

Student name: \_\_\_\_\_

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

- 1) Neutrons are uncharged particles found in the nucleus of an atom.
- true  
 false
- 2) An element with 5 protons, 5 neutrons, and 5 electrons would have an atomic number of 15.
- true  
 false
- 3) The term "chemical element" refers to the most common isotope of that element.
- true  
 false
- 4) Negatively charged ions will migrate towards the anode in an electrical field.
- true  
 false
- 5) Hydrogen bonds form between the partially charged atoms of two polar molecules, such as the slightly positively charged hydrogen atom of one water molecule and the slightly negatively charged oxygen atom of another.
- true  
 false
- 6) Hydrogen bonds form between the partially charged atoms of two polar molecules, such as the slightly positively charged hydrogen atom of one water molecule and the slightly negatively charged oxygen atom of another.
- true  
 false

7) Atoms sharing a pair of electrons form covalent bonds.

- true
- false

8) If a molecule containing primarily ionic bonds is placed in an aqueous solution, it is more likely to retain its structure than a molecule composed primarily of polar covalent bonds.

- true
- false

9) The pH of a solution is directly proportional to the hydrogen ion concentration of the solution.

- true
- false

10) If a substance with a pH of 4 is added to a solution, the pH of that solution will decrease in proportion to the amount of hydrogen ions released into the solution.

- true
- false

11) If an acid with a pH of 3 is added to a solution, yet the pH of the solution remains relatively stable, the solution must have contained bicarbonate.

- true
- false

12) Lactate is an example of an organic acid that has been ionized.

- true
- false

**13)** Fatty acids and glucose are the two primary, and preferred sources of energy to create ATP.

- true
- false

**14)** Glucose and lactose are structural isomers that can be used immediately by cells to create ATP.

- true
- false

**15)** Covalent bonds are formed between monosaccharides through dehydration synthesis.

- true
- false

**16)** Despite being a more immediate source of energy for a cell, glucose must be stored as glycogen in order to prevent excess intracellular fluid from accumulating.

- true
- false

**17)** Unsaturated fatty acids contain more hydrogen atoms than saturated fatty acids of the same length.

- true
- false

**18)** If triglycerides are rapidly hydrolyzed in sufficient amounts, blood pH may increase as acidic ketone bodies are formed.

- true
- false

**19)** Steroids are derived from cholesterol.

- true
- false

20) All amino acids contain carboxyl and amino groups.

- true
- false

21) The specific sequence of amino acids in a polypeptide is known as the primary protein structure.

- true
- false

22) The specific shape of a protein determines its function.

- true
- false

23) In DNA, cytosine forms a complementary base pair with adenine.

- true
- false

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

24) Water makes up \_\_\_\_\_ of the total body weight of an average adult.

- A) 50–60%
- B) 55–65%
- C) 60–70%
- D) 65–75%

25) Most of the water found in the body is in the \_\_\_\_\_.

- A) blood
- B) intracellular fluid compartment
- C) extracellular fluid compartment
- D) blood and extracellular fluid compartment

26) The atomic nucleus does NOT contain \_\_\_\_\_, which are negatively charged subatomic particles.

- A) protons
- B) electrons
- C) neutrons

27) An element with 11 neutrons, 11 protons, and 11 electrons would have a mass number of \_\_\_\_\_.

- A) 11
- B) 33
- C) 22
- D) 21

28) The \_\_\_\_\_ is the physical space that an electron occupies in an atom.

- A) nucleus
- B) orbital
- C) energy level
- D) Both orbital and energy level are correct.

29) An element with 11 neutrons, 10 protons, and 11 electrons would have a mass number of \_\_\_\_\_.

- A) 11
- B) 33
- C) 22
- D) 21

30) Isotopes have the same \_\_\_\_\_ number, but a different \_\_\_\_\_ number.

- A) mass; atomic
- B) neutron; mass
- C) atomic; mass
- D) atomic; proton

31) Which of the following is NOT true of isotopes of a given atom?

- A) They have the same number of neutrons
- B) They have the same number of protons
- C) They have different atomic masses
- D) All are not true regarding isotopes of a given atom.

32) Which of the following subatomic particles have negligible mass?

- A) Electrons
- B) Neutrons
- C) Protons
- D) Both neutrons and protons are correct.

33) When an atom loses one or more electrons, it \_\_\_\_\_.

- A) becomes positively charged
- B) becomes negatively charged
- C) is called an anion
- D) has no change in its charge

34) When an atom gains one or more electrons, it \_\_\_\_\_.

- A) becomes positively charged
- B) has no change in its charge
- C) is called an anion
- D) is called a cation

35) An atom with 5 protons, 5 neutrons, and 6 electrons would have a net charge of \_\_\_\_\_.

- A) -1
- B) -2
- C) +1
- D) +2

36) The type of bond formed when atoms share electrons unequally is termed \_\_\_\_\_.

- A) nonpolar covalent
- B) ionic
- C) polar covalent
- D) van der Waals

37) Hydration spheres can be formed by compounds which contain \_\_\_\_\_ bonds.

- A) nonpolar covalent
- B) polar covalent
- C) ionic
- D) Both polar covalent and ionic are correct.

**38)** Hydrophobic molecules would contain \_\_\_\_\_ bonds.

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

**39)** Surface tension between water molecules occurs because adjacent water molecules form \_\_\_\_\_ bonds with each other.

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

**40)** Bonds that are formed between oxygen and hydrogen atoms within water molecules are called \_\_\_\_\_.

- A) hydrogen bonds
- B) ionic bonds
- C) nonpolar covalent bonds
- D) polar covalent bonds

**41)** The type of bond found in sodium chloride is \_\_\_\_\_.



- A) an ionic bond
  - B) a polar covalent bond
  - C) a hydrogen bond
  - D) a nonpolar covalent bond
- 42) What type of bond is formed between potassium and iodine?
- A) Polar covalent bond
  - B) Ionic bond
  - C) Nonpolar covalent bond
  - D) Hydrogen bond
- 43) Which of the following would be most easily broken?
- A) A hydrogen bond
  - B) A nonpolar covalent bond
  - C) An ionic bond
  - D) A polar covalent bond
- 44) Water molecules form \_\_\_\_\_ ions when they associate with a hydrogen ion.
- A) hydroxide
  - B) bicarbonate
  - C) hydronium
  - D) water
- 45) A solution of a pH above 7 is called \_\_\_\_\_.

- A) acidic
- B) neutral
- C) basic
- D) isotonic

46) Bases will \_\_\_\_\_ protons in a solution.

- A) accept
- B) donate
- C) ignore
- D) repel

47) The primary buffer in the blood is the \_\_\_\_\_ buffer.

- A) hydronium
- B) ammonia
- C) phosphate
- D) bicarbonate

48) The pH of a solution increases as the \_\_\_\_\_ ion concentration decreases.

- A) hydrogen
- B) hydroxide
- C) bicarbonate
- D) sodium

49) In an acidic solution, \_\_\_\_\_.

A) the  $\text{OH}^-$  ion concentration is greater than the  $\text{H}^+$  ion concentration  
B) the  $\text{OH}^-$  ion concentration is less than the  $\text{H}^+$  ion concentration  
C) the  $\text{H}^+$  ion concentration is equal to the  $\text{OH}^-$  ion concentration  
D) the  $\text{H}^+$  ion concentration is less than the  $\text{OH}^-$  ion concentration only if the solution is buffered

50) A blood pH of 7.6 \_\_\_\_\_.

- A) is indicative of acidosis
- B) is indicative of alkalosis
- C) is in the normal physiological range
- D) indicates effective buffering by the bicarbonate/carbonic acid system

51) Regarding acids and bases, \_\_\_\_\_.

- A) acids will increase the pH of a solution
- B) bases will decrease the pH of a solution
- C) acids will accept hydrogen ions in a solution
- D) bases will accept hydrogen ions in a solution

52) Ammonia usually \_\_\_\_\_.

- A) acts as a base
- B) acts as an acid
- C) acts as a buffer
- D) ionizes to form a hydroxyl ion

53) Molecules that contain carbon and hydrogen atoms are \_\_\_\_\_.

- A) ionic
- B) inorganic
- C) organic
- D) carbonic

54) How many single bonds can a carbon atom form if it is double-bonded to an oxygen atom?

- A) 1
- B) 2
- C) 3
- D) 4

55) A six-sided organic molecule with alternating double bonds is termed a(n) \_\_\_\_\_.

- A) aromatic compound
- B) ketone
- C) alcohol
- D) organic acid

56) Ketones contain a(n) \_\_\_\_\_ group within the carbon chain.

- A) hydroxyl
- B) carbonyl
- C) carboxyl
- D) aromatic

57) Organic acids will contain \_\_\_\_\_.

- A) a carboxyl group
- B) a carbonyl group
- C) an amino group
- D) a hydroxyl group

**58)** An example of an aromatic substance is \_\_\_\_\_.

- A) hexane
- B) cyclohexane
- C) fructose
- D) benzene

**59)** Molecules with the same atoms, in the same sequence, but arranged differently in space are called \_\_\_\_\_.

- A) structural isomers
- B) stereoisomers
- C) functional groups
- D) aromatic molecules

**60)** Molecules that are mirror images of each other are \_\_\_\_\_.

- A) enantiomers
- B) geometric isomers
- C) cis/trans isomers
- D) structural isomers

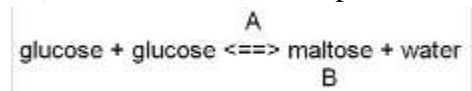
**61)** Molecules with the same ratio of atoms, but different arrangements of atoms, are known as \_\_\_\_\_.

- A) isotopes
- B) structural isomers
- C) stereoisomers
- D) radioactive isotopes

62) The addition of water with the proper enzymes to a molecule is called \_\_\_\_\_.

- A) dehydration synthesis
- B) condensation
- C) hydrolysis
- D) combustion

63) Which reaction represents a dehydration synthesis reaction?



- A) Reaction A
- B) Reaction B
- C) Both Reaction A and Reaction B are correct.
- D) Neither Reaction A nor Reaction B is correct.

64) Sucrose is a disaccharide that is composed of \_\_\_\_\_ and \_\_\_\_\_.

- A) glucose; glucose
- B) glucose; galactose
- C) glucose; fructose
- D) fructose; galactose

65) Which statement regarding glycogen is correct?

- A) Glycogen contains more potential energy for humans than the carbohydrates found in starch.
- B) Glycogen contains more potential energy for humans than cellulose.
- C) Glycogen, but not cellulose, is a polysaccharide eaten and digested by humans.
- D) Glycogen can be comprised of any monosaccharides.

66) An example of a monosaccharide is \_\_\_\_\_.

- A) maltose
- B) sucrose
- C) glucose
- D) glycogen

67) Which of the following is NOT a disaccharide?

- A) Fructose
- B) Sucrose
- C) Maltose
- D) Lactose

68) Which of the following molecules cannot be used as a source of energy for humans?

- A) Glycogen
- B) Cellulose
- C) Triglycerides
- D) Amino acids

69) In order to maintain proper health, total dietary fat intake should not exceed \_\_\_\_\_ calories for a 2000 calorie diet.

- A) 100
- B) 800
- C) 600
- D) 400

70) Which of the following is NOT a type of lipid?

- A) Prostaglandins
- B) Triglycerides
- C) Cholesterol
- D) Glycogen

71) Lipids containing glycerol would include \_\_\_\_\_ and \_\_\_\_\_.

- A) triglycerides; steroids
- B) prostaglandins; phospholipids
- C) triglycerides; phospholipids
- D) steroids; prostaglandins

72) What molecules are liver-synthesized derivatives of free fatty acids that can be used as an immediate source of energy by many organs?

- A) Glycerols
- B) Ketone bodies
- C) Steroids
- D) Cholesterols

73) Prostaglandins are a class of \_\_\_\_\_ that are involved in \_\_\_\_\_.



- A) triglyceride; inflammation
- B) carbohydrate; blood clotting
- C) fatty acid; cell membrane integrity
- D) fatty acid; blood clotting

74) A molecule that is part polar and part nonpolar is called \_\_\_\_\_.

- A) an enantiomer
- B) a ketone body
- C) unsaturated
- D) amphipathic

75) This group of organic compounds acts as surfactants.

- A) Carbohydrates
- B) Phospholipids
- C) Nucleic acids
- D) Prostaglandins

76) In the formation of triglycerides, \_\_\_\_\_.

- A) hydroxyl and carbonyl groups interact
- B) amino and carbonyl groups interact
- C) carboxyl and amino groups interact
- D) carboxyl and hydroxyl groups interact

77) Which of the following is false regarding unsaturated fatty acids?

- A) They contain one or more double bonds.
- B) They are found in cooking oil rather than a stick of butter.
- C) All of their hydrogen ions are occupied in double bonds.
- D) They can be formed from nuts and other plants.

**78)** Which of the following is NOT true of phospholipids?

- A) They are glycolipids originally isolated from the prostate gland.
- B) They are major components of the cell membrane.
- C) They have a polar head and a nonpolar tail.
- D) They are amphipathic molecules.

**79)** Ketosis\_\_\_\_\_.

- A) occurs when stored fats are rapidly degraded by the body
- B) stimulates an increased blood pH
- C) may lead to alkalosis
- D) occurs as the concentration of ketones in the urine decreases

**80)** Which of the following describes a trans-fat?

- A) Has carbon-carbon single bonds
- B) Has carbon-carbon double bonds with hydrogens on opposite sides of the bonds
- C) Has carbon-carbon double bonds with hydrogens on the same side of the bonds
- D) The fatty acids form a bent chain

**81)** Which of the following is false regarding steroids?

A) They have three 6-carbon rings joined to one 5-carbon ring.  
B) They contain a variety of functional groups.  
C) They are derived from palmitate.  
D) They differ in the position of the double covalent bonds between the carbon atoms in the rings.

**82)** Which of the following is NOT a derivative of cholesterol?

- A) Corticosteroids
- B) Vitamin D<sub>3</sub>
- C) Aldosterone
- D) Insulin

**83)** Phospholipid molecules will form aggregates called \_\_\_\_\_ when placed in water.

- A) surfactants
- B) ketone bodies
- C) prostaglandins
- D) micelles

**84)** What characteristic of phospholipids allows them to form the double layer seen in cell membranes?

- A) They are amphipathic.
- B) They are totally nonpolar.
- C) They are soluble in water.
- D) They are totally hydrophobic.

**85)** \_\_\_\_\_ is a structural protein found in tendons and ligaments.

- A) Collagen
- B) Keratin
- C) Myosin
- D) Fibrin

**86)** Peptide bonds are formed by the process of \_\_\_\_\_.

- A) ketosis
- B) hydrolysis
- C) dehydration synthesis
- D) aromatization

**87)** The secondary structure of proteins is \_\_\_\_\_.

- A) the linear arrangement of amino acids in the molecule
- B) alpha helix coils and beta-pleated sheet folds of a protein strand
- C) due to the interaction between protein subunits
- D) stabilized when a protein is denatured

**88)** The primary structure of proteins is \_\_\_\_\_.

- A) the linear arrangement of amino acids in the molecule
- B) alpha helix coils and beta-pleated sheet folds of a protein strand
- C) due to the interaction between protein subunits
- D) stabilized when a protein is denatured

**89)** The subunit of protein is the \_\_\_\_\_.

- A) fatty acid
- B) nucleic acid
- C) amino acid
- D) carboxylic acid

**90)** What holds a protein in its tertiary structure?

- A) Hydrogen bonds between nearby amino acids
- B) Weak chemical bonds between widely spaced amino acids
- C) Disulfide bonds between sulfur groups on cysteines
- D) Both weak chemical bonds between widely spaced amino acids and disulfide bonds between sulfur groups on cysteines are correct.

**91)** How many amino acids are present for a polypeptide chain to be called a protein?

- A) 3
- B) 30
- C) 50
- D) 100

**92)** A protein that is combined with another type of molecule , such as a carbohydrate, becomes \_\_\_\_\_.

- A) conjugated
- B) denatured
- C) hydrolyzed
- D) complemented

**93)** Which of the following is NOT a function of proteins in the body?

- A) Carriers for membrane transport
- B) Enzymes
- C) Compose genes
- D) Receptors for regulator molecules

94) Keratin and collagen are considered \_\_\_\_\_ proteins.

- A) functional
- B) structural
- C) fibrous
- D) Both structural and fibrous are correct.

95) The nitrogenous base adenine is a \_\_\_\_\_.

- A) purine
- B) pyrimidine
- C) steroid
- D) prostaglandin

96) Which of the following is NOT a component of DNA?

- A) Phosphate
- B) Deoxyribose sugar
- C) Guanine
- D) Uracil

97) The "spiral staircase" structure of DNA is referred to as the \_\_\_\_\_.

- A) tertiary structure
- B) spiral structure
- C) double helix
- D) twist of life

**98)** Which of the following is NOT one of the three types of RNA?

- A) dRNA
- B) tRNA
- C) rRNA
- D) mRNA

**99)** The base that is NOT found in RNA is \_\_\_\_\_.

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

**100)** Which of the following is NOT a difference between DNA and RNA?

- A) They have different sugars.
- B) RNA is a single strand, while DNA is a double strand.
- C) DNA has thymine, while RNA has uracil.
- D) They both can leave the nucleus to perform their functions.

**101)** The backbone of a DNA molecule is a chain of \_\_\_\_\_.

- A) alternating deoxyribose sugar and phosphate
- B) alternating phosphate and nitrogen
- C) alternating nitrogenous bases
- D) alternating deoxyribose and ribose sugars

**102)** Which of the following is NOT a function of a purine-containing nucleotide?

- A) Neurotransmitter
- B) Hormone
- C) Energy carrier
- D) Coenzymes



## **Answer Key**

Test name: Fox 2

- 1) TRUE
- 2) FALSE
- 3) FALSE
- 4) TRUE
- 5) TRUE
- 6) TRUE
- 7) TRUE
- 8) FALSE
- 9) FALSE
- 10) TRUE
- 11) TRUE
- 12) TRUE
- 13) TRUE
- 14) FALSE
- 15) TRUE
- 16) TRUE
- 17) FALSE
- 18) FALSE
- 19) TRUE
- 20) TRUE
- 21) TRUE
- 22) TRUE
- 23) FALSE
- 24) C
- 25) B
- 26) B

- 27) C
- 28) D
- 29) D
- 30) C
- 31) A
- 32) A
- 33) A
- 34) C
- 35) A
- 36) C
- 37) D
- 38) A
- 39) C
- 40) D
- 41) A
- 42) B
- 43) A
- 44) C
- 45) C
- 46) A
- 47) D
- 48) A
- 49) B
- 50) B
- 51) D
- 52) A
- 53) C
- 54) B
- 55) A
- 56) B

- 57) A
- 58) D
- 59) B
- 60) A
- 61) B
- 62) C
- 63) A
- 64) C
- 65) A
- 66) C
- 67) A
- 68) B
- 69) C
- 70) D
- 71) C
- 72) B
- 73) D
- 74) D
- 75) B
- 76) D
- 77) C
- 78) A
- 79) A
- 80) B
- 81) C
- 82) D
- 83) D
- 84) A
- 85) A
- 86) C

- 87) B
- 88) A
- 89) C
- 90) D
- 91) D
- 92) A
- 93) C
- 94) D
- 95) A
- 96) D
- 97) C
- 98) A
- 99) A
- 100) D
- 101) A
- 102) B