attractions

**43)** Equal sharing of electrons is a characteristic of a _____ covalent bond, while unequal sharing is in a _____ bond.

A) polar; nonpolar
B) nonpolar; polar

**44)** The most abundant molecule in living organisms is

A) water.
B) glucose.
C) oxygen.
D) ammonia.

**45)** Organic compounds always contain _____ atoms.

A) water
B) carbon
C) nitrogen
D) oxygen

**46)** Water molecules are

A) polar.
B) nonpolar.

**47)** The attraction between a slightly positive hydrogen to a slightly negative oxygen of another molecule describes a(n) _____ bond.

A) hydrogen
B) oxygen
C) nitrogen
D) ionic

**48)** Which of the following is NOT a property of water?

A) High heat capacity
B) Low heat of vaporization
C) Solvent for polar and ionic compounds
D) Cohesiveness

**49)** Which of the following is NOT a property of water?

A) The ability to cling to other water molecules, yet flow
B) The ability to facilitate chemical reactions
C) The ability to insulate the body from temperature extremes
D) The ability to dissolve nonpolar, hydrophobic molecules

**50)** Substances that dissolve in water are called

A) hydrophilic.
B) hydrophobic.
C) hydrophoric.
D) hydrochromic.

**51)** The ability of water molecules to cling to each other is _____, while the ability to cling to other surfaces is _____.

A) cohesion; adhesion
B) dissolving; vaporization
C) adhesion; cohesion
D) cohesion; dissolving

**52)** The ability of water to absorb large amounts of heat energy without changing its temperature is a

A) low specific heat capacity.
B) low heat of vaporization.
C) high specific heat capacity.
D) high heat of vaporization.

**53)** A substance that dissociates in water, releasing hydrogen ions, is a(n)

A) salt.
B) base.
C) protein.
D) acid.

**54)** A substance that can take up hydrogen ions or release hydroxide ions in water is a(n)

A) salt.
B) base.
C) protein.
D) acid.

**55)** Hydrochloric acid is considered a strong acid because it

A) produces very fewhydrogen ions in water.
B) produces manyhydroxide ions in water.
C) produces manyhydrogen ions in water.
D) dissociates verylittle in water.

**56)** The lower the pH,

A) the lesser thehydrogen ion concentration.
B) the more acidic the solution.
C) the lesser thehydrogen ion concentration and the more acidic the solution.
D) the greater the hydroxide ion concentration.
E) the more basic the solution and the greater the hydroxide ion concentration.

**57)** The pH of the blood is slightly basic. Which of the following describes this pH?

A) 6.4
B) 12.6
C) 4.7
D) 7.4

**58)** A pH of 5.5 would be considered

A) acidic.
B) basic.
C) neutral.

**59)** A pH of 7.0 would be considered

A) acidic.
B) basic.
C) neutral.

**60)** Compared to a solution with a pH of 7, a solution with a pH of 5 would have a concentration of $H^+$ that is

A) two times higher.
B) one hundred times higher.
C) two times lower.
D) two hundred times lower.

**61)** A blood pH of 7.2 would be considered _____, while a pH of 7.6 would be _____.

A) acidosis; alkalosis
B) alkalosis; acidosis
C) acidosis; normal
D) alkalosis; hyperalkalosis
E) Both values are within the normal range.

**62)** Chemicals that help keep body fluids within a normal pH range are called

A) acids.
B) bases.
C) buffers.
D) salts.

**63)** Orange juice is acidic. When people drink orange juice and the acid enters their blood, the extra hydrogen ions combine with _____, providing a helpful buffer.

A) hemoglobin
B) calcium
C) bicarbonate
D) hydrochloric acid

**64)** An electrolyte is a substance that releases _____ when dissolved in water.

A) ions
B) electrons
C) bases

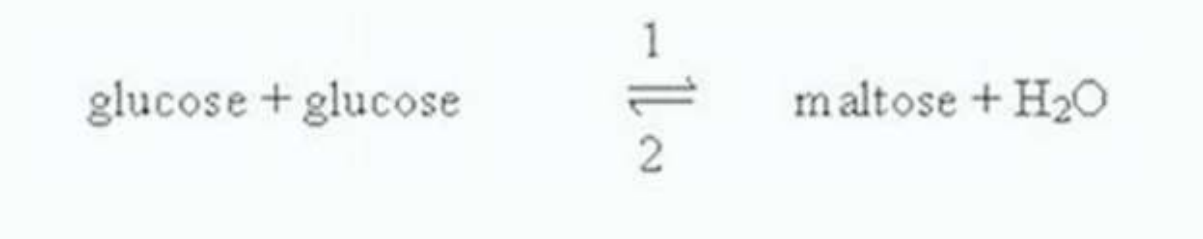
**65)** Which pair does NOT correctly match a macromoleculewith its monomer?

A) carbohydrate - monosaccharide
B) lipid - citric acid
C) protein - amino acid
D) nucleic acid - nucleotide

**66)** The subunit molecules for proteins are

A) nucleic acids.
B) amino acids.
C) fatty acids.
D) monosaccharides.

**67)** Which arrow in the following equation represents dehydration?



A) Arrow 1
B) Arrow 2

**68)** The addition of water in an enzyme-catalyzed reaction is a(n) _____ reaction.

A) dehydration
B) hydrolysis
C) exchange
D) neutralization

**69)** When two hydrogen atoms and one oxygen atom are removed from adjacent monomers, the overall chemical reaction results in

A) hydrolysis.
B) forming anacid.
C) methyl exchange.
D) dehydration synthesis.

**70)** The main function of carbohydrates is to provide

A) cellular energy.
B) insulation.
C) transport molecules.
D) hereditary information.

**71)** A monosaccharide of five carbons is a

A) hexose sugar.
B) glycerol.
C) fatty acid.
D) pentose sugar.

**72)** The monomer of carbohydrates is a

A) nucleotide.
B) fatty acid.
C) monosaccharide.
D) amino acid.

**73)** Which of the following is NOT a monosaccharide?

A) Glucose
B) Fructose
C) Sucrose
D) Galactose

**74)** Which of the following is NOT a disaccharide?

A) Maltose
B) Galactose
C) Lactose
D) Sucrose

**75)** Which of the following contains many units of glucose?

A) Protein
B) Fat
C) Nucleic acid
D) Starch

**76)** Glycogen is

A) a monosaccharide used for quick energy.
B) a protein found in cell membranes.
C) a polysaccharide used as stored energy in animals.
D) a fat found in margarine.

**77)** Which of the following is the main component of fiber in our diet?

A) Glycogen
B) Protein
C) Cellulose
D) Starch

**78)** Which class of organic compounds is most consistently insoluble in water?

A) Sugars
B) Lipids
C) Nucleotides
D) Proteins

**79)** Which of the following is NOT a function of lipids?

A) Long-term energystorage
B) Formation ofantibodies
C) Formation of cellmembranes
D) Component of sex hormones

**80)** Which type of macromolecule is composed of one glycerol plus three fatty acids?

A) Neutral fat
B) Phospholipid
C) Nucleic acid
D) Protein
E) Bile

**81)** The process that allows fats to mix with water, particularly so digestion can occur, is called

A) hydrolysis.
B) degradation.
C) dehydration.
D) emulsification.

**82)** When fatty acids contain one or more double bonds, they are considered

A) saturated.
B) unsaturated.
C) emulsified.
D) synthesized.

**83)** What makes a phospholipid different from a fat?

A) Fats are neutralwhile phospholipids are ionized.
B) Fats are liquid while phospholiopids are solid.
C) Fats are ionizedwhile phospholipids are neutral.
D) Fats are basicwhile phospholipids are acidic.

**84)** The macromolecules that are the main component of cell membranes are

A) steroids.
B) triglycerides.
C) phospholipids.
D) prostaglandins.

**85)** Steroids differ in structure from other lipids in that they have a backbone of

A) four fused carbon rings.
B) branched chains of carbons.
C) saturated carbon chains.
D) unsaturated carbon chains.

**86)** Which of the following is NOT a function of proteins?

A) Providing structural support
B) Serving as chemical messengers
C) Generating muscle contractions
D) Storing chemical energy

**87)** Which of the following is NOT a function of proteins?

A) They form enzymesto speed up reactions.
B) They form thebackbone of cell membranes.
C) They formhemoglobin to transport oxygen in the blood.
D) They formantibodies to protect the body from disease.

**88)** How many different amino acids compose all human polypeptides (proteins)?

A) 10
B) 15
C) 20
D) 25

**89)** The sequence of amino acids makes up the _____ structure of a protein.

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

**90)** The coiling or folding of a polypeptide chain is the _____ structure of a protein.

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

**91)** The bending and twisting of a polypeptide chain into a more circular molecule is the _____ structure of a protein.

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

**92)** Proteins that have more than one polypeptide arranged together have a _____ structure.

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

**93)** The differences between one polypeptide and another lies in

A) the type of peptide bond they contain.
B) the type of sugar they contain.
C) whether they are saturated or not.
D) the sequence of amino acids.

**94)** Any process that causes an irreversible change in the shape of a protein is called

A) denaturation.
B) emulsification.
C) hydrolysis.
D) degradation.

**95)** Irreversible changes in the shape of a protein result from

A) extreme heat and pH.
B) freezing temperatures and changes in air pressure.
C) the presence of catalysts.
D) steroid action.

**96)** The sum of all the chemical reactions that occur in a cell is called

A) emulsification.
B) metabolism.
C) denaturation.
D) synthesis.

**97)** What is the role of an enzyme in a chemical reaction?

A) Raises the energyof activation
B) Raises thetemperature of the reaction
C) Lowers the energyof activation
D) Lowers thetemperature of the reaction

**98)** In the reactions that occur in metabolism, enzymes function as

A) amino acids.
B) lipids.
C) catalysts.
D) compounds.

**99)** The substance that an enzyme acts upon is its

A) substrate.
B) active site.
C) catalyst.
D) product.

**100)** An enzyme's specificity for its substrate is due to

A) the shape of its active site.
B) its denaturation.
C) the presence of cofactors or coenzymes.

**101)** The area of the enzyme that binds to its substrate is called the

A) active site.
B) catalyst.
C) activation energy.
D) product.

**102)** What role can inorganic metals such as iron or zinc have in a reaction?

A) A catalyst
B) A coenzyme
C) A substrate
D) A cofactor

**103)** To help catalyze reactions, certain vitamins act as _____ in some chemical reactions.

A) coenzymes
B) substrates
C) steroids
D) energy sources

**104)** Which of the following types of reactions involves the production of a larger product by combining smaller reactants?

A) Degradation
B) Replacement
C) Synthesis
D) Decomposition

**105)** A hydrolysis reaction is an example of which reaction type?

A) Decomposition
B) Synthesis
C) Replacement
D) Neutralization

**106)** When a single atom of one molecule trades places with a single atom of another molecule, the swapping is called a _____ reaction.

A) replacement
B) degradation
C) ionization
D) neutralization

**107)** Some disease-causing agents are infectious proteinscalled

A) viruses.
B) bacteria.
C) flukes.
D) prions.

**108)** Which of the following is NOT a component of a nucleotide?

A) Pentose sugar
B) Phosphategroup
C) Glucose
D) Nitrogen-containing base

**109)** A gene is a segment of DNA that is described as a blueprint for production of a

A) protein
B) lipid
C) complex carbohydrate
D) methyl group

**110)** Which of the following is NOT a nitrogen base found in DNA?

A) Uracil
B) Adenine
C) Guanine
D) Cytosine

**111)** The shape of the DNA molecule is a(n)

A) single strand.
B) globule.
C) double helix.
D) inverted T.

**112)** The backbone or sides of a DNA helix consists of

A) nitrogen base pairs.
B) a sugar-phosphate chain.
C) an adenine-ribose chain.
D) a glucose-phosphate chain.

**113)** The rungs of the DNA ladder are composed of

A) nitrogen base pairs.
B) sugar-phosphate chain.
C) adenine-ribose chain.
D) glucose-phosphate chain.

**114)** In the DNA molecule, the complementary base pair of adenine is always

A) uracil.
B) cytosine.
C) thymine.
D) guanine.

**115)** In the DNA molecule, the complementary base pair of cytosine is always

A) uracil.
B) guanine.
C) adenine.
D) thymine.

**116)** A three-base sequence on DNA and therefore RNA codes for a(n)

A) glucose.
B) fatty acid.
C) amino acid.
D) steroid.

**117)** Which of the following is NOT true of RNA?

A) It is single stranded.
B) It has uracil instead of thymine.
C) It has ribose sugar.
D) It has a helical structure.

**118)** Which of the following molecules is the primary energy carrier in cells?

A) DNA
B) ATP
C) RNA
D) GNA

**119)** What is the main molecule that provides the energy to produce ATP?

A) Phosphate
B) Glucose
C) RNA
D) Uracil

**120)** Protein synthesis and muscle contraction are examples of cellular functions that _____ ATP.

A) generate
B) consume
C) are independent of

**121)** Which of the following contains high-energy phosphate bonds?

A) DNA
B) Glycogen
C) RNA
D) ATP

# Answer Key

Test name: Unnamed Test2

1) FALSE
The four most common elements in the body are: carbon, nitrogen, oxygen, and hydrogen.

2) TRUE
3) FALSE
A strong base will accept many hydrogen ions.

4) FALSE
Fats are usually solid at room temperature and oils are liquid.

5) FALSE
Enzymes can serve as catalysts in both synthesis and degradation reactions.

6) [A, C, D, E]
7) [A, C]
8) [B, C]
9) [B, D]
10) [A, C]
11) B
12) C
13) C
14) C
15) D
16) A
17) A
18) B

19) C
20) A
21) A
22) D
23) D
24) C
25) C
26) C
27) A
28) B
29) A
30) C
31) B
32) A
33) C
34) C
35) D
36) B
37) C
38) A
39) A
40) B
41) A
42) A
43) B
44) A
45) B
46) A
47) A
48) B

49) D
50) A
51) A
52) C
53) D
54) B
55) C
56) B
57) D
58) A
59) C
60) B
61) A
62) C
63) C
64) A
65) B
66) B
67) A
68) B
69) D
70) A
71) D
72) C
73) C
74) B
75) D
76) C
77) C
78) B

79) B
80) A
81) D
82) B
83) A
84) C
85) A
86) D
87) B
88) C
89) A
90) B
91) C
92) D
93) D
94) A
95) A
96) B
97) C
98) C
99) A
100) A
101) A
102) D
103) A
104) C
105) A
106) A
107) D
108) C

109) A
110) A
111) C
112) B
113) A
114) C
115) B
116) C
117) D
118) B
119) B
120) B
121) D