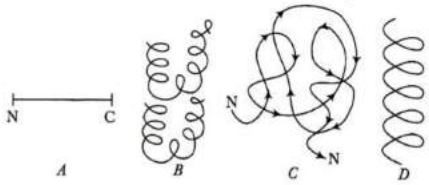
BIOMOLECULES

Single Correct Answer Type

1. Which kinds of structures of proteins are shown in the figures given below



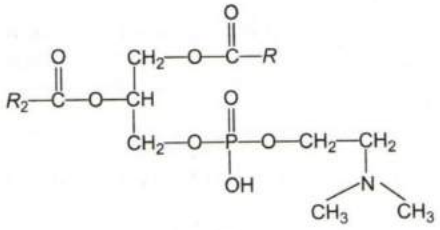
a) A = 1° structure, B = 2° structure, C = 3° structure, D = 4° structure
b) A = 4° structure, B = 2° structure, C = 3° structure, D = 1° structure
c) A = 1° structure, B = 4° sstructure, C = 3° structure, D = 2° structure
d) A = 4° structure, B = 3° structure, C = 2° structure, D = 1° structure

2. Lipid are found in acid insoluble fraction during the analysis of chemical composition of tissues. Given the reason
a) It has very high molecular weight
b) It is polymer
c) It has low molecular weight
d) On grinding, the biomembranes are broken into pieces and form insoluble vesicles

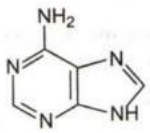
3. Choose the element which is negligible in living matter
a) Si b) Mg c) Ca d) S

4. Name the plant pigments present in the following
I. Carrots
II. Tomatoes
a) I-Tycopene II-Carotene b) I-Carotene II-Lycopene
c) I-Leucopene II-Carotene d) None of the above

5. Which one of the following structural formulae of two organic compounds is correctly identified along with its related function?



(A)



(B)

a) A- Triglyceride major-Source of energy
b) B- Uracil -A component of DNA
c) A-Lecithin -A component of cell membrane
d) B-Adenine -A nucleotide that makes up nucleic acids

6. Silk consists of
   a) Central core of sericin
   b) Central core of fibroin
   c) Both (a) and (b)
   d) A fine mixture of fibroin and sericin
7. Which statement regarding coenzyme is incorrect?
   a) Every coenzyme is a cofactor and every cofactor is a coenzyme
   b) Every coenzyme is a cofactor but every cofactor is not a coenzyme
   c) Most of the coenzymes are nucleotides and are composed of vitamins
   d) Coenzymes are the active constituents of enzymes
8. The rate of the reaction doubles or decreases by half, for every... °C change in either direction
   a) 10°
   b) 15°
   c) 20°
   d) 27°
9. Enzyme often have additional parts in their structures that are made up of molecules other than proteins. When this additional chemical part is an organic molecule, it is called
   a) Cofactor
   b) Coenzyme
   c) Substrate
   d) Both (a) and (b)
10. Which one is imino acid?
   a) Pepsin
   b) Proline
   c) Cysteine
   d) Rennin
11. The sum total composition of acid soluble and acid insoluble fraction pool represents the
   a) Molecular
   b) Dead cells
   c) Gene library
   d) Cellular pool
12. The 'lock' and 'key' model of enzyme action illustrates that a particular enzyme molecule
   a) May be destroyed and resynthesised several times
   b) Interacts with a specific type of substrate molecule
   c) Reacts at identical rates under all conditions
   d) Forms a permanent enzyme-substrate complex
13. Acidic amino acids carry two $-COOH$ and one $-NH_2$ groups per molecule. Keeping this in mind, select the correct pair of acidic amino acid
   a) Lysine and arginine
   b) Aspartic acid and glutamic acid
   c) Glycine and alanine
   d) Both (a) and (b)
14. After doing the chemical analysis of organic compounds found in living organisms, two fractions were observed namely
   a) Acid soluble pool and acid insoluble pool
   b) Carbon pool and hydrogen pool
   c) Inorganic pool and organic pool
   d) Aquous pool and non-aquous pool
15. Which one is not an example for hydrolases?
   a) Dehydrogenase
   b) Protease
   c) Amylase
   d) Esterase
16. Which type of protein is present in human skin?
   a) Primary proteins
   b) Secondary proteins
   c) Tertiary proteins
   d) Quarternary proteins
17. The metabolic flow is called
   a) Dynamic state of body constituents
   b) Flow of traffic junctions
   c) Turn over flow
   d) Adiabatic flow of reactions
18. Read the two reaction A and B given below and select the correct option accordingly
   A. $ADP + Pi \rightarrow ATP$
   B. $ATP \rightarrow ADP + Pi$
   a) A-Endergonic; B-Exergonic
   b) A-Exergonic; B-Endergonic
   c) A-Endergonic; B-Endergonic

d) A-Exergonic; B-Exergonic

19. The pyrimidine base, which confers additional stability to DNA over RNA, is
a) Adenine b) Guanine c) Cytosine d) Thymine

20. If the total amount of adenine and thymine in a double-stranded DNA is 60%, then the amount of guanine in this DNA will be
a) 15% b) 20% c) 30% d) 40%

21. An enzyme extract when subjected to electric field, separates into two fractions each catalyzing the same reaction. These fractions are
a) Allosteric enzymes b) Isoenzymes c) Inducible enzymes d) Coenzymes

22. Amino acids the substituted methanes. Name the four substituent groups occupying the four valency positions
a) Hydrogen, carboxyl group, amino group and a variable group (R)
b) Two carboxyl groups amino group and OH
c) Two hydrogen, one carboxyl group, amino group and a variable group (R)
d) Two amino groups, one hydrogen and one carboxyl group

23. The 'lock' and 'key' theory of enzyme structure and function was proposed by
a) Morgan b) Robertson c) Brown d) Fischer

24. Histone octamer contains
a) Eight types of histones
b) Eight histones of four different types
c) Five histones
d) Six types of histones

25. What is grape sugar?
a) Glucose b) Fructose c) Sucrose d) Galactose

26. Pepsin is an .....enzyme
a) Intracellular b) Extracellular c) Both (a) and (b) d) None of these

27. Which one is a polymer?
a) Sucrose b) Glycogen c) Fructose d) Lactose

28. Which of the following statements are correct?
I. Acetic acid can form cholesterol
II. Flow of metabolites through metabolic pathway has a definite rate and direction. It is called dynamic state of body constituents
III. Anabolic pathway is endergonic while catabolic pathway is exergonic
IV. All biomolecules have a term over, *i. e.*, they are constantly being changed into some other biomolecules and also made from other biomolecules
The correct options is
a) All are correct
b) I and II are correct
c) Only IV is correct
d) All are wrong

29. An α-helix is the example of ..... protein structure
a) Primary b) Secondary c) Tertiary d) Quaternary

30. Which is a reducing sugar?
a) Galactose
b) Gluconic acid
c) β- methyl galactoside
d) Sucrose

31. Formation of glycogen from glucose is called
a) Glycogenolysis b) Glycogenesis c) Glycolysis d) Gluconeogenesis

32. Which of the following statements are correct for polysaccharides?
I. The polysaccharides are found as a part of the acid insoluble pellet
II. These are long chains of sugars
III. They are threads containing different monosaccharides as building blocks
IV. Cellulose is a polymeric polysaccharide consisting of only one type of monosaccharide *i. e.*, fructose

a) All are correct
b) All are correct except IV
c) III and IV
d) Only IV is correct

33. Select the false statement
I. Living process is a constant effort to promote falling into equilibrium
II. Energy can enter and leave a cell
III. Matter can enter and leave a cell
IV. Metabolic pathways are interlinked
a) Only I b) Only IV c) I and IV d) Only II

34. Arachidonic acid is
a) Non-essential fatty acid
b) Essential fatty acid
c) Polyunsaturated fatty acid
d) Both (b) and (c)

35. Inulin is a polymer of
a) Glucose b) Galactose c) Fructose d) Arabinose

36. Table sugar consists of
a) Lactose b) Sucrose c) Maltose d) glucose

37. For nucleic acids, the building block is a
a) Nucleotide b) Nucleoside c) Polynucleotide d) Sugar

38. An example of feedback inhibition is
a) Cyanide action on cytochrome
b) Sulpha drug on folic acid synthesizer bacteria
c) Allosteric inhibition of hexokinase by glucose 6-phosphate
d) Reaction between succinic dehydrogenase and succinate

39. The term metabolism means
a) The sum of all the enzymatically catalysed chemical reactions constantly taking place in the cells and tissues of the living organisms
b) Processes that change the small molecules into larger ones
c) Processes that converts the large molecules into smaller ones
d) None of the above

40. Chitin is a
a) Polysaccharide
b) Nitrogenous polysaccharide
c) Lipoprotein
d) protein

41. Richest energy compound is
a) Creatine phosphate b) Protein c) Carbohydrate d) fat

42. Select the wrong statement.
a) The building blocks of lipids are amino acids
b) Majority of enzymes contain a non-protein part called the prosthetic group
c) The thylakoids are arranged one above the other like a stack of coins forming a granum
d) Crossing over occurs at pachytene stage of meiosis-I

43. Which of the following is an essential amino acids?
a) Valine b) Leucine c) Tryptophan d) All of these

44. The aggregation of the various kinds of biomolecules in a cell is referred to as the
a) Acid soluble pool
b) Acid insoluble pool
c) Cellular pool
d) None of the above

45. Secondary metabolites can be observed in
a) Plant cells b) Fungal cells c) Microbial cells d) All of these

46. Select the secondary metabolites from the list given below
I. alkaloids
II. flavonoids

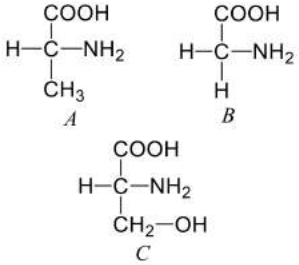
III. rubber
IV. essential oils
V. antibiotics
VI. coloured pigments
VII. scents
VIII. gums
IX. spices
Choose the correct option

a) I to IX b) All except II and IX c) I, III, IV and VI d) All except I and VII

47. What is the starting point in the production of food?

a) Catabolism b) Metabolism c) Anabolism d) Photosynthesis

48. Name the amino acids $A - C$ correctly



a) A-Glycine, B-Serine, C-Alanine b) A-Alanine, B-Glycine, C-Serine

c) A-Serine, B-Glycine, C-Alanine d) A-Serine, B-Alanine, C-Glycine

49. Name the heterocyclic compounds which are known as nitrogenous bases

Choose the most appropriate options

a) Adenine, guanine, uracil, cytosine and thymine

b) Adenine, guanine, uracil and thymine

c) Adenine, guanine, cytosine, uracil

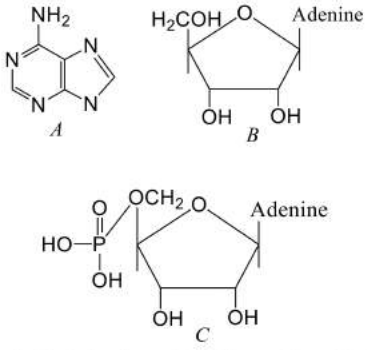
d) None of these

50. In which one of the following enzymes copper is necessarily associated as an activator?

a) Carbonic anhydrase b) Tryptophanase

c) Lactic dehydrogenase d) Tyrosinase

51. Identify the structural formulae and select the correct option



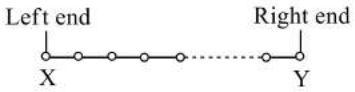
a) A-Adenine, B-Adenosine, C-Adenylic acid b) A-Guanine, B-Adenosine, C-Adenylic acid

c) A-Adenosine, B-Adenylic acid, C-Adenine d) A-Uracil, B-Adenosine, C-Adenylic acid

52. The regulation of the chemical composition of blood and body fluids and other aspects of its internal environment by an organism to maintain the physiological process is called

a) Entropy b) Enthalpy c) Homeostasis d) Metabolism

53. Name the term given to the left and right ends of a polysaccharide



a) Left end—N —terminal end, Right end—C —terminal end
b) Left end—reducing end, Right end—non-reducing end
c) Left end— non-reducing end, Right end—reducing end
d) Left end—C —terminal end, Right end—N —terminal end

54. 'G' in DNA strand base pairs with 'C' by 3... bonds
a) Hydrogen b) Von der Waal c) Covalent d) Ionic

55. The inhibitor which inhibits the enzyme activity by binding to the active site of the enzyme, due to the close resemblance to the substrate in its molecular structure is called
a) Non-competitive inhibitor
b) Competitive inhibitor
c) Allosteric modulator
d) Feedback inhibitor

56. Select the correct pair of substituted purines
a) Cytosine and thymine
b) Adenine and guanine
c) Uracil and cytosine
d) Guanine and uracil

57. Which one of the following is wrongly matched?
a) Fungi – Chitin
b) Phospholipid – Plasma membrane
c) Enzyme – Lipopolysaccharide
d) ATP – Nucleotide derivative

58. Amino acids are organic compounds and are called α-amino acids. Why?
a) Amino acids are organic compounds containing an amino group and acidic group as substituents n two different carbons
b) Amino acids are organic compounds containing an amino group and an acidic group as substituents on the same carbon
c) Amino acids are inorganic compounds containing an amino group and acidic group as substituents on two different carbons
d) Amino acids are inorganic compounds containing an amino group and acidic group as substituents on the same carbon

59. Enzymes that catalyze inter-conversion of optical, geometrical or positional isomers, are
a) Ligases b) Lyases c) Hydrolases d) Isomerases

60. All the carbon compounds obtained from living tissues are named as
a) Biomolecules
b) Inorganic compounds
c) Organic compounds
d) Only DNA

61. A fatty acid has a carboxyl group attached to *R* group. The R group could be a
a) Methyl
b) Ethyl
c) Higher number of $-CH_2$ groups (1 to 19 carbons)
d) All of the above

62. With reference to enzymes, which one of following statements is true?
a) Apoenzyme=Holoenzyme+Coenzyme
b) Holoenzyme=Apoenzyme+Coenzyme
c) Coenzyme=Apoenzyme+Holoenzyme
d) Holoenzyme=Coenzyme+Apoenzyme

63. Benedict's reagent test is conducted to confirm the presence of
a) Polysaccharides like starch
b) Lipids
c) Reducing sugars
d) proteins

64. When a metabolic disequilibrium is in effect, then only cells continue to function
How do cells avoid reaching metabolic equilibrium?
a) Use feedback inhibition to turn off pathways
b) The products of one reaction become the reactant of another reaction and are unable to accumulate
c) Cellular metabolism utilises only those reactions that are irreversible
d) Providing constant supply of enzymes

65. Which of the following radioisotope is not suitable for DNA labeling based studies?
a) H^3 b) P^{32} c) N^{15} d) S^{35}

66. Jacob and Monod named some enzymes as allosteric, whose activity is regulated by

a) End product b) Substrate c) A by-product d) Coenzyme

67. Identify the term 'ash' in term of living tissue sample analysis from the statements given below

a) Organic compounds oxidised to gaseous form (CO_2 and water vapour) after burning of the tissue

b) The material left after burning the tissue which contains inorganic elements (*e.g.*, calcium, magnesium etc.)

c) Compounds removed in the form of gases

d) Compounds which may be soluble in intracellular fluid

68. Grinding of a living tissue in trichloroacetic acid shows the presence of the inorganic compounds like sulphate, phosphate etc, which are categorised in

a) Acid insoluble fraction
b) Acid soluble fraction
c) Both (a) and (b)
d) Not found in cellular pool

69. Formation of lactic acid form glucose occurs in... metabolic steps

a) 25 b) 5 c) 30 d) 10

70. A nucleotide has three chemically distinct compounds. These are A, B and C
Choose the correct option for A, B and C

a) A-Sugar, B-carbonates, C-chlorides
b) A-DNA, B-cellulose, C-chitin
c) A-Heterocyclic compound, B-Monosaccharide, C-a phosphate
d) A-Phosphoric acid, B-Proteins, C-acids

71. Answer briefly

I. Hydrolysis of glycogen to glucose is termed as?
II. Name the enzyme which takes part in the hydrolysis of glycogen
III. Amylum is an another name of
IV. Name the polysaccharide formed as the end product of the photosynthesis
Correct option with all the answers is

a) I-Glycogenolysis, II-Amylases, III-Starch, IV-Starch b) I-Starch, II-Amylases, III-Glycogenolysis, IV-Starch
c) I-Starch, II-Glycogenolysis, III-Starch, IV-Amylases d) I-Amylases, II-Glycogenolysis, III-Starch, IV-Starch

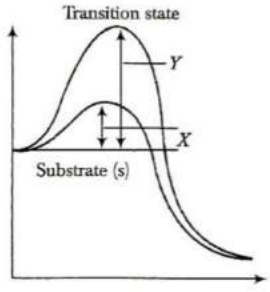
72. Which of the following is not a conjugated protein?

a) Peptone b) Phosphoprotein c) Lipoprotein d) Chromoprotein

73. ..... is the most abundant protein in whole of the biosphere

a) Collagen b) Trypsin c) Insulin d) RUBISCO

74. Choose the correct option representing X and Y in the given graph



a) X-Activation energy without enzymes, Y-Activation energy with enzyme

b) X- Activation energy with enzyme, Y-Activation energy without enzyme

c) X-Substrate concentration with enzyme, Y-Substrate concentration without enzyme

d) X-Substrate concentration without enzyme, Y-Substrate concentration with enzyme

75. Given below is the chemical formula of

O
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$CH_3(CH_2)_{14} - C - OH$

a) Palmitic acid b) Stearic acid c) Glycerol d) Galactose

76. Which enzyme is useful as colour brightening agent in detergent industry?
a) Amylase b) Lipase c) Protease d) Cellulase

77. Locations or sites in the human DNA where single base DNA differences occur, are called
a) Repetitive DNA b) VNTR
c) SNP d) SSCP

78. An organic substance bound to an enzyme and essential for its activity, is called
a) Coenzyme b) Holoenzyme c) Apoenzyme d) Isoenzyme

79. Choose the correct statements
I. Bond energy (ATP) is utilised for biosynthesis, osmotic and mechanical work that we perform
II. When glucose is degraded into lactic acid in our muscles, energy of liberated
III. Assembly of a proteins from amino acids requires energy
IV. Majority of metabolic reactions can occur in isolation
V. There are many examples of uncatalysed metabolic reactions
a) Except IV and V b) I and III c) All of these d) None of these

80. Maltose consists of which one of the following?
a) β – glucose and α – galactose b) α – glucose and α – fructose
c) α – sucrose and β – glucose d) Glucose and glucose

81. Mannitol is
a) Amino acid b) Amino alcohol c) Sugar alcohol d) Sugar acid

82. Almost all enzymes are ... in nature
a) Lipids b) Proteins c) Carbohydrates d) Nucleic Acid

83. One of the secondary structures exhibited by DNA is.....
a) Stehenson's model b) Watson-Crick model c) Bohr's model d) Wilkenson model

84. Feedback inhibition of enzymes is affected by which of the following?
a) Enzyme b) Substrate
c) End products d) Intermediate end products

85. All the chemical reactions occurring in living organisms are called
a) Metabolism b) Anabolism c) Catabolism d) Enzymatic

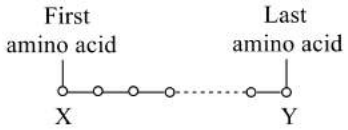
86. Given below are two statements A and B. Choose the correct answer related to the statements.
Statement A Amino acids are amphoteric in their function.
Statement B All amino acids are necessary for our body.
a) Statement A is correct but statement B is wrong b) Both the statements A and B are correct
c) Statement A is wrong but statement B is correct d) Both the statements A and B are wrong

87. The tertiary structure of the proteins containing amino acid cysteine is achieved through
a) Hydrogen bonds b) Disulphide bonds
c) Van der Waal's force d) Ionic bonds

88. Maltose gives rise to two molecules of
a) Fructose b) Lactose c) Glucose d) Sucrose

89. One of the following is a simple protein.
a) Nucleoprotein b) Glycoprotein c) Lipoprotein d) Albumin

90. Identify X and Y in the given protein structure



a) X-N-terminal amino acid, Y-C-terminal amino acid
b) X-N-terminal amino acid, Y-N-terminal amino acid
c) X-C-terminal amino acid, Y-N-terminal amino acid
d) X-C-terminal amino acid, Y-C-terminal amino acid

91. Which of the following statements are correct?
I. Relative abundance of carbon and hydrogen with respect to other elements is higher in any living organisms
II. Living organisms have more nitrogen and oxygen per unit mass than inanimate objects (*e. g.*, earth crust)
III. All the elements present in a sample of earth's crust are also present in a sample of living tissue
IV. Living organisms have more Ca, Mg, Na in them than inanimate object
a) All of these b) All except IV c) Only IV d) None of these

92. Which one is diaminodicarboxylic amino acid?
a) Cystine b) Lysine c) Cysteine d) Aspartic acid

93. Which of the following statements about enzymes are correct?
I. Enzymes do not alter the overall change in free energy for a reaction
II. Enzymes are highly specific for reactions
III. The energy input needed to start a chemical reaction is called activation energy
IV. Enzymes are proteins whose three dimensional shape is key to their functions
a) I and V b) I, II and V c) II and V d) All of these

94. Which amino acid is denoted by symbol 'F'?
a) Phenylalanine b) Proline
c) Tryptophan d) Methionine

95. Which enzyme catalyse the break down of hydrogen peroxide to water and oxygen?
a) A carbonic anhydrase and catalase b) Hydrolyase and oxidase
c) Peroxidase and catalase d) Hydrolase and oxidase

96. Sugar and amino acids are
a) Primary metabolites b) Secondary metabolites
c) Feedback d) Inoculum

97. Which of the following statements regarding enzyme inhibition is correct?
a) Non-competitive inhibition of an enzyme can be overcome by adding large amount of substrate
b) Competitive inhibition is seen when a substrate competes with an enzyme for binding to an inhibition protein
c) Competitive inhibition is seen when the substrate and the inhibitor compete
d) Non-competitive inhibitors often bind to the enzyme irreversibly

98. Enzymes are functional at
a) 10-15°C b) 15-25°C c) 25-30°C d) 30-50°C

99. Cellulose is made up of
a) Branched chain of glucose molecule linked by $\alpha - 1, 4$ glycosidic bond in straight chain and $\beta - 1, 6$ glycosidic bond at the site of branching
b) Branched chain of glucose molecule linked by $\alpha - 1, 6$ glycosidic bond in straight chain and β-1, 4 glycosidic bond at the site of branching
c) Unbranched chain of glucose molecule linked by β-1, 4 glycosidic bond
d) Unbranched chain of glucose molecule linked by α-1, 6 glycosidic bond

100. Which of the following statements is wrong?
a) Sucrose is a disaccharide
b) Cellulose is a polysaccharide
c) Glycine is a sulphur containing amino acid
d) Uracil is a pyrimidine

101. Name the four elements called 'Big-four' which make up 95% of all elements found in a living system
a) C, H, O, P
b) C, H, O, N
c) C, N, O, K
d) C, H, O, S

102. Proteins are heteropolymers which are madeup of ..... type of monomers of amino acids
a) 10
b) 4
c) 20
d) 3

103. Catabolic and anabolic pathways are often coupled in cell. Why?
a) Both the path are the same energy
b) The free energy released from are pathway is used to drive other
c) The intermediate of a catabolic pathway are used in the anabolic pathway
d) Their enzymes are controlled by their activators and inhibitors

104. Molecular weight of protein is
a) >12000
b) >6000
c) <12000
d) 600-3000

105. Name the disaccharide which is the major sugar of insect haemolymph
a) Trehalose
b) Chitin
c) Cellulose
d) All of these

106. One turn of DNA has nucleotide pairs
a) 8
b) 100
c) 6
d) 10

107. Phospholipids are
a) Amphipathic
b) Amphibolic
c) Hydrophobic
d) None of these

108. The following reaction is catalysed by which of the enzyme?

$$NADH + H^+ + \frac{1}{2}O_2 \longrightarrow NAD^+ + H_2O$$

a) Hydrolases
b) Cytochrome oxidases
c) Transferases
d) Lyases

109. Why metabolic pathways are comparable to automobile traffic in a city?
a) Because they have definite direction
b) Because they result in clumsiness
c) Because they result in massive production of toxic compounds
d) None of the above

110. A bond formed between carboxyl group of one amino acid and amino group of adjacent amino acid, is called
a) Peptide bond
b) Hydrogen bond
c) Covalent bond
d) All of these

111. In animal tissues, the categories of compounds present are called
a) Molecules
b) Primary metabolites
c) Secondary metabolites
d) Biomolecules

112. Cellulose is a polymer of
a) $\alpha -$ glucose
b) $\alpha -$ fructose
c) $\beta -$ glucose
d) $\beta -$ fructose

113. Proteins with catalytic power are called
a) Reactants
b) Substrate
c) Co-factors
d) Enzymes

114. The enzyme which converts corn starch into fructose rich corn syrup is
a) Amylase
b) Glucoamylase
c) Glucoisomerase
d) All of these

115. The globular proteins undergo structural changes, in response to extremes of pH or temperature, the process called
a) Renaturation
b) Denaturation
c) Combination
d) Both (a) and (b)

116. Which of the following is a disaccharide?
a) Glucose
b) Fructose
c) Sucrose
d) Galactose

117. During Meselson and Stahl's experiments, heavy DNA was distinguished from normal DNA by centrifugation in
a) CsOH gradient b) $^{14}NH_4Cl$ c) $^{15}NH_4Cl$ d) CsCl gradient

118. Protein in silk thread is
a) Fibroin b) Keratin c) Albumin d) Globulin

119. What are proenzymes?
a) Inactive form of enzymes b) Active form of enzymes
c) Neutral form of enzymes d) None of these

120. Which of the following is the simplest amino acid?
a) Tyrosine b) Asparagine c) Glycine d) Alanine

121. Hydrolysis of a glycosidic bond in a disaccharide is an example of
a) Cleavage of biomolecules b) Hydrolysis of biomolecules
c) Transformation of biomolecules d) Formation of biomolecules

122. Which of the following is non-reducing sugar?
a) Starch b) Sucrose c) Maltose d) Galactose

123. Phospholipids are
a) Conjugated lipids b) Derived lipids c) Simple lipids d) None of these

124. Richest source of protein is
a) Rice b) Gram c) Wheat d) *Glycine max*

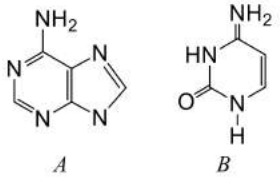
125. Which of the following polysaccharide is present as a store house of energy in plant tissues?
a) Glycogen b) Cellulose c) Insulin d) Starch

126. Which form of keratin is present in human hair?
a) Parallel β-sheet b) α-helix
c) Antiparallel β-sheet d) None of these

127. The most abundant chemical in living organisms is
a) Protein b) Water
c) Lipids d) Nucleic acids

128. Basic structure of proteins was given by
a) W M Stanley b) Nicholson c) Waston d) F Sanger

129. Name the structural formulae of the given structures correctly



A *B*

a) A-Adenine; B-Uracil b) A-Guanine; B-Thymine
c) A-Adenine; B-Guanine d) A-Cytosine; B-Thymine

130. Name the most abundant protein in animal world
a) RUBISCO b) Carboxylase-oxygenase
c) Collagen d) Cellulose

131. Proteins with catalytic power are known as
a) Metabolites b) Essential proteins
c) Enzymes d) Receptors

132. In a polypeptide chain, a β-pleated sheet is an example of
a) 2° structure b) 1° structure c) 4° structure d) 3° structure

133. Which of the following is the example of structural protein?
a) Myosin b) Collagen c) Keratin d) All of these

134. Which of the following statements are incorrect?
I. Left end of a polysaccharide is called non-reducing end while right end is called reducing end

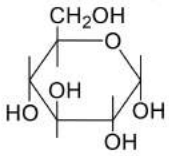
II. Starch and glycogen are branched molecules
III. Starch and glycogen are the reserve food materials of plants and animals, respectively
IV. Starch can hold iodine molecules in its helical secondary structure but cellulose being non-helical, cannot hold iodine

a) Statements I and II are incorrect
b) All statement are incorrect
c) Only statement IV is incorrect
d) None of these

135. Enzymes catalyses the biochemical reactions by ..... the activation energy

a) Increasing
b) Lowering
c) Unaltering
d) Either (a) or (b)

136. Identify the given structure and name the compound



a) Ribose
b) Sucrose
c) Glucose
d) Ribulose

137. Answer briefly

I. Which colour glycogen gives on its reaction with iodine solution?
II. What is satellite DNA?
III. Name three components of a nucleotide molecule
Correct option will all answers is

a) I-Blue
II-Long sequences
III-Phosphoric acid, pentose sugar and nitrogenous base

b) I-Red
II-Repetitive base pairs
III-Phosphoric acid, pentose sugar and nitrogenous organic base

c) I-Blue
II-Non-repetitive base pairs
III-Glucose phosphoric acid, nucleic acids

d) I-Red
II-Non-repetitive base pairs
III-Phosphoric acid, fructose, nucleotides

138. The acid soluble pool, roughly represents

a) Chemical composition of cell
b) Cytoplasmic composition of cell
c) Both (a) and (b)
d) None of the above

139. Choose the type of enzyme involved in the following reaction

$$S - G + S' \rightarrow S + S' - G$$

a) Dehydrogenase
b) Transferase
c) Hydrolase
d) Lyase

140. Which of the following is an isozyme?

a) α-amylase
b) Glucokinase
c) Lactic dehydrogenase
d) All of these

141. Primary metabolites play known roles in

a) Ecology
b) Chemical process
c) Human welfare
d) Physiological process

142. Sucrose, a common table sugar is composed of

a) Glucose and fructose
b) Glucose and galactose
c) Fructose and galactose
d) None of the above

143. Double sugar is

a) Table sugar
b) Milk sugar
c) Sugar in germinating seeds
d) All of the above

144. Variety of amino acids are formed on the basis of

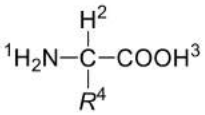
a) Position of hydroxyl group
b) Position of carboxyl group
c) Position of hydrogen
d) Nature of R group

145. Carbohydrates, the most abundant biomolecules earth, are produced by

a) All bacteria, fungi and algae
b) Fungi, algae and green plant cells

c) Some bacteria, algae and green plant cells d) Viruses, fungi and bacteria

146. Which of the two groups of following formula is involved in peptide bond formation between different amino acids?



a) 1 and 3 b) 2 and 3 c) 2 and 4 d) 1 and 4

147. Where the starch is stored in the plant cell?

a) Golgi bodies b) Amyloplasts c) Chromoplast d) None of these

148. The form of DNA with 34Å pitch with a rise per base pair of 3.4Å is called

a) A-DNA b) B-DNA c) Z-DNA d) C-DNA

149. The catalytic efficiency of two different enzymes can be compared by the

a) The Km value b) The pH optimum value

c) Formation of the product d) Molecular size of the enzyme

150. A competitive inhibitor, competes with the substrate, for the substrate binding site of enzymes due to its

a) Structural similarity with substrate

b) Molecular weight similarity with substrate

c) Both (a) and (b)

d) Larger size than that of substrate

151. The most abundant molecule in cell, is

a) Water b) Carbohydrate c) Lipid d) Protein

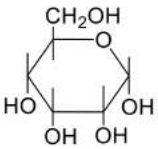
152. The left handed DNA is called

a) A-DNA b) B-DNA c) Z-DNA d) C-DNA

153. Adult human haemoglobin consists of

a) 2 subunits b) 2 subunits (β, β) c) 4 subunits (2α, 2β) d) 3 subunits (2α, 1β)

154. The below structural formula belongs to



a) Ribose b) Glucose c) Sucrose d) Deoxyribose

155. Which enzyme is most specific?

a) Trypsin b) Pepsin c) Sucrase d) Nuclease

156. Chemical compounds which are found in the acid insoluble fraction are called

a) Biomolecules b) Macromolecules c) Micromolecules d) Both (a) and (b)

157. Lipids are generally

I. water soluble

II. water insoluble

III. soluble in non-polar organic solvents

IV. not soluble in non-polar organic solvents

Choose the correct options

a) Only I b) II and III c) II and IV d) Only IV

158. Nucleotides are formed by

a) Purine, sugar and phosphate b) Purine, pyrimidine and phosphate

c) Purine or pyrimidine, sugar and phosphate d) Pyrimidine, sugar and phosphate

159. The substance, which is metal ion essential for the normal functioning of enzyme is called

a) Cofactor b) Coenzyme c) Holoenzyme d) None of these

160. Water molecules are connected by

a) Van der Waal's force
b) Covalent bond
c) H-bond
d) Amide linkage

161. The physical and the chemical compositions of amino acids are essentially of the
a) Only the carboxyl group
b) Only the *R*-functional group
c) Amino, carboxyl and *R* groups
d) Only amino group

162. The proteinaceous molecule that joins a non-proteinaceous prosthetic group to form a functional enzyme is called
a) Co-factor
b) Apoenzyme
c) Holoenzyme
d) Isoenzyme

163. Select the correct constituents of protein
a) Carbon, hydrogen, oxygen and nitrogen
b) Carbon, hydrogen, nitrogen and sulphur
c) Carbon, hydrogen, nitrogen, oxygen and sulphur
d) Carbon, hydrogen and oxygen

164. The β-pleated sheet structure found in proteins is due to
a) Linking together of two or more polypeptides
b) Coiling of polypeptide chains
c) Formation of peptide bonds
d) Folding of the coiled polypeptide chains

165. Enzymes, vitamins and hormones can be classified into a single category of biological chemicals, because all of these
a) Enhance oxidative metabolism
b) Are conjugated proteins
c) Are exclusively synthesized in the body of a living organism as at present
d) Help in regulating metabolism

166. Paraffin wax is
a) Ester
b) Acid
c) Monohydric alcohol
d) Cholesterol

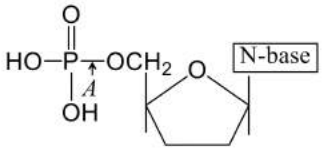
167. Many physiological functions are performed by proteins. One such function involves that some proteins discharge
a) Antibiotics
b) Hormones
c) Pigment making colours of flowers
d) Pigment conferring colour to skin

168. One full turn of the helical strand involves ... steps
a) 20
b) 15
c) 34
d) 10

169. One strand of DNA has sequence of nucleotide 3' ATTCGCTAT 5' then other strand of DNA has
a) 3' TAAGCGATA 5'
b) 5' TAGCACGTA 5'
c) 5' TAGCACGTA 3'
d) 5' TAAGCGATA 3'

170. In a protein molecule, the amino acid units are linked together by ..... bonds formed between the amino acid units and the carboxyl group of successive amino acids
a) Peptide
b) Hydrogen
c) Covalent
d) Ionic

171. A in the given structure represents



a) Ester bond
b) Ionic bond
c) Phosphate bond
d) Glycosidic bond

172. Identify wheather the given statements are true or false
I. A protozoan contains thousand of organic compounds
II. Concentration of biomolecules in an organism is not fixed
a) I-True; II-True
b) I-False; II-False
c) I-True; II-False
d) I-False; II-True

173. Michaelis Menten constant (km) is equal to

a) The rate of enzymatic activity
b) The rate of reaction
c) Substrate concentration at which the reaction attains half of its maximum velocity
d) Substrate concentration at which the rate of reaction is maximum

174. Which one of the following amino acids was not found to be synthesized in Miller's experiement?
a) Glycine b) Aspartic acid c) Glutamic acid d) Alanine

175. Which of the following amino acids is not optically active?
a) Glycine b) Valine c) Leucine d) Isoleucine

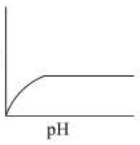
176. What provides roughage (fibre) in our diet?
a) Cellulose b) Sucrose c) Maltose d) Collagen

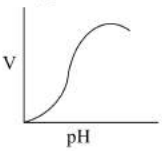
177. Starch can be used as an indicator for the detection of traces of
a) Glucose in aqueous solution b) Proteins in blood
c) Iodine in aqueous solution d) All of the above

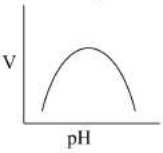
178. Pick the odd statement out
a) Removal of CO_2 from amino acids converts an amino acid into an amine
b) All the biomolecules have a turnover
c) Metabolic pathway are termed as transformation reactions
d) Metabolic pathways always follows a linear route

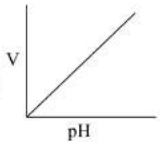
179. Which one is the sweetest sugar?
a) Glucose b) Fructose c) Sucrose d) Maltose

180. Choose the correct graph showing, the effect of pH on the velocity of a typical enzymatic reaction (V)?

a) 

b) 

c) 

d) 

181. In which one of the following sets of three items each belong to the category mentioned against them?
a) Lysine, glycine, thiamine – Amino acids
b) Myosin, oxytocin and gastric – Hormones
c) Rennin, helicase and hyaluronidase – Enzymes
d) Optic nerve, oculomotor, vagus – Sensory nerves

182. The inhibitor which binds to the enzyme at site other than the active site and do not resemble the substrate in structure is called
a) Activator b) Substrate analogue
c) Competitive inhibitor d) Non-competitive inhibitor

183. Biomolecules are constantly being changed into some other biomolecules and are made from ....
a) Amino acids b) Biomolecules only c) Monosaccharides d) Enzymes

184. A physical change, during a chemical reaction refers to
a) Change in shape without breaking of bonds
b) Change in state of matter
c) Change in the bond energy during the chemical reaction
d) Both (a) and (b)

185. Identify, in which of the following carbon compounds, heterocyclic rings can be found?
a) Proteins b) Amino acids c) Nitrogen bases d) Lipids

186. Hydrolysis of lipid yields?
a) Fats b) Fatty acids and glycerol
c) Mannose and glycerol d) Maltose and fatty acids

187. If all the peptide bonds of protein are broken, then the remaining part is

a) Amide b) Oligosaccharide c) Polypeptide d) Amino acid

188. In a polysaccharide, the individual monosaccharides are linked by a
a) Glycosidic bond b) Peptide bond
c) Ester bond d) Phosphodiester bond

189. The free energy of a system, in a spontaneous reaction
a) Decreases b) Increases
c) Becomes equal to zero d) Remains unchanged

190. Inhibition of enzyme activity by a molecule, which reversibly modifies the structure of the active site of the enzyme is called
a) Competitive inhibition b) Non-competitive reversible inhibition
c) Allosteric inhibition d) None of the above

191. Pentoses and hexoses are common
a) Monosaccharides b) Disaccharides c) Polysaccharides d) Oligosaccharides

192. Which one of the following is polysaccharide?
a) Glycogen b) Sucrose c) Lactose d) Maltose

193. Oxygenic compounds of biological process, which activate chemical reactions are
a) Vitamins b) Hormones c) Enzymes d) Fats

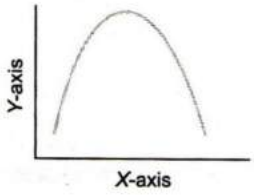
194. A product of metabolism is called a
a) Metabolite b) Catabolite c) Anabolite d) All of these

195. Starch and cellulose are compounds of many units of
a) Glycerol b) Amino acids c) Simple sugars d) Fatty acids

196. According to Watson-Crick model, DNA exists as a ...A... . The two strands of polynucleotides are ...B... . The backbone is formed by the sugar ...C..., ...D... chain. The nitrogen bases are more or less ...E... to this backbone
Choose the correct options for the blanks A, B, C, D and E
a) A-chain, B-perpendicular, C-carbonate, D-base, E-parallel
b) A-helix, B-parallel, C-sugar, D-phosphate, E-perpendicular
c) A-double helix, B-antiparallel, C-phosphate, D-sugar, E-perpendicular
d) A-strand, B-parallel, C-sulphate, D-sugar, E-perpendicular

197. After grinding a living tissue in trichloroacetic acid and then straining it, you would obtain two fractions : acid soluble pool and acid insoluble fraction. Acid insoluble fraction does not contains
a) Nucleic acids b) Polysaccharides
c) Lipids d) Flavonoids and alkaloids

198. The curve given below shows enzymatic activity with relation to three conditions (pH, temperature and substrate concentration)
What do the two axes (X and Y) represent?



	X-axis	Y-axis
a)	Temperature	Enzyme activity
b)	Substrate concentration	Enzymatic activity
c)	Enzymatic activity	Temperature
d)	Enzymatic activity	pH

199. Choose the correct options
a) $E + S \rightarrow ES \rightarrow E + P \rightarrow EP$
b) $E + S \rightleftharpoons ES \rightarrow E - P \rightarrow E + P$
c) $E + S \rightarrow ES \rightleftharpoons E - P \rightarrow E + P$
d) $E + S \rightleftharpoons ES \rightleftharpoons E - P \rightleftharpoons E + P$

200. Which of the following statement(s) are/is correct?
I. In the process of metabolism, all organic biomolecules are constantly being broken down but not being built up through chemical reactions
II. A product of metabolism in called a metabolite, but not always
III. Metabolism is always known to built up new products
IV. Metabolism is the characteristic feature of non-living things
a) All are incorrect
b) All are correct
c) Only IV is correct
d) II and IV are correct

201. The 'Repeating unit' of glycogen is
a) Fructose
b) Mannose
c) Glucose
d) galactose

202. Every chemical (metabolic) reaction is a ... reaction
a) Induced
b) Reversible
c) Catalysed
d) Spontaneous

203. Which of the following secondary metabolites are used as drugs?
a) Vinblastin and curcumin
b) Anthocyanin
c) Gums and cellulose
d) Abrin and ricin

204. Enzymes are most functional at the temperature range of
a) $15° - 25°C$
b) $20° - 30°C$
c) $30° - 50°C$
d) $50° - 60°C$

205. One of the major feature of metabolic reaction is that they are...
a) Elementary reactions
b) Non-linked reactions
c) Heat evolving reactions
d) Catalysed reactions

206. Which of these is not a ketone body?
a) Acetoacetic acid
b) Acetone
c) Succinic acid
d) Betahydroxy butyric acid

207. Which of the following is not a cell inclusion?
a) Protein
b) Carbohydrate
c) Pigment
d) Vacuole

208. Which of the following is incorrect?
a) In cellular organisms, DNA is genetic material
b) Adenylic acid is nucleoside
c) Cytidine is nucleoside
d) N-bases (A, G, C, T, U) have heterocyclic rings

209. Identify wheather the given conditions are anabolic or catabolic
I. Glucose → Lectic acid
II. Amino acids → Proteins
a) I-catabolic; II-catablic
b) I-anabolic; II-catabolic
c) I-catabolic; II-anabolic
d) I-catabolic; II-catabolic

210. Choose the correct statement
a) The living state is a non-equilibrium steady state to be able to perform work
b) The constant flow of material for energy in and out of cell prevent the cell from reaching equilibrium
c) Living state and metabolism are synonyms
d) All are correct

211. Pick out the wrong statement
a) Amino acids are substituted methanes
b) Glycerol is a trihydroxy propone
c) Lysine is a neutral amino acid
d) Lecithin is a phospholipid

212. Each active sites in enzyme is bounded by how many amino acids?

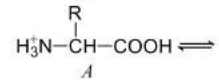
a) 20 b) Infinite c) 3 d) None of these

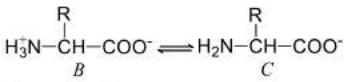
213. Select the wrong statement
a) Proteins are heteropolymers made of amino acids
b) Ribozymes are nucleic acids with catalytic power
c) Nucleic acids serve as genetic material
d) Collagen is the most abundant protein in the whole of the biosphere and Rubisco is the most abundant proteins in animal world

214. The simple polyhydroxy ketone molecule containing 3-7 carbons is a
a) Disaccharide b) Monosaccharide c) Polysaccharide d) dipeptide

215. Primary structure of proteins is due to the presence of
a) Peptide bond b) Covalent bond c) Disulphide bond d) Ionic bonds

216. Identify the zwitterionic form in the given reversible reaction





Choose the correct option
a) A is the zwitterionic form
b) C is the zwitterionic form
c) B is the zwitterionic form
d) None of the above

217. Removal of amino group from an amino acid is known as
a) Deamination b) Excretion c) Amination d) Egestion

218. The tightly bound non-proteinaceous organic compound in enzyme, is
a) Coenzyme b) Prosthetic group c) Cofactor d) Apoenzyme

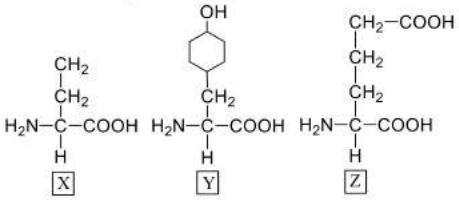
219. Why living state cannot afford to reach equilibrium?
a) Due to insufficiency of biomolecules b) To remain active all the time
c) To save the energy d) None of the above

220. Chemical compounds that have molecular weights less than one thousand dalton are usually referred to as
a) Biomolecules b) Micromolecules c) Macromolecules d) Both (a) and (b)

221. Find out the wrongly matched pair.
a) Primary metabolite – Ribose b) Secondary metabolic – Anthocyanin
c) Protein – Insulin d) Cellulose – Heteropolymer

222. The bond present between two carbohydrate molecules is
a) Amide b) Hydrogen c) Glycosidic d) phosphodiester

223. Name the given amino acids

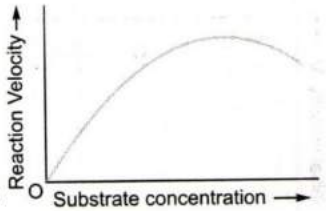


a) Glutamic acid, tyrosine and cysteine, respectively
b) Tyrocine, cysteine and glutamic acid, respectively
c) Cysteine, tyrosine and glutamic acid, respectively
d) Cysteine, glutamic acid and tyrosine, respectively

224. Enzyme having different molecular arrangement but similar functions is
a) Isoenzyme b) Holoenzyme c) Apoenzyme d) Coenzyme

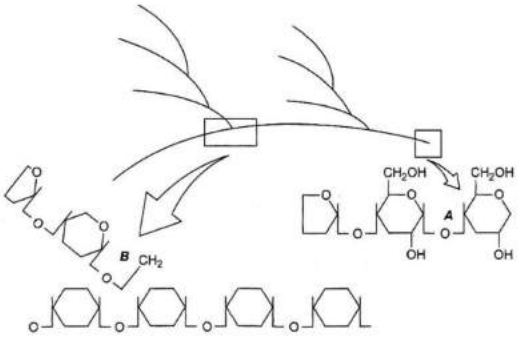
225. The chemical reactions which liberate energy by enzymatic oxidation of food stuffs to CO_2 and H_2O, in the tissues are referred to as the
a) Energy metabolism
b) Respiratory metabolism
c) None of these
d) Both (a) and (b)

226. The given graph shows the effect of substrate concentration on the rate of reaction of the enzyme green gram-phosphatase. What does the graph indicate?



a) The rate of enzyme reaction is directly proportional to the substrate concentration
b) Presence of an enzyme inhibitor in the reaction mixture
c) Formation of an enzyme-substrate complex
d) At higher substrate concentration, the pH increase

227. Identify A and B bonds in the following diagrammatic representation of a portion of glycogen



Choose the correct option
a) A = 1 − 6α-glycosidic bonds, B = 1 − 4α-glycosidic bonds
b) A = 1 − 1α-glycosidic bonds, B = 1 − 1α-glycosidic bonds
c) A = 1 − 4α-glycosidic bonds, B = 1 − 4α-glycosidic bonds
d) A = 1 − 4α-glycosidic bonds, B = 1 − 6, α-glycosidic bonds

228. Which is an organic compound found in most cells?
a) Glucose b) Water c) Sodium chloride d) Oxygen

229. Select the correct which represents the homopolysaccharides made up of glucose monomers
a) Sucrose, lactose, maltose
b) Chitin, glycogen, starch
c) Starch, inulin, peptidoglycan
d) Starch, glycogen, cellulose

230. A high fever is dangerous to humans because
a) Proteins are used up quickly
b) Fats are oxidised
c) Enzymes are denatured
d) BMR is lowered

231. All enzymes are basically
a) Carbohydrates b) Steroids c) Proteins d) Lipoproteins

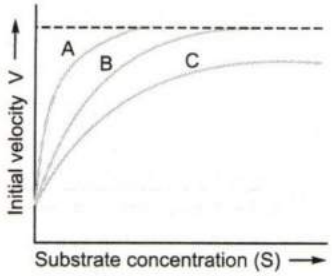
232. In a DNA, 'A' base pairs with ...by... H bonds.
Chooses the correct option for the blanks A and B
a) T, three b) C, four c) T, two d) G, two

233. ..... is a heteropolymer
a) Starch b) Glycogen c) Chitin d) Cellulose

234. Those nucleic acids which behave like enzymes are known as
a) Ribozymes b) Pepzymes c) Both (a) and (b) d) Ribose

235. How many of the twenty two amino acids are essential for children?
a) 6 b) 8 c) 10 d) 7

236. The figure given below shows three velocity substrate concentration curves for an enzyme reaction. What do the curves A, B and C depict respectively?



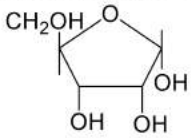
a) A-normal enzyme reaction, B-competitive inhibition, C-non-competitive inhibition
b) A-enzyme with an allosteric modulator added, B-normal enzyme activity, C-competitive inhibition
c) A-enzyme with an allosteric stimulator, B-competitive inhibitor added, C- normal enzyme reaction
d) A- normal enzyme reaction, B-non-competitive inhibitor added, C- allosteric inhibitor added

237. Raffinose is a
a) Monosaccharides b) Disaccharides c) Trisaccharides d) Polysaccharides

238. Example of a typical homopolysaccharide is
a) Lignin b) Suberin c) Inulin d) Starch

239. The aleurone layer in maize grain is specially rich in
a) Lipids b) Auxins c) Proteins d) Starch

240. Given below is the structural formula of

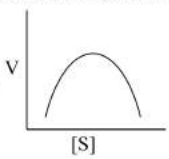


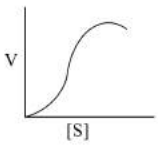
a) Sucrose b) Ribose c) Glucose d) Deoxyribose

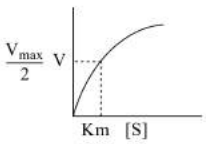
241. Ribozymes are ..... molecules that function as biocatalysts in modern cells
a) DNA b) RNA
c) Both DNA and RNA d) None of these

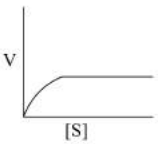
242. Types of amino acids found in proteins are
a) 21 b) 19 c) 20 d) 23

243. Select the correct graph which shows the relationship between the rate of an enzymatic activity and substrate concentration

a) 

b) 

c) 

d) 

244. The effectiveness of an enzyme is affected least by
a) Temperature b) Concentration of the substrate
c) Original activation energy of the system d) Concentration of the enzyme

245. Fluidity of bio-membranes can be shown by
a) Electron microscope b) Tissue culture
c) Phase-contrast microscope d) Fluorescence microscope

246. A mathematical explanation for enzyme action on substrate was formulated by
a) Leonor Michaelis and Maud Menten
b) Hans Gaffron
c) Melvin Calvin
d) Vant Krebs

247. Insulin is a polymer of
a) Fructose
b) Glucose
c) Sucrose
d) Xylose

248. What is the approximate percentage of proteins in the cell contents?
a) 12%
b) 10%
c) 15%
d) 20%

249. How does radiations inactivates enzymes?
a) By destroying tertiary structure
b) By destroying primary structure
c) Both (a) and (b)
d) None of the above

250. The fastest acting enzyme, in the biological kingdom, is
a) Lipase
b) Amylase
c) Peptidase
d) Carbonic anhydrase

251. The most important form of energy currency in living organisms is the bond energy in the chemical called .....
a) Adenosine Triphosphate (ATP)
b) Adenosine Diphosphate (ADP)
c) Phosphate (P)
d) None of the above

252. An example of competitive inhibition of an enzyme is the inhibition of
a) Succinic dehydrogenase by malonic acid
b) Cytochrome oxidase by cyanide
c) Hexokinase by glucose-6-phosphate
d) Carbonic anhydrase by carbon dioxide

253. The amino acids are acidic, basic and neutral based on the number of
a) Amino groups and hydrogen
b) Amino and carboxyl groups
c) Hydrogen and carboxyl group
d) Carboxyl groups

254. The type of bond involved in the formation of sodium chloride, is
a) Ester bond
b) Peptide bond
c) Ionic bond
d) Covalent bond

255. Allosteric modulation is due to inhibition action of enzyme by
a) Competitive inhibition
b) Substrate concentration
c) Products of reaction
d) Enzyme concentration

256. Cholesterol is considered as a crucial molecule in animals because it is
a) Necessary for survival
b) Energy source
c) Helps in hydrolysis of glycogen
d) Source of many vertebrate hormones and other steroids

257. Select the correct option that identifies the nature of apoenzyme and co-factor correctly

	Apoenzyme	Co-factor
a)	Protein	Non-protein
b)	Non-protein	Protein
c)	Protein	Protein
d)	Non-protein	Non-protein

258. The double helical model of the DNA was proposed by Watson and Crick based on what data produced by Wilkins and Franklin?
a) Hybridization
b) DNA sequencing
c) Southern blotting
d) X-ray diffraction

259. Arrange the steps of catalytic action of an enzyme in order and choose the correct option.
I. The enzyme releases the products of the reaction and the enzyme is free for another substrate.

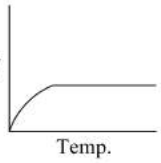
II. The active site of enzyme is in close proximity of the substrate and breaks of chemical bonds of the substrate.
III. The binding of substrate induces the enzyme to alter its shape fitting more tightly around the substrate.
IV. The substrate binds to the active site of the enzyme fitting into the active site.

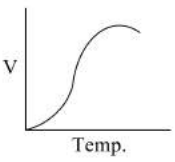
a) IV, III, II, I b) III, II, I, IV c) IV, II, I, III d) II, I, IV, III

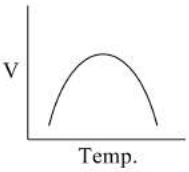
260. How many carbon atoms generally take part in the formulation of monosaccharides?
a) 5 to 10 b) 1 to 5 c) 5 to 15 d) 3 to 7

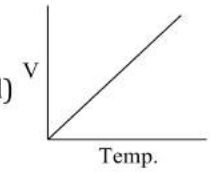
261. Enzymes catalysts differ from inorganic catalysts in which way?
a) Enzyme catalysts are smaller in size and lesser in weight in comparision to that of inorganic catalysts
b) Inorganic catalysts can work efficiently at temperature but enzymes catalyst cannot (except few enzymes)
c) Inorganic catalysts can work efficiently at high pressure but enzyme catalyst cannot
d) Both (b) and (c)

262. Select the correct graph, which shows the effect of temperature on the velocity of a typical enzymatic reaction

a) 

b) 

c) 

d) 

263. Malonate inhibits succinate dehydrogenase, is an example of
a) Allosteric inhibition b) Negative feedback
c) Competitive inhibition d) Non-competitive inhibition

264. Which disaccharide has different linkage?
a) Maltose b) Starch c) Sucrose d) Lactose

265. Which one of the following is not a fibrillar protein?
a) Elastin b) Collagen c) Myosin d) Albumin

266. The rate of physical or chemical process can be defined as
a) The amount of reactant consumed per unit time
b) The amount of product formed per unit time
c) The bond energy released during bond formation per unit time
d) All of the above

267. Enzymes that catalyses the removal of groups from substrates by mechanism other than hydrolysis, addition of groups to double bonds are called
a) Lyases b) Ligases c) Hydrolases d) Dehydrogenases

268. Which of the following is not a coenzyme?
a) NAD b) NADP c) FAD d) ATP

269. The DNA in which the base sequence of one strand is opposite to that of other strand when read from opposite direction is called
a) Satellite DNA b) Palindromic DNA c) Repetitious DNA d) Non-coding DNA

270. The enzyme part, which combines with non-protein part to form a functional enzyme, is known as
a) Coenzyme b) Holoenzyme c) Apoenzyme d) Prosthetic group

271. Which of the following statements are true?
I. Genetic RNA occurs in certain viruses called ribovirus
II. RNA of riboviruses may be single stranded
III. Double stranded RNA may also be present in riboviruses
a) All are correct b) Only I c) All are incorrect d) Only II

272. Lactose is composed of following components
   a) Glucose and fructose
   b) Glucose and glucose
   c) Glucose, fructose and galactose
   d) Glucose and galactose

273. Holoenzyme is a/an
   a) Non-protein and apoenzyme
   b) Protein and apoenzyme
   c) Enzyme protein and coenzyme
   d) Enzyme, non-protein and coenzyme

274. One feature common to all the compounds found in the acid soluble pool is
   a) They have molecular weights ranging from 18 to around 800 daltons (Da) approx
   b) They have molecular weights ranging from 18 to around 80 daltons (Da) approx
   c) They have molecular weights ranging from 18 to around 800 approx
   d) None of the above

275. Which of the following statements are correct?
   a) Living steady state has a self regulatory mechanism called homeostasis
   b) Energy flow and energy transformation of living system follows law of thermodynamics
   c) Metabolism is the release and gain of energy
   d) All of the above

BIOMOLECULES

: ANSWER KEY :

1)	c	2)	d	3)	a	4)	b	141)	d	142)	a	143)	d	144)	d
5)	c	6)	b	7)	a	8)	a	145)	c	146)	a	147)	b	148)	b
9)	b	10)	b	11)	d	12)	b	149)	a	150)	a	151)	a	152)	c
13)	b	14)	a	15)	a	16)	b	153)	c	154)	b	155)	d	156)	b
17)	a	18)	a	19)	d	20)	b	157)	b	158)	b	159)	a	160)	c
21)	b	22)	a	23)	d	24)	b	161)	c	162)	b	163)	c	164)	a
25)	a	26)	b	27)	b	28)	a	165)	d	166)	a	167)	b	168)	d
29)	b	30)	a	31)	b	32)	b	169)	d	170)	a	171)	a	172)	c
33)	a	34)	d	35)	c	36)	b	173)	c	174)	c	175)	a	176)	a
37)	a	38)	c	39)	a	40)	b	177)	c	178)	d	179)	b	180)	c
41)	a	42)	a	43)	d	44)	c	181)	c	182)	d	183)	b	184)	a
45)	d	46)	a	47)	d	48)	b	185)	c	186)	b	187)	d	188)	a
49)	a	50)	d	51)	a	52)	c	189)	a	190)	c	191)	a	192)	a
53)	c	54)	a	55)	b	56)	b	193)	c	194)	a	195)	c	196)	c
57)	c	58)	b	59)	d	60)	a	197)	d	198)	a	199)	b	200)	a
61)	d	62)	b	63)	c	64)	c	201)	c	202)	c	203)	a	204)	c
65)	d	66)	a	67)	b	68)	b	205)	d	206)	c	207)	d	208)	b
69)	d	70)	c	71)	a	72)	a	209)	c	210)	d	211)	c	212)	a
73)	d	74)	b	75)	a	76)	d	213)	d	214)	b	215)	a	216)	c
77)	c	78)	a	79)	c	80)	d	217)	a	218)	b	219)	b	220)	d
81)	c	82)	b	83)	b	84)	c	221)	d	222)	c	223)	c	224)	a
85)	a	86)	d	87)	b	88)	c	225)	d	226)	b	227)	d	228)	a
89)	d	90)	a	91)	b	92)	a	229)	d	230)	c	231)	c	232)	c
93)	d	94)	a	95)	c	96)	a	233)	c	234)	a	235)	c	236)	a
97)	c	98)	d	99)	c	100)	c	237)	c	238)	d	239)	c	240)	b
101)	b	102)	c	103)	b	104)	b	241)	b	242)	a	243)	c	244)	c
105)	a	106)	d	107)	a	108)	b	245)	d	246)	a	247)	a	248)	a
109)	a	110)	a	111)	b	112)	c	249)	a	250)	d	251)	a	252)	a
113)	d	114)	d	115)	b	116)	c	253)	b	254)	c	255)	c	256)	d
117)	d	118)	a	119)	a	120)	c	257)	a	258)	d	259)	a	260)	d
121)	c	122)	b	123)	a	124)	d	261)	b	262)	c	263)	c	264)	c
125)	d	126)	b	127)	b	128)	d	265)	d	266)	b	267)	a	268)	d
129)	a	130)	c	131)	c	132)	a	269)	b	270)	c	271)	a	272)	d
133)	d	134)	d	135)	b	136)	c	273)	a	274)	a	275)	a		
137)	b	138)	b	139)	b	140)	c								

BIOMOLECULES

: HINTS AND SOLUTIONS :

1 **(c)**
A = 1° structure B = 4° sstructure
C = 3° structure D = 2° structure

2 **(d)**
When we grind a tissue, we are distrupting the cell structure
Cell membrane and other membranes are broken into pieces and form vesicles which are not water soluble. Therefore, these membrane fragments in the form of vesicles get separated along with the acid insoluble pool and hence, in the macromolecular fraction. Lipids are not strictly macromolecules

3 **(a)**
Silicon is almost negligible in living organism. A comparison of elements present in non-living and living matter is as follows

Element	% Weight of Earth's crust	Human Body
Hydrogen (H)	0.14	0.5
Carbon (C)	0.03	18.5
Oxygen (O)	46.6	65.0
Nitrogen (N)	Very little	3.3
Sulphur (S)	0.03	0.3
Sodium (Na)	2.8	0.2
Calcium (Ca)	3.6	1.5
Magnesium (Mg)	2.1	0.1
Silicon (Si)	27.7	negligible

*Adapted from CNR Rao, Understanding Chemistry Universities Press Hyderabad

4 **(b)**
(i) Carrots – Carotene
(ii) tomatoes – Lycopene

5 **(c)**
Lecithin is a phospholipid composed of choline and inositol. It is found in all living cells as a major component of cell membrane.

6 **(b)**
The central core of silk fibre is made up of fibroin protein. Silk fibres are soft and flexible. These are composed of β-pleated sheets.

7 **(a)**
Every coenzyme is a cofactor but every cofactor is not coenzyme.

8 **(a)**
The rate of reaction doubles are decreases by half for every 10°C change in either direction

9 **(b)**
Special non-protein molecules are called cofactors. These help enzymes to catalyze chemical reactions. Organic cofactors are called coenzymes.

10 **(b)**
There are 20 different amino acids. In proline and hydroxyl proline instead of $-NH_2$ group, NH group is present. These are called **imino acids**.
Methionine and **cysteine** are sulphur containing amino acids.

11 **(d)**
The sum total composition of acid soluble and acid insoluble fraction represents the composition of cellular pool

12 **(b)**
Emil Fisher (1894) proposed 'lock and key theory' for the mechanism of enzyme action, according to which the active sites of enzyme have a specific geometric shape wherein the substrate molecules fit in just like a key in a particular lock. In other words, it illustrates that a particular enzyme molecule interacts with a specific type of substrate molecule.

13 **(b)**
Acidic amino acids have two carboxyl groups and one amino groups per molecule. They are called

monoamino dicarboxylic amino acids. They include aspartic acid and glutamic acid

14 **(a)**
After doing the chemical analysis of organic compounds found in living organisms, two types of organic compounds were observed. There are filtrate (acid soluble pool) and the retentate (acid insoluble pool)

15 **(a)**
Dehydrogenase is not an example of hydrolases. It is an example for oxidoreductases.

16 **(b)**
Human skin contains α-keratin, which is a secondary form of proteins

17 **(a)**
Dynamic state of body constituents

18 **(a)**
$ADP + P_i \rightarrow ATP$ (endergonic)
$ATP \rightarrow ADP + P_i$ (exergonic)

19 **(d)**
In DNA, thymine (5 – methyl uracil) is present. Uracil is present in RNA at the place of thymine.

20 **(b)**
Purine and pyrimidine nitrogenous base are found in DNA. Among purines, adenine pairs only with the pyrimidine thymine. Similarly, guanine pairs with the cytosine. The fact that total amount of purine will be equal to total amount of pyrimidine was first enunciated by Chargaff in 1950. From this law,
Adenine=Thymine=60/2=30%
Guanine=Cytosine=40/2=20%

21 **(b)**
Isoenzymes are one of the several forms of an enzyme in an individual or population that catalyse the same reaction but differ from each other in such properties as substrate affinity and maximum rates of enzyme-substrate reaction.

22 **(a)**
Amino acids are substituted methanes, there are four substituent groups occupying the four valency positions. These are hydrogen, carboxyl group, amino group and a variable group designrated as *R* group

23 **(d)**
Emil Fisher (1894) proposed 'lock and key' theory to explain the mechanism of enzyme action. According to this theory, the active sites of enzyme have a specific geometric shape wherein the substrate molecule get fitted to form enzyme-substrate complex. This is like the fitting of a key to a particular lock.

24 **(b)**
Histones are a set of positively-charged, basic proteins. Histones are rich in the basic amino acid residuesl lysines and arginines. Both the amino acid residues carry positive charges in their side chains. Two molecules of each of the four types of histones – H_2A, H_2B, H_3 and H_4 are organized to form **histone octamers**. These form the inner core of nucleosome. The negatively charged DNA is wrapped around the positively – charged histone octamer to form a structure called nucleosome.

25 **(a)**
Grape sugar is glucose, it is the main fuel in all cells. It is the blood sugar of many mammals

26 **(b)**
Pepsin is an extracellular enzyme

27 **(b)**
Glycogen is the main storage polysaccharide in animals. Like those of amylopectin, glycogen molecules are also large highly branched (branch points are α′ 1-6 linkages) polymers of thousands of D-glucose residues linked by α, 1-4 glycosidic bonds.

28 **(a)**
All are correct

29 **(b)**
An α-helix is an example of secondary protein structure

30 **(a)**
Glucose, fructose, mannose and galactose are hexose monosaccharides. The monosaccharides have free aldehyde or ketone group, which can reduce Cu^{2+} to Cu. Therefore, these are called reducing sugars.

31 **(b)**
Formation of glycogen from glucose is called glycogenesis

32 **(b)**
Cellulose is a polymeric polysaccharide consisting of only one type of monosaccharide, *i.e.*, glucose

33 **(a)**
As living organisms work continuously, they cannot afford to reach equilibrium. Hence, the living state is a non-equilibrium steady-state to be able to perform work, living process is a constant effort to prevent falling into equilibrium

34 **(d)**
Arachidonic acid is polyunsaturated (*i. e.*, have more than one double bond) and essential fatty acids.

35 **(c)**
Inulin (Dahlia starch) is a polymer of **fructose**. It consists of 30 fructose units linked by $\beta 1-2$ linkage.

36 **(b)**
Sucrose is a sugar comprising one molecule of glucose linked to a fructose molecule. It is abundant in sugarcane, sugar beet, etc, from which it is extracted and defined as table sugar.

37 **(a)**
For nucleic acids, the building block is a nucleotide. A nucleotide has three chemically distinct components. One is a heterocyclic compound, second is a monosaccnaride and the third a phosphoric acid or phosphate

38 **(c)**
In feedback inhibition, the product of an enzyme-catalyzed reaction (chain of reactions) accumulates and acts as inhibitor of the reaction, *e. g.*,

$$\text{Glucose} + \text{ATP} \xrightarrow{\text{Hexokinase}} \text{Glucose} - 6 - \text{phosphate} + \text{ATP}$$

39 **(a)**
The term metabolism refers to the sum of all the enzymatically catalysed chemical reactions constantly taking place in the cells and tissues of the living organisms. These include those that change the small molecules into large ones as well as those which convert the large molecules into small ones

40 **(b)**
Chitin is a homopolymer of $\beta - 1$, 4-linked N-acetyl-D-glucosamine residue. It is a principal structural component of the exoskeleton of invertebrates, *e. g.*, arthropods; and is also a major cell wall constituent of most fungi.

41 **(a)**
Creatine phosphate is a reservoir of high energy phosphate in muscle cells, as the energy released by its hydrolysis is greater than ATP. **Fat** contains more energy as compared to carbohydrate and protein. It is not directly used in respiration instead first broken down to intermediates common to glucose oxidation, *ie.*, acetul Co-A, glyceraldehydes phosphate.

42 **(a)**
Amino acids are organic acids (with carboxylic group (-COOH) and having amino group ($-NH_2$) generally attached to $\alpha -$ carbon or next to the carboxylic group. Carboxylic group provides an acidic property to the amino acid, while amino group gives it a basic reaction. Amino acids are **building blocks** of proteins and enzymes.

43 **(d)**
Seven amino acids are the essential amino acids for man. They include leucine, isoleucine, lysine, methionine, phenylalanine, tryptophan and valine

44 **(c)**
The aggregation of the various kinds of biomolecules in a cell is referred to as the cellular pool

45 **(d)**
Secondary metabolites can be observed in plant, fungal and micbrobial cells

Some Secondary Metabolites

Pigments – Carotenoids, Anthocyanins, etc.
Alkaloids – Morphine, Codeine, etc.
Terpenoides – Monoterpenes, Diterpenes etc.
Essential oils – Lemon grass oil, etc.
Toxins – Abrin, Ricin
Lectins – Concanavaline –A
Drugs – Vinblastin, curcumin, etc.
Polymeric substances – Rubber, gums, cellulose

46 **(a)**
Thousands of compounds including flavonoids, rubber, essential oils, antibiotics, coloured pigments, scents, gums, spices. There are called secondary metabolites

47 **(d)**

Photosynthesis is the starting point, in the production of food. It produces glucose, from which all other food materials are produced

49 **(a)**
The heterocyclic compounds in nucleic acids are the nitrogeneous bases named adenine, guanine, uracil, cytosine and thymine

50 **(d)**
Tyrosinase is a copper containing oxides, which is widely distributed in plants and animals including human. It oxidizes tyrosine to melanin in mammal and causes the cut surfaces of many fruits and vegetables to darken.

52 **(c)**
The regulation of the chemical composition of blood and body fluids and other aspects of its internal environment by an organism, to maintain its physiological processes is called homeostasis

53 **(c)**
In a polysaccharide chain (say glycogen), the right end is called the reducing end and the left end is called the non-reducing end

54 **(a)**
Hydrogen.
A and G of one strand compulsorily base pairs with T and C, respectively, on the other strand. There are two hydrogen bonds between A and T and three H-bonds between G and C

55 **(b)**
When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor

56 **(b)**
Adenine and guanine are substituted purines, while the rest (uracil, cytosine and thymine) are substituted pyrimidines

57 **(c)**
Almost all enzymes are basically made up of proteins. However, a small group of RNA molecules (*e. g.*, ribozyme) have also been found to be enzymatic exceptionally.

58 **(b)**
Amino acids are organic amino acids containing an amino group and an acidic group pas substituents on the same carbon, *i.e.*, the α-carbon. Hence, they are called α-amino acids

59 **(d)**
Isomerases are the enzymes which bring about rearrangement of molecular structure and catalyse the interconversion of optical, geometrical or positional isomers.

60 **(a)**
All the carbon compounds obtained from living tissues are named as biomolecules

61 **(d)**
A fatty acid has a carboxyl group attached to *R* group. The *R* group could be a methyl ($-CH_3$), or ethyl ($-C_2H_5$) or higher number of $-CH_2$ groups (1 carbon to 19 carbons)

62 **(b)**
Enzymes are water soluble colloidal macromolecules which are wholly or partially proteinaceous in nature. The proteinaceous part of enzyme is called **apoenzyme** while the non-protein part is called **prosthetic group**, which may be organic (*ie.*, coenzyme) or inorganic (*i. e.*, cofactor). This complex enzyme is called holoenzyme.

63 **(c)**
Such sugars, which give positive tests with Benedict's solution and Tollen's reagent are called reducing sugars. Most monosaccharides and some disaccharides are reducing sugars.

64 **(c)**
When a metabolic disequilibrium is in effect, then only cells continue to functions. The cellular metabolism utilises only those reactions that are irreversible

65 **(d)**
S^{35} radioisotope is not suitable for DNA labelling based studies as DNA does not contain sulphur. S^{35} radioisotope is suitable for protein labeling based studies because protein contains sulphur.

66 **(a)**
Allosteric modulation or feedback inhibition of enzymes is influenced by **end product**.
It was shown by **Jacob and Monod** (1961) through Lac operon in *E. coli*.

67 **(b)**
After burning the dry tissues, all the organic compounds are oxidised to gaseous form (CO_2 and water vapour) and are removed. The material

left is termed 'ash' which contains inorganic elements (*e.g.*, calcium, magnesium etc.)

68 **(b)**
The inorganic compounds like sulphate, phosphate *etc.*, are categorised in acid soluble pool

69 **(d)**
Metabolic pathway from glucose to lactic acid occurs in 10 metabolic steps. This pathway is known as glycolysis

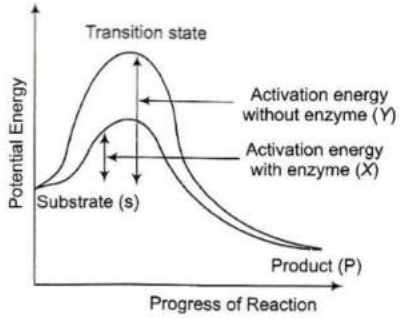
70 **(c)**
A nucleotide has three components. One is a heterocyclic compounds, second is a monosaccharide and third is a phosphate or phosphoric acid

71 **(a)**
I. Hydrolysis of glycogen to glucose is termed as glycogenolysis
II. Amylases takes part in the hydrolysis of glycogen
III. Amylum is another name of starch
IV. Polysaccharide formed as the end product of photosynthesis is starch

72 **(a)**
Peptone is any group of soluble and diffusable derived proteins formed by the action of enzymes on proteins, as in the process of digestion or by acid hydrolysis.

73 **(d)**
RUBISCO is the most abundant protein in whole of the biosphere

74 **(b)**
The amount of activation energy in the present of an enzyme is very less as compare to the amount, which is needed in the absence of enzymes



75 **(a)**
$CH_3(CH_2)_{14}COOH$ is the chemical formula of **palmitic acid**. It is a saturated fatty acid.

76 **(d)**
Cellulase enzyme is used in detergent industry for colour brightening and softening.

77 **(c)**
In human DNA at Single-Nucleotide Polymorphism (SNP), single base differences occur.

78 **(a)**
Coenzyme is non-proteinaceous organic molecule required bound to the enzyme for functioning. Apoenzyme is the proteinaceous part of enzyme.
Coenzyme+Apoenzyme=Holoenzyme

79 **(c)**
Majority of the metabolic reactions do not occur in isolation, they are always linked to some other reactions. There are many examples of catalysed metabolic reactions examples of catalysed metabolic reactions

80 **(d)**
Maltose or malt sugar, is abundantly occurred in germinating starchy seeds. Maltose is a homodisaccharide, *ie.*, made up of two similar D-glucose residues, which are linked by α 1, 4 glycosidic bond.

81 **(c)**
Mannitol is **a sugar alcohol**.

82 **(b)**
Almost all enzymes are proteinaceous in nature

83 **(b)**
Nucleic acids exhibit a wide variety of secondary structures. For example, one of the secondary structures exhibited by DNA is the famous Watson-Crick model. This model says that DNA exists as a double helix. The two strands of polynucleotides are antiparallel *i.e.*, run in the opposite direction. The backbone is formed by the sugar-phosphate-sugar chain. The nitrogen bases are projected more or less perpendicular to this backbone but face inside

84 **(c)**
Feedback inhibition is an enzyme regulatory mechanism, where the end product functions as an allosteric inhibitor, if its concentration crosses a threshold value.

85 **(a)**
Molecules are constantly being changed into some other biomolecules and also made from some other biomolecules. This breaking and making is

through chemical reactions constantly occurring in living organisms. Together all these chemical reactions are called metabolism. Each of the metabolic reactions results in the transformation of biomolecules. A few example for such metabolic transformations are removal of CO_2 from amino acids making an amino acids into an amine, removal of amino group in a nucleotide base; hydrolysis of a glycosidic bond in a disaccharide, etc.

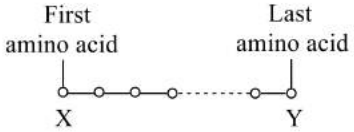
86 **(d)**
In the solid state, an amino acid ordinarily exist as Zwitter ion, which is formed by the transfer of protons from α − COOH group to $-NH_2$ group. Essential amino acids are those, which our body can not manufacture of its own that's why these are required in diet, while non-essential amino acids required in diet, while non-essential amino acids are those, which are not required in our diet essentially.

87 **(b)**
The shape of a protein in its functional mode is its teritiary structure, determined largely by primary structure, positively charged regions attract and bind to negatively charged regions and hydrophobic *R* groups interact and form water-free pockets inside the folded protein. Cysteines may link to protein, together with **disulphide bonds**.

88 **(c)**
Maltose is a disaccharide that given two molecules of glucose on hydrolysis. It is found during germination of starchy seeds. It is produced commercially from starch hydrolyzing enzyme, diastase.

89 **(d)**
Albumin is a simple water soluble protein composed of nitrogen, carbon, hydrogen, oxygen and sulphur, occurring in animal and vegetable juices.

90 **(a)**
$X \rightarrow N$-terminal amino acid
$Y \rightarrow C$-terminal amino acid



91 **(b)**
All statements are correct. Only IV is wrong. After performing elemental analysis of a plant tissue, animal tissue, microbial paste (living matter) and of a piece of earth's crust (animate object), it was found that all living and non-living systems are made-up of same chemicals *i.e.*, elements (*e.g.,* carbon, hydrogen, oxygen and several others) Most living organisms have relatively high abundance of carbon and hydrogen than in earth's crust

92 **(a)**
Cystine is a dimeric amino acid formed by the oxidation of two cysteine residues, which covalently link to make a disulphide bond.

93 **(d)**
All the statements about enzymes are correct

94 **(a)**

Amino acid	Symbol
Phenylalanine	F
Proline	P
Tryptophan	W
Methionine	M

95 **(c)**
Peroxidase and catalase, catalyze the break down of hydrogen peroxide to water and oxygen

96 **(a)**
Sugar and amino acids are **primary** metabolites. Sugars are building blocks of starch, glycogen, etc., while amino acids are the building blocks of proteins.

97 **(c)**
Competitive inhibition is seen, when the substrate and the inhibitor compete for active site.

98 **(d)**
Enzymes are thermolabile and their activity increases rapidly from 0°C − 35°C. In most of the animals, the optimum temperature is between 25°C − 40°C for most of the enzymes. Many enzymes stop activity at 60°C and are denaturated.

99 **(c)**
Cellulose is made up of unbranched chain of glucose molecule linked by β-1, 4 glycosidic bond.

100 **(c)**

Except glycine, all the amino acids contain asymmetric carbon. It is simplest amino acid. Cysteine and cystine contain sulphur.

101 **(b)**
The four main elements found in a living system which make 95% of all elements are
Carbon – 18.5%
Hydrogen – 0.5%
Oxygen – 65%
Nitrogen – 3.3%
These four elements are called 'Big-four' elements

102 **(c)**
Proteins are heteropolymers which are made up of 20 types of monomers of amino acids

103 **(b)**
Catabolic and anabolic pathways are often coupled in a cell because the free energy released from one pathway is used to drive other pathways

104 **(b)**
Proteins are linear polymers of amino acids. Hence, these are made up of C, H, O, N and in some cases S also. These are macromolecules of high molecular weight (from 6000 to several millions). The elimination of water during interaction between the amino acids is called condensation and the linkage so formed is a carbon nitrogen bond called peptide bond. The compound so formed is called dipeptide.

105 **(a)**
Trehalose is the major sugar of insect haemolymph, in disaccharide form

106 **(d)**
These are five forms of DNA, B.DNA is most common.
A-DNA – 11 pairs
B-DNA – 10 pairs
C-DNA – 9.33 pairs
D-DNA – 8 pairs
Z-DNA – 12 pairs

107 **(a)**
The phospholipid is a bipolar molecule having long fatty acid called hydrophobic tail (water hating)or non-polar end and hydrophilic (water loving) or polar end, hence it is **amphipathic** in nature.

108 **(b)**

$$NADH + H^+ + 1/2O_2 \xrightarrow[\text{oxidase}]{\text{Cytochrome}} NAD^2 + H_2O$$

Cytochrome oxidases catalyses the transfer of hydrogen to oxygen, forming water in the last reaction of electron transport system

109 **(a)**
Flow of metabolites through metabolic pathway has a definite rate and direction like automobile traffic. These pathways criss-cross each other

110 **(a)**
A peptide bond is a chemical bond formed between two molecules when the carboxyl group of one molecule reacts with the amino group of the other molecule; thereby releasing a molecule of H_2O. This is a dehydration synthesis reaction and usually occurs between amino acids. The resulting bond is a peptide bond and the resulting molecules is an amide.

111 **(b)**
In animal tissues, the categories of compounds present are called primary metabolites

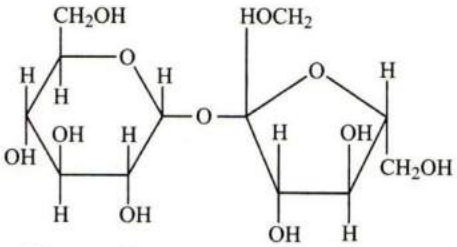
112 **(c)**
Cellulose is homopolysaccharide, a polymer of $\beta -$ glucose. The glucose monomers are linked together by $\beta - 1, 4$ linkage. Cellulose is the main constituent of plant cell wall.

113 **(d)**
The catalysts which hasten the rate of a given metabolic conversation are also proteins. These proteins with catalytic power are named enzymes

114 **(d)**
Amylases, glucoamylases and glucoisomerases are all enzymes that convert corn starch into high fructose syrup, which is used to flavour soft drinks and to sweeten biscuits and cakes.

115 **(b)**
Denaturation means deviation from natural form. Proteins or nucleic acids whenever exposed to extreme heat, pH or acids their structure become change. This process is known as **denaturation**.

116 **(c)**
Sucrose is a disaccharide, which on hydrolysis breaks down into glucose and fructose.



117 **(d)**
In Meselson and Stahl's experiment, bacterial cells were grown for several generations in a medium containing a heavy isotope of nitrogen (N^{15}) and then, were transferred to a new medium containing the normal lighter isotope (N^{14}). At various times thereafter, samples of bacteria were collected and their DNA was dissolved in a solution of cesium chloride, which was spun rapidly in a centrifuge. Because the cesium ion is so massive, it tends to settle towards the bottom of the spinning tube, establishing a gradient of caesium density.

118 **(a)**

Protein	Present in
Fibroin	Silk
Albumin	Egg, blood plasma
Keratin	Hair, skin
Globulin	Blood plasma

119 **(a)**
Inactive form of enzymes is called proenzymes

120 **(c)**
Among these, glycine is the simplest amino acid.

121 **(c)**
Transformation of biomolecules results due to the metabolic reactions occurring in body. Hydrolysis of glycosidic bond in a disaccharide results in the formation of simpler monosaccharides

122 **(b)**
Sucrose is most abundant in plants. It consists of 1-D glucose and 1, D fructose units jointed by α 1-2 glycosidic linkage. Due to absence of aldehyde group at 1-C atom, the sucrose is non-reducing sugar.

123 **(a)**
Phospholipids are conjugated lipids. There are esters of fatty acids and alcohol but contain some acids and glycerol

124 **(d)**
Glycine max or soybean is the richest source of protein (36-44%). From its seeds edible oil and a milk-like substance is obtained, which is used as a substitute of milk.

125 **(d)**
Starch is present as a store house of energy in plant tissues

126 **(b)**
Keratin of hair and myosin of muscle have α-helical structure. Fibroin, the protein in silk fibres produced by insects and spiders, has pleated structure

127 **(b)**
The most abundant chemical in living organisms is water.
Water content is 70-90% of the total cellular mass

128 **(d)**
F Sanger (1953) first time deciphered the sequence of amino acid in a protein, *i. e.*, bovine insulin. Proteins are made up of amino acids and amino acids are held together by peptide bonds.

130 **(c)**
Collagen is the most abundant protein in animal word

131 **(c)**
Proteins with catalytic power are called enzymes. Their basic function is their involvement in the change of rate of reaction either increase or decrease

132 **(a)**
The α-helix, random coil and β-pleated sheets are termed the secondary structure of proteins

133 **(d)**
All are structural proteins.

134 **(d)**
All statements are correct

135 **(b)**
Enzymes catalyses the biochemical reactions by lowering the activation energy

136 **(c)**
Glucose

137 **(b)**
I. Red
II. Long stretches of repetitive base pairs is called satellite DNA
III. Phosphoric acid, pentose sugar and nitrogenous organic base

138 **(b)**

The acid soluble pool represents the cytoplasmic composition of cell. The macromolecules from cytoplasm and organelles becomes acid insoluble fraction. Together, they represent the entire chemical composition of living tissues or organisms

139 **(b)**

Transferases catalyze transfer of group G (other than hydrogen) between a pair of substrates, S and S′, *e. g.*,

$$S - G + G' \xrightarrow{\text{Transferase}} S + S' - G$$

140 **(c)**

There are certain enzymes which have slightly different molecular structure but have similar catalytic function. Such enzymes are called isoenzymes or simply isozymes. LDH (Lactic dehydrogenase) is a good example of isoenzymes

141 **(d)**

Primary metabolities includes amino acids, sugars etc. They play a major role in physiological processes

142 **(a)**

Sucrose is a non-reducing sugar. It consists of one glucose and one fructose moiety, and is the main transporting sugar in plants.

143 **(d)**

All of the above. Double sugar is sucrose (table sugar) and milk sugar is lactose. Sugar in germinating seeds is also an example of double sugar

144 **(d)**

Based on the nature of *R* group, there are many amino acids

145 **(c)**

Carbohydrates are the products of photosynthesis, which is carried out by photosynthetic bacteria, green algae and green plant cells.

146 **(a)**

Amino acids have a central four valence carbon atom, called the alpha (α) carbon to which are attached (i) an amino group ($-NH_2$) on one side, (ii) a carboxyl groups ($-COOH$) on the other side, (iii) a hydrogen atom (H) on the third side and (iv) a variable group symbolised by *R* on the fourth side. Out of them, NH_2 and COOH are involved in peptide bond formation

147 **(b)**

Starch remain stored in chloroplasts and amyloplasts in plant cells

148 **(b)**

Each strand appears like a helical staircase. Each step of ascent is represented by a pair of bases. At each step of ascent, the strand turns the pitch would be 34Å. The rise per base pair would be 3.4Å. this form of DNA with the above mentioned salient features is called B-DNA

149 **(a)**

The catalytic efficiency of two different enzymes can be compared by the K_m value.

150 **(a)**

When the inhibitor closely resembles the substrate in its molecular structure and inhibits the activity of the enzyme, it is known as competitive inhibitor. Due to its close structural similarity with the substrate, the inhibitor competes with the substrate for the substrate-binding site of the enzyme.

Consequently, the substrate cannot bind and as a result, the enzyme action declines, *e. g.*, inhibition of succinic dehydrogenase by malonate which closely resembles the substrate succinate in structure. Such competitive inhibitors are often used in the control of bacterial pathogens

151 **(a)**

Cellular pool consists of both organic and inorganic compounds. The relative percentage of each of these is as follow:

Water – 80%

Protein – 12%

Lipids – 3.0%

Nucleic acids – 2.0%

Carbohydrates – 1.0%

Inorganic salt – 1.0%

152 **(c)**

Five forms of DNA have been reported A, B, C and D forms are right handed, while the Z-DNA is left handed

153 **(c)**

Adult human haemoglobin consists of 4 subunits (2α, 2β)

155 **(d)**

Nuclease is an enzyme that breaks phosphodiester bonds in nucleic acid molecules. It is the most specific enzyme as it functions at specific sites (between specific nucleotides) on the nucleic acid molecule.

156 **(b)**
Chemical compounds, which are found in the acid insoluble fraction are called biomacromolecules or macromolecules

157 **(b)**
Lipids are generally, water insoluble because they are non-polar. They dissolve in non-polar organic solvents, such as ether, chloroform, acetone and benzene. They disperse in water uniformly as minute droplets forming an emulsion

158 **(b)**
The nucleotide is formed by the union of a phosphate group with a nucleoside. A nucleoside contains a sugar molecule along with an organic nitrogenous base. Thus, a nucleotide contains a organic nitrogenous base (purine or pyrimidine) along with a sugar molecule and a phosphate group, *i. e.*,
Nucleoside=Sugar molecule+Organic nitrogenous base.
Nucleotide=Nucleoside+Phosphate group.

159 **(a)**
Cofactor is a non-protein component essential for the normal catalytic activity of an enzyme. Cofactors may be organic molecule or inorganic ions.

160 **(c)**
Water has structural and chemical properties that make it particularly suitable for its role in living cells. Every water molecule is capable of forming four **hydrogen bond** with nearby water molecules. Because of this strong attraction, a great deal of heat is separate water molecules from each other.

161 **(c)**
The physical and the chemical compositions of amino acids are essentially of the amino, carboxyl and *R* groups

162 **(b)**
The enzymes which work only in the presence of cofactors are known as apoenzymes.
A working combination of an apoenzyme and cofactor (mineral ion, prosthetic group or coenzyme) is called enzyme system or holoenzyme.
Apoenzyme + Mineral ion/Prosthetic/ Coenzyme group → Enzyme system or holoenzyme

163 **(c)**
The proteins are composed of carbon, hydrogen, oxygen, nitrogen and sulphur. Certain proteins may contain phosphorous, iron or other elements also

164 **(a)**
Two or more polynucleotide chains may join together by intermolecular hydrogen bonds and may bend into parallel folds to form β-pleated sheet

165 **(d)**
Enzymes, vitamins and hormones are helpful in metabolism regulation.

166 **(a)**
Waxes are the **esters** formed between a long chain alcohol and saturated fatty acids. This material is typically pliable and soft when warm but hard and water resistant when cold, *e. g.*, paraffin wax.

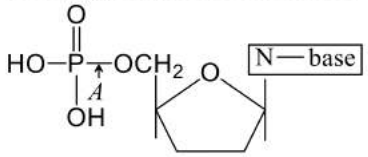
167 **(b)**
Certain proteins form enzymes, some coenzymes and many hormones (insulin, parathormone) and regulate metabolism. They are called functional proteins

168 **(d)**
On full turn of the helical strand would involves ten steps or ten base pairs

169 **(d)**
In a double stranded DNA, the sequence of nucleotides is complementary to each other, *i. e.*, A pair with T and G pair with C. So, the sequence of nucleotide for 3' ATTCGCTAT 5' will be 5' TAAGCGATA 3'.

170 **(a)**
In a protein molecule, the amino acid units are linked together by peptide bonds formed between the amino acid units and the carboxyl groups of successive amino acids

171 **(a)**
A is ester bond formed by condensation reactions, involving elimination of water



172 **(c)**
Statement II is false. Amount of biomolecules in an organisms is fixed

173 **(c)**
Michaelis Menten constant (km) is equal to the substrate concentration at which the velocity of the reaction is half maximum. It is inversely proportional to the enzyme activity

174 **(c)**
Miller and **Urey** were the two scientists, who recreated the condition of primitive earth in laboratory and abiotically synthesized amino acids and bases. They synthesized glycine, aspartic acid and alanine in abundant quantities, while **glutamic acid** was not synthesized in their experiment.

175 **(a)**
Glycine is not optically active amino acid.

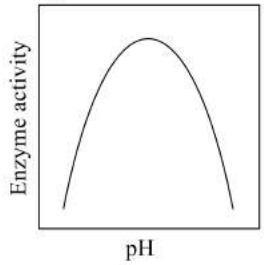
176 **(a)**
Cellulose provides roughage (fibre) in our diet

177 **(c)**
Starch can be used as an indicator for the detection of traces of **iodine** in aqueous solution.

178 **(d)**
Metabolic pathways not always follow linear routes. They are circular sometimes. These pathways criss-cross each other

179 **(b)**
Fructose is the sweetest sugar. It is found in sweet fruits and honey.

180 **(c)**
Some enzymes acts best in an acid medium and others in an alkaline medium. For every enzyme, there is an optimum pH where its action is maximum. Most enzymes shows activity in a pH range of about 6.0 to 7.5 *i.e.*, neutral pH. A shift towards the alkaline or acid side rapidly decreases the enzyme activity and finally, stops it altogether



181 **(c)**
Rennin, helicase and hyaluronidase, all are enzymes.

182 **(d)**
The non-competitive inhibitor binds to the enzyme at some site other than the substrate binding site and no product is formed. *e. g.*, cyanide inhibits the mitochondrial enzyme cytochrome oxidase, which is essential for cellular respiration

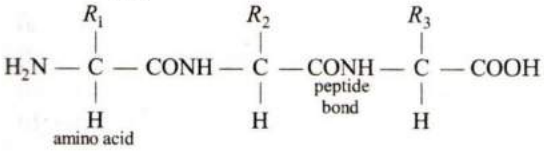
183 **(b)**
Biomolecules only

184 **(a)**
A physical change simply refers to a change in shape without breaking of bonds. This is a physical process. Another physical process is a change in state of matter when ice melts into water, or when water becomes a vapour. These are also physical processes. However, when bonds are broken and new bonds are formed during transformation, this will be called a chemical reaction

185 **(c)**
Living organisms have a number of carbon compound in which heterocyclic rings can be found. Some of these are nitrogen bases-adenine, guanine, cytosine, uracil and thymine

186 **(b)**
Lipid is a fat, which on hydrolysis forms **fatty acids** and **glycerol**.

187 **(d)**
Protein is the polymer of amino acids joined together by peptide bonds so, if all peptide bonds of protein are broken, then the remaining part will be **amino acid**.



188 **(a)**
Polysaccharides are large sized carbohydrates $(C_6H_{10}O_5)_n$ which are formed by condensation of a number of monosaccharides. These are also called glycan because of their formation from sugars. Linkage between adjacent monosaccharides is through glycosidic bonds (−COC−). A molecules of water is released at each point of condensation.

189 **(a)**
The free energy of a system decreases in a spontaneous reaction

190 **(c)**
Allosteric inhibition is the inhibition of enzyme activity by binding of an effector molecule to site (allosteric site) other than active site.

191 **(a)**
Pentoses (*e. g.*, ribose, deoxyribose) and hexoses (*e. g.*, glucose, fructose, galactose) are common monosaccharides.

192 **(a)**
Polysaccharides are polymers of monosaccharides. Glycogen and starch are both polymer of $\alpha -$ glucose. Glycogen is found in liver and muscles and store energy in mammals.

193 **(c)**
Enzymes are biological catalysts, which catalyse a vast number of chemical reactions at the temperature suitable for living organisms.

194 **(a)**
A product of metabolism is called a metabolite

195 **(c)**
Starch has straight chain or amylose part of 200-2000,$1 \rightarrow 4\ \alpha -$ D pyranose glucose units and side chain or amylopectin part of 2000-200,000 glucose units that are attached to straight chains by $1 \rightarrow 6\alpha -$ D glycosidic linkages. Cellulose is the most abundant organic substance on earth. It has a molecular linear chain of 6000-10,000, 1-4 linked-β pyranone glucose chain with molecular weight of 0.5-2.5 million. Adjacent glucose molecules lies at 180° to each other.

196 **(c)**
A-double helix, B-antiparallel, C-phosphate, D-sugar, E-perpendicular.
Adenine and guanine are substituted purines, while the rest (uracil, cytosine and thymine) are substituted pyrimidines

197 **(d)**
After grinding a living living tissue in trichloroacetic acid and then staining it, two fractions, acid-soluble and acid-insoluble can be found
Flavonoids and alkaloids all secondary metabolites, which are not present in acid insoluble fraction

198 **(a)**
X-axis represents temperature while Y-axis represent enzyme activity. All enzymes act at an optimum temperature, above and below this temperature, the enzyme activity declines.

199 **(b)**
Each enzyme [E] has a substrate [S] binding site in its molecule so that a highly reactive enzyme substrate complex [ES] is produced. This complex is short lived and dissociates into its product and the unchanged enzyme with an intermediate formation of the enzyme product complex [EP]
The formation of the ES complex is essential for catalysis
$E + S \rightleftharpoons Es \longrightarrow E - P \longrightarrow E + P$

200 **(a)**
All statements are incorrect. Metabolism is features of living beings. During the process of metabolism, the organic molecules are being broken down and build up through the series of chemical reactions. The new product produced during the metabolism are termed as metabolism are termed as metabolite

201 **(c)**
Starch, glycogen, cellulose, chitin, etc. are homoglycans (glucans) containing only glucose units. Homoglycans are the polysaccharides having only one type of monosaccharide units in them.

202 **(c)**
There is no uncatalysed metabolic conversion in living systems. Even CO_2 dissolving in water, a physical process, is a catalysed reaction in living system

203 **(a)**
Vinblastin and curcumin are used as drugs

204 **(c)**
Enzymes are most functional at the temperature range of $30° - 50°C$

205 **(d)**
Catalyzed reactions.
There is no uncatalysed metabolic conversion in living systems. Even CO_2 dissolving in water, a

physical process, is a catalysed reaction in living systems

206 **(c)**
In humans and most other mammals, acetyl C0-A formed in liver during oxidation of fatty acids, can enter the citric acid cycle for production of energy or can be converted to ketone bodies, *e. g.*, acetone, acetoacetate and betahydroxy butyric acid.

208 **(b)**
Adenylic acid is not a nucleoside, it is a nucleotide

209 **(c)**
Glucose is degraded into lactic acid in skeletal muscles by a catabolic process as energy is liberated
Assembly of a protein from amino acids requires energy and hence, it is an anabolic process

210 **(d)**
All statement are correct

211 **(c)**
The chemical and physical properties of amino acids are essentially of the amino, carboxyl and the *R* functional groups. Based on number of amino and carboxyl groups, these are acidic (*e. g.*, glutamic acid) and, basic (*e. g.*, lysine) neutral (*e. g.*, valine amino acids).

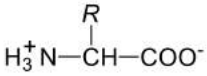
212 **(a)**
On the surface of enzyme, there are several sites for binding substrate molecules called active sites. It is lined by approximately 20 amino acids.

213 **(d)**
Collagen is the most abundant protein in animal world and Ribulose bisphosphate carboxylase-oxygenase (RUBISCO) is the most abundant protein in the whole of the biosphere.

214 **(b)**
Monosaccharides are simple sugars with empirical formula $C_n(H_2O)_n$ and containing 3-7 ccarbon, *ie.*, trioses (3C), tetroses (4C), pentoses (5C) and hexoses (6C).

215 **(a)**
Primary structure of proteins is due to the present of peptide bond

216 **(c)**
A form of amino acid with both positive and negative charges simultaneously in the same molecule is called twitter ionic form



217 **(a)**
Removal of an amino group ($-NH_2$) frequently from an amino acid by transaminase enzyme is known as **deamination**. In mammals, deamination occurs chiefly in the liver.

218 **(b)**
Cofactors are non-proteinaceous constituents of conjugated enzyme which are associated with proteinaceous apoenzyme. These are divided into three categories.

1. **Prosthetic Groups**: Organic compound tightly bound to apoenzyme.
2. **Coenzyme**: Organic in nature and bound to apoenzyme at the time of course of action.
3. **Metal Ions**: Inorganic in nature.

219 **(b)**
System at equilibrium cannot perform work. As living organisms work continuously, they make a constant effort to prevent falling into equilibrium

220 **(d)**
Chemical compounds that have molecular weightless than one thousand Dalton are usually referred to as biomolecules or micromolecules

221 **(d)**
Cellulose is the most important structural component of the cell wall of plants. It is a linear polymer of $\beta - D$ glucose units connected through $\beta - 1, 4$-glycosidic linkage. The linear chains form microfibrillae or bundles of parallel chains held together by hydrogen bonds.

222 **(c)**
The covalent bond by which monosaccharide molecules link in polymerization is called a **glycosidic bond**. In a glycosidic linkage, the **aldehyde** or **ketone** part of one monosaccharide molecule condenses with an

alcoholic group of another monosaccharide molecule, releasing a molecule of water.

224 **(a)**
Isonzymes (isoenzymes) are different forms of an enzyme, which catalyse the same reaction but possess different kinetic properties and different amino acid composition.

225 **(d)**
The chemical reactions which liberate energy by enzymatic oxidation of food stuffs to CO_2 and H_2O in the tissues are referred to as the energy metabolism or respiratory metabolism

226 **(b)**
In given graph, initial rate of enzymatic reaction increases but after sometime began to show down due to presence of an enzyme inhibitor.

227 **(d)**
$A = 1 - 4\alpha$-glycosidic bonds, $B = 1 - 6\alpha$-glycosidic binds

228 **(a)**
Glucose ($C_6H_{12}O_6$) is an organic compound (carbohydrate), which is found in most of the cells.

229 **(d)**
Homopolysaccharides are composed of monosaccharide molecule of a single type. They include three biologically important substances: glycogen, starch and cellulose

230 **(c)**
At high temperature, enzymes present in the body gets destroyed

231 **(c)**
Enzymes are biocatalyst, which are basically proteins. All enzymes are proteins but all proteins are not enzymes.

232 **(c)**
A and G of one strand compulsorily base pairs with T and C, respectively, on the other strand. There are two hydrogen bonds between A and T and three H-bonds between G and C

233 **(c)**
Chitin is a heteropolymer

234 **(a)**
Ribozymes are RNA molecules that are capable of performing specific biochemical reactions. They play very important role is therapeutic agents

235 **(c)**
In children, among twenty two amino acids, a total of **ten amino acids** are essential amino acids *viz*. leucine, isoleucine, valine, tryptophan, phenylalanine, lysine, methionine and three additional as threonine, arginine, histidine.

236 **(a)**
In the figure given in question, curve *a* shows normal enzyme reaction while curve *b* shows a competitive inhibition reaction, in which competitive that resemble the substrate molecules, bind to the active site of the enzyme, whereas curve *c* shows non-competitive inhibition reaction, in which the inhibitor binds to a part of the enzyme or enzyme substrate complex, other than the active site, known as the allosteric site.

237 **(c)**
Trisaccharides are composed of three monosaccharides. **Raffinose** is a common trisaccharide found in plant. On hydrolysis, it yields one molecule each of glucose, fructose and galactose.

238 **(d)**
Polysaccharides are branched or unbranched polymer of monosaccharides. Homopolysaccharides contain a single type of monomers, *e.g.*, starch, glycogen, cellulose, etc.

239 **(c)**
Outermost layer of endosperm in cereals such as maize is known **as aleurone layer**. This layer is consisted of aleurone grains. Each grain is surrounded by a single unit membrane layer. Aleurone grains contain protein, phytin, phospholipids and carbohydrate.

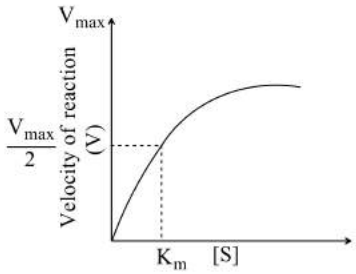
241 **(b)**
Ribozymes are RNA molecules that functions as biocatalysts in modern cells

242 **(a)**
Amino acids which occurs in proteins are mainly of 21 types

243 **(c)**
When enzyme molecules are more than substrate molecules, a progressive increase in the substrate

molecules (s), increases the velocity (v) of their conversion to products

However, eventually the rate of reaction reaches a maximum. At this stage, the active sites of all the available enzyme molecules are occupied by the substrate molecules. Therefore, the substrate molecules occupy the active sites vacated by the products and cannot increase the rate of reaction further



244 **(c)**

The enzymes lower the requirement of activation energy for catalyzing a reaction and these are least affected by the original activation energy of the system. Enzymes are thermolabile. Increase in substrate concentration or enzyme concentration increases the rate of reaction.

245 **(d)**

In fluorescence microscopy, the object is stained with a fluorescent substance and when stained cell or all parts are observed through ordinary microscope using UV light, appear as luminous objects. This technique is helpful to show the fluidity of biomembranes.

246 **(a)**

Michaelis and **Menten** in 1913 gave a mathematical expression to an enzyme catalyzed reaction. The equation is commonly called the Michaelis equation.

247 **(a)**

Insulin is a polymer of fructose

248 **(a)**

In cell contents, the approximate percentage of proteins is 12%

249 **(a)**

Radiation inactivates enzyme by destroying the tertiary structure of enzyme

250 **(d)**

Carbonic anhydrase is found in red blood cells. This is the fastest acting enzyme and helps in the formation as well as decomposition of carbonic acid to carry carbon dioxide.

251 **(a)**

The most important form of energy currency in living organism is the bond energy in the chemical called ATP

252 **(a)**

Classical example of competitive inhibiton is reduction of activity of succinate dehydrogenase by malonate, oxaloacetate and other anions.

253 **(b)**

Based on number of amino and carboxyl groups, amino acids are acidic (*e.g.*, glutamic acid), basic (lysine) and neutral (valine)

254 **(c)**

Sodium chloride is formed by bonding between positively charged sodium ions (Na^+) and negatively charged chloride ions(Cl^-). The type of bonding between these ions is ionic bonding as ionic bonds are formed by the electrical attractions between ions bearing opposite charges ($eg.$,Na^+ and Cl^-).

255 **(c)**

Enzyme inhibition caused by a product of enzyme catalyzed reaction is allosteric modulation or feedback inhibition. Thus, products of reaction inhibits the enzyme action, *e. g.*, glucose-6-phosphate, the end product in glycolysis, can inhibit hexokinase activity.

256 **(d)**

Cholesterol is considered as a crucial molecule in animals because it is the source of many vertebrate hormones and other steroids

257 **(a)**

Many enzymes show enzymatic (catalytic) activity only in association with certain non-protein substance. Such substances are called cofactor. Apoenzyme is the proteinaceous substance that combines with prosthetic group to form holoenzyme

258 **(d)**

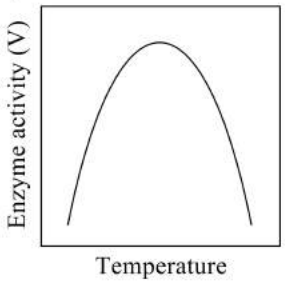
In 1953, **James Wateson** and **Francis Crick** based on the X-ray diffraction data produced by **Maurice, Wilkins** and **Rosalind Franklin**,

proposed a very simple but famous double helix model for the structure of DNA.

260 **(d)**
Generally, 3-7 carbon atoms take part in the formation of monosaccharides

261 **(b)**
Enzyme catalysts differ from inorganic catalysts in many ways, but one major difference is that inorganic catalysts work efficiently at high temperatures and high pressures, while enzymes get damaged at high temperatures (say above 40°C). However, enzymes isolated from organisms who normally live under extremely high temperature (*e. g.*, hot vents and sulphur springs), are stable and retain their catalytic power even at high temperatures (up to 80-90°C). Thermal stability is thus, an important quality of such enzymes isolated from thermophilic organisms

262 **(c)**
Enzymes generally function in a narrow range of temperature. Each enzyme shows its highest activity at a particular temperature, called the optimum value



Low temperature preserves the enzyme in a temporarily inactive state whereas high temperature destroys enzymatic activity because proteins are denatured by heat

263 **(c)**
Malonate inhibits succinate dehydrogenase is an example of competitive inhibition, which closely resembles the substrate succinate in structure. Such competitive inhibitors are often used in the control of bacterial pathogens

264 **(c)**
Sucrose has different linkage. It consists of 1, D-glucose and 1, D-fructose units jointed by $\alpha - 1,2 -$ glycosidic linkage.

265 **(d)**
Albumins are the simple proteins soluble in water and dilute salt solutions are heat-coagulable. The common albumins are leucosin (from wheat), ricin (from caster seeds), legumelin (from legume seeds), β-amylase from barley and albumin from egg white.

266 **(b)**
Rate of a physical or chemical process refers to the amount of product formed per unit time. It can be expressed as

$$\text{Rate} = \frac{\delta P}{\delta t}$$

Rate can also be called velocity if the direction is specified. Rates of physical and chemical processes are influenced by temperature among other factors. A general rule of thumb is that rate doubles or decreases by half for every 10°C change in either direction. Catalysed reactions proceed at rates vastly higher than that of uncatalysed ones. When enzyme catalysed reactions are observed, the rate would be vastly higher than the same but uncatalysed reaction

267 **(a)**
Lyases catalyse the breakage of specific covalent bonds and removal of groups without hydrolysis. Example histidine decarboxylase splits C – C bonds of histidine forming CO_2 and histamine

268 **(d)**
Coenzymes are loosely attached non-protein low molecular weight thermostable organic groups, which readily separate from the apoenzyme, *e. g.*, NAD (Nicotinamide Adenine Dinucleotide), NADP (Nicotinamide Adenine Dinucleotide Phosphate), FAD, FMN, Co-A, TPP (Thiamine Pyrophosphate), lipoic acid, etc. **ATP** (Adenosine Triphosphate) is the common energy currency of all cells.

269 **(b)**
Palindromic DNA Satellite DNA part of DNA having long stretches of repetitive base pairs
Non-coding DNA Greater part of DNA is eukaryotic cells does not code for RNAs. This 'extra' DNA seems to have no function. It has two special forms
(i) Repetitions DNA
(ii) Jumping genes

270 **(c)**
Functional form of enzymes is known as **holoenzyme**. It consists of a proteins part known as apoenzyme and non-protein part

called prosthetic group (coenzyme of a metal ion).

271 **(a)**
All are correct

272 **(d)**
Lactose or milk sugar is reducing sugar formed through β, 1 → 4 condensation between galactose and glucose.

273 **(a)**
Holoenzyme is an entire conjugated enzyme consisting of a protein component (an apoenzyme) and a non-protein component (a coenzyme or an activator).

274 **(a)**
There is a common feature to all the compounds found in the acid soluble pool. They have molecular weights ranging from 18 to around 800 dalton (Da) approximately

275 **(a)**
All statements are correct