

MCQs for Medical Lab  
Technology

# Biochemistry & Chemical Pathology

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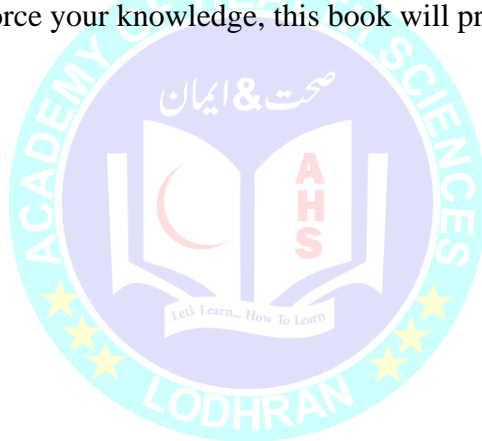
## Preface

Welcome to the world of Biochemistry and Chemical Pathology MCQs, a concise yet comprehensive resource designed specifically for students of Medical Lab Technology. This book aims to provide a solid foundation in the fundamental concepts of biochemistry and chemical pathology through a series of multiple-choice questions (MCQs).

Biochemistry and Chemical Pathology play a vital role in the diagnosis, monitoring, and treatment of various diseases. As a medical laboratory technologist, it is essential to possess a thorough understanding of the biochemical processes occurring in the human body and the biochemical markers used in disease evaluation. This book is meticulously crafted to help students develop their knowledge and critical thinking skills in these areas.

Organized into chapters covering key topics such as carbohydrates, lipids, proteins, enzymes, metabolism, and clinical chemistry, this book offers a comprehensive range of MCQs to test your understanding and application of biochemistry and chemical pathology concepts. Each question is thoughtfully designed to challenge your knowledge and facilitate your learning journey.

Whether you are a student aspiring to excel in the field of medical laboratory technology or a laboratory professional seeking to reinforce your knowledge, this book will prove to be a valuable tool.



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1. Which of the following is the basic unit of matter particle?
- Atom
  - Molecule
  - Compound
  - Element

Answer: a. Atom

2. Which of the following is a combination of two or more atoms?
- Atom
  - Molecule
  - Compound
  - Element

Answer: b. Molecule

3. A substance composed of two or more elements chemically combined in fixed proportions is called a:
- Mixture
  - Compound
  - Element
  - Atom

Answer: b. Compound

4. Which of the following is a substance composed of two or more substances physically combined in varying proportions?
- Compound
  - Element
  - Atom
  - Mixture

Answer: d. Mixture

5. Which of the following is a substance made up of only one type of atom?
- Molecule
  - Compound
  - Mixture
  - Element

Answer: d. Element

6. Which of the following cannot be broken down into simpler substances by chemical reactions?
- Compound
  - Mixture
  - Element
  - Atom

7. Answer: c. Element

8. Which of the following is a combination of two or more elements and/or compounds that are not chemically combined?
- Molecule
  - Compound
  - Element
  - Mixture

Answer: d. Mixture

9. Which of the following is a group of atoms that act as a single unit?
- Compound
  - Molecule
  - Element
  - Atom

Answer: b. Molecule

10. What is the general rule for writing chemical formulas?

- Write the symbol for the cation first, followed by the symbol for the anion
- Write the symbol for the anion first, followed by the symbol for the cation
- Write the symbol for the element with the highest atomic number first, followed by the element with the lowest atomic number
- Write the symbol for the element with the lowest atomic number first, followed by the element with the highest atomic number

Answer: a Write the symbol for the cation first, followed by the symbol for the anion

11. What is the formula for magnesium chloride?
- $MgCl_2$
  - $Mg_2Cl$
  - $MgCl$
  - $Mg_3Cl_2$

Answer: a.  $MgCl_2$

12. What is the formula for sodium sulfate?
- $NaSO_4$
  - $Na_2SO_4$
  - $NaSO_3$
  - $Na_2SO_3$

Answer: b.  $Na_2SO_4$

13. What is the formula for copper (II) nitrate?
- $Cu(NO_2)_2$

- b.  $\text{CuNO}_2$
- c.  $\text{Cu}_2\text{NO}_3$
- d.  $\text{Cu}(\text{NO}_3)_2$

Answer: d.  $\text{Cu}(\text{NO}_3)_2$

14. What is the formula for aluminum oxide?

- a.  $\text{AlO}_3$
- b.  $\text{Al}_2\text{O}_3$
- c.  $\text{AlO}$
- d.  $\text{Al}_2\text{O}_2$

Answer: b.  $\text{Al}_2\text{O}_3$

15. Who is credited with the development of the modern periodic table?

- a. Dmitri Mendeleev
- b. J. J. Thomson
- c. Marie Curie
- d. Antoine Lavoisier

Answer: a. Dmitri Mendeleev

16. What is the atomic number of carbon?

- a. 6
- b. 12
- c. 14
- d. 8

Answer: a. 6

17. The vertical columns on the periodic table are called:

- a. Groups
- b. Periods
- c. Metals
- d. Nonmetals

Answer: a. Groups

18. Which element is located in group 18 of the periodic table?

- a. Helium
- b. Neon
- c. Argon
- d. Xenon

Answer: c. Argon

19. What is the name of the element with the symbol Fe?

- a. Fluorine
- b. Iron
- c. Francium
- d. Fermium

Answer: b. Iron

20. Which of the following is not a metal?

- a. Sodium
- b. Chlorine

- c. Copper
- d. Zinc

Answer: b. Chlorine

21. Which element is located in period 2, group 1 of the periodic table?

- a. Lithium
- b. Sodium
- c. Potassium
- d. All of the above

Answer: d. All of the above

22. Which of the following is the smallest atom on the periodic table?

- a. Helium
- b. Lithium
- c. Neon
- d. Fluorine

Answer: a. Helium

23. What is the name of the element with the symbol Hg?

- a. Mercury
- b. Hydrogen
- c. Helium
- d. Hafnium

Answer: a. Mercury

24. Which of the following elements is a noble gas?

- a. Oxygen
- b. Nitrogen
- c. Neon
- d. Fluorine

Answer: c. Neon

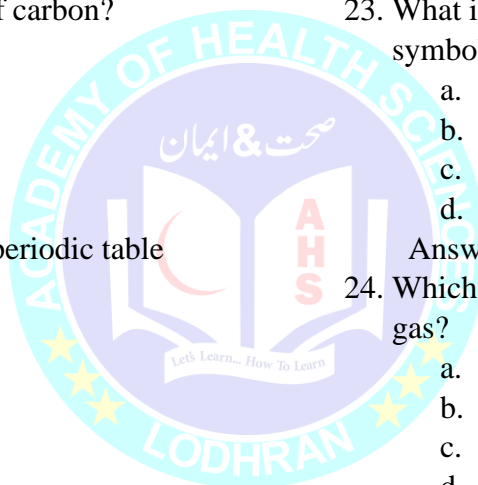
25. What is organic chemistry?

- a. The study of the behavior of electrons in atoms and molecules
- b. The study of the properties and reactions of carbon-containing compounds
- c. The study of the composition and structure of matter
- d. The study of the principles of chemical bonding

Answer: b. The study of the properties and reactions of carbon-containing compounds

26. Which of the following is an example of an alkane?

- a. Ethene
- b. Ethanol



- c. Ethane
- d. Acetylene

Answer: c. Ethane

27. What is the general formula for an alkane?

- a.  $C_nH_{2n+2}$
- b.  $C_nH_{2n}$
- c.  $C_nH_{2n-2}$
- d.  $C_nH_{2n-4}$

Answer: a.  $C_nH_{2n+2}$

28. Which of the following is an unsaturated hydrocarbon?

- a. Alkane
- b. Alkene
- c. Alkyne
- d. All of the above

Answer: b. Alkene

29. What is the general formula for an alkene?

- a.  $C_nH_{2n+2}$
- b.  $C_nH_{2n}$
- c.  $C_nH_{2n-2}$
- d.  $C_nH_{2n-4}$

Answer: b.  $C_nH_{2n}$

30. What is the general formula for an alkyne?

- a.  $C_nH_{2n+2}$
- b.  $C_nH_{2n}$
- c.  $C_nH_{2n-2}$
- d.  $C_nH_{2n-4}$

Answer: c.  $C_nH_{2n-2}$

31. Which functional group is present in aldehydes?

- a. -OH
- b. -COOH
- c. -CHO
- d. -NH<sub>2</sub>

Answer: c. -CHO

32. Which functional group is present in ketones?

- a. -OH
- b. -COOH
- c. -CHO
- d. -CO-

Answer: d. -CO-

33. Which functional group is present in carboxylic acids?

- a. -OH
- b. -COOH
- c. -CHO

- d. -CO-

Answer: b. -COOH

34. Which functional group is present in esters?

- a. -OH
- b. -COOH
- c. -CHO
- d. -COO-

Answer: d. -COO-

35. Which of the following is an example of an aldehyde?

- a. Acetone
- b. Ethanal
- c. Propanone
- d. Methanol

Answer: b. Ethanal

36. Which of the following is an example of a ketone?

- a. Acetone
- b. Ethanal
- c. Propanone
- d. Methanol

Answer: c. Propanone

37. Which of the following is an example of a carboxylic acid?

- a. Ethanol
- b. Acetic acid
- c. Methanol
- d. Ethyl acetate

Answer: b. Acetic acid

38. Which of the following is an example of an ester?

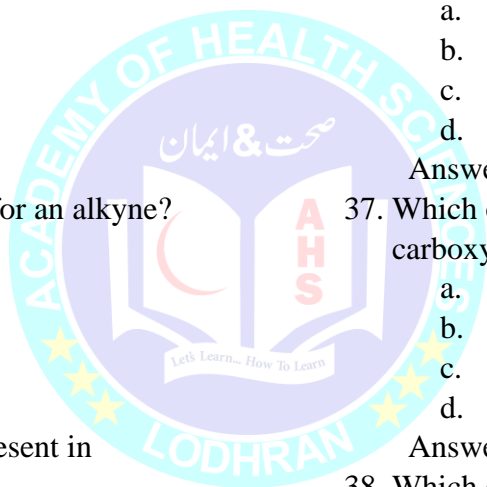
- a. Ethanol
- b. Acetic acid
- c. Methanol
- d. Ethyl acetate

Answer: d. Ethyl acetate

39. What is an alkyl group?

- a. A hydrocarbon chain with a functional group attached
- b. A hydrocarbon chain without a functional group attached
- c. A functional group with a hydrocarbon chain attached
- d. A molecule containing both carbon and hydrogen

Answer: b. A hydrocarbon chain without a functional group attached



40. What is a monosaccharide?

- a. A type of amino acid
- b. A type of nucleotide
- c. A type of carbohydrate
- d. A type of lipid

Answer: c. A type of carbohydrate

41. What is the general formula for a monosaccharide?

- a.  $C_nH_{2n}$
- b.  $C_nH_{2n}O$
- c.  $C_nH_{2n}O_2$
- d.  $C_nH_{2n}O_{2n}$

Answer: c.  $C_nH_{2n}O_2$

42. Which of the following is a common monosaccharide?

- a. Glucose
- b. Sucrose
- c. Lactose
- d. Maltose

Answer: a. Glucose

43. What is the chemical formula for glucose?

- a.  $C_6H_{12}O_6$
- b.  $C_{12}H_{22}O_{11}$
- c.  $C_6H_{10}O_5$
- d.  $C_4H_8O_4$

Answer: a.  $C_6H_{12}O_6$

44. What is the function of monosaccharides in the body?

- a. Provide energy
- b. Build proteins
- c. Store fat
- d. Make DNA

Answer: a. Provide energy

45. Which of the following is a characteristic of monosaccharides?

- a. They are insoluble in water
- b. They have a sweet taste
- c. They are composed of long chains of glucose molecules
- d. They are only found in animal products

Answer: b. They have a sweet taste

46. Which of the following is a type of monosaccharide?

- a. Galactose

- b. Sucrose
- c. Maltose
- d. Lactose

Answer: a. Galactose

47. Which of the following is a structural isomer of glucose?

- a. Fructose
- b. Sucrose
- c. Lactose
- d. Maltose

Answer: a. Fructose

48. Which of the following is a reducing sugar?

- a. Sucrose
- b. Lactose
- c. Maltose
- d. Glucose

Answer: d. Glucose

49. Which of the following is a common disaccharide made up of two monosaccharides?

- a. Glucose
- b. Fructose
- c. Sucrose
- d. Galactose

Answer: c. Sucrose

50. What are monosaccharide isomers?

- a. Monosaccharides with the same chemical formula but different structures
- b. Monosaccharides with different chemical formulas
- c. Monosaccharides that are only found in animal products
- d. Monosaccharides that have a sweet taste

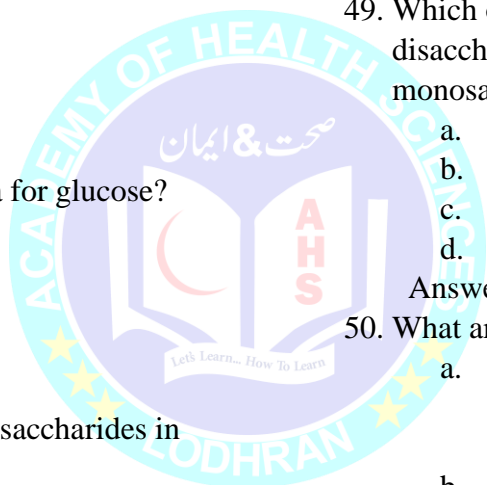
Answer: a. Monosaccharides with the same chemical formula but different structures

51. Which of the following is an isomer of glucose?

- a. Fructose
- b. Sucrose
- c. Lactose
- d. Maltose

Answer: a. Fructose

52. What is the difference between glucose and fructose?



- a. Glucose has a five-carbon ring structure, while fructose has a six-carbon ring structure
- b. Glucose has a six-carbon ring structure, while fructose has a five-carbon ring structure
- c. Glucose has a linear structure, while fructose has a ring structure
- d. Glucose and fructose have the same chemical structure

Answer: b. Glucose has a six-carbon ring structure, while fructose has a five-carbon ring structure

53. Which of the following is an example of a structural isomer of glucose?

- a. Fructose
- b. Galactose
- c. Sucrose
- d. Lactose

Answer: b. Galactose

54. What is the significance of monosaccharide isomers in biology?

- a. They have different physical and chemical properties that affect their function in the body
- b. They are all used for the same functions in the body, so their differences are not important
- c. They are only found in certain types of organisms
- d. They have the same physical and chemical properties, so their differences are not important

Answer: a. They have different physical and chemical properties that affect their function in the body.

55. What are disaccharides?

- a. Carbohydrates made up of two monosaccharide units
- b. Carbohydrates made up of three monosaccharide units
- c. Carbohydrates made up of four monosaccharide units
- d. Carbohydrates made up of a mixture of monosaccharides and disaccharides

Answer: a. Carbohydrates made up of two monosaccharide units

56. Which of the following is a common disaccharide?

- a. Glucose
- b. Fructose
- c. Sucrose
- d. Galactose

Answer: c. Sucrose

57. What are the two monosaccharides that make up lactose?

- a. Glucose and fructose
- b. Glucose and galactose
- c. Galactose and fructose
- d. Sucrose and maltose

Answer: b. Glucose and galactose

58. Which of the following is a reducing disaccharide?

- a. Sucrose
- b. Lactose
- c. Maltose
- d. Cellulose

Answer: b. Lactose

59. What is the function of disaccharides in the body?

- a. Provide energy
- b. Build proteins
- c. Store fat
- d. Regulate hormones

Answer: a. Provide energy

60. What type of bond links monosaccharides together to form carbohydrates?

- a. Covalent bond
- b. Hydrogen bond
- c. Ionic bond
- d. Van der Waals bond

Answer: a. Covalent bond

61. What is the name of the bond that links two monosaccharides together?

- a. Glycosidic bond
- b. Peptide bond
- c. Ionic bond
- d. Hydrogen bond

Answer: a. Glycosidic bond

62. How many glycosidic bonds are present in a disaccharide?

- a. One

- b. Two
- c. Three
- d. Four

Answer: a. One

63. What is the difference between an alpha and beta glycosidic bond?

- a. The orientation of the OH group on the first carbon of one monosaccharide relative to the second carbon of the other monosaccharide
- b. The number of carbon atoms in each monosaccharide
- c. The presence or absence of an oxygen atom in the bond
- d. The strength of the bond

Answer: a. The orientation of the OH group on the first carbon of one monosaccharide relative to the second carbon of the other monosaccharide

64. What is the role of bonds in carbohydrates?

- a. To provide structural support to the carbohydrate molecule
- b. To regulate the functions of the carbohydrate in the body
- c. To provide energy to the body
- d. To help with the digestion and absorption of carbohydrates

Answer: a. To provide structural support to the carbohydrate molecule

65. What are polysaccharides?

- a. Carbohydrates made up of multiple monosaccharide units
- b. Carbohydrates made up of a single monosaccharide unit
- c. Carbohydrates made up of two monosaccharide units
- d. Carbohydrates made up of a mixture of monosaccharides and disaccharides

Answer: a. Carbohydrates made up of multiple monosaccharide units

66. Which of the following is a common polysaccharide?

- a. Sucrose
- b. Lactose
- c. Maltose

- d. Starch

Answer: d. Starch

67. What is the main function of glycogen in the body?

- a. Energy storage
- b. Structural support
- c. Hormone regulation
- d. Digestive enzyme production

Answer: a. Energy storage

68. What type of glycosidic bond is present in cellulose?

- a. Alpha glycosidic bond
- b. Beta glycosidic bond
- c. Both alpha and beta glycosidic bonds
- d. Cellulose does not contain glycosidic bonds

Answer: b. Beta glycosidic bond

69. What is the difference between amylose and amylopectin?

- a. Amylose is a linear polysaccharide, while amylopectin is branched
- b. Amylose is a branched polysaccharide, while amylopectin is linear
- c. Amylose and amylopectin are the same thing
- d. Amylose and amylopectin are both disaccharides

Answer: a. Amylose is a linear polysaccharide, while amylopectin is branched

70. What are amino acids?

- a. Carbohydrates made up of multiple monosaccharide units
- b. Proteins made up of multiple amino acids
- c. Fatty acids made up of multiple carbon atoms
- d. Nucleic acids made up of multiple nucleotides

Answer: b. Proteins made up of multiple amino acids

71. How many amino acids are there?

- a. 20
- b. 30
- c. 40
- d. 50



Answer: a. 20

72. What is the general structure of an amino acid?
- A central carbon atom, an amino group, a carboxyl group, and a side chain
  - A central oxygen atom, an amino group, a carboxyl group, and a side chain
  - A central nitrogen atom, an amino group, a carboxyl group, and a side chain
  - A central carbon atom, a phosphate group, a carboxyl group, and a side chain

Answer: a. A central carbon atom, an amino group, a carboxyl group, and a side chain

73. What is the name of the bond that links two amino acids together?
- Peptide bond
  - Glycosidic bond
  - Hydrogen bond
  - Ionic bond

Answer: a. Peptide bond

74. What is the difference between a polar and nonpolar amino acid?
- Polar amino acids have a side chain that contains a polar group, while nonpolar amino acids have a side chain that does not contain a polar group
  - Nonpolar amino acids have a side chain that contains a polar group, while polar amino acids have a side chain that does not contain a polar group
  - Polar amino acids have a positive charge, while nonpolar amino acids have a negative charge
  - Nonpolar amino acids have a positive charge, while polar amino acids have a negative charge

Answer: a. Polar amino acids have a side chain that contains a polar group, while nonpolar amino acids have a side chain that does not contain a polar group

75. Which amino acid is responsible for disulfide bond formation in proteins?
- Glycine
  - Cysteine
  - Proline
  - Serine

Answer: b. Cysteine

76. What is the difference between an essential and nonessential amino acid?
- Essential amino acids cannot be synthesized by the body and must be obtained through the diet, while nonessential amino acids can be synthesized by the body
  - Nonessential amino acids cannot be synthesized by the body and must be obtained through the diet, while essential amino acids can be synthesized by the body
  - Essential and nonessential amino acids are the same thing
  - Essential amino acids are found in animal proteins, while nonessential amino acids are found in plant proteins

Answer: a. Essential amino acids cannot be synthesized by the body and must be obtained through the diet, while nonessential amino acids can be synthesized by the body

77. Which of the following is an example of a basic amino acid?
- Valine
  - Aspartic acid
  - Lysine
  - Proline

Answer: c. Lysine

78. What is the role of the R-group (side chain) in an amino acid?
- Determines the size and shape of the amino acid
  - Determines the charge of the amino acid
  - Determines the polarity of the amino acid
  - All of the above

Answer: d. All of the above

79. What is the general structure of an amino acid?
- A central carbon atom, an amino group, a carboxyl group, and a side chain
  - A central oxygen atom, an amino group, a carboxyl group, and a side chain
  - A central nitrogen atom, an amino group, a carboxyl group, and a side chain
  - A central carbon atom, a phosphate group, a carboxyl group, and a side chain

Answer: a. A central carbon atom, an amino group, a carboxyl group, and a side chain

80. What is the difference between an essential and nonessential amino acid?
- Essential amino acids cannot be synthesized by the body and must be obtained through the diet, while nonessential amino acids can be synthesized by the body
  - Nonessential amino acids cannot be synthesized by the body and must be obtained through the diet, while essential amino acids can be synthesized by the body
  - Essential and nonessential amino acids are the same thing
  - Essential amino acids are found in animal proteins, while nonessential amino acids are found in plant proteins

Answer: a. Essential amino acids cannot be synthesized by the body and must be obtained through the diet, while nonessential amino acids can be synthesized by the body

81. How many essential amino acids are there?
- 5
  - 9
  - 12
  - 20

Answer: b. 9

82. Which of the following is an example of a nonpolar amino acid?

- Tyrosine
- Asparagine
- Leucine
- Lysine

Answer: c. Leucine

83. Which amino acid is known for its role in protein synthesis and muscle growth?
- Valine
  - Lysine
  - Leucine
  - Methionine

Answer: c. Leucine

84. What is the role of an amino acid in protein synthesis?
- They act as enzymes to catalyze the formation of peptide bonds
  - They provide the energy needed for protein synthesis
  - They form the building blocks of proteins by linking together through peptide bonds
  - None of the above

Answer: c. They form the building blocks of proteins by linking together through peptide bonds

85. Which amino acid is responsible for the blue color of the eyes and the pigment in skin and hair?
- Tyrosine
  - Tryptophan
  - Histidine
  - Methionine

Answer: a. Tyrosine

86. What is the term used to describe a protein that contains all the essential amino acids in the correct proportions for human use?
- High-quality protein
  - Low-quality protein
  - Complete protein
  - Incomplete protein

Answer: c. Complete protein

87. What is the primary structure of a protein?
- The three-dimensional shape of the protein
  - The linear sequence of amino acids in the protein

- c. The arrangement of multiple polypeptide chains in a protein
- d. The arrangement of alpha helices and beta sheets in a protein

Answer: b. The linear sequence of amino acids in the protein

88. What is the secondary structure of a protein?

- a. The three-dimensional shape of the protein
- b. The linear sequence of amino acids in the protein
- c. The arrangement of multiple polypeptide chains in a protein
- d. The arrangement of alpha helices and beta sheets in a protein

Answer: d. The arrangement of alpha helices and beta sheets in a protein

89. What is the tertiary structure of a protein?

- a. The three-dimensional shape of the protein
- b. The linear sequence of amino acids in the protein
- c. The arrangement of multiple polypeptide chains in a protein
- d. The arrangement of alpha helices and beta sheets in a protein

Answer: a. The three-dimensional shape of the protein

90. What is the quaternary structure of a protein?

- a. The three-dimensional shape of the protein
- b. The linear sequence of amino acids in the protein
- c. The arrangement of multiple polypeptide chains in a protein
- d. The arrangement of alpha helices and beta sheets in a protein

Answer: c. The arrangement of multiple polypeptide chains in a protein

91. Which of the following is not a type of protein?

- a. Enzymes
- b. Antibodies
- c. Hormones
- d. Polysaccharides

Answer: d. Polysaccharides

92. What is the function of an enzyme?

- a. To break down proteins
- b. To break down carbohydrates
- c. To catalyze chemical reactions in the body
- d. To transport molecules in the body

Answer: c. To catalyze chemical reactions in the body

93. Which of the following is not an example of a fibrous protein?

- a. Collagen
- b. Elastin
- c. Myoglobin
- d. Keratin

Answer: c. Myoglobin

94. Which of the following is not an example of a globular protein?

- a. Hemoglobin
- b. Insulin
- c. Albumin
- d. Keratin

Answer: d. Keratin

95. What is the function of a structural protein?

- a. To catalyze chemical reactions in the body
- b. To provide structure and support for cells and tissues
- c. To transport molecules in the body
- d. To regulate gene expression

Answer: b. To provide structure and support for cells and tissues

96. What is the function of a contractile protein?

- a. To provide structure and support for cells and tissues
- b. To catalyze chemical reactions in the body
- c. To transport molecules in the body
- d. To generate movement and force

Answer: d. To generate movement and force

97. What is the function of a transport protein?

- a. To provide structure and support for cells and tissues
- b. To catalyze chemical reactions in the body
- c. To transport molecules in the body
- d. To generate movement and force

Answer: c. To transport molecules in the body

98. What is denaturation of a protein?
- The breaking of peptide bonds between amino acids
  - The coiling of a polypeptide chain into an alpha helix
  - The loss of a protein's three-dimensional structure and function due to heat or other stressors
  - The formation of disulfide bonds between cysteine residues
99. Which of the following is an example of a post-translational modification of a protein?
- Splicing of mRNA
  - Formation of peptide bonds between amino acids
  - Addition of a phosphate group to a serine residue
  - Synthesis of a polypeptide chain

Answer: c. Addition of a phosphate group to a serine residue

100. What is the primary structure of a protein?
- The arrangement of multiple polypeptide chains in a protein
  - The linear sequence of amino acids in the protein
  - The arrangement of alpha helices and beta sheets in a protein
  - The three-dimensional shape of the protein

Answer: b. The linear sequence of amino acids in the protein

101. What is the secondary structure of a protein?
- The arrangement of multiple polypeptide chains in a protein
  - The linear sequence of amino acids in the protein
  - The arrangement of alpha helices and beta sheets in a protein
  - The three-dimensional shape of the protein

Answer: c. The arrangement of alpha helices and beta sheets in a protein

102. Which type of bonding is responsible for the formation of secondary structure in proteins?

- Peptide bonds
- Disulfide bonds
- Hydrogen bonds
- Ionic bonds

Answer: c. Hydrogen bonds

103. What is the tertiary structure of a protein?

- The arrangement of alpha helices and beta sheets in a protein
- The linear sequence of amino acids in the protein
- The three-dimensional shape of the protein
- The arrangement of multiple polypeptide chains in a protein

Answer: c. The three-dimensional shape of the protein

104. Which type of bonding is responsible for the stability of the tertiary structure in proteins?

- Peptide bonds
- Disulfide bonds
- Hydrogen bonds
- Ionic bonds

Answer: b. Disulfide bonds

105. What is the quaternary structure of a protein?

- The arrangement of multiple polypeptide chains in a protein
- The linear sequence of amino acids in the protein
- The arrangement of alpha helices and beta sheets in a protein
- The three-dimensional shape of the protein

Answer: a. The arrangement of multiple polypeptide chains in a protein

106. Which type of bonding is responsible for the stability of the quaternary structure in proteins?

- Peptide bonds
- Disulfide bonds
- Hydrogen bonds
- Ionic bonds

Answer: c. Hydrogen bonds

107. What is a protein domain?
- A specific sequence of amino acids within a polypeptide chain
  - A distinct, structurally and functionally independent part of a protein
  - A region of a protein where two or more polypeptide chains come together
  - A linear sequence of amino acids that forms an alpha helix or beta sheet

Answer: b. A distinct, structurally and functionally independent part of a protein

108. Which of the following is an example of a protein that contains multiple domains?
- Hemoglobin
  - Insulin
  - Myoglobin
  - Lysozyme

Answer: a. Hemoglobin

109. What is a protein folding funnel?
- A model used to describe how proteins fold into their three-dimensional structures
  - A tool used to measure the stability of a protein's tertiary structure
  - A technique used to identify protein-protein interactions
  - A method used to purify proteins from complex mixtures

Answer: a. A model used to describe how proteins fold into their three-dimensional structures

110. Which of the following is a function of structural proteins?
- Transporting oxygen
  - Regulating gene expression
  - Providing mechanical support to cells and tissues
  - Initiating cell signaling pathways

Answer: c. Providing mechanical support to cells and tissues

111. What is the function of contractile proteins?

- Transporting oxygen
- Regulating gene expression
- Enabling movement and contraction of cells and tissues
- Catalyzing biochemical reactions

Answer: c. Enabling movement and contraction of cells and tissues

112. What is the function of enzymes?

- Transporting oxygen
- Regulating gene expression
- Providing mechanical support to cells and tissues
- Catalyzing biochemical reactions

Answer: d. Catalyzing biochemical reactions

113. What is the function of transport proteins?

- Transporting oxygen
- Regulating gene expression
- Providing mechanical support to cells and tissues
- Catalyzing biochemical reactions

Answer: a. Transporting oxygen

114. Which of the following is a function of regulatory proteins?

- Transporting oxygen
- Regulating gene expression
- Providing mechanical support to cells and tissues
- Catalyzing biochemical reactions

Answer: b. Regulating gene expression

115. What is the function of antibodies?

- Transporting oxygen
- Regulating gene expression
- Providing mechanical support to cells and tissues
- Recognizing and neutralizing foreign molecules and pathogens

Answer: d. Recognizing and neutralizing foreign molecules and pathogens

116. Which of the following is a characteristic of saturated fatty acids?

- They contain double bonds
- They are liquid at room temperature
- They are typically found in plant sources

d. They are solid at room temperature

Answer: d. They are solid at room temperature

117. Which of the following is a characteristic of unsaturated fatty acids?
- They contain double bonds
  - They are liquid at room temperature
  - They are typically found in animal sources
  - They are solid at room temperature

Answer: a. They contain double bonds

118. What is the primary function of fatty acids?
- Energy storage
  - Providing structural support to cells
  - Transporting oxygen
  - Catalyzing biochemical reactions

Answer: a. Energy storage

119. Which of the following is an omega-3 fatty acid?
- Linoleic acid
  - Oleic acid
  - Palmitic acid
  - Docosahexaenoic acid (DHA)

Answer: d. Docosahexaenoic acid (DHA)

120. What is the difference between a cis and trans fatty acid?
- The number of carbon atoms in the molecule
  - The orientation of the double bond
  - The presence or absence of a carboxyl group
  - The size of the fatty acid molecule

Answer: b. The orientation of the double bond

121. Which of the following is a type of trans fatty acid that is produced during the process of hydrogenation?
- Linoleic acid
  - Oleic acid
  - Palmitic acid
  - Elaidic acid

Answer: d. Elaidic acid

122. Which of the following is an example of a medium-chain fatty acid?
- Lauric acid
  - Palmitic acid

c. Stearic acid

d. Arachidonic acid

Answer: a. Lauric acid

123. What is the difference between a saturated and an unsaturated fatty acid?
- The number of carbon atoms in the molecule
  - The orientation of the double bond
  - The presence or absence of a carboxyl group
  - The saturation of the carbon chain with hydrogen atoms

Answer: d. The saturation of the carbon chain with hydrogen atoms

124. Which of the following is an example of a simple lipid?
- Phospholipid
  - Steroid
  - Triglyceride
  - Wax

Answer: c. Triglyceride

125. Which of the following is an example of a compound lipid?
- Phospholipid
  - Steroid
  - Triglyceride
  - Wax

Answer: a. Phospholipid

126. Which of the following is not a function of lipids in the body?
- Energy storage
  - Structural support
  - Signaling molecules
  - Enzyme catalysis

Answer: b. Structural support

127. What is the basic structure of a triglyceride?
- A glycerol molecule with three fatty acids attached
  - A glycerol molecule with a phosphate group and two fatty acids attached
  - A cholesterol molecule with three fatty acids attached
  - A glycerol molecule with a carboxylic acid group and two fatty acids attached

Answer: a. A glycerol molecule with three fatty acids attached

128. What is the difference between a saturated and unsaturated fatty acid?
- The number of carbon atoms in the molecule
  - The orientation of the double bond
  - The presence or absence of a carboxyl group
  - The saturation of the carbon chain with hydrogen atoms

Answer: d. The saturation of the carbon chain with hydrogen atoms

129. Which of the following is a derived lipid?
- Phospholipid
  - Steroid
  - Triglyceride
  - Wax

Answer: b. Steroid

130. Which of the following is not a function of steroids in the body?
- Hormone synthesis
  - Cell membrane structure
  - Cholesterol synthesis
  - Regulation of metabolism

Answer: b. Cell membrane structure

131. Which of the following is a characteristic of waxes?
- They are highly water-soluble
  - They are made up of long chains of fatty acids
  - They are commonly found in plant leaves
  - They provide a waterproof barrier

Answer: d. They provide a waterproof barrier

132. Which of the following is a function of phospholipids in the body?
- Energy storage
  - Structural support
  - Cell membrane structure
  - Hormone synthesis

Answer: c. Cell membrane structure

133. Which of the following is an example of a saturated fatty acid?
- Linoleic acid

- Oleic acid
- Palmitic acid
- Docosahexaenoic acid (DHA)

Answer: c. Palmitic acid

134. Which of the following is a characteristic of unsaturated fatty acids?
- They contain double bonds
  - They are solid at room temperature
  - They are typically found in animal sources
  - They are saturated with hydrogen atoms

Answer: a. They contain double bonds

135. Which of the following is a characteristic of derived lipids?
- They are composed of a glycerol molecule and three fatty acids
  - They are water-soluble
  - They are involved in energy storage
  - They are not found in animal tissues

Answer: b. They are water-soluble

136. Which of the following is true about the structure of enzymes?
- They are usually composed of a single polypeptide chain
  - They are typically composed of multiple polypeptide chains
  - They contain both hydrophilic and hydrophobic regions
  - They have a rigid, static structure

Answer: c. They contain both hydrophilic and hydrophobic regions

137. Which of the following is not a type of enzyme structure?
- Primary structure
  - Secondary structure
  - Tertiary structure
  - Quaternary structure

Answer: a. Primary structure

138. What is the active site of an enzyme?
- The region of the enzyme that binds to the substrate
  - The region of the enzyme that binds to the cofactor
  - The region of the enzyme that undergoes a conformational change

- d. The region of the enzyme that is not involved in catalysis

Answer: a. The region of the enzyme that binds to the substrate

139. What is the role of a cofactor in enzyme catalysis?
- It provides structural stability to the enzyme
  - It increases the reaction rate of the enzyme
  - It acts as a substrate for the enzyme
  - It inhibits the enzyme activity

Answer: b. It increases the reaction rate of the enzyme

140. What is the difference between an apoenzyme and a holoenzyme?
- An apoenzyme is the active form of the enzyme, while a holoenzyme is inactive
  - An apoenzyme requires a cofactor to be active, while a holoenzyme has a cofactor bound
  - An apoenzyme is composed of multiple polypeptide chains, while a holoenzyme is composed of a single polypeptide chain
  - An apoenzyme has a quaternary structure, while a holoenzyme has a tertiary structure

Answer: b. An apoenzyme requires a cofactor to be active, while a holoenzyme has a cofactor bound

141. Which of the following is not a factor that affects enzyme activity?
- Temperature
  - pH
  - Substrate concentration
  - Molecular weight of the substrate

Answer: d. Molecular weight of the substrate

142. Enzymes can be classified based on the type of reaction they catalyze. Which of the following is not a type of enzyme based on this classification?
- Hydrolase
  - Transferase
  - Oxidoreductase

- d. Isomerase

Answer: d. Isomerase

143. Enzymes can also be classified based on the type of molecule they act upon. Which of the following is not a type of enzyme based on this classification?
- Protease
  - Lipase
  - Nuclease
  - Carbohydrase

Answer: d. Carbohydrase

144. Enzymes that catalyze the transfer of a phosphate group from ATP to a substrate are called:
- Hydrolases
  - Transferases
  - Isomerases
  - Oxidoreductases

Answer: b. Transferases

145. Enzymes that catalyze the breakdown of carbohydrates into simpler sugars are called:
- Hydrolases
  - Transferases
  - Isomerases
  - Oxidoreductases

Answer: a. Hydrolases

146. Enzymes that catalyze the addition of water to a substrate are called:
- Hydrolases
  - Transferases
  - Isomerases
  - Oxidoreductases

Answer: a. Hydrolases

147. Enzymes that catalyze the transfer of electrons from one molecule to another are called:
- Hydrolases
  - Transferases
  - Isomerases
  - Oxidoreductases

Answer: d. Oxidoreductases

148. Enzymes that catalyze the formation of a double bond in a substrate are called:
- Hydrolases
  - Transferases
  - Isomerases



d. Oxidoreductases

Answer: c. Isomerases

149. Enzymes that catalyze the breakdown of lipids into fatty acids and glycerol are called:

- a. Proteases
- b. Lipases
- c. Nucleases
- d. Carbohydrases

Answer: b. Lipases

150. Enzymatic activity can be affected by pH. Which of the following is not true regarding pH and enzymatic activity?

- a. Each enzyme has an optimal pH at which it functions best.
- b. Extreme pH values can cause the enzyme to denature and lose activity.
- c. Changing the pH of the environment can alter the ionization state of the amino acid residues in the active site.
- d. Enzymatic activity is generally highest at a neutral pH of 7.

Answer: d. Enzymatic activity is generally highest at a neutral pH of 7.

151. Temperature can also affect enzymatic activity. Which of the following is not true regarding temperature and enzymatic activity?

- a. Each enzyme has an optimal temperature at which it functions best.
- b. Extreme temperatures can cause the enzyme to denature and lose activity.
- c. Increasing temperature can increase the rate of the reaction up to a certain point.
- d. Enzymatic activity is generally highest at a low temperature of 0°C.

Answer: d. Enzymatic activity is generally highest at a low temperature of 0°C.

152. Enzymatic activity can be affected by the concentration of substrate. Which of the following is not true regarding substrate concentration and enzymatic activity?

- a. At low substrate concentrations, enzymatic activity is low.

b. At high substrate concentrations, enzymatic activity is low.

c. There is an optimal substrate concentration at which enzymatic activity is highest.

d. Increasing substrate concentration can cause the reaction rate to increase until the enzyme becomes saturated with substrate.

Answer: b. At high substrate concentrations, enzymatic activity is low.

153. Enzymatic activity can be affected by the concentration of enzyme. Which of the following is not true regarding enzyme concentration and enzymatic activity?

- a. At low enzyme concentrations, enzymatic activity is low.
- b. At high enzyme concentrations, enzymatic activity is low.
- c. There is an optimal enzyme concentration at which enzymatic activity is highest.
- d. Increasing enzyme concentration can cause the reaction rate to increase until the substrate becomes saturated with enzyme.

Answer: b. At high enzyme concentrations, enzymatic activity is low.

154. Enzymatic activity can be affected by the presence of inhibitors. Which of the following is not true regarding inhibitors and enzymatic activity?

- a. Competitive inhibitors bind to the active site of the enzyme and prevent substrate binding.
- b. Non-competitive inhibitors bind to a site on the enzyme other than the active site and alter the enzyme's shape.
- c. Inhibitors can cause a decrease in enzymatic activity.
- d. Activators can enhance enzymatic activity.

Answer: d. Activators can enhance enzymatic activity.

155. Vitamin A is essential for:

- a. Healthy vision

- b. Strong bones
- c. Proper immune function
- d. All of the above

Answer: a. Healthy vision

156. Which of the following foods is a good source of vitamin A?

- a. Oranges
- b. Spinach
- c. Beef liver
- d. None of the above

Answer: c. Beef liver

157. Vitamin D is necessary for:

- a. Calcium absorption and bone health
- b. Vision
- c. Blood clotting
- d. All of the above

Answer: a. Calcium absorption and bone health

158. Which of the following is a good source of vitamin D?

- a. Milk
- b. Sunlight
- c. Salmon
- d. All of the above

Answer: d. All of the above

159. Vitamin E acts as a:

- a. Antioxidant
- b. Hormone
- c. Enzyme
- d. None of the above

Answer: a. Antioxidant

160. Which of the following foods is a good source of vitamin E?

- a. Carrots
- b. Olive oil
- c. Grapes
- d. None of the above

Answer: b. Olive oil

161. Vitamin K is necessary for:

- a. Blood clotting
- b. Calcium absorption
- c. Vision
- d. All of the above

Answer: a. Blood clotting

162. Which of the following foods is a good source of vitamin K?

- a. Spinach

- b. Beef liver
- c. Carrots
- d. None of the above

Answer: a. Spinach

163. Vitamin A toxicity can lead to:

- a. Blindness
- b. Weak bones
- c. Nausea and vomiting
- d. All of the above

Answer: d. All of the above

164. Vitamin D deficiency can lead to:

- a. Rickets in children
- b. Osteoporosis in adults
- c. Increased risk of infections
- d. All of the above

Answer: d. All of the above

165. Vitamin E deficiency can lead to:

- a. Anemia
- b. Blindness
- c. Neurological problems
- d. None of the above

Answer: c. Neurological problems

166. Vitamin K deficiency can lead to:

- a. Increased risk of bleeding
- b. Night blindness
- c. Skin rashes
- d. None of the above

Answer: a. Increased risk of bleeding

167. Excess intake of vitamin A can be harmful during:

- a. Pregnancy
- b. Childhood
- c. Elderly age
- d. All of the above

Answer: a. Pregnancy

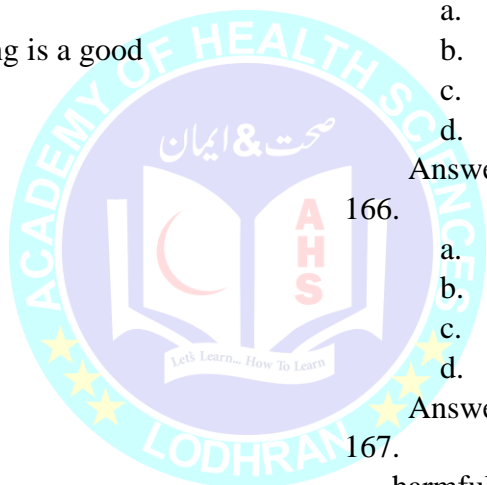
168. Which vitamin is produced by the body when the skin is exposed to sunlight?

- a. Vitamin A
- b. Vitamin D
- c. Vitamin E
- d. Vitamin K

Answer: b. Vitamin D

169. Which vitamin is commonly added to fortified cereals and other processed foods?

- a. Vitamin A
- b. Vitamin D



c. Vitamin E

d. Vitamin K

Answer: b. Vitamin D

170. How many vitamins are included in the B complex group?

a. 5

b. 7

c. 8

d. 10

Answer: c. 8

171. Which of the following is a water-soluble vitamin from the B complex group?

a. Vitamin A

b. Vitamin C

c. Vitamin D

d. Vitamin K

Answer: b. Vitamin C

172. Which B vitamin is essential for the formation of red blood cells?

a. Vitamin B1

b. Vitamin B6

c. Vitamin B12

d. Vitamin B3

Answer: c. Vitamin B12

173. Which B vitamin is essential for the metabolism of carbohydrates, proteins, and fats?

a. Vitamin B2

b. Vitamin B5

c. Vitamin B6

d. Vitamin B3

Answer: d. Vitamin B3

174. Which B vitamin is commonly referred to as "niacin"?

a. Vitamin B1

b. Vitamin B2

c. Vitamin B3

d. Vitamin B6

Answer: c. Vitamin B3

175. Which B vitamin is essential for the synthesis of DNA and RNA?

a. Vitamin B5

b. Vitamin B6

c. Vitamin B7

d. Vitamin B9

Answer: d. Vitamin B9

176. Which B vitamin is commonly found in leafy green vegetables and is essential for the production of energy in the body?

a. Vitamin B1

b. Vitamin B2

c. Vitamin B6

d. Vitamin B12

Answer: b. Vitamin B2

177. Which B vitamin is essential for the proper functioning of the nervous system and is commonly used to treat depression and anxiety?

a. Vitamin B1

b. Vitamin B6

c. Vitamin B12

d. Vitamin B7

Answer: b. Vitamin B6

178. Which scientific name is used for Vitamin C?

a. Ascorbic acid

b. Folic acid

c. Nicotinic acid

d. Pantothenic acid

Answer: a. Ascorbic acid

179. What is the daily recommended intake of Vitamin C for adults?

a. 10-20 mg

b. 50-70 mg

c. 100-200 mg

d. 500-1000 mg

Answer: d. 500-1000 mg

180. What is the main function of Vitamin C in the body?

a. Production of collagen

b. Maintenance of healthy bones

c. Formation of red blood cells

d. Maintenance of healthy nervous system

Answer: a. Production of collagen

181. What is the scientific term for Vitamin C deficiency disease?

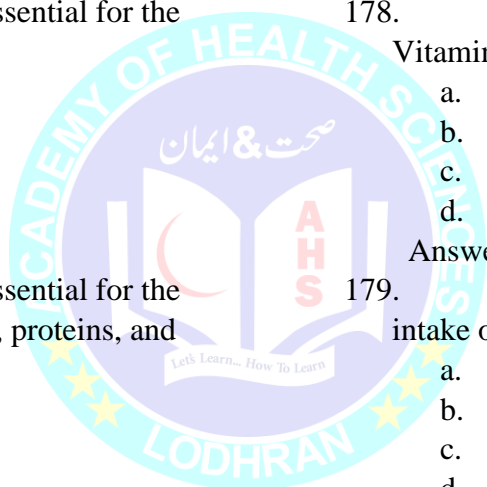
a. Scurvy

b. Rickets

c. Beriberi

d. Pellagra

Answer: a. Scurvy



182. Which of the following foods is the richest source of Vitamin C?

- a. Oranges
- b. Milk
- c. Meat
- d. Potatoes

Answer: a. Oranges

183. What percentage of the human body is made up of water?

- a. 50%
- b. 60%
- c. 70%
- d. 80%

Answer: c. 70%

184. Which of the following is an electrolyte?

- a. Glucose
- b. Sodium
- c. Fat
- d. Protein

Answer: b. Sodium

185. What is the most abundant cation (positively charged ion) in the extracellular fluid?

- a. Potassium
- b. Calcium
- c. Sodium
- d. Magnesium

Answer: c. Sodium

186. What is the most abundant anion (negatively charged ion) in the extracellular fluid?

- a. Chloride
- b. Phosphate
- c. Bicarbonate
- d. Sulfate

Answer: a. Chloride

187. What is the process by which water and dissolved substances move across a semipermeable membrane from an area of higher concentration to an area of lower concentration?

- a. Active transport
- b. Osmosis
- c. Diffusion
- d. Filtration

Answer: b. Osmosis

188. Which hormone regulates water balance in the body by controlling the reabsorption of water in the kidneys?

- a. Insulin
- b. Glucagon
- c. Antidiuretic hormone (ADH)
- d. Thyroid hormone

Answer: c. Antidiuretic hormone (ADH)

189. What is the normal pH range of human blood?

- a. 7.0-7.2
- b. 7.2-7.4
- c. 7.4-7.6
- d. 7.6-7.8

Answer: b. 7.2-7.4

190. Which of the following conditions can lead to dehydration?

- a. Diarrhea
- b. Excessive sweating
- c. Vomiting
- d. All of the above

Answer: d. All of the above

191. Which of the following is an example of an isotonic solution?

- a. Hypotonic saline
- b. Hypertonic saline
- c. Normal saline
- d. None of the above

Answer: c. Normal saline

192. Which electrolyte imbalance can cause muscle weakness, cramps, and irregular heartbeat?

- a. Hyperkalemia (high potassium)
- b. Hypokalemia (low potassium)
- c. Hyponatremia (high sodium)
- d. Hyponatremia (low sodium)

Answer: b. Hypokalemia (low potassium)

193. What is the function of a spectrophotometer?

- a. To measure the intensity of light absorbed by a sample
- b. To measure the intensity of light emitted by a sample
- c. To measure the refractive index of a sample
- d. To measure the scattering of light by a sample

Answer: a. To measure the intensity of light absorbed by a sample

194. Which of the following is not a component of a spectrophotometer?

- a. Light source
- b. Monochromator
- c. Sample holder
- d. Balance

Answer: d. Balance

195. What is the name of the law that relates the absorbance of a sample to its concentration?

- a. Beer-Lambert law
- b. Avogadro's law
- c. Charles's law
- d. Boyle's law

Answer: a. Beer-Lambert law

196. Which of the following is not a type of spectrophotometer?

- a. UV-Vis spectrophotometer
- b. Fluorescence spectrophotometer
- c. Infrared spectrophotometer
- d. X-ray spectrophotometer

Answer: d. X-ray spectrophotometer

197. What is the range of wavelengths typically used in UV-Vis spectroscopy?

- a. 200-400 nm
- b. 400-700 nm
- c. 700-1000 nm
- d. 1000-2000 nm

Answer: b. 400-700 nm

198. Which of the following is not a factor that can affect the accuracy of spectrophotometric measurements?

- a. Temperature
- b. pH
- c. Sample volume
- d. Color of the sample holder

Answer: d. Color of the sample holder

199. What is the main application of a flame photometer?

- a. To measure the color of a flame
- b. To measure the intensity of light emitted by metal ions
- c. To measure the intensity of light absorbed by metal ions

d. To measure the temperature of a flame

Answer: b. To measure the intensity of light emitted by metal ions

200. Which of the following is the most commonly used flame in a flame photometer?

- a. Acetylene
- b. Hydrogen
- c. Nitrogen
- d. Oxygen

Answer: b. Hydrogen

201. What is the principle behind the flame photometer?

- a. Atomic absorption spectroscopy
- b. Atomic emission spectroscopy
- c. Molecular absorption spectroscopy
- d. Molecular emission spectroscopy

Answer: b. Atomic emission spectroscopy

202. What is the main function of the kidney in the body?

- a. Regulating blood pressure
- b. Producing insulin
- c. Filtering waste products from the blood
- d. Digesting food

Answer: c. Filtering waste products from the blood

203. What is the primary waste product that is measured in a blood urea nitrogen (BUN) test?

- a. Urea
- b. Creatinine
- c. Glucose
- d. Lactic acid

Answer: a. Urea

204. Which of the following conditions can cause elevated levels of BUN in the blood?

- a. Dehydration
- b. Kidney failure
- c. Liver disease
- d. Diabetes

Answer: b. Kidney failure

205. What is the typical reference range for BUN in adults?

- a. 5-10 mg/dL

- b. 10-20 mg/dL
- c. 20-30 mg/dL
- d. 30-40 mg/dL

Answer: b. 10-20 mg/dL

206. What is the primary waste product that is measured in a serum creatinine test?

- a. Urea
- b. Creatinine
- c. Glucose
- d. Lactic acid

Answer: b. Creatinine

207. What is the typical reference range for serum creatinine in adults?

- a. 0.1-0.5 mg/dL
- b. 0.5-1.0 mg/dL
- c. 1.0-2.0 mg/dL
- d. 2.0-5.0 mg/dL

Answer: b. 0.5-1.0 mg/dL

208. What is the main advantage of using a point-of-care creatinine test over a laboratory-based test?

- a. Faster results
- b. Greater accuracy
- c. Lower cost
- d. Greater sensitivity

Answer: a. Faster results

209. What is the main disadvantage of using a point-of-care creatinine test over a laboratory-based test?

- a. Lower accuracy
- b. Higher cost
- c. Greater risk of contamination
- d. Lower sensitivity

Answer: a. Lower accuracy

210. What is bilirubin?

- a. A hormone produced by the adrenal gland
- b. A waste product of red blood cell breakdown
- c. A neurotransmitter that regulates mood
- d. A protein involved in blood clotting

Answer: b. A waste product of red blood cell breakdown

211. What is the main site of bilirubin production in the body?

- a. The liver

- b. The spleen
- c. The bone marrow
- d. The kidneys

Answer: b. The spleen

212. What happens to bilirubin after it is produced in the body?

- a. It is excreted in the urine
- b. It is excreted in the stool
- c. It is converted into bile and stored in the gallbladder
- d. It is converted into glucose and stored in the liver

Answer: c. It is converted into bile and stored in the gallbladder

213. What is jaundice?

- a. A condition in which the skin and whites of the eyes turn yellow
- b. A type of cancer that affects the liver
- c. A viral infection that affects the liver
- d. A genetic disorder that affects bilirubin metabolism

Answer: a. A condition in which the skin and whites of the eyes turn yellow

214. What are the two main types of jaundice?

- a. Hemolytic jaundice and obstructive jaundice
- b. Viral jaundice and bacterial jaundice
- c. Acute jaundice and chronic jaundice
- d. Neonatal jaundice and adult jaundice

Answer: a. Hemolytic jaundice and obstructive jaundice

215. What causes hemolytic jaundice?

- a. Liver damage or disease
- b. Obstruction of the bile ducts
- c. Rapid breakdown of red blood cells
- d. Buildup of bilirubin in the liver

Answer: c. Rapid breakdown of red blood cells

216. What is the purpose of liver function tests?

- a. To diagnose liver disease or damage
- b. To measure the levels of vitamins in the blood
- c. To monitor kidney function
- d. To check for anemia

Answer: a. To diagnose liver disease or damage

217. Which liver function test measures the amount of bilirubin in the blood?

- Alanine aminotransferase (ALT)
- Aspartate aminotransferase (AST)
- Alkaline phosphatase (ALP)
- Total bilirubin

Answer: d. Total bilirubin

218. Which liver function test measures the amount of albumin in the blood?

- Alanine aminotransferase (ALT)
- Aspartate aminotransferase (AST)
- Alkaline phosphatase (ALP)
- Total protein

Answer: d. Total protein

219. Which liver function test measures the amount of alkaline phosphatase in the blood?

- Alanine aminotransferase (ALT)
- Aspartate aminotransferase (AST)
- Alkaline phosphatase (ALP)
- Total bilirubin

Answer: c. Alkaline phosphatase (ALP)

220. Which liver function test measures the amount of enzymes released by damaged liver cells?

- Alanine aminotransferase (ALT)
- Aspartate aminotransferase (AST)
- Alkaline phosphatase (ALP)
- Total protein

Answer: a. Alanine aminotransferase (ALT)

221. What can liver function tests indicate?

- Liver damage or disease
- Kidney failure
- Pancreatic cancer
- Hypertension

Answer: a. Liver damage or disease

222. What is a lipid profile?

- A blood test that measures the levels of various types of fats in the blood
- A test to diagnose liver disease
- A test to measure kidney function
- A test to check for anemia

Answer: a. A blood test that measures the levels of various types of fats in the blood

223. Which lipids are measured in a lipid profile?

- Triglycerides, cholesterol, LDL, HDL
- Hemoglobin, red blood cell count, white blood cell count, platelets
- Vitamin D, calcium, phosphorus, magnesium
- Glucose, insulin, HbA1c, C-peptide

Answer: a. Triglycerides, cholesterol, LDL, HDL

224. What is the recommended level of LDL cholesterol in the blood?

- <100 mg/dL
- <130 mg/dL
- <160 mg/dL
- <200 mg/dL

Answer: a. <100 mg/dL

225. What is the recommended level of HDL cholesterol in the blood?

- <40 mg/dL (men), <50 mg/dL (women)
- >40 mg/dL (men), >50 mg/dL (women)
- <60 mg/dL
- >60 mg/dL

Answer: b. >40 mg/dL (men), >50 mg/dL (women)

226. Which type of cholesterol is considered "bad" cholesterol?

- HDL
- LDL
- VLDL
- Chylomicrons

Answer: b. LDL

227. Which type of cholesterol is considered "good" cholesterol?

- HDL
- LDL
- VLDL
- Chylomicrons

Answer: a. HDL

228. What is the recommended level of triglycerides in the blood?

- <100 mg/dL

- b. <150 mg/dL
- c. <200 mg/dL
- d. <250 mg/dL

Answer: b. <150 mg/dL

229. What can an abnormal lipid profile indicate?

- a. Increased risk of heart disease
- b. Kidney failure
- c. Liver disease
- d. Anemia

Answer: a. Increased risk of heart disease

230. Beer's Law/Lambert's Law describes the relationship between:

- a. The concentration of a substance and the amount of light that it absorbs
- b. The concentration of a substance and the amount of light that it reflects
- c. The concentration of a substance and the amount of heat that it produces
- d. The concentration of a substance and the amount of electricity that it conducts

Answer: a. The concentration of a substance and the amount of light that it absorbs.

231. What color tube is used for a complete blood count (CBC)?

- a. Red
- b. Lavender
- c. Blue
- d. Green

Answer: b. Lavender

232. What additive is found in a green top tube?

- a. EDTA
- b. Heparin
- c. Sodium Citrate
- d. Clot activator

Answer: b. Heparin

233. What type of tube is used for blood glucose testing?

- a. Red top
- b. Gray top
- c. Yellow top
- d. Light blue top

Answer: b. Gray top

234. What is the purpose of a clot activator tube?

- a. To prevent coagulation of the blood
- b. To enhance coagulation of the blood
- c. To stabilize the blood sample for transport
- d. To prevent hemolysis of the blood sample

Answer: b. To enhance coagulation of the blood

235. What additive is found in a light blue top tube?

- a. EDTA
- b. Heparin
- c. Sodium Citrate
- d. Clot activator

Answer: c. Sodium Citrate

236. Which enzyme is primarily found in the liver and is commonly used to diagnose liver damage?

- a. Amylase
- b. Lipase
- c. Creatinine kinase
- d. Alanine aminotransferase (ALT)

Answer: d. Alanine aminotransferase (ALT)

237. What enzyme is used to diagnose acute pancreatitis?

- a. Lipase
- b. Amylase
- c. Alanine aminotransferase (ALT)
- d. Aspartate aminotransferase (AST)

Answer: b. Amylase

238. What is the name of the enzyme that breaks down lactose?

- a. Lactase
- b. Maltase
- c. Amylase
- d. Protease

Answer: a. Lactase

239. Which enzyme is used to diagnose a heart attack?

- a. Creatinine kinase
- b. Lipase
- c. Amylase
- d. Alanine aminotransferase (ALT)

Answer: a. Creatinine kinase



240. What enzyme is used to diagnose prostate cancer?

- a. Prostate-specific antigen (PSA)
- b. Creatinine kinase
- c. Alanine aminotransferase (ALT)
- d. Aspartate aminotransferase (AST)

Answer: a. Prostate-specific antigen (PSA)

241. What enzyme is commonly used to diagnose acute renal failure?

- a. Lipase
- b. Creatinine kinase
- c. Creatinine
- d. Amylase

Answer: c. Creatinine

242. Which enzyme is used to diagnose muscle damage?

- a. Creatinine kinase
- b. Lipase
- c. Alanine aminotransferase (ALT)
- d. Aspartate aminotransferase (AST)

Answer: a. Creatinine kinase

243. What enzyme is used to diagnose gallbladder disease?

- a. Amylase
- b. Lipase
- c. Alkaline phosphatase
- d. Aspartate aminotransferase (AST)

Answer: c. Alkaline phosphatase

244. Which enzyme is involved in the breakdown of protein?

- a. Amylase
- b. Lipase
- c. Protease
- d. Lactase

Answer: c. Protease

245. What enzyme is used to diagnose liver disease?

- a. Creatinine kinase
- b. Lipase
- c. Alanine aminotransferase (ALT)
- d. Aspartate aminotransferase (AST)

Answer: c. Alanine aminotransferase (ALT)

246. Which molecules transfer electrons from complex to complex in the electron transport chain?

- a. ATP
- b. NADH and FADH<sub>2</sub>
- c. GTP
- d. Coenzyme Q and cytochrome c

247. Answer: d. Coenzyme Q and cytochrome c

248. What is the final electron acceptor in the electron transport chain?

- a. ATP
- b. NADH
- c. Oxygen
- d. Acetyl-CoA

Answer: c. Oxygen

249. In which part of the cell does the Krebs cycle take place?

- a. Mitochondria
- b. Nucleus
- c. Cytoplasm
- d. Ribosomes

Answer: a. Mitochondria

250. What is the end product of the Krebs cycle?

- a. Acetyl-CoA
- b. Pyruvate
- c. Lactate
- d. Carbon dioxide

Answer: d. Carbon dioxide

251. Which coenzymes are produced in the Krebs cycle that are used in the electron transport chain?

- a. ATP
- b. NADH and FADH<sub>2</sub>
- c. GTP
- d. Acetyl-CoA

Answer: b. NADH and FADH<sub>2</sub>

252. How many ATP molecules are produced per molecule of acetyl-CoA that enters the Krebs cycle?

- a. 1 ATP
- b. 2 ATP
- c. 3 ATP
- d. 4 ATP

Answer: b. 2 ATP

253. Which molecules transfer electrons from complex to complex in the electron transport chain?

- a. ATP
- b. NADH and FADH<sub>2</sub>
- c. GTP
- d. Coenzyme Q and cytochrome c

Answer: d. Coenzyme Q and cytochrome c

254. What is the final electron acceptor in the electron transport chain?

- a. ATP
- b. NADH
- c. Oxygen
- d. Acetyl-CoA

Answer: c. Oxygen

255. What is the net ATP gain from glycolysis?

- a. 1 ATP
- b. 2 ATP
- c. 3 ATP
- d. 4 ATP

Answer: b. 2 ATP

256. Which molecule is the final electron acceptor in glycolysis?

- a. NAD<sup>+</sup>
- b. FAD
- c. Oxygen
- d. Pyruvate

Answer: a. NAD<sup>+</sup>

257. What is the end product of glycolysis?

- a. Acetyl-CoA
- b. Pyruvate
- c. Lactate
- d. Oxaloacetate

Answer: b. Pyruvate

258. Glycolysis takes place in which part of the cell?

- a. Mitochondria
- b. Nucleus
- c. Cytosol
- d. Ribosomes

Answer: c. Cytosol

259. What is the rate-limiting enzyme in glycolysis?

- a. Phosphofructokinase
- b. Glucose-6-phosphate dehydrogenase

c. Pyruvate kinase

d. Hexokinase

Answer: a. Phosphofructokinase

260. The urea cycle takes place mainly in which organ of the body?

- a. Kidneys
- b. Liver
- c. Pancreas
- d. Intestine

Answer: b. Liver

261. What is the primary source of nitrogen for the urea cycle?

- a. Amino acids
- b. Fatty acids
- c. Glucose
- d. Ketones

Answer: a. Amino acids

262. What is the main function of the urea cycle?

- a. To produce glucose
- b. To produce ATP
- c. To remove excess nitrogen from the body
- d. To produce amino acids

Answer: c. To remove excess nitrogen from the body

263. Which enzyme catalyzes the conversion of ammonia and carbon dioxide to carbamoyl phosphate in the urea cycle?

- a. Ornithine transcarbamylase
- b. Argininosuccinate synthetase
- c. Carbamoyl phosphate synthetase I
- d. Arginase

Answer: c. Carbamoyl phosphate synthetase I

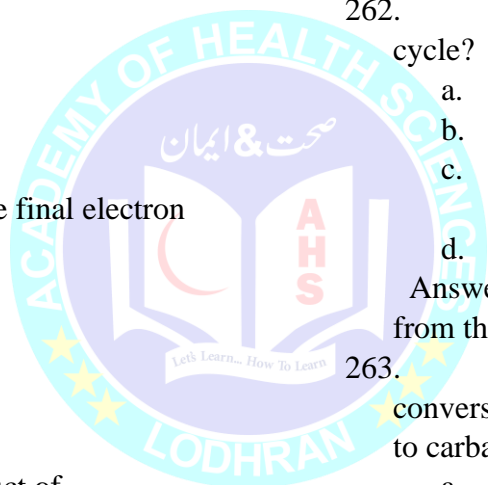
264. What is the final product of the urea cycle?

- a. Urea
- b. Glucose
- c. Amino acids
- d. ATP

Answer: a. Urea

265. What is the importance of the urea cycle?

- a. To produce energy
- b. To regulate blood sugar levels



- c. To remove toxic ammonia from the body
- d. To produce hormones

Answer: c. To remove toxic ammonia from the body

266. What is the fate of the urea produced in the liver?
- a. It is excreted in the urine
  - b. It is used for energy production
  - c. It is stored in the liver
  - d. It is used to make proteins

Answer: a. It is excreted in the urine

267. What is the main enzyme involved in the breakdown of proteins into amino acids?
- a. Protease
  - b. Amylase
  - c. Lipase
  - d. Nuclease

Answer: a. Protease

268. What is the fate of excess amino acids in the body?
- a. They are converted into glucose
  - b. They are stored in adipose tissue
  - c. They are converted into fatty acids
  - d. They are broken down into urea and excreted in the urine

Answer: d. They are broken down into urea and excreted in the urine

269. What is the role of the liver in protein metabolism?
- a. To synthesize proteins
  - b. To break down proteins into amino acids
  - c. To remove excess nitrogen from the body
  - d. All of the above

Answer: d. All of the above

270. Which of the following enzymes is responsible for breaking down triglycerides into fatty acids and glycerol during beta-oxidation?
- a. lipoprotein lipase
  - b. hormone sensitive lipase
  - c. carnitine acyltransferase
  - d. acyl-CoA dehydrogenase

Answer: d. acyl-CoA dehydrogenase

271. The primary function of ketone bodies is to:
- a. provide energy to the brain and other tissues during times of fasting or carbohydrate restriction
  - b. aid in the digestion and absorption of fats
  - c. regulate blood sugar levels
  - d. build and repair cellular structures

Answer: a. provide energy to the brain and other tissues during times of fasting or carbohydrate restriction

272. What is the primary function of the urea cycle?
- a. to remove toxic ammonia from the body
  - b. to produce ATP through the breakdown of amino acids
  - c. to produce glucose through the breakdown of amino acids
  - d. to synthesize new proteins from amino acids

Answer: a. to remove toxic ammonia from the body

273. What enzyme is responsible for the first step of the urea cycle, converting ammonia into carbamoyl phosphate?
- a. argininosuccinate synthetase
  - b. ornithine transcarbamylase
  - c. carbamoyl phosphate synthetase I
  - d. arginase

Answer: c. carbamoyl phosphate synthetase I

274. Which of the following is a product of the Krebs cycle?
- a. NADH
  - b. FADH<sub>2</sub>
  - c. ATP
  - d. All of the above

Answer: d. All of the above

275. The electron transport chain takes place in which part of the cell?
- a. cytoplasm
  - b. mitochondria
  - c. nucleus
  - d. Golgi apparatus

Answer: b. mitochondria

276. What are nucleic acids?
- Carbohydrates
  - Proteins
  - Nucleotides
  - Lipids
- Answer: c. Nucleotides
277. What is the function of DNA?
- Stores and transmits genetic information
  - Catalyzes chemical reactions
  - Provides energy for cells
  - Transports oxygen
- Answer: a. Stores and transmits genetic information
278. What is the monomer of DNA?
- Glucose
  - Fatty acid
  - Amino acid
  - Nucleotide
- Answer: d. Nucleotide
279. What are the three components of a nucleotide?
- Sugar, phosphate, and nitrogenous base
  - Glucose, phosphate, and nitrogenous base
  - Fatty acid, phosphate, and nitrogenous base
  - Amino acid, phosphate, and nitrogenous base
- Answer: a. Sugar, phosphate, and nitrogenous base
280. What is the base pairing rule in DNA?
- Adenine pairs with guanine and cytosine pairs with thymine
  - Adenine pairs with thymine and guanine pairs with cytosine
  - Adenine pairs with uracil and guanine pairs with cytosine
  - Adenine pairs with cytosine and guanine pairs with thymine
- Answer: b. Adenine pairs with thymine and guanine pairs with cytosine
281. What is the function of RNA?
- Stores and transmits genetic information
  - Catalyzes chemical reactions
  - Provides energy for cells
  - Transports oxygen
- Answer: b. Catalyzes chemical reactions
282. What is the monomer of RNA?
- Glucose
  - Fatty acid
  - Amino acid
  - Nucleotide
- Answer: d. Nucleotide
283. What is the process by which DNA is transcribed into RNA?
- Replication
  - Translation
  - Transcription
  - Transduction
- Answer: c. Transcription
284. What is the process by which RNA is translated into protein?
- Replication
  - Translation
  - Transcription
  - Transduction
- Answer: b. Translation
285. What is the role of enzymes in nucleic acid metabolism?
- To break down nucleotides into their component parts
  - To build nucleotides from their component parts
  - To catalyze the reactions of DNA replication, transcription, and translation
  - All of the above
- Answer: d. All of the above
286. What is the function of the nucleotide adenosine triphosphate (ATP)?
- To store and release energy for cellular processes
  - To catalyze chemical reactions
  - To transmit genetic information
  - To synthesize proteins
- Answer: a. To store and release energy for cellular processes

287. What is the importance of the urea cycle in nucleic acid metabolism?
- It converts ammonia, a toxic waste product of protein metabolism, into urea, which can be excreted in urine
  - It converts nucleotides into amino acids for use in protein synthesis
  - It converts glucose into pyruvate for use in energy production
  - It converts fatty acids into acetyl-CoA for use in energy production

Answer: a. It converts ammonia, a toxic waste product of protein metabolism, into urea, which can be excreted in urine.

288. What is the main cause of high levels of uric acid in the blood?
- Overproduction of uric acid
  - Underproduction of uric acid
  - Inability of the kidneys to excrete uric acid
  - All of the above

Answer: c. Inability of the kidneys to excrete uric acid

289. What medical condition is associated with high levels of uric acid in the blood?
- Hypertension
  - Diabetes
  - Gout
  - Asthma

Answer: c. Gout

