BIOMOLECULES

1. Identify the correct statement regarding enzymes
   a) Enzymes are specific biological catalysts that can normally function at very high temperatures ($T \sim 1000$ K)
   b) Enzymes are normally heterogeneous catalysts that are very specific in their action
   c) Enzymes are specific biological catalysts that cannot be poisoned
   d) Enzymes are specific biological catalysts that possess well defined active sites
2. Which statement is not correct for an enzyme?
   a) It acts as a biocatalyst
   b) Its aqueous solution is colloidal
   c) It can catalyse any chemical reaction
   d) Its catalytic efficiency is temperature dependent
3. The vector for genetic code is called
   a) Messenger RNA b) Transfer RNA c) Ribosomal RNA d) Viral DNA
4. Vitamin A is also known as:
   a) Xerophythol b) Thiamine c) Riboflavin d) Pyridoxine
5. Fructose is prepared commercially by...a polysaccharide which occurs in dahlia tubers and Jerusalem arthichokes.
   a) Inulin b) Cellulose c) Lactose d) None of these
6. Sugars are characterized by the preparation of osazone derivatives. Which sugar have identical osazones?
   a) Glucose and lactose
   b) Glucose and fructose
   c) Glucose and arabinose
   d) Glucose and maltose
7. Which one of the following is an example of a non-reducing sugar?
   a) Sucrose b) Lactose c) Maltose d) Cellobiose
8. Epimers are pair of diastereoisomeric aldoses which differ only in configuration at position:
   a) C_5 b) C_2 c) C_4 d) C_3
9. Which one of the following compounds is not a vitamin?
   a) Ascorbic acid b) Thiamine c) Testosterone d) Riboflavin
10. The presence or absence of hydroxyl group on which carbon atom of sugar differentiates RNA and DNA?
    a) 1^{st} b) 2^{nd} c) 3^{rd} d) 4^{th}
11. Turpentine oil is obtained from:
    a) Oak tree b) Pine tree c) Birch tree d) Lemon tree
12. Protein gives blue colour with
    a) Benedict reagent b) Iodine solution c) Ninhydrin d) Biurete
13. The red colouring matter of blood which transport oxygen contains an element in a system of rings. The element is:
    a) Iron b) Magnesium c) Cobalt d) Calcium
14. Proteins are
    a) Polypeptides with low molecular weights b) Polypeptides with high molecular weights
    c) Polymers of amides d) Polymers of secondary amines
15. A substance forms Zwitter ion. It can functional groups

a) $-NH_2, -COOH$ b) $-NH_2, -SO_3H$ c) Both (a) and (b) d) None of these

16. A chemical substance acts as the currency of energy metabolism in a cell. It is:
    a) Adenosine triphosphate
    b) Adenosine diphosphate
    c) Adenosine monophosphate
    d) Glucose
17. Artificial sweetner used in soft drinks is:
    a) Glucose b) Fructose c) Cellulose d) Asparatame
18. DNA multiplication is called
    a) Translation b) Transduction c) Transcription d) Replication
19. Which of the following is the first member of monosaccharides?
    a) $CH_2OH-\overset{\overset{O}{\|}}{C}-CH_2OH$
    b) $CH_2OH-CHOH-CHO$
    c) $CH_2OH-CHOH-CHOH-CHO$
    d) $CH_2OH-CHOH-\overset{\overset{O}{\|}}{C}-CH_2OH$
20. Which is not a reducing sugar?
    a) Glucose b) Fructose c) Mannose d) Sucrose
21. Fats and oils are formed from:
    a) Glycerol and long chain unsaturated acids only
    b) Glycerol and long chain saturated acids only
    c) Glycerol and long chain saturated and unsaturated acids
    d) Ethylene glycol and long chain saturated and unsaturated acids
22. A solution of D-glucose in water rotates the plane of polarized light
    a) To the left b) To the right c) To either side d) None of these
23. Ordinary soaps are defined as:
    a) Al salts of higher fatty acids
    b) Na salts of lower fatty acids
    c) Na salts of higher fatty acids
    d) Mg salts of lower fatty acids
24. Cellulose is a linear polymer of:
    a) α-glucose b) β-glucose c) α-fructose d) None of these
25. Cofactors (non-proteinic prosthetic groups) used to bond conjugated proteins are:
    a) Carbohydrates b) Phosphoric acid c) Iron pigments d) All are correct
26. Genetic code determines
    a) Sequence of amino acids in a peptide chain
    b) Sequence of variable amino acids in a protein chain
    c) Structure of human cells
    d) Morphology of traits
27. Acetone may be obtained from starch by the action of :
    a) Acid b) Bacteria c) Oxidizing agent d) None of these
28. Fat on hydrolysis gives which alcohol?
    a) Glycerol b) Propanol c) Butanol d) Ethanol
29. Which one of the following sets of monosaccharides forms sucrose?
    a) β-D-Glucopyranose and α-D-fructofuranose
    b) α-D-Glucopyranose and β-D-fructopyranose
    c) α-D-Galactopyranose and α-D-Glucopyranose
    d) α-D-Glucopyranose and β-D-fructofuranose
30. Simple proteins bonded with a non-proteinic prosthetic group (acting as cofactor) are called:
    a) Simple proteins b) Conjugated proteins c) Proteonic proteins d) None of these

31. Glucose is hydrolysed by zymase into
a) Amino acids b) Alcohol c) Aromatic acids d) Dicarboxylic acid
32. A carbohydrate is treated with α −naphthol and conc. H_2SO_4. What colour will be formed at the junction of two liquids?
a) Blood-red b) Violet c) Brown d) Orange
33. Which of the following test is not used for testing of proteins?
a) Millon's test b) Molish's test c) Biuret test d) Ninhydrin test
34. In biological systems, the RNA molecules direct the synthesis of specific proteins which are characteristics of each kinds of organism. This process is known as
a) Transcription b) Mutation c) Replication d) Translation
35. Galactose is converted into glucose in
a) Mouth b) Stomach c) Liver d) Intenstine
36. A sequence of how many nucleotides in messenger RNA makes a codon for an amino acid?
a) Three b) Four c) One d) Two
37. The segment of DNA which acts as the instrumental manual for the synthesis of the protein is:
a) Nucleoside b) Nucleotide c) Ribose d) Gene
38. Which vitamin contains N?
a) Vitamin A b) Vitamin C c) Vitamin B d) Vitamin D
39. All protein are
a) Simple b) Biocatalysts c) Useful d) Polymers
40. Iodine test is shown by
a) Glucose b) Starch c) Glycogen d) Polypeptide
41. Glucose reacts with acetic anhydride to form:
a) Monoacetate b) Tetra acetate c) Penta acetate d) Hexa acetate
42. Fats and oils belong to the class of:
a) Alcohols b) Acids c) Esters d) Hydrocarbons
43. The function of DNA is:
a) To synthesize RNA
b) To synthesize the necessary proteins
c) To carry the hereditary characteristics from generation to generation
d) All are correct
44. The enzyme present in saliva is:
a) Pepsin b) Peptidase c) Lipase d) Ptyalin
45. On heating with conc. H_2SO_4 sucrose gives:
a) CO and CO_2 b) CO and SO_2 c) CO, CO_2 and SO_2 d) None of these
46. DNA has deoxyribose, base and the third compound is:
a) Phosphoric acid b) Ribose c) Adenine d) Thymine
47. To which of the following classes of organic compounds soap belongs?
a) Esters b) Amines c) Salts of organic acids d) Aldehydes
48. An organic compound consumes 4 moles of periodic acid to form following compounds, per mole of the starting compounds HCHO, 3HCOOH and CHOCOOH. The organic compound is
a) Glucose b) Fructose c) Gluconic acid d) Sorbitol
49. Which does not contain carbohydrate?
a) Cellulose b) Wax c) Starch d) Wheat flour
50. Waxes are esters of
a) Glycerol b) Long chain alcohols
c) Glycerol and fatty acid d) Long chain alcohols and long chain acids
51. Nucleic acids are:
a) Polymers of nucleotides
b) Polymers of nucleosides

c) Polymers of purine bases through phosphate ester bonds
d) Phosphate ester bonds

52. Lactose has the same molecular formula as:
a) Glucose b) Maltose c) Sucrose d) Lactose

53. Which is an amino acid?
a) Glycine b) Valine c) Lysine d) All of these

54. Glycogen on hydrolysis gives:
a) Starch b) Amylopectin c) Amylose d) Glucose

55. An enzyme is formed by chemically bonding together
a) Lipases b) Amino acids
c) Carbohydrates d) Vitamins of B complex group

56. Glucose with excess of phenyl hydrazine forms:
a) Fructosazone
b) Glucose phenyl hydrazone
c) Glucosazone
d) Phenyl hydrazone of glucosazone

57. Animal starch is the name given for:
a) Glycogens b) Lactogens c) Cellulose d) None of these

58. Fructose or ketohexose contains:
a) 5 —OH groups
b) 3 secondary alcoholic groups
c) 2 primary alcoholic gps. And one keto gp.
d) All of the above

59. A mixture of amylose and amylopectin is called
a) Lactose b) Starch c) Cellulose d) Sucrose

60. Protein can be most easily removed by:
a) Alkanes b) Alkenes c) Alkynes d) Benzene

61. Dextrins $(C_6H_{10}O_5)_n$ are used in:
a) Making adhesive b) Confectionary c) Sizing paper d) All of these

62. Aqueous solution of carbohydrate with 2 drops of alcoholic solution of α-naphthol and H_2SO_4 gives a ring at the junction. The colour of the ring is:
a) Yellow b) Green c) Violet d) Red

63. The catalyst used in the hydrogenation of oils into fats is:
a) V_2O_5 b) Fe c) Ni d) Pt

64. Which one is absent in protein?
a) C b) N c) S d) P

65. The energy change produced by the combustion of foods is called the 'calorific value'. The best calorific value is given by:
a) Proteins b) Fats c) Carbohydrates d) Vitamins

66. Which of the following is not a classification of proteins?
a) Enzymes b) Antibiotics c) Antigens d) Hormones

67. Commercial detergents contain mainly:
a) RONa b) RCOONa c) $ROSO_3Na$ d) $ROCH_2CHORCH_2OR$

68. Monosaccharides usually contain:
a) 3 to 8 carbon atoms b) 5 to 8 carbon atoms c) 2 to 10 carbon atoms d) 6 to 10 carbon atoms

69. In aqueous solution glucose remains as
a) Only in open chain form b) Only in pyranose form
c) Only in furanose forms d) In all three forms in equilibrium

70. Glucose forms many derivatives. The derivative which will help to prove the furanose structure is:
a) Osazone b) Benzoyl c) Acetyl d) Isopropylidene

71. An example of a sulphur containing amino acid is
a) Lysine b) Serine c) Cysteine d) Tyrosine
72. What happens when drying oils are exposed to light and moist air?
a) Polymerization b) Fermentation c) Hardening d) Isomerization
73. Which one is not a protein?
a) Actin b) Collagen c) Albumin d) Haematin
74. Which of the following hormones helps in the conversion of glucose into glycogen in the body?
a) Insulin b) Cortisone c) Thyroxin d) Oxytocin
75. Formation of amylene oxide ring in glucose is an indication that ring in glucose is at:
a) C_1 and C_5 b) C_2 and C_5 c) C_3 and C_6 d) C_2 and C_4
76. Oils are:
a) Phospholipids b) Liquid fats c) Steroids d) All of these
77. Glucose contains in addition to aldehyde group
a) One secondary OH and four primary OH group
b) One primary OH and four secondary OH group
c) Two primary OH and three secondary OH group
d) Three primary OH and two secondary OH group
78. The total number of C-atoms in β-D fructofuranose are:
a) 6 b) 5 c) 4 d) 7
79. Bleeding gums are caused by deficiency of:
a) Thiamine b) Ascorbic acid c) Folic acid d) Vitamin E
80. Which is false
a) Glucose is a disaccharide b) Starch is a polysaccharide
c) Glucose and fructose are not anomers d) Invert sugar consists of glucose and fructose
81. Vitamin B_6 is known as
a) Pyridoxin b) Thiamine c) Tocopherol d) Riboflavin
82. Which is insoluble in water?
a) Glucose b) Cellulose c) Fructose d) Sucrose
83. The antibodies necessary to protect new born babies from infection are derived from:
a) Cow's milk b) Pasteurised milk c) Mother's milk d) Honey
84. The element present in traces in insulin is:
a) Iron b) Cobalt c) Zinc d) Magnesium
85. Adenosine is an example of:
a) Nucleotide b) Nucleoside c) Purine base d) Pyrimidine base
86. Which of the following statements is incorrect?
a) Two polynucleotide chains pointing in opposite directions are coiled to form a double helix
b) Both helixes are right handed
c) The helixes have ten nucleotides in each turn
d) The two chains are not complementary to each other
87. The chemical messengers produced in ductless glands are:
a) Vitamins b) lipids c) Antibiotics d) Hormones
88. The tripeptide hormone present in most living cells is
a) Glutathione b) Glutamine c) Oxytocin d) Ptyalin
89. The chemical change in DNA molecule that could lead to synthesis of protein with an altered amino acid sequence is called
a) Replication b) Lipid formation c) Cellular membrane d) Mutation
90. Calciferol is
a) Vitamin b) Antibiotic c) Hormone d) Antipyretic
91. Keratin, a structural protein is present in:
a) Hair b) Skin c) Wool d) All of these

92. The letter 'D' in carbohydrates represents:
a) Its direct synthesis b) Its dextrorotation c) Its mutarotation d) Its configuration

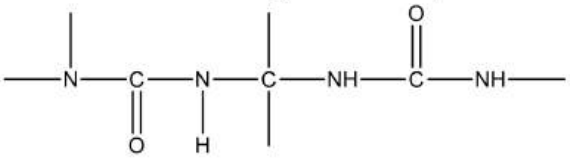
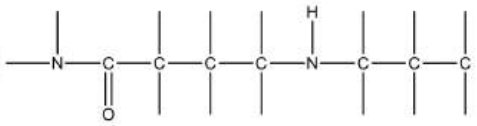
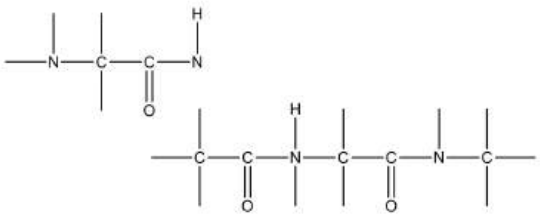
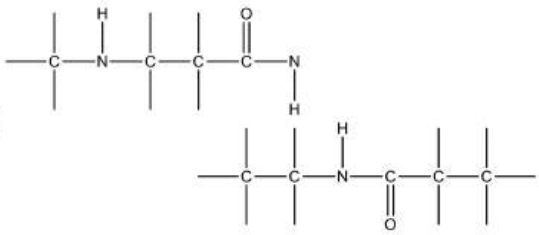
93. The reason for double helical structure of DNA is operation of
a) Van der Waals' forces b) Dipole –dipole interaction
c) Hydrogen bonding d) Electrostatic attractions

94. The two functional group present in a typical carbohydrate are
a) —OH and — COOH b) —CHO and —COOH c) >C= O and —OH d) —OH and —CHO

95. The compound, which give a positive ninhydrin test and a negative Benedict's solution test, is
a) A monosaccharide b) A disaccharide c) A lipid d) A protein

96. The change in the optical rotation of freshly prepared solution of glucose is known as
a) Tautomerism b) Racemization c) Specific rotation d) Mutarotation

97. Which one of the following structure represents the peptide chain?

a) 
b) 
c) 
d) 

98. Water insoluble component of starch is
a) Amylopectin b) Amylose c) Cellulose d) None of these

99. Which one of the given proteins transports oxygen in the blood stream?
a) Myoglobin b) Insulin c) Albumin d) Haemoglobin

100. Oxygen, necessary for life on earth was formed in atmosphere as a result of:
a) Eradication of ozone
b) Photosynthesis
c) Electric discharge on water
d) None of the above

101. Which of the following is ketohexose?
a) Glucose b) Sucrose c) Fructose d) Ribose

102. Which of the following enzymes hydrolysis starch to glucose?
a) Amylase b) Invertase c) Lactase d) Maltase

103. Which one is a phospholipid?
a) Lecithin b) Cephalin c) Kephalin d) All of these

104. Hydrolysis of fats and oils yield:
a) Dihydride alcohol b) Trihydric alcohol c) Esters d) Unsaturated acids

105. RNA contains
a) Ribose sugar and thymine b) Ribose sugar and uracil
c) Deoxyribose sugar and uracil d) Deoxyribose sugar and thymine

106. Starch is changed into disaccharides in presence of:
a) Diastase b) Maltase c) Lactase d) zymase

107. Cane sugar on hydrolysis yields:
a) Glucose and maltose b) Glucose and lactose c) Glucose and fructose d) Only glucose

108. The colour of the precipitate formed when a reducing sugar is heated with Fehling's solution is:
a) Brown b) Red c) Blue d) Green

109. Invert sugar is:

a) Chemically inactive form of sugar
b) Equimolecular mixture of glucose and fructose
c) Mixture of glucose and sucrose
d) A variety of cane sugar

110. Consider the following reagents
I. Br_2 water II. Tollen's reagesnt
III. Fehling's solution
Which can be used to make distinction between an aldose and a ketose?
a) I, II and III b) II and III c) I only d) II only

111. Which one of the following vitamins contains a metal atom?
a) Riboflavin b) Vitamin B_{12} c) Vitamin A d) Vitamin B_6

112. Carbohydrate contains:
a) $-OH$ gp. b) $-CHO$ gp c) $>CO=O$ gp. d) All of these

113. Which is used for making rayon (artificial silk)?
a) Starch b) Cellulose c) Terephthalic acid d) Adipic acid

114. Which carbohydrates is as important as steel and is employed in manufacture of many articles in daily use as well as most abundant in nature?
a) Cellulose b) Glucose c) Starch d) Sucrose

115. Glucose gives silver mirror with ammoniacal silver nitrate because it has
a) Aldehyde group b) Ester group
c) Ketone group d) Alcoholic silver nitrate

116. Aleurone grains are
a) Starch b) Glycogen c) Lipid d) Protein

117. The number of disulphide linkage present in insulin are
a) 1 b) 2 c) 3 d) 4

118. Which are not the essential constituents of balanced diet?
a) Carbohydrates b) Fats c) Proteins d) Hormones

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

120. The number of milligram of KOH required to neutralise l g of the oil or fat is called:
a) Saponification value b) Iodine value c) Acetyl value d) Acid value

121. The destruction of the biological nature and activity of proteins by heat or chemical agent is called:
a) Dehydration b) Denaturation c) Denitrogenation d) Deamination

122. Glucose and mannose are
a) Epimers b) Anomers c) Ketohexoses d) Disaccharides

123. The hormone thyroxine:
a) Is secreted by pancreas
b) Is secreted by thyroid
c) Decreases blood sugar
d) Does not stimulate metabolism

124. Although D-galactose rotates plane-polarised light, its oxidation product, galactaric acid, due to HNO_3, does not. It is due to
a) Galactaric acid is racemic mixture of D- and L-isomer b) Galactaric acid is a *meso* compound
c) Both are correct d) None of the above is correct

125. Which of the following vitamins is present in cod-liver oil?

a) A b) B_{12} c) B_1 d) C

126. Glucose molecule reacts with 'X' number of molecules of phenyl hydrazine to yield osazone. The value of 'X' is
a) Four b) One c) Two d) Three

127. Diabetes is detected, using ..... for testing urine of patients.
a) Fehling 's solution b) Tollen's regent c) Benedict's solution d) Baeyer's reagent

128. A nanopeptide contains ..... peptide linkages.
a) 10 b) 8 c) 9 d) 18

129. The pH value of a solution in which a polar amino acid does not migrate under the influence of electric field is called:
a) Isoelectronic point b) Isoelectric point c) Neutralization point d) None of these

130. Cellophane is made from:
a) Cellulose b) Phenol c) Gum d) Petroleum

131. The letter 'D' in D-glucose signifies
a) Configuration at all chiral carbons b) Dextrorotatory
c) That it is a monosaccharide d) Configuration at a particular chiral carbon

132. The number of asymmetric carbon atoms in fructose are:
a) 2 b) 3 c) 4 d) 5

133. Which of the following compounds can be detected by Molisch's test?
a) Sugars b) Amines c) Primary alcohols d) Nitro compounds

134. Vitamin which is believed to cure common cold is:
a) A b) C c) K d) E

135. The store house for all biological information is:
a) RNA b) m-RNA c) DNA d) None of these

136. Which of the following compounds is known as the antisterility factor?
a) α −tocopherol b) Retinol c) Calciferol d) Pyridoxine

137. Which amino acid has imidazole ring?
a) Alanine b) Leucine c) Tyrosine d) Histidine

138. DNA molecule consists of units of:
a) Base-sugar
b) Base-sugar-phosphate
c) Base-phosphate
d) None of these

139. On fermentation, glucose yields
a) Ethanol b) Ethanal c) Acetic acid d) Fructose

140. In DNA, the complementary bases are,
a) Adenine and thymine; guanine and cytocine
b) Uracil and adenine; cytocine and guanine
c) Adenine and guanine; thymine and cytocine
d) Adenine and thymine; guanine and uracil

141. Iodised salt prevents .....
a) TB b) Anaemia c) Goiter d) Beri-beri

142. Nucleotide pairs present in one turn of DNA helix
a) 4 b) 10 c) 8 d) 9

143. Which of the following is not an amino acid?
a) Glycine b) Alanine c) Histidine d) Benzidine

144. Proteins mainly contain:
a) C, H, O and N b) Only C and H c) C, H and O d) N and H

145. The two forms of D-glucopyranose obtained from the solution of D-glucose are called
a) Isomer b) Anomer c) Epimer d) Enantiomer

146. Raffinose is
a) Trisaccharide b) Disaccharide c) Monosaccharide d) Polysaccharide
147. A saturated fatty acid found in oils and fats is:
a) Palmitic acid b) Linolenic acid c) Oleic acid d) Linoleic acid
148. The enzyme that hydrolyses casein of milk into par casein is:
a) Renoline b) Rennin c) Replication d) Renil
149. Which of the following is a fat soluble vitamin?
a) Vitamin A b) Riboflavin c) Pyridoxine d) Thiamine
150. The enzyme pepsin hydrolyses
a) Proteins to amino acids b) Fats to fatty acids
c) Glucose to ethyl alcohol d) Poloysaccharides to monosaccharides
151. Hydrolysis of fats and oils in the body produces:
a) A fatty acid b) Carbon dioxide c) A lipase d) An ester
152. Deoxyribonucleic acid (DNA) is a polymer of units called:
a) Sugars b) Ribose c) Amino acids d) Nucleotides
153. Scurvy is caused due to deficiency of :
a) Vitamin B_1 b) Vitamin B_2 c) Ascorbic acid d) Glutamic acid
154. Glycogen and amylopectin have:
a) Same structure
b) Similar structure but differ in branching of glucose chain
c) Similar structure but differ in their solubility in water
d) Same structure but they are stored in different parts of the body
155. Lactose on hydrolysis yields:
a) Two glucose molecules
b) Two galactose molecules
c) A galactose and fructose molecule
d) A galactose and a glucose molecule
156. Glycogen is:
a) Monosaccharide b) Disaccharide c) Trisaccharide d) Polysaccharide
157. Ribose sugar is a component of:
a) DNA b) RNA c) Glucose d) Wax
158. Which one of the following is a non-steroidal hormone?
a) Estradiol b) Prostaglandin c) Progesterone d) Estrone
159. It is best to carry out reactions with sugars in neutral or acid medium not in alkaline medium. This is because in alkaline medium sugar undergoes one of the following changes:
a) Decomposition b) Inversion c) Rearrangement d) Racemization
160. Which is not characteristic of soap?
a) They are colourless when pure
b) They are lighter than water
c) They are immiscible with organic solvents
d) They form emulsions with water
161. Which of the following vitamins contains isoprene unit?
a) A b) C c) B_2 d) D
162. Give the pOH range for the isoelectric point of the amphoteric ion of an amino acid
a) 5.5 to 6.3 b) 2.5 to 5.0 c) 7.7 to 8.5 d) 9.0 to 10.7
163. Wool-wax contains:
a) Fatty acid ester b) Paraffin wax c) Cholesterol ester d) None of these
164. Which one is the complimentary base of adenine in one strand to that in the other strand of DNA?
a) Cytosine b) Guanine c) Uracil d) Thymine
165. The helical structure of protein is stabilized by

a) Dipeptide bonds b) Hydrogen bonds c) Ether bonds d) Peptide bonds

166. The sweetest carbohydrate is
a) Sucrose b) Glucose c) Fructose d) Lactose

167. Cane sugar is made of:
a) 5 membered glucose ring and 5 membered fructose ring
b) 6 membered glucose ring and 6 membered fructose ring
c) 6 membered glucose ring and 5 membered fructose ring
d) 6 membered glucose ring and 6 membered fructose ring

168. Blood protein is:
a) Albumin b) Haemoglobin c) Both (a) and (b) d) None of these

169. Casein contained in milk as a
a) Carbohydrate b) Lipid c) Protein d) Important molecule

170. Which of the following statement (s) is/are true?
(i) All amino acids contain one chiral centre
(ii) Some amino acids contain one, while some contain more chiral centre or even no chiral centre
(iii) All amino acids in protein have L-configuration
(iv) All amino acids found in proteins have 1° amino group
a) (ii), (iii)and (iv) b) (ii) and (iii) c) (i), (iii) and (iv) d) (i) and (iv)

171. Which is not a member of vitamin B complex group?
a) Retinol b) Thiamine c) Riboflavin d) Pyridoxine

172. How many hydrogen bonds are present between pair of thymine and adenine in DNA?
a) 1-hydrogen bond b) 2- hydrogen bond c) 3-hydrogen bond d) No bonds occur

173. The term LABS abbreviates as:
a) Laboratory
b) Lauryl acidic benzene sulphate
c) Linear alkyl benzene sulphonate
d) None of the above

174. Glucose cannot be classified as:
a) A hexose b) A carbohydrate c) An oligosaccharide d) An aldose

175. The organic compounds of high physiological importance which are essential in small amounts for the well being of all human beings are:
a) Proteins b) Vitamins c) Mineral salts d) Enzymes

176. Protein is an important constituent of our diet. It functions mainly as:
a) A sources of energy b) Construction material c) Shock absorber d) Reserve food

177. Which statement about ribose is incorrect?
a) A polyhydroxy compound
b) An aldehyde sugar
c) Has six carbon atoms
d) Exhibits optical activity

178. During hydrogenation of oils, higher melting point 'vegetable ghee' is formed because:
a) Hydrogen is dissolved in the oil
b) Hydrogen combines with oxygen of the oil
c) Esters of unsaturated fatty acids are reduced to those of saturated acids
d) Hydrogen drives off the impurities from the oil

179. Phospholipids are esters of glycerol with
a) One carboxylic acid residue and two phosphate groups
b) Three phosphate groups
c) Three carboxylic acid residues
d) Two carboxylic acid residues and one phosphate groups

180. The structure of RNA molecule consists of:

a) Double helix b) Single helix c) Single strand d) Branched chain

181. One mole of glucose on respiration produces:
a) 36 mole of ATP b) 34 mole of ATP c) 40 mole of ATP d) 38 mole of ATP

182. Number of possible isomers of glucose is:
a) 10 b) 14 c) 16 d) 20

183. When glucose reacts with bromine water, the major product is:
a) Gluconic acid b) Saccharic acid c) Sorbitol d) Galactose

184. Starch is made up of:
a) Glucose and fructose
b) Amylose and amylopectin
c) Amylose and glycogen
d) Amylopectin and glycogen

185. Glucose gives many reactions of aldehyde because:
a) It is hydrolysed to acetaldehyde
b) It is a polyhydroxy ketone
c) It is a cyclic aldehyde
d) It is a hemiacetal in equilibrium with its aldehyde form in solution

186. Which of the following is not an essential amino acid for man?
a) Tyrosine b) Leucine c) Lysine d) Valine

187. Which is not essential oil?
a) Turpentine oil b) Clove oil c) Paraffin oil d) Khus oil

188. Which of the following is laevorotatory?
a) Glucose b) Fructose c) Sucrose d) None of these

189. The number of asymmetric carbon atoms in the glucose molecule is:
a) 1 b) 2 c) 4 d) 6

190. Which of the following exists as Zwitter ion?
a) *p*-aminophenol b) Salicylic acid
c) Sulphanilic acid d) Ethanolamine

191. Glucose is hydrolysed by zymase into:
a) Dicarboxylic acid b) Alcohol c) Amino acids d) Aromatic acids

192. Which statement about protein is wrong?
a) Proteins occur in all living cells
b) Proteins invariably contain N, O, C and H
c) Proteins are synthesized by plant kingdom only
d) Proteins are also synthesized in laboratory

193. Which of the following compound shows aromatic properties?
a) Valine b) Leucine c) Serine d) Tyrosine

194. Bees wax is:
a) Tripalmitin b) Cetyl palmitate c) Myricyl palmitate d) Myricyl ceorate

195. Which of the following is a protein?
a) Pepsin b) Adrenaline c) ATP d) Glutamine

196. Which vitamin is closely involved in the formation of collagen-a protein present in connective tissues and bones?
a) Riboflavin b) Ascorbic acid c) Niacin d) Cyanocobalamine

197. Raffinose on hydrolysis forms:
a) Glucose b) Fructose c) Galactose d) All of these

198. Nucleic acid is a polymer of
a) Nucleotides b) α –amino acids c) Nucleosides d) Glucose

199. Linseed oil is:
a) Used in soap formation

b) Drying oil
c) Acts as carrier for paints
d) All of the above

200. Glucose and cane sugar can be distinguished by:
a) Fehling's solution b) Baeyer's reagent c) Molisch test d) Iodine solution

201. Spermaceti is commonly used in:
a) Fermentation of cane sugar
b) Preparation of acetic acid
c) Birth control
d) Cosmetics and soaps

202. Metal lauryl sulphate acts as:
a) Soap b) Disinfectant c) Antiseptic d) Detergent

203. The process used in conversion of triolein to tristearin is
a) Hrdrolysis b) Hydration c) Hydrogenation d) Dehydrogenation

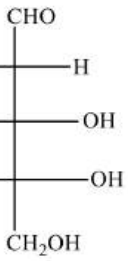
204. When glucose reacts with bromine water the main product is
a) Gluconic acid b) Glyceraldehyde
c) Sorbitol d) Saccharic acid

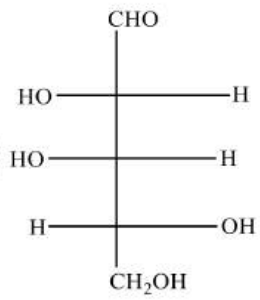
205. Which of the following carbohydrates is synthesized by nature on the largest scale?
a) Glucose b) Fructose c) Lactose d) Cellulose

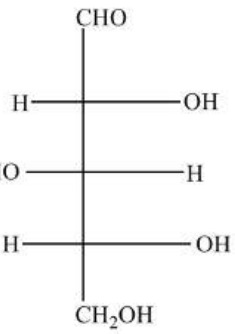
206. The main structural feature of protein is
a) Ester linkage b) Ether linkage c) Peptide linkage d) All of these

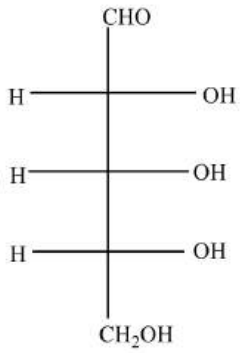
207. Which of the following hormones contains iodine?
a) Thyroxine b) Insulin c) Testosterone d) Adrenaline

208. Which of the following is the structure of D-xylose?

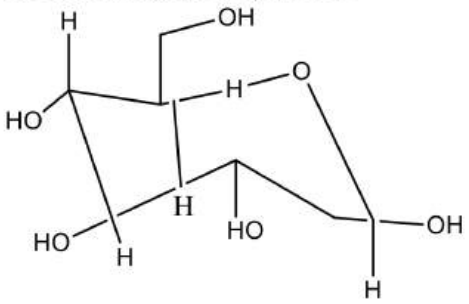
a) 

b) 

c) 

d) 

209. The following carbohydrate is



a) A ketohexose b) An aldohexose c) An α −furanose d) An α −pyranose

210. Which molecule possess the general formula of carbohydrates, but is not a carbohydrate?
a) Glyceraldehyde b) Arabinose c) Acetic acid d) All of these

211. Deficiency of vitamin E causes:
a) Sterility b) Rickets c) Beri-beri d) Scurvy

212. Which is polysaccharide?
a) Nylon b) Polyethene c) Glucose d) Cellulose

213. Sanger's method is used to identify
a) C–terminal amino acid
b) N–terminal amino acid
c) Side chain
d) Molecular weight of protein

214. The carbon chain in fructose is identified by converting it into:
a) α-methyl hexane
b) cyclohexane
c) *n*-hexane
d) α-methyl caproic acid

215. Progesterone is secreted by .....
a) Thyroid
b) Ovaries
c) Adrenal
d) Testes

216. Which of the following is a heterocyclic amino acid?
a) Glycine
b) Alanine
c) Phenylalanine
d) Tryptophan

217. Which one is not a constituent of nucleic acid?
a) Uracil
b) Guanidine
c) Phosphoric acid
d) Ribose sugar

218. Which is used to identify glucose?
a) Neutral ferric chloride
b) $CHCl_3 + KOH(alc.)$
c) Ammoniacal $AgNO_3$
d) C_2H_5ONa

219. Which of the following is non-reducing sugar?
a) Ribose
b) Lactose
c) Sucrose
d) Maltose

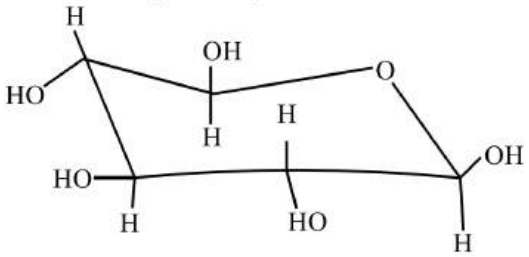
220. Hexoses and pentoses are
a) Disaccharides
b) Monosaccharides
c) Polysaccharides
d) Oligosaccharides

221. The sugar present in honey is:
a) Sucrose
b) Glucose
c) Fructose
d) Maltose

222. Which one of the following is not a protein?
a) Wool
b) Nail
c) Hair
d) DNA

223. The deficiency of vitamin B_1 causes
a) Beri-bei
b) dermatitis
c) Scurvy
d) rickets

224. The following carbohydrate is:



a) A ketohexose
b) An aldohexose
c) An α-furanose
d) An α-pyranose

225. The ultimate products of oxidation of most of hydrogen and carbon in food-stuffs are:
a) H_2O alone
b) CO_2 alone
c) H_2O and CO_2
d) None of these

226. The sources of fats and oils are:
a) Milk
b) Butter
c) Cheese
d) All of these

227. The lye is:
a) 10% solution of NaOH
b) 10% solution of KOH
c) 10% solution of NaCl
d) 10% solution of Na_2CO_3

228. The two forms of D-glucopyranose obtained from the solution of D-glucose are called
a) Isomer
b) Anomer
c) Epimer
d) Enantiomer

229. Glucose and fructose are:
a) Chain isomers
b) Position isomers
c) Functional isomers
d) Optical isomers

230. Initiation of polypeptide chain is through
a) Lysine
b) Glycine
c) Lencine
d) Methionine

231. Nucleic acids contain:
a) 4 purine bases
b) 4 pyrimidine bases
c) 2 purine bases and 3 pyrimidine bases
d) 4 pyrimidine bases and one purine base

232. Antibiotic inhibiting translation in eukaryotes is
a) Tetracyclin b) Penicillin c) Puromycin d) Chloromycetin

233. The term anomers of glucose refers to
a) Isomers of glucose that differ in configurations at carbons one and four (C-1 and C-4)
b) A mixture of (D)-glucose and (L)-glucose
c) Enantiomers of glucose
d) Isomers of glucose that differ in configuration at carbon one (C-1)

234. Sucrose is made up of:
a) Glucopyranose and fructopyranose
b) A glucopyranose and a fructofuranose
c) A glycofuranose and a fructofuranose
d) A glucofuranose and fructopyranose

235. Fats, on alkaline hydrolysis, gives
a) Oils b) Soaps c) Detergents d) Glycol+ acid

236. Lipids are
a) Nucleic acids occurring in plants
b) Proteins occurring in animals
c) Carbohydrates occurring in plants
d) Fats of natural origin

237. Which one of the following statements is correct?
a) All amino acids are optically active.
b) All amino acids except glycine are optically active.
c) All amino acids except glutamic acid are optically active.
d) All amino acids except lysine are optically active.

238. Vitamin D is also known as:
a) Growth vitamin b) Ascorbic acid c) Reproductive vitamin d) Sunshine vitamin

239. Which one of the following statement is not true reagarding (+) Lactose?
a) (+) Lactose, $C_{12}H_{22}O_{11}$ contains 8-OH groups
b) On hydrolysis (+) Lactose gives equal amount of D(+) glucose and D(+) galactose
c) (+) Lactose is a β-glycoside formed by the union of a molecule of D(+) glucose and a molecule of D(+) galactose
d) (+) Lactose is a reducing sugar and does not exhibit mutarotation

240. The α −amino acid which doesn't give purple colour in the ninhydrin test is
a) Proline b) Glycine c) Lysine d) Aspartic acid

241. How can you say that glucose is cyclic compound?
a) Glucose undergoes Tollen's reaction
b) Glucose reacts with phenyl hydrazine
c) Glucose fails to react with sodium hydrogen sulphite
d) Glucose reacts with nitric acid

242. An unsaturated acid found in natural oils and fats is:
a) Palmitic acid b) Myristic acid c) Linoleic acid d) Lauric acid

243. Which of the following elements is responsible for oxidation of water to O_2 in biological processes?
a) Fe b) Mn c) Cu d) Mo

244. A tripeptide is composed equally of L-valine, L-tryosine and L-alanine (one molecule of each). How many isomeric tripeptide of this kind may exist?
a) 3 b) 4 c) 6 d) 8

245. Which of the following is an example of conjugated protein?

a) Albumin b) Globulin c) Glutelin d) Glycoprotein

246. Which of the following is used in our body as a fuel for muscles and nerves and to build and repair body tissue?
a) Cane sugar b) Fructose c) Proteins d) Glucose

247. Pick out the one which doesn't belong to the family?
a) Pepsin b) Cellulose c) Ptyalin d) Lipase

248. Cellulose, starch and glycogen are the polysaccharides having.....monosaccharide unit:
a) Glucose b) Ribose c) Fructose d) Pentose

249. Which one is a test for proteins?
a) Beilstein test b) Biuret test c) Benedict's test d) Molisch test

250. Hydrolysis of oils and fats gives glycerol and long chain fatty acids containing:
a) Even number of carbon atoms
b) Odd number of carbon atoms
c) Both (a) and (b)
d) None of the above

251. Cell membranes are mainly compose of :
a) Phospholipids b) Fats c) Proteins d) Carbohydrates

252. Which one of the following is not present in RNA?
a) Uracil b) Thymine c) Ribose d) Phosphate

253. In blood, the transport of oxygen from lungs to tissues is carried out by:
a) White blood cells(leukocytes)
b) Red blood cells (erythrocytes)
c) Fibrinogen
d) Globulins

254. Glycogen is :
a) A polysaccharide found in both animals and plants
b) A polysaccharide found in plants
c) A polysaccharide found in animals
d) A polysaccharide found in honey

255. Which enzyme hydrolyses triglyceride to fatty acids and glycerol?
a) Amylase b) Maltase c) Lipase d) Pepsin

256. Citrus fruits are an important source of vitamin:
a) B b) C c) D d) K

257. Glucose reacts with acetyl chloride to form penta acetyl glucose, it indicates presence of:
a) Five primary alcoholic groups
b) Five secondary alcoholic groups
c) Aldehyde as well as alcoholic group
d) Five $-OH$ groups

258. Night-blindness may be caused by the deficiency of vitamin
a) A b) B c) D d) C

259. Zwitter ion is formed by
a) Aniline b) Acetanilide c) Benzoic acid d) Glycine

260. In human body enzymes hydrolyse protein into:
a) A ketonic acid like $CH_3COCOOH$
b) A hydroxyl acid like $CH_3CHOHCOOH$
c) Dicarboxylic acid like $HOOC-COOH$
d) Amino acid like CH_2NH_2COOH

261. Starch on hydrolysis by a dilute inorganic mineral acid gives:
a) Sucrose b) Glucose c) Fructose d) maltose

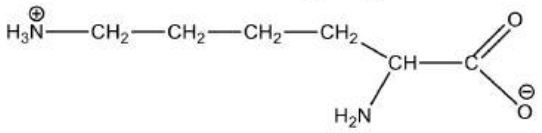
262. Oleic, stearic and palmitic acids are:

a) Nucleic acids b) Amino acids c) Fatty acids d) None of these

263. Oils contain a higher percentage of :
a) Stearin b) Butyrin c) Olein d) Palmitin

264. Which of the following pairs give positive Tollen's test?
a) Glucose, sucrose
b) Glucose, fructose
c) Hexanal, acetophenone
d) Fructose, sucrose

265. The total number of basic groups in the following form of lysine is



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

266. Glucose or aldohexose contains:
a) One $-CHO$ group
b) Five $-OH$ groups
c) One primary alcoholic group and four secondary alcoholic groups
d) All are correct

267. The monosaccharides having anomeric carbon atom are
a) Geometrical isomers
b) α –and β –optical isomers
c) Having symmetrical carbon atoms
d) None of the above

268. The charring product formed when $C_6H_{12}O_6$ is heated with conc. H_2SO_4 is due to:
a) Oxidation b) Reduction c) Dehydration d) Dehydrogenation

269. The unused fat present in the body is:
a) Converted into carbohydrates
b) Removed as waste from the body
c) Reconverted into animal fat and stored in different parts of the body
d) Easily destroyed by certain enzymes present in the body

270. Which amino acid have more than one stereogenic centre?
a) Aspartic acid b) Lysine c) Arginine d) Histidine

271. Ligase is an enzyme required for
a) Renaturation of DNA b) Proof-reading c) Joining DNA bits d) Breaking of DNA

272. Surfactants and detergents have the same common property of.....in them.
a) Detergency b) Surface activity c) Viscosity d) None of these

273. Vitamin B_6 is known as
a) Pyridoxin b) Thiamine c) Tocopherol d) Riboflavin

274. Sucrose on hydrolysis gives
a) Glucose and maltose b) Glucose and lactose c) Glucose and fructose d) Only glucose

275. Detergents are better cleansing agent than soaps because:
a) They wash clothes better
b) Absorb the hardness of water
c) They are less affected by hard water
d) They are less soapy

276. The molecular formula of a monobasic saturated fatty acid is:
a) $C_nH_{2n}O_2$ b) $C_nH_{2n-1}O_2$ c) $C_nH_{2n+2}O_2$ d) $C_nH_{2n+1}O_3$

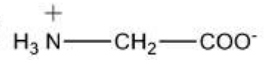
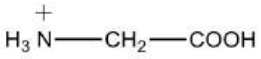
277. The reason for double helical structure of DNA is operation of
a) Van der Waals' forces
b) Dipole-dipole interaction
c) Hydrogen bonding
d) Electrostatic attractions

278. Beri-Beri is caused due to:
a) Vitamin A b) Vitamin B_1 c) Vitamin C d) Vitamin D

279. Which of the following is not present in a nucleotide?

a) Cytosine b) Guanine c) Adenine d) Tyrosine

280. At pH=4, glycine exists as

a)  b)  c) H_2N-CH_2-COOH d) $H_2N-CH_2-COO^-$

281. Sodium dodecyl benzene sulphonate is used as a:

a) Pesticide b) Soap c) Fertilizer d) Detergent

282. The reaction of glucose with red P + HI is called:

a) Sandmeyer's reaction
b) Reformatsky reaction
c) Gattermann's reaction
d) Reduction

283. Which base is present in RNA but not in DNA?

a) Uracil b) Cytosine c) Guanine d) Thymine

284. What is not a hexose?

a) Glucose b) Ribose c) Fructose d) Galactose

285. Which functional group participates in disulphide bond formation in proteins?

a) Thiolacetone b) Thiol c) Thioether d) Thioester

286. Washing soap can be prepared by saponification with alkali and:

a) Rose oil b) Paraffin oil c) Groundnut oil d) Kerosene oil

287. Deoxyribonucleic acid (DNA) consists of the following units:

a) Peptides b) Glucosides c) Nucleotides d) Deoxyribose

288. Fatty acid is to fat as glucose is to

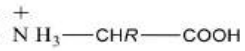
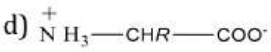
a) Cellulose b) Glycogen c) Starch d) All of these

289. Which one of the following statements is true?

a) Saponification of oil yields a diol
b) Drying of oil involves hydrolysis
c) Addition of antioxidant to oil minimizes rancidity
d) Refining of oil involves hydrogenation

290. In aqueous solution, amino acids mostly exist as

a) $NH_2-CHR-COOH$ b) $NH_2-CHR-COO^-$

c)  d) 

291. In both DNA and RNA, heterocylic base and phosphate ester linkages are at

a) C_5' and C_1' respectively of the sugar molecule
b) C_1' and C_5' respectively of the sugar molecule
c) C_2' and C_5' respectively of the sugar molecule
d) C_5' and C_2' respectively of the sugar molecule

292. The chemical name of vitamin C is

a) Nicotinic acid b) Folic acid c) Tartaric acid d) Ascorbic acid

293. Mutarotation doesn't occur in

a) Sucrose b) D–glucose c) L–glucose d) None of these

294. Deficiency of vitamin B_1 causes the disease:

a) Cheilosis b) Sterility c) Convulsions d) Beri-Beri

295. What is not true for carbohydrates?

a) General formula is $C_nH_{2n}O_n$
b) Glucose is the most common monomer of carbohydrates
c) Fructose is the sweetest of all sugars
d) Do not conjugate with lipids

296. Main constituent of plants is

a) Cellulose b) Starch c) Fructose d) Lipids

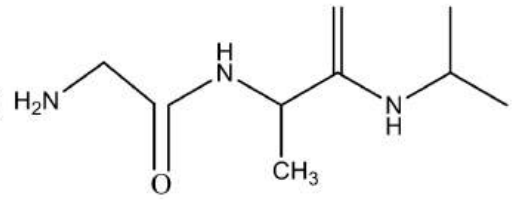
297. Paraffin wax is not used:

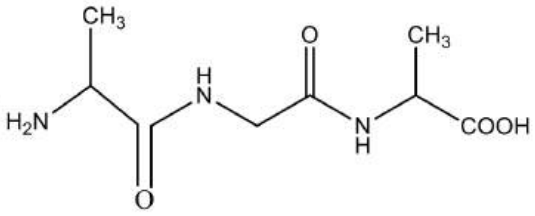
a) In making candles
b) As a coating on paper
c) In greases
d) As a stiffening agent in cosmetic creams

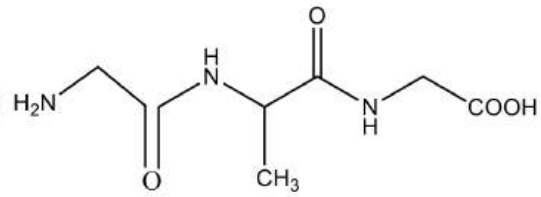
298. Pancreatic juice contains the enzyme:
a) Zymase b) Invertase c) Diastase d) lipase

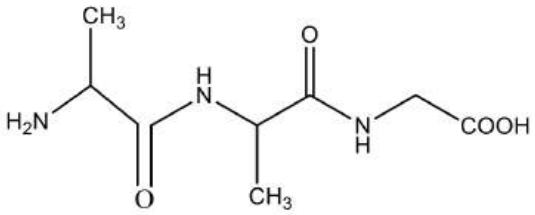
299. Reverse transcription was discovered by
a) Watson and Crick b) Khorana c) Temin and Baltimore d) Beadle and Tatum

300. A tripeptide is written as glycine-alanine–glycine. The correct structure of the tripeptide is

a) 

b) 

c) 

d) 

301. Glucose and fructose differ in:
a) Taste
b) Action of heat
c) Action of Tollens' reagent
d) Direction of optical rotation

302. Digestion of fat in intestine is aided by:
a) Diffusion b) Protection c) Peptization d) Emulsification

303. Tributyrin is a fat present in butter. It is formed by combination of butyric acid with:
a) Glycerol b) Oleic acid c) Stearic acid d) Chloroform

304. The nucleic acid base having two possible binding sites is
a) Thymine b) Cytocine c) Guanine d) Adenine

305. An achiral amino acid
a) Alanine b) Valine c) Leucine d) Glycine

306. Insulin regulates the metabolism of
a) Minerals b) Amino acids c) Glucose d) Vitamins

307. In glycine, the basic group is
a) $-COO^-$ b) $-COOH$ c) $-NH_2$ d) $-NH_3^+$

308. Rice has deficiency of the essential amino acid:
a) Alanine b) Glycine c) Lysine d) Leucine

309. Mammal's fats are hydrolysed to relase fatty acids by
a) Amylase b) Lactase c) Lipase d) Insulin

310. Which of the following has an imino $(>NH)$ group instead of amino group $(-NH_2)$?
a) Proline b) Isosleucine c) Tryptophan d) Serine

311. Molecular weight of a protein is:
a) 10,000 b) 1,000-10,000 c) 100-1,000 d) >10,000

312. Fehling's solution and benedict's solution are reduced by glucose to form:
a) CuO b) Cu_2O c) $Cu(OH)_2$ d) Cu

313. The product formed in the reaction of glycine with benzoyl chloride $+aq$. NaOH is
a) $PhCOCH_2NH_2$ b) $PhCH_2NH_2$ c) $PhCONHCH_3$ d) $PhCONHCH_2CO_2H$

314. Proteins when heated with conc. HNO_3 give a yellow colour. This is
a) Hoppe's test b) Acid-base test c) Biuret's test d) Xanthoprotic test

315. Detergents are usually made from products obtained by cracking of petroleum like:
a) Chloroalkanes
b) Sulphur compounds of benzene
c) H_2S
d) Polyethylene derivatives

316. Night-blindness may be caused by the deficiency of vitamin
a) A b) B c) C d) D

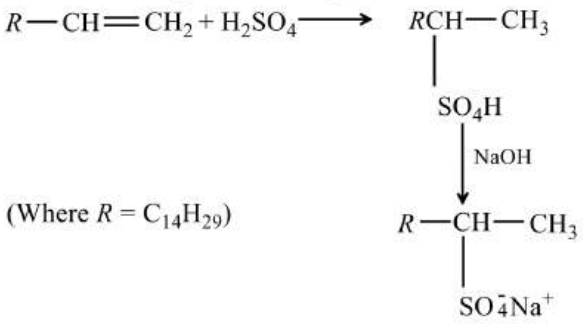
317. Which of the following sugars is present in genetic factor DNA molecule?
a) Glucose b) Maltose c) Ribose d) Deoxyribose

318. Point out the wrong statement about proteins.
a) They are nitrogenous organic compounds of high molecular mass
b) They on hydrolysis by enzymes give amino acids
c) Many of them are enzymes
d) They do not contain polypeptide linkages

319. Gums are:
a) Polysaccharides of more than one type of monosaccharides
b) Used as thickening agent
c) Used for improvement of texture in food industry
d) All of the above

320. Which of the following are all disaccharides?
a) Maltose, sucrose, lactose
b) Maltose, lactose, glucose
c) Glycogen, lactose, sucrose
d) Starch, maltose, lactose

321. In the following reaction sequence,



(Where $R = C_{14}H_{29}$)

The end product would be useful as:
a) A soap b) A fertilizer c) An explosive d) A detergent

322. Carbohydrates are:
a) Hydrates of carbon
b) Polyhydroxy aldehydes or ketones
c) Polyhydroxy acids
d) None of the above

323. A metal present in vitamin B_{12} is
a) Aluminium b) Zinc c) Iron d) Cobalt

324. The general formula of carbohydrate is:
a) $C_nH_{2n+1}O$
b) $C_nH_{2n}O$
c) $C_n(H_2O)_n$ or $C_x(H_2O)_y$
d) $C_n(H_2O)_{2n}$

325. Soap molecule has two parts, a polar part and a non-polar part. When soap is added to water:
a) Both parts dissolve in water
b) Non-polar part dissolves in water
c) Polar part dissolves in water
d) Both parts remain undissolved in water and form a hydrocarbon layer

326. Proteins are polymers of amino acids. Which of the following is not a protein?
a) Wool b) Nails c) Hair d) DNA

327. Metallic soaps are:
a) Salts of fatty acids with other metals except Na, K
b) Not used for cleaning purposes
c) Used as lubricant, driers, adhesives, etc
d) Possess all these

328. Glucose and fructose are readily distinguished by using:
a) Molisch test b) Salivanoff test c) Tollens' reagent d) None of these

329. With one of the pollutant gases in air haemoglobin of blood undergoes irreversible chemical combination thus, causing death. The gas is:
a) Carbon monoxide b) Carbon dioxide c) Sulphur dioxide d) Ozone

330. Milk sugar is (a disaccharide) :
a) Sucrose b) Lactose c) Fructose d) Glucose

331. The carbohydrates are important constituent of our diet; they function as:
a) Biofuels to provide energy
b) Shock absorbing pad
c) Heat insulator
d) None of the above

332. The number of amino acids in insulin is
a) 21 b) 574 c) 51 d) 5733

333. Candles contain a mixture of:
a) Bees wax and paraffin wax
b) Bees wax and stearic acid
c) Paraffin wax and stearic acid
d) Higher fatty acids

334. The prosthetic group haemoglobin is
a) Porphin b) Globulin c) Haem d) Gelatin

335. To become a carbohydrate, a compound must contain atleast:
a) 6 carbons b) 3 carbons c) 4 carbons d) 2 carbons

336. Amino acids have peptide linkage which is
a) —CO—NH— b) —C—NH_2 c) SO—NH— d) —CO—N—

337. Hydrogenation of oils involves:
a) Saturation of unsaturated fatty acids
b) Reaction with oxygen
c) Conversion into fatty acids
d) Driving of the impurities in oil by hydrogen gas

338. Which of the following hexoses will form the same osazone when treated with excess phenyl hydrazine?
a) D-glucose , D-fructose and D-galactose b) D-glucose , D-fructose and D-mannose
c) D-glucose , D-mannose and D-galactose d) D-fructose, D-mannose and D-galactose

339. Energy is stored in our body in the form of
a) ATP b) ADP c) Fats d) Carbohydrates

340. Which of the following contains the highest percentage of protein?
a) Groundnut b) Cow's milk c) Egg d) Wheat

341. Lipids are:

a) Long chain fatty acid esters
b) Long chain sulphonic acid esters
c) Polymeric hydrocarbons
d) Polymeric aldehydes

342. The colorific values of fats, carbohydrates and proteins vary in the order:
a) Fats > carbohydrates > proteins
b) Fats > proteins > carbohydrates
c) Carbohydrates > proteins > fats
d) Proteins > carbohydrates > fats

343. Nucleotides and nucleosides mainly differ from each other in:
a) Presence of phosphate units
b) Presence of base units
c) Presence of nucleic acids
d) None of the above

344. Which of the following is an ester?
a) Coconut oil b) Kerosene c) Soap d) Glycerine

345. Which of the following statements about enzymes is incorrect?
a) The catalytic action of an enzyme is not specific
b) An enzymatic reaction is highly sensitive to temperature
c) The catalytic action of enzymes is due to their capacity to lower the energy of activation of a particular reaction
d) None of the above

346. Which of the following is not an α-amino acid?
a) Cysteine b) Proline c) Trypsin d) Serine

347. Which of the following is true?
a) Nucleoside + phosphoester bond = nucleotide
b) DNA's are nucleotide and RNA's are nucleoside
c) Nucleotide + phosphoester bond = nucleoside
d) None of the above

348. The anti-sterility or anti-reproductory vitamin is:
a) B b) C c) D d) E

349. Which statement about fats and oils is correct?
a) They may be edible as well as inedible
b) Vegetable oils are different than essential oils
c) Soyabean oil, corn oil, olive oil, etc., are edible oils
d) All of the above

350. The hormone used as an oral contraceptive is:
a) Aldosterone b) Cortisone c) Progesterone d) Testosterone

351. If α-D-glucopyranose is reacted with acetic anhydride at 373 K, the major products is the β- isomer of the pentaacetate. It is attributed to
a) Isomerisation of α-D into β-D-glucose at 373 K
b) Opening of glucopyranose ring
c) Both the statements are correct
d) None of the statement is correct

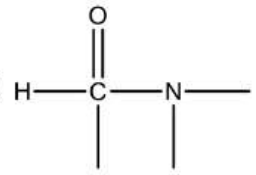
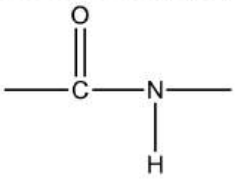
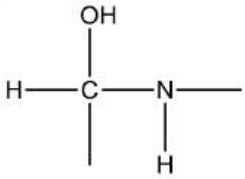
352. A decapeptide (mol. wt. 796) on complete hydrolysis gives glycine (mol. wt. 75), alanine and phenylalanine. Glycine contributes 47% to the total weight of the hydrolysed products. The number of glycine units present in the decapeptide is
a) 3 b) 4 c) 5 d) 6

353. Vegetable oils are:
a) Essential oils obtained from plants
b) Unsaturated acids
c) Glycerides of saturated fatty acids
d) Glycerides of unsaturated fatty acids

354. Which of the following compounds is found abundantly in nature?

a) Fructose b) Starch c) Glucose d) Cellulose

355. Which one is the correct representation of peptide bond?

a)  b)  c)  d) None of these

356. The proteins are hydrolysed with acids, alkalies or enzymes finally to:
a) Amino acids b) Ethers c) Esters d) Cycloparaffins

357. Which of the following is protein?
a) Terry cotton b) Natural silk c) Nylon d) Rayon

358. Which of the following indicates open chain structure of glucose?
a) Pentaacetyl derivative of glucose
b) Cyanohydrins formation with HCN
c) Reaction with Fehling solution
d) Reaction with Tollen's reagent

359. A distinctive and characteristics functional group of fats is
a) A peptide group b) An ester group c) An alcoholic group d) A ketonic group

360. In an amino acid, the carboxyl group ionizes at $pK_{a_1} = 2.34$ and ammonium ion at $pK_{a_2} = 9.6$. The isoelectric point of the amino acid is at pH
a) 5.97 b) 2.34 c) 9.60 d) 6.97

361. The primary structure of protein is based upon the
a) Hydrogen bonding
b) Van der Waals' attraction
c) Ionic bonding
d) Covalent bonding

362. A good example of an unsaturated acid got by the hydrolysis of an oil is:
a) Palmitic acid b) Stearic acid c) Oleic acid d) Lauric acid

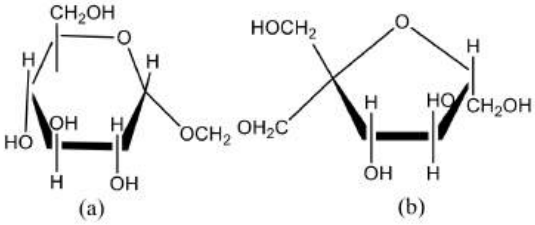
363. The epimer of glucose is:
a) Galactose b) Fructose c) Mannose d) Arabinose

364. Enzymes, in the living systems
a) Provide energy
b) Provide immunity
c) Transport oxygen
d) Catalyse biochemical processes

365. Antibodies are:
a) Carbohydrates b) proteins c) phospholipids d) lipids

366. Point out the correct statement about proteins?
a) They are nitrogenous organic compounds of high molecular weights
b) They on hydrolysis by enzyme give amino acids
c) Many of them are enzymes
d) All of the above

367. The correct statement about the following disccharide is


(a) (b)

a) Ring (a) is pyranose with α −glycosidic link
b) Ring (a) is furanose with α −glycosidic link
c) Ring (b) is furanose with α −glycosidic link
d) Ring (b) is pyranose with α −glycosidic link

368. There are 20 naturally occurring amino acids. The maximum number of tripeptides that can be obtained is
a) 8000 b) 6470 c) 7465 d) 5360

369. Number of chiral carbon atoms in β −D-(+)- glucose is
a) Five b) Six c) Three d) Four

370. Glucose on oxidation gives the acid containing the C-chiral atoms equal to

a) 2 b) 3 c) 4 d) 5

371. The synthesis of carbohydrates in plants is mainly due to:
   a) Double decomposition
   b) Photosynthesis
   c) Hydrolysis of ingradients taken from soil
   d) Nitrifying bacteria
372. The correct statement in respect of protein haemoglobin is that it
   a) Functions as a catalyst for biological reactions
   b) Maintains blood sugar level
   c) Act as an oxygen carrier in the blood
   d) Forms antibodies and offers resistance to diseases
373. From the following statements
   (A) Albumin is a simple protein
   (B) Amino acid alanine contains an acidic side chain
   (C) Insulin is a hormone
   (D) Muscles contain the protein keratin
   Choose the wrong statements
   a) A, B b) C, D c) A, C d) B, D
374. The reagent used in Ruff degradation is:
   a) Baeyer's reagent b) Tollens' reagent c) Fenton's reagent d) Benedict's reagent
375. Glucose when treated with CH_3OH in presence of dry HCl gas, gives α-and β-methylglucosides because it contains
   a) An aldehydic group b) a $-CH_2OH$ group c) A ring structure d) Five $-OH$ group
376. Iodine value related to
   a) Fats and oils b) Alcohols c) Esters d) Hydrocarbons
377. Complete hydrolysis of cellulose gives
   a) D-fructose b) D-ribose c) D-glucose d) L-glucose
378. Dihydroxy acetone ($CH_2OH \cdot CO \cdot CH_2OH$) has the general formula of carbohydrate but not included in this class because:
   a) It does not contain polyhydroxy gp.
   b) It does not contain aldehyde gp.
   c) It is not optically active
   d) All of the above
379. Fats contain higher percentage of :
   a) Unsaturated fatty acids
   b) Saturated fatty acids
   c) Free fatty acids
   d) Glycerol
380. All monosaccharides ..... Tollen's reagent.
   a) Oxidises
   b) Condense with
   c) Reduces
   d) Add to
381. Which one of the following is a conjugated protein?
   a) Phosphoprotein
   b) Glycoprotein
   c) Chromoprotein
   d) All of these
382. Glucose reacts with methyl alcohol to give:
   a) α-methyl glucoside b) β-methyl glucoside c) Both (a) and (b) d) None of these

383. Proteins give a white precipitate with Million's reagent, which is:
   a) Mercurous and mercuric nitrate in HNO_3
   b) Mercurous and mercuric chloride in HCl
   c) Mercurous and mercuric chloride in HNO_3
   d) None of the above

384. In fermentation by zymase, alcohol and CO_2, are obtained from:
   a) Glucose b) Invert sugar c) Fructose d) All of these

385. A certain compound gives negative test with ninhydrin and positive test with Benedict's solution. The compound is
   a) A protein b) A monosaccharide c) A lipid d) An amino acid

386. The function of fat in the body is to act:
   a) As reserve food
   b) As thermal insulator and to protect the body from loss of heat
   c) To absorb and carrying vitamin A and D in the body
   d) All of the above

387. The hormone which maintains blood sugar level is:
   a) Oxytocin b) Haemoglobin c) Insulin d) ptylin

388. Which one of the following is not a protein?
   a) Wool b) Nail c) Hair d) DNA

389. Osazone formation involves only 2 carbon atoms of glucose because of:
   a) Chelation b) Oxidation c) Reduction d) Hydrolysis

390. Protein which acts as hormone is:
   a) Casein b) Oxytocin c) Trypsin d) Keratin

391. The only vitamin with metal atom in it
   a) Vitamin A b) Vitamin K c) Vitamin B_{12} d) Vitamin E

392. If two moles of glucose are oxidized in the body through respiration, the number of moles of ATP produced are
   a) 19 b) 38 c) 57 d) 76

393. Which is not a poison for enzymes?
   a) CN^- b) Fe^{3+} c) Pb^{2+} d) AsO_4^{3-}

394. Which of the following is the sweetest sugar?
   a) Glucose b) Fructose c) Lactose d) Sucrose

395. Kwashiorkor is caused by the deficiency of:
   a) Vitamins b) hormones c) Amino acids d) Essential amino acids

396. The main role of oils and fats as constituents in our food is to:
   a) Act as stored source of energy
   b) To meet immediate energy needs of the body
   c) To catalyse biochemical process
   d) Form the structural material of tissues

397. Acrolein test is positive for
   a) Polysaccharides b) Proteins c) Oils and fats d) Reducing sugars

398. An electric current is passed through an aqueous solution of a mixture of alanine (isoelectric point 6.0) glutamic acid (3.2) and arginine (10.7) buffered at pH6. What is the fate of the three acids?
   a) Glutamic acid migrates of anode at pH6. Arginine present as a cation and migrates to the cathode. Alanine in a dipolar ion remains uniformly distributed in solution.
   b) Glutamic acid migrates to cathode and others remain uniformly distributed in solution.
   c) All three remain uniformly distributed in solution.
   d) All three move to cathode.

399. The non-proteinous substances which certain enzymes require for their activity are called:
   a) Catalysts b) Inhibitors c) Co-enzymes d) Epimers

400. Soaps do not form froths easily from hard water because:
a) Of formation of insoluble salts
b) Of formation of complex salts
c) Of lower solubility of soaps in hard water
d) None of the above

401. Human digestive system does not hydrolyse:
a) Starch b) Maltose c) Glycogen d) Cellulose

402. Soft soaps are:
a) Sodium salts of fatty acids
b) Potassium salts of fatty acids containing excess of free alkali
c) Potassium salts of fatty acids containing no free alkali
d) Calcium salts of fatty acids

403. A protein that controls the metabolism of glucose is:
a) Oxytocin b) Insulin c) Haemoglobin d) keratin

404. Biological catalyst (enzymes) belong to:
a) Polysaccharides
b) Synthetic polymers
c) Polypeptides
d) Poly nitrogen heterocycles

405. Fibrous proteins are present in:
a) Wool b) Silk c) Nails d) All of these

406. Which one of the following is an amine hormone?
a) Oxypurin
b) Insulin
c) Progesterone
d) Thyroxine

407. Gene is a segment of
a) DNA b) Protein c) m-RNA d) t-RNA

408. When glucose is heated with nitric acid, the product is:
a) Gluconic acid b) Glucaric acid c) Glycolic acid d) Oxalic acid

409. Pick out the unsaturated fatty acid from the following
a) Stearic acid b) Lauric acid c) Oleic acid d) Palmitic acid

410. An organic compound answers Molisch's test as well as Benedict's test. But it doesn't answer Scliwanoff's test. Most probably, it is
a) Sucrose b) Protein c) Fructose d) Maltose

411. Rice is deficient in
a) Lysine b) Alanine c) Glycine d) Leucine

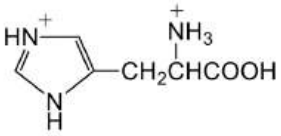
412. *Escherichia coli* with completely radioactive DNA was allowed to replicate in non-radioactive medium for two generations. Percentage of bacteria with radioactive DNA is
a) 100% b) 12.55% c) 50% d) 25%

413. Which one of the following does not exhibit the phenomenon of mutarotation?
a) (+) Sucrose b) (+) Lactose c) (+) Maltose d) (-) Fructose

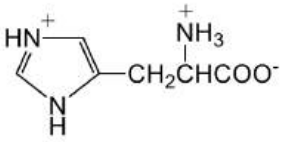
414. Redness of blood is because of the presence of:
a) Iron in haeme pigment
b) Haemoglobin
c) Copper in haeme pigment
d) All of the above

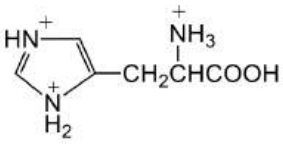
415. Which of the following is not a pyrimidine base?
a) Thymine b) Guanine c) Cytosine d) Uracil

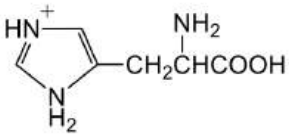
416. Histidine, a heterocyclic amino acid has following structure at pH < 1.82

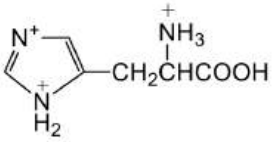


At pH > 1.82, it should have which structure?

a) 

b) 

c) 

d) 

417. Fats are ester of
a) Sugar b) Glycerol c) Tributyrine d) Polypeptide

418. Amylose is a polymer of :
a) α-D glucopyranose b) Fructose c) β-fructose d) β -D fructose

419. Which one of the following vitamin deficiency causes rickets?
a) Vitamin A b) Vitamin B c) Vitamin C d) Vitamin D

420. Hydrolysis of sucrose with dilute aqueous sulphuric acid yields
a) 1 : 1D-(+)–glucose; D-(-)-fructose b) 1 : 2D-(+)–glucose; D-(-)-fructose
c) 1 : 1D-(-)–glucose; D-(+)-fructose d) 1 : 2D-(-)–glucose ; D-(+)-fructose

421. Which is fat soluble vitamin?
a) Vitamin A b) Pyridoxin c) Riboflavin d) Thiamine

422. Denaturation of proteins leads to loss of its biological activity by
a) Formation of amino acids b) Loss of primary structure
c) Loss of both primary and secondary structures d) Loss of both secondary and tertiary structures

423. The simple prokaryotic cells evolved when life began on earth. Which of the following nutrients used for evolving more complex eukaryotes cells?
a) CO_2 b) N_2 c) CO_2 and N_2 d) O_2

424. An aldose is converted into its next higher homologue by:
a) Ruff 's method
b) Amadori rearrangement
c) Kiliani's synthesis
d) None of the above

425. When fat is heated with NaOH the substances formed are:
a) Oil and Na_2CO_3
b) Soap and glycerol
c) Soap and oil
d) Soapless detergent and water

426. Paraffin waxes are:
a) Higher alkanes b) Higher alkenes c) Higher alkynes d) None of these

427. The enzymes which have control site in addition to active site are called
a) Holozymes b) Coenzymes c) Apoenzymes d) Allosteric enzymes

428. The intermediate compound in the conversion of starch to glucose is:
a) Lactose b) Maltose c) Fructose d) Sucrose

429. Lactose gives on hydrolysis
a) Glucose b) Glucose and galactose c) Fructose d) Glucose and fructose

430. When glucose reacts with bromine water the main product is
a) Acetic acid b) Saccharic acid c) Glyceraldehydes d) Gluconic acid

431. The vitamin that is most readily manufactured in our bodies is:
a) Vitamin A b) Vitamin B c) Vitamin C d) Vitamin D

432. Maximum amount of RNA is found in
a) Nucleolus b) Chloroplast c) Ribosomes d) Cytoplasm

433. The function(s) of DNA is/are:
a) Protein synthesis
b) Self replication
c) Store of hereditary information
d) All of the above

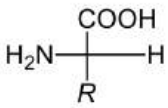
434. Drying oils are used:
a) In the manufacture of paints
b) In the manufacture of varnishes
c) In the manufacture of linoleum products
d) All of the above

435. An example of disaccharide made up of two units of the same monosaccharides is:
a) maltose b) Maltose c) Sucrose d) Lactose

436. Glucose molecules reacts with X number of molecules of phenylhydrazine to yield osazone. The value of X is
a) Three b) Two c) One d) Four

437. A solution of D-glucose in water rotates the plane polarised light:
a) To the right b) To the left c) To either side d) None of these

438. Which is not an unsaturated acid?
a) Oleic acid b) Linoleic acid c) Linolenic acid d) Myristic acid

439. 

When is acylated using Ac_2O
a) Its configuration is retained b) Its configuration is inverted
c) It becomes unstable d) No reaction takes place

440. Increased blood pressure may be caused by excess secretion of:
a) Thyroxin b) Testosterone c) Estradiol d) Adrenaline

441. Essential oils are:
a) Mixture of various hydrocarbons
b) Pleasant smelling liquids occurring in plants
c) Mixture of higher fatty acids
d) None of the above

442. Insulin, a protein acts as:
a) An antibody b) A hormone c) An enzyme d) A transport agent

443. The change in optical rotation with time of freshly prepared solution of reducing sugar is known as
a) Inversion b) Specific rotation c) Rotatory motion d) Mutarotation

444. The number of atoms in the ring structure of pyranoses are:

	Carbon	Oxygen						
a)	5	1	b)	4	2	c)	4	1	d)	3	2

445. Which of the following compounds, when heated at 483 K turns to caramel?
a) Glucose b) Sucrose c) Fructose d) Lactose

446. If one strand of DNA has the sequence ATCGTATG, the sequence in the complementary strand would be
a) TAGCTTAC b) TCACATAC c) TAGCATAC d) TACGATAC

447. The detergency of a substance can be increased by addition of :
a) Another detergent
b) Builders like sodium tripoly phosphate
c) Presence of other additive

d) All of the above

448. Purity of butter is determined in terms of:
a) Saponification value b) Iodine value c) Acetyl value d) Reichert-Meissl value

449. Which of the following is protein hormones?
a) Insulin b) Oxytocin c) Both (a) and (b) d) None of these

450. Which amino acid has pyhenyl —OH group?
a) Lysine b) Arginine c) Proline d) Tyrosine

451. Hydrolytic reaction of fats with caustic soda is known as:
a) Esterification b) Saponification c) Acetylation d) Carboxylation

452. The enzyme that is used to dissolve blood clot is
a) Trypsin b) Renin c) Streptokinase d) Tyrosinase

453. Secondary structure of proteins refers to:
a) Mainly denaturated proteins and structure of prosthetic group
b) Three dimensional structure specially the bond between amino acid residues that are distant from each other in polypeptide chain
c) Linear sequence of amino acid residue in the polypeptide chain
d) Regular folding patterns of continuous portion of the polypeptide chain

454. Hard soaps are:
a) Sodium salts of higher fatty acids
b) Potassium salts of higher fatty acids
c) Calcium salts of higher fatty acids
d) Magnesium salts of higher fatty acids

455. Which of the following body parts is not composed of structural proteins?
a) Muscle b) Nails c) Bones d) Skin and bone matrix

456. In an alkaline medium, Glycine predominantly exists as/in a/an
a) Cation b) Anion c) Zwitter ion d) Covalent form

457. An antigen develops antibodies which protect the body from their harmful effects. The antibodies are:
a) Immunoglobulins b) Phospholipids c) Albumins d) Lymphocytes

458. The process of respiration in absence of oxygen is called:
a) Metabolic b) Aerobic c) Anaerobic d) Glycolysis

459. Globular proteins are present in:
a) Blood b) Eggs c) Milk d) All of these

460. Polypeptides having, molecular weights, above 10000 are known as
a) Amino acids b) Hormones c) Proteins d) Terminal amino acids

461. At intermediate pH values of about 6.0, an amino acid behaves as a dipolar ion or Zwitter ion. On decreasing and increasing the pH values, the amino acid becomes
a) Basic and acidic respectively
b) Acidic and basic respectively
c) Remains in the state of a neutral molecule
d) Loses its optical activity with the exception of glycine

462. Fructose reduces Tollens' reagent due to:
a) Asymmetric carbons
b) Primary alcoholic group
c) Secondary alcoholic group
d) Enolisation of fructose followed by conversion to aldehyde by base

463. Glucose on reduction with Na/Hg and water gives:
a) Sorbitol b) Fructose c) Saccharic acid d) Gluconic acid

464. The hormone insulin is a secretion of the organ:
a) Ovary b) Testes c) Adrenal cortex d) Pancreas

465. Vitamin C is:

a) Alcohol b) Amide c) Amine d) Lactose

466. In an electric field, if an amino acid migrates towards cathode, the pH of the solution is said to be
a) Less than pI b) More than pI
c) Equal to pI d) 7

467. When sucrose is heated with concentrated nitric acid the product is:
a) Saccharic acid b) Oxalic acid c) Formic acid d) Invert sugar

468. Which enzyme convert glucose into alcohol?
a) Invertase b) Zymase c) Maltase d) Diastase

469. Waxes are along chain compounds belonging to the class of:
a) Acids b) Alcohols c) Esters d) Ethers

470. Proteins give:
a) A violet colour with alkaline $CuSO_4$ solution
b) Form a purple colour on boiling with dilute ninhydrin solution
c) Yellow colour on boiling with HNO_3
d) All of the above

471. Which compounds is orbtained, when glucose reacts with excess C_6H_5 —NH . NH_2?
a) Glucosazone b) Gluconic acid
c) Glucose phenyl hydrazone d) Saccharic acid

472. Carbohydrates are used by body mainly
a) For obtaining vitamins b) As source of energy
c) For all its developmental needs d) For building muscles

473. The enzyme carbonic anhydrase catalyses the change:
a) Carbonic acid to H_2O and CO_2
b) Lactose to glucose and galactose
c) Maltose to glucose
d) None of the above

474. Which of the following pairs give positive Tollen's test?
a) Glucose , sucrose b) Glucose , fructose
c) Hexanal, acetophenone d) Fructose, sucrose

475. The end product of protein digestion is:
a) Amino acid b) Glucose c) Glycerol d) Oxalic acid

476. Glucose is a/an
a) Polyhydroxy ketone b) Alcohol
c) Hydrate of carbon d) Pentahydroxy aldehyde

477. Experimental material in the study of DNA replication has been
a) *Escherichia coli* b) *Drosophila melanogas*c) *Pneumococcus* d) *Neurospora crassa*

478. Enzymes are made up of
a) Edible proteins b) Proteins with specific structure
c) Nitrogen containing carbohydrates d) Carbohydrates

479. Which are called biomolecules?
a) Carbohydrate b) Protein c) Lipids d) All of these

480. The metal present in vitamin B_{12} is
a) Iron b) Manganese c) Cobalt d) Mercury

481. When adenine is attached to ribose sugar, it is called adenosine. To make a nucleotide from it, it would require
a) Oxygenation b) Addition of a base
c) Addition of phosphate d) Hydrogenation

482. Complete hydrolysis of cellulose gives
a) D-fructose b) D-ribose c) D-glucose d) L-glucose

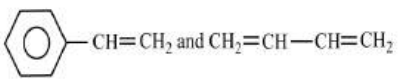
483. Drying oils are so called because they:

a) Are volatile and so evaporate rapidly
b) Are hygroscopic and so absorb moisture from the surroundings
c) Are easily hydrolysed by atmospheric moisture to give solid products
d) Are highly unsaturated and so undergo atmospheric oxidation to yield resinous residue and becomes hard solid

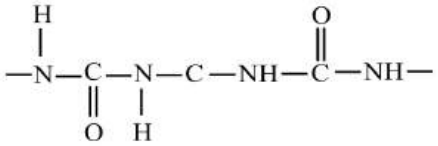
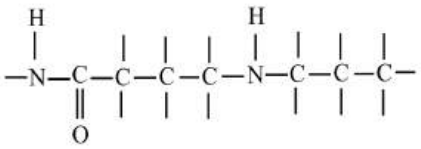
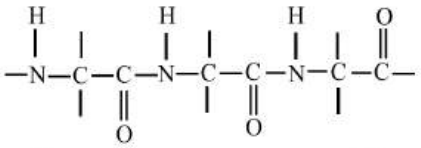
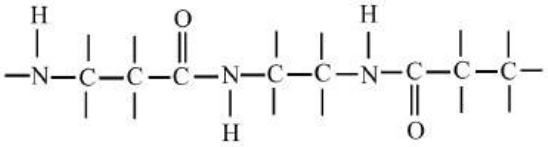
484. Cellulose is a:
a) Monosaccharide b) Disaccharide c) Polysaccharide d) None of these

485. An essential constituent of plant is:
a) Cellulose b) Glucose c) Sugar d) Raffinose

486. Maltose is made up of:
a) α-D glucose b) α and β-D glucose c) Glucose and fructose d) Fructose only

487. Which one of the following sets forms the biodegradable polymer?
a) $CH_2{=}CH{-}CN$ and $CH_2{=}CH{-}CH{=}CH_2$
b) $H_2N{-}CH_2{-}COOH$ and $H_2N{-}(CH_2)_5{-}COOH$
$HO{-}CH_2{-}CH_2{-}OH$ and
c) 
d) 

488. The chemical name of vitamin B_1 is
a) Ascorbic acid b) Riboflavin c) Pyridoxine d) Thiamine

489. Which of the following structure represents the peptide chain?
a) 
b) 
c) 
d) 

490. Pyranose structure of glucose is:
a) Hexagonal b) Pentagonal c) Linear d) Tetrahedral

491. Oils and fats in our food not only provide us energy but also act as carriers of certain vitamins such as:
a) A and B b) A and C c) B and C d) A and D

492. The aqueous solution of which vitamin is dark pink in colour:
a) B_1 b) B_2 c) B_6 d) B_{12}

493. Glucose gives the silver mirror test with ammoniacal solution of silver nitrate because it contains:
a) Aldehydes gp. b) Ester gp. c) Ketone gp. d) Amide gp.

494. Which of the following statements is not true?
a) Fats and oils are stored source of energy

b) They provide more energy than proteins or carbohydrates
c) They help in absorbing the vitamins A and D
d) Fats are soluble in water

495. Direct conversion of starch into glucose may be carried out by:
a) Fermentation with diastase
b) Fermentation with zymase
c) Heating it with dil. HCl
d) Fermentation with maltase

496. In alkaline medium, alanine exits predominantly as
a) Anion b) Zwitter ion c) Cation d) Covalent form

497. Double stranded DNA virus with 20,000 base pairs has nucleotides
a) 20,000 b) 10,000 c) 666 d) 40,000

498. A diabetic person carries a packet of glucose with him always because
a) Glucose reduces the blood sugar level slowly
b) Glucose increases the blood sugar level slowly
c) Glucose reduces the blood sugar level
d) Glucose increases the blood sugar level almost-instantaneously.

499. Ascorbic acid is:
a) Vitamin C b) Enzyme c) Protein d) Lipid

500. Which one is the complimentary base in RNA strand to the adenine base in DNA during protein synthesis?
a) Adenine b) Guanine c) Uracil d) Cytosine

501. The purine base present in RNA is
a) Guanine b) Thymine c) Cytosine d) Uracil

502. Which of the following is proteolytic enzyme?
a) Insulin b) Diastase c) Pepsin d) Adenine

503. The polymer formed with more than two monosaccharides units is known as:
a) Disaccharide b) Polysaccharide c) Both (a) and (B) d) None of these

504. Which lipid is not obtained by the hydrolysis of simple lipid and compound lipid from the following?
a) Cholesterols b) Neutral fats c) Carotenoid d) Terpenes

505. A soap can be obtained by the saponification of:
a) Liquid paraffin b) Coconut oil c) Lemongrass oil d) Sandal wood

506. Ribose is an example of
a) Ketohexose b) disaccharide c) Pentose d) Polysaccharide

507. Which of the following reagent used to identify fructose?
a) Neutral $FeCl_3$ b) $CHCl_3$/ alc KOH c) Ammoniacal $AgNO_3$ d) Iodine

508. Which of the following set consists only of essential amino acids?
a) Alanine, tyrosine, cystine b) Leucine, lysine, tryptophane
c) Alanine , glutamine, lycine d) Leucine, proline, glycine

509. Which of the following is present in animals like cow, buffaloes etc. to digest compound like paper, cloth etc.?
a) Urease b) Cellulose c) Silicones d) Sucrose

510. Enzyme trypsin converts:
a) Amino acids into proteins
b) Glucose into glycogens
c) Starch into sugar
d) Proteins into amino acids

511. Many of the carbohydrates are sweet in taste because:
a) They give sugars on hydrolysis
b) Of covalent bonding
c) Of electrovalent bonding

d) Of coordinate bonding

512. The highest calorific value is found in
a) Proteins b) Fats c) Vitamins d) Carbohydrates

513. Successive nucleotides are covalently linked through
a) Hydrogen bonds b) Phosphodiester bonds
c) Sulphide bonds d) Any type of bonds

514. Which differs from the rest?
a) Glucose b) Maltose c) Sucrose d) Lactose

515. Milk changes after digestion into
a) Cellulose b) Fructose c) Glucose d) Lactose

516. Which of the following monosaccharide is pentose?
a) Glucose b) Fructose c) Arabinose d) Galactose

517. The hydrogen bonding for the bases pairs of DNA are between
a) Amide carbonyl and $-NH_2$ only b) Amide $N-H$ and cyclic amine nitrogen only
c) Alcohols and carbonyls only d) Both (a) and (b)

518. Which of the following is involved in formation of heme?
a) Lysine b) Glycine c) Tyrosin d) Arginine

519. Cellulose trinitrate is used in preparation of:
a) Food b) Explosives c) Rayon d) None of these

520. Sucrose molecule is made up of
a) A gluco pyranose and a fructo pyranose b) A gluco pyranose and a fructo furanose
c) A gluco furanose and a fructo pyranose d) A gluco furanose and a fructo furanose

521. Wax used in gramophone records is :
a) Paraffin wax b) Bees wax c) Carnauba wax d) None of these

522. If one strand of DNA has the sequences T A T G A C T G , the sequence in the complimentary strand would be
a) A T A C A C T C b) A C G T T G A C c) A T A C T G A C d) A T A C T G C A

523. Which of the following compounds is not of the lipid series?
a) Fat b) Soap c) Oil d) Lard

524. Peptides are formed from
a) Aliphatic amines b) Carbohydrates c) α −amino acids d) Aromatic amines

525. Which of the following biomolecules acts as specific catalysts in biological reaction?
a) Carbohydrates b) Lipids c) Vitamins d) Enzymes

526. Wax is
a) Alcohol b) Ester c) Ketone d) Acid

527. Amylopectin is a polymer of
a) α-D glucose b) α-D fructose c) Lactose d) Amylose

528. After digestion, starch is converted into:
a) Glucose b) Fructose c) Lactose d) sucrose

529. Which one of the following is a peptide hormone?
a) Thyroxine b) Adrenaline c) Glucogen d) Testosterone

530. Which one of the following hormones contains iodine?
a) Adrenalin b) Testosterone c) Thyroxine d) Insulin

531. α-D(+)– glucose and β −D-(+) – glucose are
a) Conformers b) Epimers c) Anomers d) Enantiomers

532. The process of formation of RNA from DNA is known as:
a) Translation b) Transcription c) Replication d) Mutation

533. α-glucose and β-glucose are:
a) Isomers b) Anomers c) Epimers d) Tautomers

534. One gram of fat gives:

a) Same amount of energy as one gram of carbohydrate
b) Same amount of energy as one gram of protein
c) More than twice the energy as one gram of carbohydrate or protein
d) None of the above

535. Insulin production and its action in human body are responsible for the level of diabetes. This compound belongs to which of the following categories?
a) A co-enzyme b) A hormone c) An enzyme d) An antibiotic

536. Cellulose is a polymer of
a) Glucose b) Fructose c) Ribose d) Sucrose

537. Common table sugar is more formally described as:
a) Glucose b) Lactose c) Maltose d) Sucrose

538. Glucose is used in:
a) Manufacture of vitamin C
b) As preservative
c) In the manufacture of alcohol
d) All of the above

539. Methyl α −D-glucoside and methyl- β −D-glucoside are
a) Epimers b) Anomers
c) Enantiomers d) Conformational diastereomers

540. Ring structure of glucose is due to formation of hemiacetal and ring formation between:
a) C_1 and C_5 b) C_1 and C_4 c) C_1 and C_3 d) C_3 and C_4

541. Monomer of nucleic acid is
a) Nucleotides b) Nucleoxides c) Aminoacids d) Carboxylic acid

542. An example of a protein which acts as a hormone is
a) Casein b) Oxytocin c) Trypsin d) Keratin

543. An example for a saturated fatty acid, presents in nature is
a) Oleic acid b) Linoleic acid c) Linolenic acid d) Palmitic acid

544. Charagaff's rule states that in an organism
a) Amount of adenine (A) is equal to that of thymine (T) and amount of guanine (G) is equal to that of cytocine (C)
b) Amount of adenine (A) is equal to that of guanine (G) and the amount of thymine (T) is equal to that of guanine (G)
c) Amount of adenine (A) is equal to that of cytocine (C) and the amount of thymine (T) is equal to that of guanine (G)
d) Amount of all bases are equal

545. Which of the following gives reddish brown precipitate with dilute solution of resorcinol in dilute HCl?
a) Glucose b) Fructose c) Lactose d) Maltose

546. Washing soaps are potassium and sodium salts of:
a) Formic , acetic, and maleic acid
b) Oleic, palmitic and stearic acid
c) Sulphur, chlorine and fluorine
d) Acetone, ketone and quinones

547. Which of the following elements are necessary for maintaining fluid balance in the body?
a) Calcium and magnesium
b) Potassium and sodium
c) Iron and magnesium
d) None of the above

548. Vitamin A is present in:
a) Liver b) Milk c) Green vegetables d) All of these

549. Molisch test is made for the detection of :

a) Alkyl halide b) Carbohydrate c) Alkaloid d) Fat

550. The disease 'diabetes mellitus' is caused by the deficiency of:
a) Iodine
b) Insulin
c) Phenyl alanine hydroxylase
d) lysine

551. Starch is a polymer of
a) Sucrose b) Maltose c) Glucose d) Hexose

552. Bases common to DNA and RNA are:
a) Adenine, cytosine, uracil
b) Guanine, adenine, cytosine
c) Guanine, uracil, thymine
d) Adenine, thymine, guanine

553. The correct statement in respect of protein haemoglobin is that it
a) Acts as an oxygen carrier in the blood
b) Forms antibodies and offers resistance to diseases
c) Function as a catalyst for biological reactions
d) Maintains blood sugar level

554. A compound of non-sugar and glucose which yields glucose on hydrolysis found in plants, is called:
a) Alkoxide b) Glucoside c) Glycoside d) None of these

555. The enzyme which facilitates internal rearrangement in 3-phosphoglyceric acid to form 2-phosphoglyceric acid is
a) Aldolase
b) Triose phosphate isomerase
c) Phosphoglycero mutase
d) Pyruvate kinase

556. An example of protein is
a) Narvon b) Lecithin c) Cellulose d) Insulin

557. Pick out the one which does not belong to the family
a) Pepsin b) Cellulose c) Ptyalin d) lipase

558. The hormone that helps in the conversion of glucose to glycogen is
a) Cortisone b) Bile acids c) Adrenaline d) Insulin

559. The sugar present in fruits is:
a) Fructose b) Glucose c) Sucrose d) Galactose

560. Which one is a fibrous protein?
a) Globulin b) Collagen c) Hordein d) Glutin

561. Deficiency of which vitamin can cause night blindness an eye disease?
a) Vitamin B_6 b) Vitamin C c) Vitamin B_{12} d) Vitamin A

562. Which of the following base is linked, as one strand of DNA to cytosine of the other strand by hydrogen bonds?
a) Guanine b) Adenine c) Thymine d) Uracil

563. A nucleoside on hydrolysis gives
a) A heterocyclic base and orthophosphoric acid
b) An aldopentose, a heterocyclic base and orthophosphoric acid
c) An aldopentose and a heterocyclic base
d) An aldopentose and orthophosphoric acid

564. Number of chiral carbons in β-D-(+) glucose is:
a) 5 b) 6 c) 3 d) 4

565. Colour of osazone of glucose is
a) Red b) Brown c) Yellow d) Orange

566. Rancidity of butter is due to the formation of:
a) Butyric acid b) Formaldehyde c) Acetic acid d) Benzoic acid

567. The enzyme which hydrolysis triglycerides to fatty acids and glycerol is called
a) Maltase b) Lipase c) Zymase d) Pepsin

568. A DNA nucleotide chain has AGCTTCGA sequence. The nucleotide sequence of other chain would be
a) TCGAAGCT b) GCTAAGCT c) TAGCATAT d) GATCCTAG
569. Blood sugar is the same as:
a) Fructose b) Galactose c) Glucose d) Glycogen
570. Rancidity of oils and fats is due to:
a) Partial hydrolysis by the action of atmospheric moisture and oxidation of fatty acids to foul smelling products
b) Absorption of foul smelling ingredients from the air
c) Fermentation caused by microorganisms
d) Slow decomposition of fatty acids
571. Who pointed out peptide linkage in proteins?
a) Kekule b) Hofmann c) Fisher d) Cannizzaro
572. The charring of sugar when it is treated with conc. H_2SO_4 is due to
a) Oxidation b) Reduction c) Dehydration d) Hydrolysis
573. The vitamin which is water soluble:
a) Vitamin E b) Vitamin D c) Vitamin K d) Vitamin B
574. A compound gives negative test with ninhydrin and positive test with Benedict's solution. The compound is
a) A protein b) An amino acid c) A lipid d) A mono saccharide
575. Proteins are composed of:
a) Nucleotides b) Nucleosides c) Dipeptides d) Amino acids
576. Glucose will show mutarotation when solvent is :
a) Acidic b) Basic c) Neutral d) Amphioprotic
577. Which of the following enzymes are used to convert starch into alcohol?
a) Maltase, diastase
b) Invertase, zymase
c) Diastase, maltase, zymase
d) Invertase, diastase, zymase
578. Which of the following is not simple protein?
a) Albumin b) Globulin c) Glutinin d) All of these
579. The enzyme pepsin hydrolyses:
a) Proteins to amino acids
b) Fats to fatty acids
c) Glucose to ethyl alcohol
d) Polysaccharides to monosaccharides
580. Which of the following is an amphoteric acid?
a) Glycine b) Salicylic acid c) Benzoic acid d) Citric acid
581. *Iso*-electric is a
a) Specific temperature
b) Suitable concentration of amino acid
c) Hydrogen ion concentration that does not allow migration of amino acid under electric field
d) Melting point of an amino acid under the influence of electric field
582. Which enzyme is present in salive?
a) Urease b) Maltase c) Lactase d) Amylase
583. α −maltose consists of
a) One α −D-glucopyranose unit and one β −D-glucopyranose uniy with 1-2 glyosidic linkage
b) Two α -D-glucopyranose units with 1-2 glycosidic linkage.
c) Two β-D-glucopyranose units with 1-4 glycosidic linkage
d) Two α −D-glucopyranose units with 1-4 glycosidic linkage
584. An alkali salt of palmitic acid is known as:

a) An alkoxide b) An ester c) A soap d) An epoxide

585. A compound which catalyses a chemical reaction in a living organism is called a/an:
a) Carbohydrate b) Enzyme c) Lipid d) Vitamin

586. The carbohydrate that will yield glucose and fructose on homogeneous catalytic hydrolysis in presence of dilute sulphuric acid is
a) Cellulose b) Maltose c) Starch d) Sucrose

587. All drying oils contain a large amount of:
a) Linoleic acid b) Linolenic acid c) Both (a) and (b) d) None of these

588. Which is capable to self replication?
a) Enzymes b) DNA polymerase c) DNA ligase d) DNA

589. Which destroy antigens?
a) Insulin b) Antibodies c) Chromoprotein d) Phosphoprotein

590. Aqueous solution of soap is:
a) Acidic b) Basic c) Neutral d) Amphoteric

591. A detergent is a:
a) Cleansing agent b) Drug c) Catalyst d) Soap

592. Which one is not a glyceride?
a) Fat b) Oil c) Phospholipid d) Soap

593. Which carbohydrate is used in silvering of mirrors?
a) Sucrose b) Starch c) Glucose d) Fructose

594. Biuret test is not given by
a) Carbohydrates b) Polypeptides c) Urea d) Proteins

595. Structurally a biodegradable detergent should contain a:
a) Normal alkyl chain b) Branched alkyl chain c) Hexyl side chain d) Cyclohexyl side chain

596. Starch is polymer of:
a) Fructose b) Glucose c) Lactose d) None of these

597. The one which has least iodine value is
a) Sunflower oil b) Ginger oil c) Ghee d) Groundnut oil

598. A vitamin which plays a vital role in the coagulating property of blood is:
a) Vitamin A b) Vitamin D c) Vitamin E d) Vitamin K

599. Oligosaccharides contain.... Simple sugar units:
a) 2 to 10 b) 4 to 8 c) 6 to 12 d) 6 to 10

600. Dalda is prepared from oils by
a) Oxidation b) Reduction c) Hydrolysis d) Distillation

601. The anomeric carbon in D(+) glucose is
a) C-1 carbon b) C-2 carbon c) C-5 carbon d) C-6 carbon

602. DNA template sequence of CTGATAGC is transcribed over m-RNA as
a) GUCTUTCG b) GACUAUCG c) GAUTATUG d) UACTATCU

603. Ascorbic acid is also known as
a) Vitamin A b) Vitamin B c) Vitamin C d) Vitamin D

604. The main point of difference between DNA and RNA is:
a) Presence of thymine in DNA and RNA
b) Presence of deoxyribose and thymine in DNA, ribose and uracil in RNA
c) Presence of ribose and thymine in DNA, deoxyribose and uracil in RNA
d) Presence of deoxyribose in DNA and ribose in RNA

605. The substance constituting more than 80% of cell contents is:
a) Protein b) Mineral c) Fat d) Water

606. Helical structure of protein is stablilised by
a) Peptide bond b) Hydrogen bond c) Van der Waal's force d) Dipole association

607. Which is sweetest among known sugars?

a) Sucrose b) Fructose c) Glucose d) Lactose

608. Saccharin is :
a) Hexose b) Reducing sugar c) Glucoside d) None of these

609. Which one is involved in the formation of nicotinamide and indole -3-acetic acid?
a) Lysine b) Tryptophan c) Tyrosine d) Glutamic acid

610. The polysaccharide used in the manufacture of paper is:
a) Cellulose b) Starch c) Glucose d) Sucrose

611. Acetyl derivative of which carbohydrate is used in sizing of paper industry?
a) Glucose b) Fructose c) Lactose d) Starch

612. Nucleic acid are polymers of
a) Nucleosides b) Globulins c) Nucleons d) Nucleotides

613. Which of the following doesn't form an oxime?
a) Glucose b) Glucose pentaacetate c) Arabinose d) Galactose

614. Emil Fischer was awarded Nobel Prize for his work on:
a) Sugars and purines synthesis
b) Ammonia discovery
c) Optical activity
d) Alkaloid synthesis

615. A source of oleic acid is:
a) Animal fat b) Corn oil c) Linseed oil d) None of these

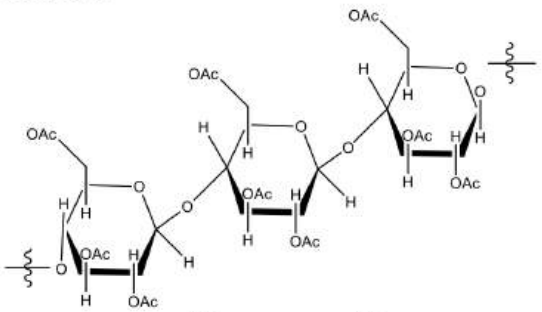
616. A Zwitter ion is
a) Negatively charged ion without metal atom
b) A heavy ion with a small charge on it.
c) An ion with positive and negative charge at different points on it.
d) A positively charged ion without a metal atom.

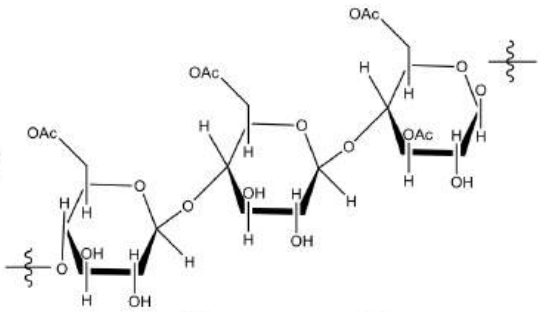
617. Milk changes after digestion into
a) Glucose b) Lactose c) Fructose d) Glucogen

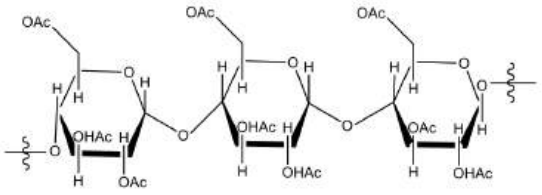
618. Glycogen is a branched polymer of:
a) α-glucose b) β-glucose c) α-fructose d) None of these

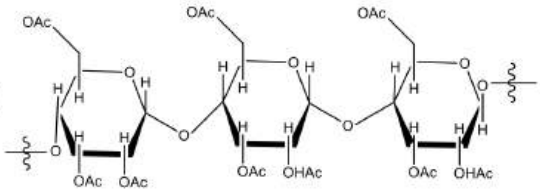
619. The sequence in the structure of nucleic acid is:
a) Base +phosphate group + pentose
b) Phosphate group + pentose + base
c) Pentose + base + phosphate group
d) All of the above

620. Cellulose upon acetylation with excess acetic anhydride/H_2SO_4 (catalytic) gives cellulose triacetate whose structure is

a)


b)


c)


d)


621. Which one of the following statements about amino acids is not true?

a) They are constituents of all protein.
b) They are all high melting solids.
c) Most naturally occurring amino acids have D-configurations
d) They are characterized by isoelectric point.

622. Which amino acid has no asymmetric carbon?
a) Histidine b) Glycine c) α-alanine d) Threonine

623. The best source of vitamin A is
a) Wheat b) Beans c) Carrots d) Oranges

624. Which set is the correct pairing set (or contains complementary pairs) responsible for the structure of DNA?
(A = adenine, G = guanine, C = cytosine, T = thymine, U = uracil)
a) A—T, G—C b) A—C, G—T c) A—G, C—T d) A—U, G—C

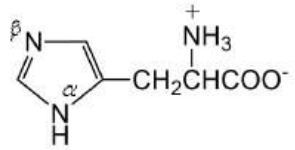
625. The pyrimidine bases presents in DNA are
a) Cytosine and adenine b) Cytosine and guanine c) Cytosine and thymine d) Cytosine and uracil

626. Identify the product 'C' in the following series of reactions
Glucose $\xrightarrow{HCN} A \xrightarrow{H_2O} B \xrightarrow{HI} C$
a) Heptanoic acid b) Hexanoic acid c) α-methyl caproic acid d) None of these

627. Toilet soap is:
a) A mixture of calcium and sodium salts of higher fatty acids
b) A mixture of potassium stearate and glycerol
c) A mixture of sodium salts of higher fatty acids
d) A mixture of potassium salts of higher fatty acids

628. Degree of unsaturation in oils and fats is measured in terms of:
a) Saponification value b) Iodine value c) R/M value d) Acetyl value

629. Which of the nitrogen of histidine is first protonated?



a) α b) β c) Both (a) and (b) d) None of these

630. Carbohydrates containing more than 10 simple units of sugar are called:
a) Monosaccharides b) Disaccharides c) Trisaccharides d) Polysaccharides

631. An optically active compound A, gave an $[\alpha]_D^{25} = 30°$, while a mixture of A and its enantiomer B, gave $[\alpha]_D^{25} = +15°$. The ratio of A and B in the mixture is
a) 1 to 3 b) 3 to 1 c) 1 to 2 d) 2 to 1

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

633. Insulin has 51amino acids in two polypeptide chains which are linked by:
a) One sulphide bond
b) One disulphide bond
c) Two disulphide bonds
d) Three disulphide bonds

634. DNA and RNA are chiral molecule due to the presence of:
a) Chiral bases b) Phosphate ester unit c) D-sugar component d) L-sugar component

635. A glyceride is:
a) A compound of glycerol with a metal
b) A molecular compound of glycerol with a metal salt
c) An ether formed by glycerol
d) An ester of glycerol with fatty acids

636. Insulin production and its action in human body are responsible for the level of diabetes. This compound belongs to which of the following categories?
a) A coenzyme b) A hormone c) An enzyme d) An antibiotic

637. Which one of the following does not correctly match with each other?
a) Silk-polyamide b) Lipase–enzyme c) Butter–fat d) Oxytocin-enzyme

638. When vegetable oils react with hydrogen in presence of finely divided nickel catalyst we get:
a) Saturated fat b) CO_2 and H_2O c) Washing soap d) None of these

639. The main structural feature of protein is:
a) The ester linkage b) The ether linkage c) The peptide linkage d) All of these

640. Which is a protein?
a) Gelatin b) Casein c) Plasma protein d) All of these

641. Which of the following hormones is excreted from adrenal cortex?
a) Cortisone b) Estrogen c) Progesterone d) Testosterone

642. What is not true for enzymes?
a) They are powerful biocatalysts
b) They are all proteins
c) They are highly specific in their action
d) They do not lose activity on heating

643. One of the essential alpha amino acid is:
a) Lysine b) Glycine c) Serine d) Proline

644. The amino acid which is not optically active is
a) Lactic acid b) Serine c) Alanine d) Glycine

645. How glucose is related with fructose?
a) Functional group isomerism b) Rotamers
c) Position isomerism d) Geometrical isomerism

646. The chemical messenger produced in the endocrine (ductless) glands are grouped as:
a) Polypeptides b) Hormones c) Bile salts d) Purines

647. The ultimate product of the hydrolysis of starch is:
a) Glucose b) Fructose c) Sucrose d) None of these

648. Which of the following is not correct?
a) Chlorophyll is responsible for the synthesis of carbohydrates in plants
b) The compound formed in the addition of oxygen to haemoglobin is called oxyhaemoglobin
c) Acetyl salicylic acid is known aspirin
d) The metal ion present in vitamin B_{12} is Mg^{2+}

649. Hormones function as:
a) Chemical messengers b) Co-enzymes c) Provitamins d) All of these

650. Hardening of fat (lipid) is due to
a) Hydrogenation b) Dehydrogenation
c) Halogenation d) Dehydrohalogenation

651. Which of the following monosaccharide is pentose?
a) Glucose b) Fructose c) Arabinose d) Galactose

652. The function of DNA in an organism is
a) To assist in the synthesis of RNA molecule.
b) To store information of heredity characteristics
c) To assist in the synthesis of proteins and polypeptides
d) All of the above

653. Which of the following biomolecules contain non-transition metal ion?
a) Vitamin B_{12} b) Chlorophyll c) Haemoglobin d) Insulin

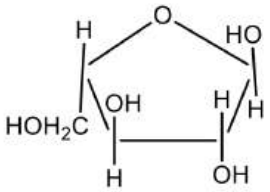
654. The secondary structure of a protein refers to
a) α −helical backbone
b) Hydrophobic interaction
c) Sequence of α −amino acids
d) Fixed configuration of the polypeptide backbone

655. Raw linseed oil is present in a paint as:
a) Drier b) Vehicle c) Lacquer d) Thinner

656. Which of the following contains vitamin D?
a) Calciferol b) Keratin c) Tocopherol d) None of these

657. Which protein is main constituent of milk?
a) Keratin b) Casein c) Myosin d) Insulin

658. Which set of terms correctly identifies the carbohydrate shown?



1. Pentose 2. Hexose
3. Aldose 4. Ketose
5. Pyranose

a) 1, 3 and 6 b) 1, 3 and 5 c) 2, 3 and 5 d) 2, 3 and 6

659. Which of the following is not a function of proteins?
a) Nail formation b) Skin formation
c) Muscle formation d) Providing energy for metabolism

660. α −and β − glucose differ in the orientation of -OH group around
a) C_1 b) C_2 c) C_3 d) C_4

661. Which one of the following is an ester?
a) Coconut oil b) Kerosene oil c) Soap d) Glycerine

662. The carbohydrate which serves as reserve glucose in body is:
a) Sucrose b) Starch c) Glycogen d) fructose

663. Which of the following compounds is responsible for the transmission of heredity characters?
a) RNA b) DNA c) Glucose d) Haemoglobin

BIOMOLECULES

: ANSWER KEY :

1)	d	2)	c	3)	b	4)	a	165)	b	166)	c	167)	c	168)	c
5)	d	6)	b	7)	a	8)	b	169)	c	170)	b	171)	a	172)	b
9)	c	10)	b	11)	b	12)	c	173)	c	174)	c	175)	b	176)	b
13)	a	14)	b	15)	c	16)	a	177)	c	178)	c	179)	d	180)	b
17)	d	18)	d	19)	b	20)	d	181)	d	182)	c	183)	a	184)	b
21)	c	22)	b	23)	c	24)	b	185)	d	186)	a	187)	c	188)	b
25)	d	26)	a	27)	b	28)	a	189)	c	190)	c	191)	b	192)	d
29)	d	30)	b	31)	b	32)	b	193)	d	194)	c	195)	a	196)	b
33)	b	34)	d	35)	c	36)	a	197)	d	198)	a	199)	d	200)	a
37)	d	38)	c	39)	d	40)	b	201)	d	202)	d	203)	c	204)	a
41)	c	42)	c	43)	a	44)	d	205)	d	206)	c	207)	a	208)	a
45)	d	46)	a	47)	c	48)	c	209)	d	210)	c	211)	a	212)	d
49)	b	50)	d	51)	a	52)	b	213)	d	214)	c	215)	b	216)	d
53)	d	54)	d	55)	b	56)	c	217)	b	218)	c	219)	c	220)	b
57)	a	58)	d	59)	b	60)	d	221)	c	222)	d	223)	a	224)	b
61)	d	62)	c	63)	c	64)	d	225)	c	226)	d	227)	a	228)	b
65)	b	66)	b	67)	c	68)	a	229)	c	230)	d	231)	c	232)	c
69)	d	70)	d	71)	c	72)	c	233)	d	234)	b	235)	b	236)	d
73)	d	74)	a	75)	a	76)	b	237)	b	238)	d	239)	d	240)	a
77)	b	78)	a	79)	b	80)	a	241)	c	242)	c	243)	a	244)	c
81)	a	82)	b	83)	c	84)	c	245)	d	246)	c	247)	b	248)	a
85)	b	86)	d	87)	d	88)	a	249)	b	250)	c	251)	a	252)	b
89)	d	90)	a	91)	d	92)	d	253)	b	254)	c	255)	c	256)	b
93)	c	94)	c	95)	d	96)	d	257)	d	258)	a	259)	d	260)	d
97)	c	98)	a	99)	d	100)	b	261)	d	262)	c	263)	c	264)	b
101)	c	102)	a	103)	d	104)	b	265)	b	266)	d	267)	b	268)	c
105)	b	106)	a	107)	c	108)	b	269)	c	270)	c	271)	c	272)	b
109)	b	110)	c	111)	b	112)	d	273)	a	274)	c	275)	c	276)	a
113)	b	114)	a	115)	a	116)	d	277)	c	278)	b	279)	d	280)	d
117)	b	118)	d	119)	c	120)	a	281)	c	282)	d	283)	a	284)	b
121)	b	122)	a	123)	b	124)	b	285)	b	286)	c	287)	c	288)	d
125)	a	126)	d	127)	c	128)	b	289)	c	290)	d	291)	a	292)	d
129)	b	130)	a	131)	d	132)	b	293)	a	294)	d	295)	b	296)	a
133)	a	134)	b	135)	c	136)	a	297)	c	298)	d	299)	c	300)	c
137)	d	138)	b	139)	a	140)	a	301)	d	302)	d	303)	a	304)	c
141)	c	142)	b	143)	d	144)	a	305)	d	306)	c	307)	c	308)	c
145)	b	146)	a	147)	a	148)	b	309)	c	310)	a	311)	d	312)	b
149)	a	150)	a	151)	a	152)	d	313)	d	314)	d	315)	b	316)	a
153)	c	154)	b	155)	d	156)	d	317)	d	318)	d	319)	d	320)	a
157)	b	158)	b	159)	c	160)	c	321)	d	322)	b	323)	d	324)	c
161)	a	162)	c	163)	c	164)	d	325)	c	326)	d	327)	d	328)	b

329)	a	330)	b	331)	a	332)	c	501)	a	502)	c	503)	b	504)	b
333)	c	334)	c	335)	b	336)	a	505)	b	506)	c	507)	c	508)	b
337)	a	338)	b	339)	a	340)	a	509)	b	510)	d	511)	a	512)	b
341)	a	342)	a	343)	a	344)	a	513)	b	514)	a	515)	c	516)	c
345)	a	346)	c	347)	a	348)	d	517)	d	518)	b	519)	b	520)	b
349)	d	350)	c	351)	a	352)	d	521)	c	522)	c	523)	b	524)	c
353)	d	354)	d	355)	b	356)	a	525)	d	526)	b	527)	a	528)	a
357)	b	358)	a	359)	b	360)	a	529)	a	530)	c	531)	c	532)	a
361)	d	362)	c	363)	b	364)	d	533)	b	534)	c	535)	b	536)	a
365)	b	366)	d	367)	a	368)	a	537)	d	538)	d	539)	b	540)	a
369)	a	370)	c	371)	b	372)	c	541)	a	542)	b	543)	d	544)	a
373)	d	374)	c	375)	c	376)	a	545)	b	546)	b	547)	b	548)	d
377)	c	378)	c	379)	b	380)	c	549)	b	550)	b	551)	c	552)	b
381)	d	382)	c	383)	a	384)	a	553)	a	554)	b	555)	c	556)	d
385)	b	386)	d	387)	c	388)	d	557)	b	558)	d	559)	a	560)	b
389)	b	390)	b	391)	c	392)	d	561)	d	562)	c	563)	c	564)	d
393)	b	394)	b	395)	c	396)	b	565)	c	566)	a	567)	b	568)	a
397)	c	398)	a	399)	c	400)	a	569)	c	570)	a	571)	c	572)	c
401)	d	402)	b	403)	b	404)	c	573)	c	574)	d	575)	d	576)	d
405)	d	406)	d	407)	a	408)	b	577)	c	578)	d	579)	a	580)	a
409)	c	410)	d	411)	a	412)	c	581)	c	582)	d	583)	d	584)	c
413)	a	414)	a	415)	b	416)	a	585)	b	586)	d	587)	c	588)	d
417)	b	418)	a	419)	d	420)	a	589)	b	590)	b	591)	a	592)	d
421)	a	422)	d	423)	c	424)	c	593)	c	594)	a	595)	a	596)	b
425)	b	426)	a	427)	d	428)	b	597)	c	598)	d	599)	a	600)	b
429)	b	430)	d	431)	d	432)	a	601)	a	602)	b	603)	c	604)	b
433)	d	434)	d	435)	a	436)	a	605)	d	606)	b	607)	b	608)	d
437)	a	438)	d	439)	a	440)	d	609)	b	610)	a	611)	d	612)	d
441)	b	442)	b	443)	d	444)	a	613)	b	614)	a	615)	b	616)	c
445)	b	446)	c	447)	d	448)	d	617)	a	618)	a	619)	c	620)	a
449)	c	450)	d	451)	b	452)	c	621)	c	622)	b	623)	c	624)	a
453)	d	454)	a	455)	b	456)	b	625)	c	626)	a	627)	d	628)	b
457)	a	458)	c	459)	d	460)	c	629)	b	630)	d	631)	b	632)	a
461)	b	462)	d	463)	a	464)	d	633)	c	634)	c	635)	d	636)	b
465)	a	466)	a	467)	b	468)	b	637)	d	638)	a	639)	c	640)	d
469)	c	470)	d	471)	a	472)	b	641)	a	642)	d	643)	a	644)	d
473)	a	474)	b	475)	a	476)	d	645)	a	646)	b	647)	a	648)	d
477)	a	478)	b	479)	d	480)	c	649)	a	650)	a	651)	c	652)	d
481)	c	482)	c	483)	d	484)	c	653)	b	654)	a	655)	b	656)	a
485)	a	486)	a	487)	b	488)	d	657)	b	658)	a	659)	d	660)	a
489)	c	490)	a	491)	d	492)	d	661)	a	662)	c	663)	b		
493)	a	494)	d	495)	c	496)	a								
497)	d	498)	d	499)	a	500)	d								

BIOMOLECULES

: HINTS AND SOLUTIONS :

1 **(d)**
Enzymes have well defined active sites and their action are specific in nature. They are called biological catalysts and work at optimum temperature between 25°C to 40°C

2 **(c)**
Enzyme catalysed reactions are highly specific in nature.

4 **(a)**
Vitamin A is also called xerophythol or retinol.

5 **(d)**
Inulin is a polysaccharide made up of fructose units.

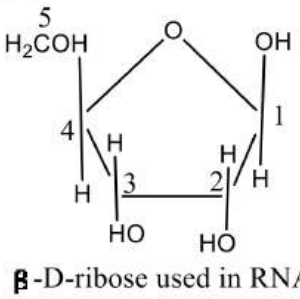
6 **(b)**
The reaction with phenyl hydrazone gives same osazone because glucose and fructose differ only on carbon atoms 1 and 2 which are involved in osazone formation.

7 **(a)**
The sugar which cannot reduce Fehling solution and Tollen's reagent are called non-reducing sugars *e.g.,* sucrose and all polysaccharides.

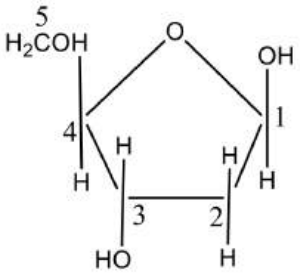
8 **(b)**
Glucose and mannose are epimers of each other.

9 **(c)**
Testosterone is an hormone.

10 **(b)**



β-D-ribose used in RNA;
At 2nd carbon-OH group is present



β-D-deoxyribose used in DNA
At 2nd carbon-OH group is missing.

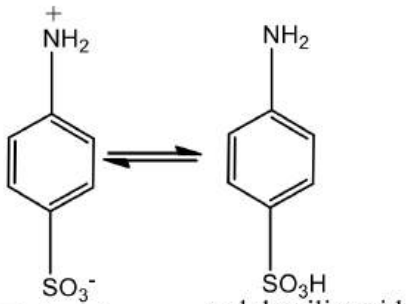
11 **(b)**
Commercially it is obtained from pine trees.

12 **(c)**
When protein is boiled with a dilute solution of ninhydrin (triketo hydrindin), a blue colour is produced.

$$\text{Protein} + \text{Ninhydrin solution} \xrightarrow{\Delta} \text{Blue colour}$$

13 **(a)**
Haemoglobin containing iron is a transport protein found in RBC of most of the animals. It is responsible for the transport of oxygen from the lungs to the cells and for removal of waste CO_2 from the cells which it returns to lungs.

15 **(c)**
The compounds having $-NH_2$ and $-COOH$ or $-NH_2$ and $-SO_3H$ groups exist as Zwitter ion *e.g.,*



Zwitter ion sulphanilic acid

16 **(a)**
ATP provides energy during metabolic changes.

17 **(d)**
It is 160 times sweeter than sucrose.

18 **(d)**

The formation of DNA from older one is called replication. It requires a DNA template, a primer deoxyribonucleoside triphosphates (dATP, dGTP, dTTP, dCTP). Mg^{2+}, DNA unwinding protein supper halix releasing protein. It is also called as DNA multiplication.

19 **(b)**

Glyceraldehyde ($CH_2OH - CHOH - CHO$) is the first member of monosaccharide.

20 **(d)**

The sugars which doesn't reduce Tollen's reagent, Fehling solution and Benedict solution are known non-reducing sugars. Sucrose is a non-reducing sugar.

21 **(c)**

Follow text.

22 **(b)**

Natural glucose is dextrorotatory and thus glucose is also known as dextrose

23 **(c)**

Soaps are salts of higher fatty acids.

24 **(b)**

Cellulose is a linear polymer of β-glucose.

25 **(d)**

All are conjugated proteins.

Conjugated proteins are composed of simple proteins and non-protein material. The non-protein material is called **prosthetic group** or **cofactor**. These proteins on hydrolysis yield amino acids and non-protein material. Examples are: mucin in saliva (Prosthetic group, carbohydrate), casein in milk (Prosthetic group, phosphoric acid), haemoglobin in blood (Prosthetic group, iron pigment).

27 **(b)**

Starch on bacterial action produces acetone as one product.

28 **(a)**

$$\text{Fat} + \text{NaOH or KOH} \longrightarrow \begin{array}{c} CH_2OH \\ | \\ CHOH \\ | \\ CH_2OH \\ \text{Glycerol} \end{array} \text{ sodium or potassium}$$

Salt of fatty acid.

∴ Glycerol is alcohol, formed by hydrolysis of fats.

29 **(d)**

Sucrose formation involves α-D Glucopyranose and β-D fructo- furanose.

30 **(b)**

All are conjugated proteins.

Conjugated proteins are composed of simple proteins and non-protein material. The non-protein material is called **prosthetic group** or **cofactor**. These proteins on hydrolysis yield amino acids and non-protein material. Examples are: mucin in saliva (Prosthetic group, carbohydrate), casein in milk (Prosthetic group, phosphoric acid), haemoglobin in blood (Prosthetic group, iron pigment).

31 **(b)**

$$\underset{\text{Glucose}}{C_6H_{12}O_6} \xrightarrow{\text{Zymase}} \underset{\text{alcohol}}{2C_2H_5OH} + 2CO_2$$

32 **(b)**

This is Molisch's test of carbohydrates. In this experiment, violet ring is formed at the junction of two liquids.

33 **(b)**

Molisch's test is used in testing of carbohydrate and is not used in testing of protein.

36 **(a)**

A sequence of three nucleotides in messenger RNA makes a codon for an amino acid because four bases in messenger RNA adenine, cytosine, guanine and uracil have been shown to act in the form of triplet.

37 **(d)**

Genes are responsible for synthesis of protein.

38 **(c)**

N is present in all vitamins B, (i.e., $B_1, B_2, B_3, B_5, B_6, B_{12}$).

40 **(b)**

$$\text{Starch} + \text{iodine} \rightarrow \text{blue colour}$$
$$\xrightarrow{\Delta} \text{blue colour disappears}$$
$$\xrightarrow{\text{Cool}} \text{blue colour reappears}$$

So, iodine test is given by starch.

41 **(c)**

Glucose has five —OH gp. and thus, acylation occurs at all —OH units.

42 **(c)**

It is a fact.

43 **(a)**

All are functions of DNA.

44 **(d)**

Ptyalin enzyme is found in saliva.

46 **(a)**

DNA has nucleotide unit, i.e., sugar + base + H_3PO_4.

49 **(b)**
Wax is ester.

50 **(d)**
Waxes are the esters of higher fatty acids with higher monohydric alcohols such as mericyl and cetyl alcohols.

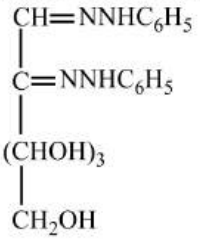
51 **(a)**
Nucleic acids (RNA and DNA) are polymers of nucleotides.

52 **(b)**
Both have molecular formula $C_{12}H_{22}O_{11}$.

53 **(d)**
All these are amino acids.

54 **(d)**
Glycogen is polysaccharide with monomeric units of glucose.

56 **(c)**
One molecule of glucose reacts with 3 molecules of phenyl hydrazine to form glucosazone.



57 **(a)**
Animal starch is glycogen, a polysaccharide having glucose units and is synthesized in liver.

58 **(d)**
Fructose is $CH_2OH \cdot CO \cdot (CHOH)_3\ CH_2OH$.

59 **(b)**
Aa mixture of amylase and amylopectin is called starch. Amylase is a water soluble fraction while amylopectin is water insoluble fraction.

60 **(d)**
Proteins are soluble in benzene.

61 **(d)**
All are uses of dextrins.

62 **(c)**
This is Molisch test for carbohydrate.

65 **(b)**
The calorific value is the energy released by combustion of 1 g of a substance. The order is:
Fat > Carbohydrate > Protein.

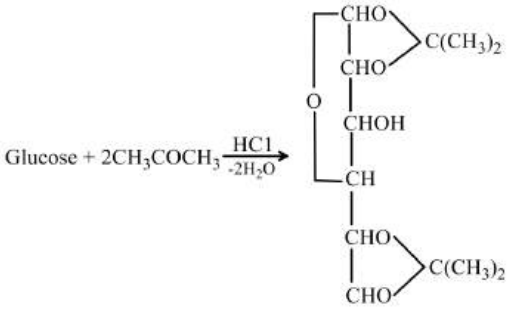
66 **(b)**
Antibiotics are synthesized drugs, not proteins; rest all are proteins.

67 **(c)**
Sodium alkyl sulphate. These contain $-SO_4$ gp.

68 **(a)**
Simplest carbohydrate is glyceraldehyde with 3 C atom.

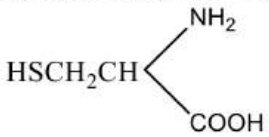
69 **(d)**
$\beta - D -$glucose D-glucose $a - D -$glucose
$(\approx 64\%)$ (open chain $\approx 0.02\%$) $(\approx 34\%)$

70 **(d)**
Glucose reacts with acetone to form 1,2,5,6-di-isopropylidene glucose.



This proves furanose structure.

71 **(c)**
Structure of cysteine is



72 **(c)**
These are oils which on exposure to air changes into hard solids, e.g, linseed oil. All drying oils contain a large proportion of the unsaturated acids i.e., linoleic $C_{17}H_{31}COOH$ and linolenic acid $C_{17}H_{29}COOH$. This property is used in paint industry as vehicle for paints.

74 **(a)**
Insulin, an hormonal protein secreted by pancreas controls the metabolism of glucose.

76 **(b)**
Oils are unsaturated esters (liquid); fats are saturated esters.

79 **(b)**
A deficiency of vitamin C causes bleeding gums.

80 **(a)**
Glucose is a monosaccharide. The chemical composition of glucose is $C_6H_{12}O_6$.

81 **(a)**
Vitamin B_6 is called pyridoxin. It is found in fruits, green-vegetables, milk etc. Due to its deficiency, anaemia disease is caused.

82 **(b)**
Cellulose is a polysaccharide and is insoluble in water.

83 **(c)**

Mother's milk is capable of producing antibodies.

84 **(c)**
Traces of Zn are present in insulin.

85 **(b)**
A nucleoside made up of sugar ribose + base adenine is called adenosine.

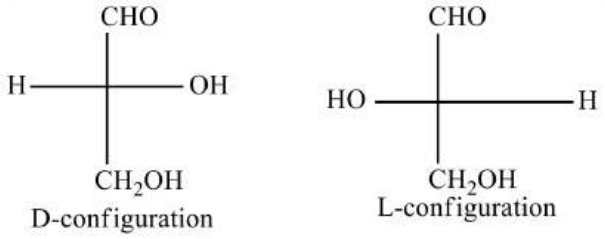
86 **(d)**
The two chains are complimentary to each other.

87 **(d)**
Hormones are either proteins or steroids or simple organic compounds produced by the endocrine glands and are secreted to blood which are carried to all parts of body where they regulate many metabolic functions of the organisms.

88 **(a)**
The tripeptide hormone present in most living cell is glutathione. It is made up of 3 amino-acids *viz.* glycine, glutamic acid and cysteine. It also acts as coenzyme in various cells.

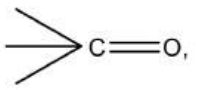
90 **(a)**
Calciferol is the chemical name of vitamin D.

92 **(d)**
The D, L notations signify for the configuration of groups on last but one carbon atom.



93 **(c)**
Hydrogen bonding is involved molecular force in the DNA molecule.
Watson and Crick observed the purine-pyrimidine type of hydrogen bonding (instead of purine-purine and pyrimidine-pyrimidine).

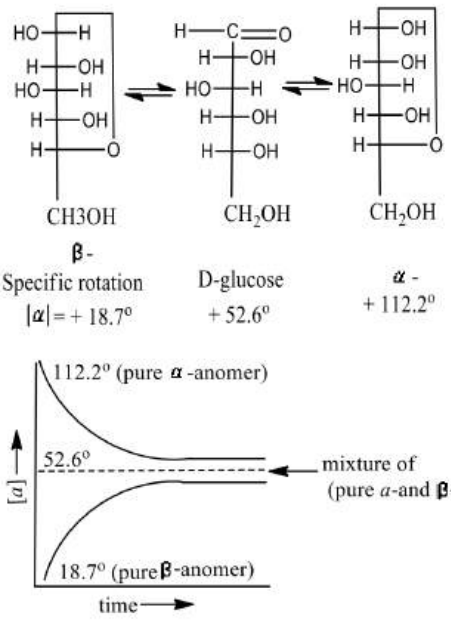
94 **(c)**
Carbohydrates are optically active polyhydroxy aldehyde or polyhydroxy ketones.



OH Functional groups of typical ketose
OH Functional groups of typing aldose

95 **(d)**
Only proteins give positive ninhydrin test. They give blue colour with ninhydrin.

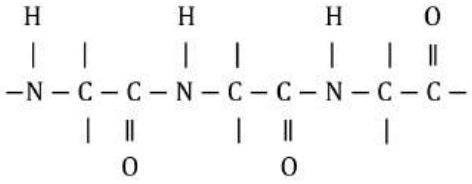
96 **(d)**
A spontaneous change in the specific rotation of a solution of an optically active compound is called mutarotation. Hemiacetal forms of α and β −D-glucose are stable in solid state but in aqueous solution, there is opening of the cyclic structure which gives solution of constant specific rotation.



97 **(c)**
The peptide linkage (−NH − CO −) is formed by the condensation of amino acids molecules.

$$HNH-CH(R)-C(=O)-OH + H.NH-CH(R)-C(=O)-OH \xrightarrow[-H_2O]{} -HN-CH(R)-C(=O)-NH-CH(R)-C(=O)-$$

Hence, following structure represents the peptide chain.



98 **(a)**
Amylopectin consists of D-glucose units from 300 to 600. So it is insoluble in H_2O.

99 **(d)**
Haemoglobin containing iron is a transport protein found in RBC most of the animals. It is responsible for the transport of oxygen from the lungs to the cells and for removal of waste CO_2 from the cells which it returns to lungs.

100 **(b)**

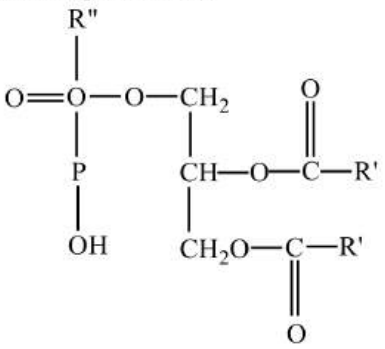
Photosynthesis is:

$$CO_2 + H_2O \xrightarrow{h\nu} (C_6H_{10}O_5)_n + O_2 \uparrow$$

101 **(c)**
The term hexose refers to the presence of six carbon atoms and term keto shows the presence of ketonic group. Thus, the compound which contains 6 C atoms and one $> C = O$ group is called ketoheoxse. Among the given only glucose and fructose are six C compounds. Out of them, glucose contains an aldehyde group while fructose contains a ketonic group. Hence, the example of ketohexose is fructose.

102 **(a)**
Amylase enzyme act on starch and hydrolyse it to glucose.

103 **(d)**
Another very important class of lipids are the phospholipids. These are polar lipids and, like the fats, are esters of glycerol. In this case, however, only two fatty acid molecules are esterified to glycerol; at the first and second carbon atom. The remaining end position of the glycerol is esterified to a molecule of phosphoric acid, which in turn is also esterified to another alcohol. This gives a general structure, e.g., Lecithin, cephalin, kephalin, etc.



105 **(b)**
RNA contains ribose sugar and uracil.

107 **(c)**

$$C_{12}H_{22}O_{11} \xrightarrow[H^+]{HOH} \underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\text{Frucots}}{C_6H_{12}O_6}$$

The process is known as inversion of cane sugar.

108 **(b)**
Reducing sugar + $CuO \longrightarrow Cu_2O$ (red).

111 **(b)**
Vitamin B_{12} or cyanocobalamine is $C_{63}H_{88}O_{14}N_{14}PCo$.

112 **(d)**
Carbohydrates are defined as polyhydroxy aldehydes (aldoses) or ketones (ketoses) along with all substances which produce these on hydrolysis.

113 **(b)**
An use of cellulose.

114 **(a)**
Cellulose is cementing material of cells. Also it is most abundant carbohydrate of nature.

115 **(a)**
Glucose gives silver mirror with ammoniacal silver silver nitrate because of presence of – CHO group (aldehyde group) in the structure of glucose.

$$CH_2OH\,(CHOH)_4CHO + Ag_2O \rightarrow CH_2OH\,(CHOH)_4COOH + 2Ag \downarrow$$

Gluconic acid silver mirror

117 **(b)**
Insulin is composed of two peptide chains referred to as the chain *A* and chain *B*. *A* chain of

21 residues and *B* chain of 30 residues are cross-linked by two disulphide bridges.

118 **(d)**
Rest all are essential constituents of diet.

119 **(c)**
Starch + I_2 ⟶ Blue colour.

120 **(a)**
It is definition of saponification value, used in analysis of fats and oils.

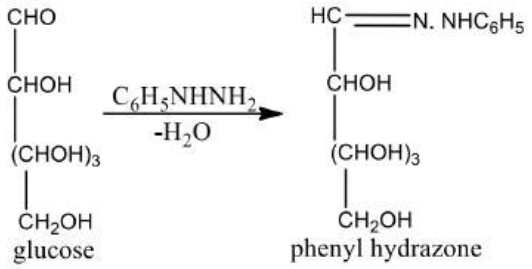
121 **(b)**
After denaturation, soluble proteins become insoluble. The process which brings in the changes in physical and biological activity of proteins.

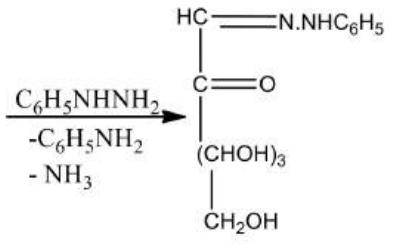
122 **(a)**
Glucose and mannose are epimers, because they differ in configuration at C_2.

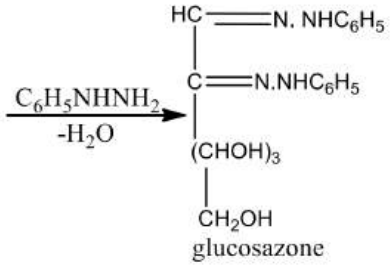
123 **(b)**
It is an amine hormone secreted from thyroid which stimulates rate of oxidative metabolism and regulates general growth and development.

125 **(a)**
Vitamin A is present in milk, butter, kidney, egg yolk, liver, fish oil, etc.

126 **(d)**







Thus, only three phenyl hydrazine molecules and one molecule of glucose is required to form osazone.

127 **(c)**
Benedict's solution contains $CuSO_4$, Na_2CO_3 and sodium citrate. This permits formation of a complex, which lowers the concentration of Cu (II) ions to such an extent that it doesn't permit the precipitation of insoluble $Cu(OH)_2$. Benedict's solution is more stable than Fehling's solution is not affected by substance like uric acid present in urine. Hence, it is preferred to detect the presence of glucose in urine.

128 **(b)**
A nanopeptide contains 8 peptide linkages.

129 **(b)**
Isoelectric point is the pH at which structure of amino acid has no charge.

130 **(a)**
Cellophane is a semipermeable membrane made from cellulose fibre.

131 **(d)**
Letter 'D' before the name of monosaccharide reveals that the – OH group at the second carbon atom is towards the right *i.e.,* it only shows the configuration a particular chiral carbon.

132 **(b)**

$CH_2OH \cdot CO(\overset{*}{C}HOH)_3 \cdot CH_2OH$;
*represents asymmetric carbon.

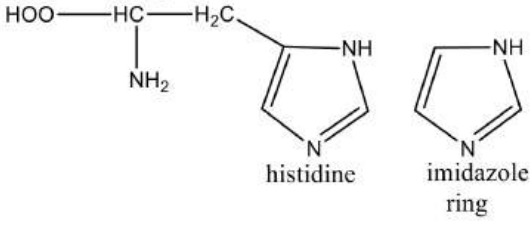
133 **(a)**
Molisch's test is for sugars.

134 **(b)**
It cures cold effect.

135 **(c)**
DNA is called the master molecule since, it plays key role in life process.

136 **(a)**
α –tocopherol is vitamin-E. It acts as antisterlity factor. Its deficiency can cause sterility.

137 **(d)**
Histidine is the unique amino acid which contains imidazole ring.

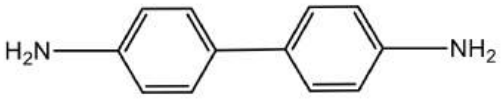


138 **(b)**
DNA has nucleotide unit, i.e., sugar + base $+H_3PO_4$.

141 **(c)**

Iodised salt prevents goitre.

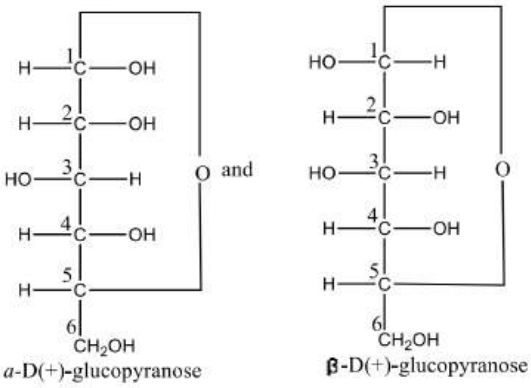
143 **(d)**
Amino acid contains both amino group and carboxylic group. Benzidine is not a amino acid while glycine, alanine and histidine are amino acid.



benzidine

144 **(a)**
Proteins are made up of amino acids which contains $-COOH$ gp. and NH_2 gp.

145 **(b)**
Two forms of D-glucopyranose are $\alpha - D -$ $(+) -$glucopyranose and $\beta - D -$ $(+) -$glucopyranose. These are anomers (a pair of stereoisomers which differ in configuration only around first-carbon atom are called anomers).



a-D(+)-glucopyranose
ß-D(+)-glucopyranose

146 **(a)**
Raffinose is a triaccharide. It gives three mol,es of monosaccharides on hydrolysis.

$$C_{18}H_{32}O_{16} + 2H_2O \xrightarrow{H^+} \text{glucose} + \text{fructose} + \text{galactose}$$

147 **(a)**
Only palmitic acid ($C_{15}H_{31}COOH$)is saturated acid.

148 **(b)**
Rennin hydrolyses casein of milk into par casein.

149 **(a)**
The vitamin which are soluble in fats are called fat soluble vitamins,*e.g*,. vitamins A, D, E and K are fat soluble vitamins.

150 **(a)**
Pepsin hydrolysis proteins into amino acids as

$$\text{proteins} \xrightarrow{\text{Pepsin}} \text{amino acids.}$$

151 **(a)**

$$\text{Fat or oil} \xrightarrow{\text{Hydrolysis}} \text{Fatty acid} + \text{Glycerol}$$

152 **(d)**
DNA is a polymer of nucleotides.

153 **(c)**
Vitamin C deficiency causes scurvy disease.

154 **(b)**
Follow structures of glycogen and amylopectin.

155 **(d)**
Lactose is disaccharide having galactose and glucose units.

156 **(d)**
Glycogen is polysaccharide with monomeric units of glucose.

157 **(b)**
Ribose sugar contains ribonucleic acid.

158 **(b)**
Prostaglandin is not a steroidal hormome. It is a derivative of fatty acid.

159 **(c)**
The rearrangement is called Lobry de Bruyn Ekestein rearrangement.it is therefore, fructose being a keto hexose reduces Tollens' reagent and Fehling's solution.

160 **(c)**
They are also soluble in organic solvents.

161 **(a)**
Vitamin A contains isoprene unit.

162 **(c)**
The pH at which a particular amino acid does not migrate under the influence of an electric field is called isoelectric point of that amino acid. The pH range for the isoelectric point is from 5.5 to 6.3 or the pOH range for the isoelectric point is form 7.7 to 8.5

163 **(c)**
Wool-wax is cholesterol esters.

164 **(d)**
Follow replication in nucleic acid.

165 **(b)**
The helical structure of protein is stabilized by hydrogen bonds between amide group of the same peptide chain. These bonds are formed by $-NH-$ group of one unit and oxygen of carbonyl group of the third unit.

167 **(c)**
In sucrose, glucose is in pyranose form while fructose is in furanose form.

168 **(c)**
Albumin and haemoglobin are found in blood.

170 **(b)**

Although D-alanine is a constituent of a bacterial cell walls, it is not found in proteins

171 **(a)**
Retinol is vitamin A.

173 **(c)**
The term is used in chemical industries for detergents.

174 **(c)**
Glucose is hexose and not an oligosaccharide. It is a monosaccharide which on further hydrolysis does not give sugar. Oligosaccharides contain more than one saccharide units and on hydrolysis yields sugars.

175 **(b)**
These are vitamins.

176 **(b)**
Proteins mainly act as constructing material in body.

177 **(c)**
It is a pentose having 5 carbon atoms.

178 **(c)**
Lipids are of two types: oils and fats; oils are glycerides or esters of unsaturated fatty acids while fats are glycerides of saturated fatty acids.

179 **(d)**
Phospholipids are esters of glycerol centigrams of with two carboxylic acid residue and one phosphate group.
Hence, phospholipids may be regarded as derivative of glycerol in which two hydyroxyl groups are esterified with fatty acid, while third is esterified with phosphoric acid.

180 **(b)**
RNA has single helix strand.

181 **(d)**
It is a fact.

182 **(c)**
$a = 2^n$; n is asymmetric carbon atom (4 in glucose).

184 **(b)**
A polymer of amylose and amylopectin is starch.

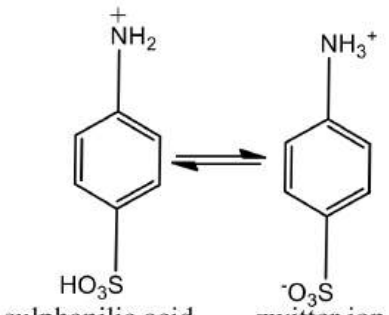
188 **(b)**
It is also known as laevulose.

189 **(c)**

$CH_2OH \cdot (\overset{*}{C}HOH)_4 \cdot CHO;$

*represents asymmetric carbon.

190 **(c)**
Sulphalilic acid exists as Zwitter ion.



sulphanilic acid zwitter ion

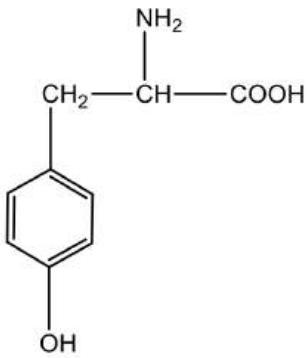
It exists as a dipolar ion, which has acidic and basic groups in the same molecule.

191 **(b)**

$C_6H_{12}O_6 \xrightarrow{\text{Zymase}} C_2H_5OH$

192 **(d)**
Proteins are not synthesized in lab.

193 **(d)**
The aromatic properties can only be represented by tyrosine. Tyrosine is $\alpha -$ amino $\beta(p -$ hydroxyphenyl) propionic acid. It has aromatic nucleus. It is aromatic amino acid.



194 **(c)**
Bees wax us myricyl palmitate, *i. e.*,

$C_{15}H_{31}COOC_{30}H_{61}$

196 **(b)**
Vitamin C is involved in this process.

199 **(d)**
These are oils which on exposure to air changes into hard solids, e.g, linseed oil. All drying oils contain a large proportion of the unsaturated acids i.e., linoleic $C_{17}H_{31}COOH$ and linolenic acid $C_{17}H_{29}COOH$. This property is used in paint industry as vehicle for paints.

200 **(a)**
Glucose is reducing sugar.

201 **(d)**
Spermaceti is white waxy solid consisting mainly cetyl palmitate, i.e., $C_{15}H_{31}COOC_{16}H_{33}$.

202 **(d)**
$C_{12}H_{25}SO_4Na$; Synthetic detergents are the chemical compounds synthesized in laboratory

and possess properties like soaps. These are also surface active agents and possess cleansing capacity like soaps. These are generally sodium or potassium salts of long chain alkyl benzene sulphonic acids, or long chain alkyl sulphate.

203 **(c)**
Triolein is an unsaturated glyceride while tristearin is a saturated glyceride. Hence, the conversion of triolein to tristearin can be affected by hydrogenation.

$$\text{Triolein} + H_2 \xrightarrow{Ni} \text{Tristearin}$$

204 **(a)**

$$CH_2OH(CHOH)_4CHO \xrightarrow[\text{oxidation}]{Br_2H_2O}$$

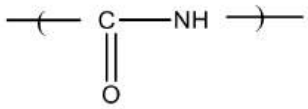
Glucose

$CH_2OH\,(CHOH)_4COOH$

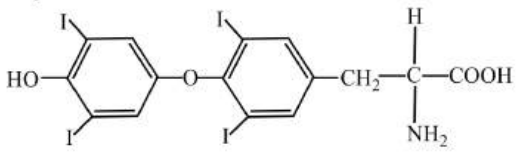
gluconic acid

205 **(d)**
All plant cells contain cellulose.

206 **(c)**
The main structural feature of protein is peptide linkage.



207 **(a)**
Thyroxine is:



208 **(a)**
Follow text.

209 **(d)**
Here, the – OH of hemiacetal group is equatorial therefore, it is a β –pyranose of an aldohexose.

210 **(c)**
General formula of acetic acid $C_2(H_2O)_2$ but it is not a carbohydrate.

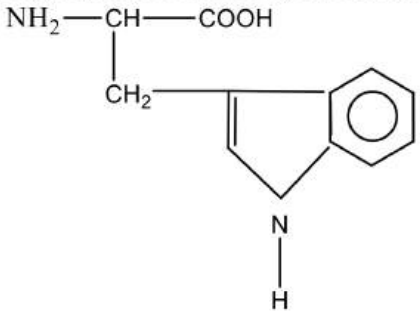
211 **(a)**
Vitamin E develops impotency.

212 **(d)**
Glucose is $CHO(CHOH)_4\,CH_2OH$.

214 **(c)**
On reduction with HI/P fructose gives n- hexane.

215 **(b)**
Progesterone is secreted by Ovaries.

216 **(d)**
Tryptophan is a heterocyclic amino acid.



217 **(b)**
Guanine is the constituent of nucleic acid and guanidine.

218 **(c)**
It is Tollens' reagent and with this Ag mirror is formed.

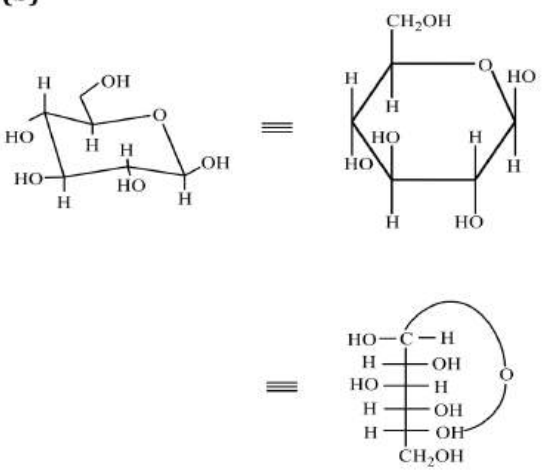
219 **(c)**
Sucrose is the only naturally occurring disaccharide which is non-reducing

220 **(b)**
Those sugar which contain 2, 3, 5, 6 carbon atom are known as monosaccharides. Hence, hexoses and pentoses are monosaccharides.

221 **(c)**
Honey is collected from flowers by honey bee which contains fructose.

222 **(d)**
Which one of the following is not a protein?

224 **(b)**



In β – D glucopyranose all the OH groups and CH_2OH group occupy equatorial position in the most stable conformer.

225 **(c)**
Because food-stuffs mainly contains compounds of C, H and O.

226 **(d)**
All these are sources of fats and oils.

227 **(a)**
A 10% solution of NaOH is called lye, used in hot process for manufacturing soaps.

228 **(b)**
α-D(+)-Glucopyranose and β-D(+)-glucopyranose are anomers (a pair of stereoisomers which differ in configuration only around first carbon atom)

229 **(c)**
Glucose and fructose have molecular formula $C_6H_{12}O_6$ and

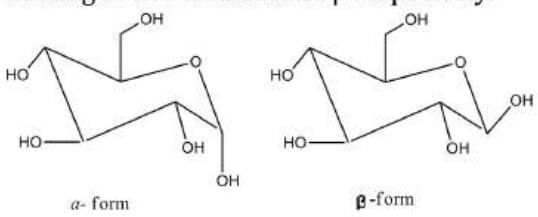
possess —CHO and $\rangle$CO gp. respectively.

230 **(d)**
The first codon of *m*-RNA will be always AUG. This codon specifies the amino-acid methionine. So, the first amino-acid in a polypeptide chain will be always methionine

231 **(c)**
It is a fact.

232 **(c)**
The antibiotic puromycin inhibits protein synthesis by causing nascent polypeptide chain to be released before their synthesis is completed

233 **(d)**
Anomers of glucose are cyclic diastereomers (epimers) differing in configuration at C-1 existing in two forms α and β respecively.



α- form β-form

235 **(b)**
Fats are esters of higher fatty acids with glycerol, hence on alkaline hydrolysis, they give back glycerol and sodium or potassium salt of acid (this is called soap).

$$\begin{array}{l} CH_2OCOR \\ | \\ CHOCOR + 3NaOH \\ | \\ CH_2OCOR \\ \text{fat} \end{array} \rightarrow \begin{array}{l} CH_2OH \\ | \\ CHOH + 3RCOONa \\ | \\ CH_2OH \end{array}$$

236 **(d)**
Naturally occurring fats are called lipids.

237 **(b)**
Glycine is optically inactive:

$NH_2.CH_2.COOH$ is glycine

Lysine is optically active:

$NH_2CH_2 \cdot CH_2 \cdot CH_2CH_2 \cdot \underset{*}{CH}(NH_2)COOH$ is lysine

Glutanic acid is optically active;

$COOH \cdot CH_2 \cdot CH_2 \cdot \underset{*}{CH}(NH_2) \cdot COOH$ is Glutanic acid

238 **(d)**
It is also called sunshine vitamin.

239 **(d)**
(+) lactose on hydrolysis yields equal amount of D (+) glucose and D (+) galactose. These two monosachharides are joined by β – 1, 4-glucosidic linkage. (+) lactose contains hemiacetal gp and thus reducing sugar. Also it exhibits mutarotation.

240 **(a)**
Ninhydrin test is highly specific for primary amines. Proline being a secondary amine gives a yellow orange colour with ninhydrin whereas all other α —amino acids give a blue-purple colour with ninhydrin.

241 **(c)**
Despite having, the aldehyde group, glucose does not give, 2, 4-DNP test, Schiff's test and it does not form the hydrogen sulphite addition product with $NaHSO_3$. It shows that glucose is a cyclic compound.

242 **(c)**
Lauric acid: $C_{11}H_{23}COOH$, palmitic acid: $C_{15}H_{31}COOH$,
myristic acid: $C_{13}H_{27}COOH$ and linoleic acid: $C_{17}H_{31}COOH$ (an unsaturated acid).

243 **(a)**
Fe of haemoglobin acts as catalyst for the reaction.

244 **(c)**
Val. Uyr. Ala Tyr. ala. Val
Val. Ala. Tyr Ala. Tyr. Val
Tyr. Val. Ala Ala. Val. Tyr

245 **(d)**
It is an example of conjugated protein (conjugated proteins hydrolysis give α —amino acids and a non-protein portion. This non-protein portion is called the prosthetic group).

247 **(b)**
Cellulose is a polysaccharide (carbohydrate) while rest three are enzymes. Enzymes are

chemically complex proteins which act as catalyst in biological activities.

248 **(a)**
Each one is a polymer of glucose.

249 **(b)**
The first is biuret test, protein gives violet colour with alkali and $CuSO_4$ (aq.); the second is ninhydrin test and the third is xanthoproteic test; all are tests of proteins.

250 **(c)**
Fats and oils contain even or odd carbon fatty acid derivative of glycerol.

251 **(a)**
It is a fact.

252 **(b)**
Thymine base is not present in RNA. Uracil is found in place of thymine.

253 **(b)**
Haemoglobin containing iron is a transport protein found in RBC of most of the animals. It is responsible for the transport of oxygen from the lungs to the cells and for removal of waste CO_2 from the cells which it returns to lungs.

254 **(c)**
In liver glucose is converted into glycogen.

255 **(c)**
Lipase hydrolyses triglycerides to fatty acids and glycerol.

256 **(b)**
Lemon, orange, etc., are sources of vitamin C.

257 **(d)**
One molecule of CH_3COCl reacts at one $-OH$.

$$-OH + CH_3COCl \longrightarrow -OOCCH_3$$

258 **(a)**
Night blindness is caused by the deficiency of vitamin A or retinol

259 **(d)**
Zwitter ion is formed by amino acid. Glycine is amino acid. Zwitter ion of glycine is

$$\overset{+}{N}H_2—CH_2—COO^-$$

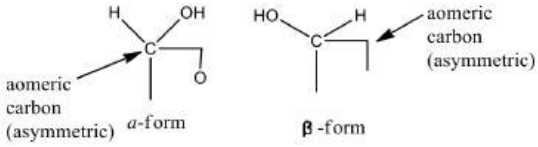
263 **(c)**
Oils are unsaturated esters or glycerides olein is ester of unsaturated acid.

264 **(b)**
Aldehydes and α-hydroxyl ketones give positive Tollen's test. Glucose is a polyhydroxy aldehyde and fructose is an α-hydroxyl ketone

265 **(b)**
Lysine contains two basic groups.
e.g., NH_2

266 **(d)**
Glucose is $CHO(CHOH)_4CH_2OH$.

267 **(b)**
C_1 carbon of monosaccharides is called anomeric carbon. When the – OH group attached with C_1 carbon is towards right, it is called α –from and when the – OH group is towards left, it is called β –from. Such pair of optical isomers which differ in the configuration only around anomertic carbon are called anomers.



268 **(c)**
Glucose $\xrightarrow{\text{Conc.}H_2SO_4} 6C + 6H_2O$; this is dehydration.

269 **(c)**
Reserved fat act as thermoinsulator.

272 **(b)**
Both surfactants and detergents possess the surface activity, i.e., the tendency lower surface tension of water. A surfactant also having cleansing action, i. e., detergency in addition to surface activity is called detergent.

274 **(c)**
Sucrose gives glucose and fructose on hydrolysis with invertase enzyme.

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow{\text{Invertase}} C_6H_{12}O_6 + C_6H_{12}O_6$$

Sucrose glucose fructose

275 **(c)**
A characteristic of detergent.

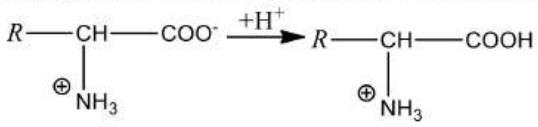
276 **(a)**
The general formula of saturated acids is $C_nH_{2n}O_2$ or $C_nH_{2n+1}COOH$.

277 **(c)**
The two polynucleotide chains or strands of DNA are joined by hydrogen bonding between the nitrogenous base molecules of their nucleotide monomers

279 **(d)**
A nucleotide contains a pentose sugar [deoxyribose (in DNA) or ribose (in RNA)], nitrogenous base [such as adenine or guanine or thymine (in DNA) or cytosine or uracil (in RNA)] and a phosphate molecule.

280 **(d)**

At pH = 4, an amphoteric Zwitter ion structure changes into cation when an acid is added to it.



281 **(c)**

$C_nH_{2n+1}COONa$

282 **(d)**

Red P +HI is reducing agent.

283 **(a)**

Uracil is present in RNA but not in DNA.

285 **(b)**

Disulphide bond may be reduced to thiol by means of reagents, *i.e.,* $NaBH_4$, which shows the presence of thiol group in disulphide bond formation.

286 **(c)**

Only groundnut oil is glyceride of higher fatty acid.

287 **(c)**

DNA has nucleotide unit, i.e., sugar + base $+H_3PO_4$.

289 **(c)**

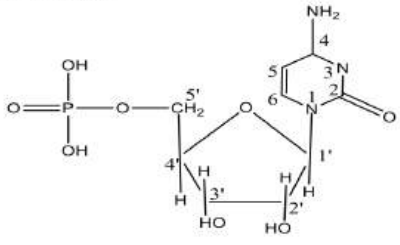
Saponification of oils yields a triol (glycerol). Drying (hardening) of oils involves hydrogenation. Refining of oil is done by distillation or other such processes but not by hydrogenation.

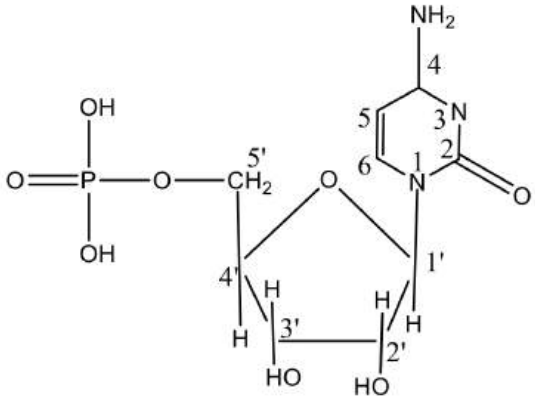
Antioxidant are added to prevent the oxidation of oil, thus they minimizes rancidity.

291 **(a)**

Synthesis of RNA/DNA from phosphoric acid, ribose and cytosine is given below

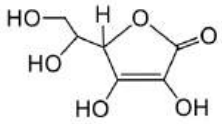
Thus ester linkages are at C_5'''' and C_1'''' of sugar molecule.





292 **(d)**

The chemical name of vitamin C is ascorbic acid. Its structure is



293 **(a)**

Sucrose doesn't show mutarotation. It is a non-reducing sugar.

294 **(d)**

Deficiency of vitamin B_1 causes Beri-Beri.

297 **(c)**

Rest all are uses of paraffins wax. In greases esters of higher fatty acids are used.

298 **(d)**

Lipase hydrolyses fats and alcohols.

301 **(d)**

Glucose is dextrorotatory; fructose is laevorotatory.

302 **(d)**

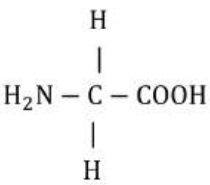
Bile salts excreted from gall bladder does so.

303 **(a)**

Fats are glycerides.

305 **(d)**

Glycine is an achiral amino acid while all other amino acids are chiral.



Glycine

306 **(c)**

Insulin regulates metabolism of carbohydrates (glucose).

307 **(c)**

Glycine is $NH_2 . CH_2 . COOH$

In this $-NH_2$ is basic group and –COOH is acidic group.

308 **(c)**
Rice has deficiency of lysine amino acid.

309 **(c)**
Fats and lipids are hydrolysed by lipase.

311 **(d)**
Proteins are macromolecules having mol. wt. > 10000.

312 **(b)**
It is red in colour.

313 **(d)**
Glycine reacts with benzoyl chloride in the presence of *aq.* NaOH to give benzoylglycine (Hippuric acid).

$$HOOC.CH_2NH_2 + PhCOCl \xrightarrow[\Delta]{Aq.NaOH} PhCONHCH_2COOH + HCl$$

Glycine benzoyl chloride benzoyl glycine (Hippuric acid)

314 **(d)**
Protein + conc. $HNO_3 \xrightarrow{\Delta}$ yellow colour
This test is called Xanthoprotic test. It is given by those proteins which consists of α- amino acid containing benzene ring *eg.*, *tyrosine*

315 **(b)**
These usually contain $-SO_3H$ gp. or SO_4 gp.

316 **(a)**
Deficiency of vitamin A causes night-blindness.

317 **(d)**
DNA stands for deoxyribonucleic acid and it contains deoxyribose sugar.

318 **(d)**
All are characteristics of proteins.

319 **(d)**
These are facts about gums.

320 **(a)**
Maltose (2 glucose units), Sucrose (glucose and fructose units), Lactose (glucose and galactose units).

321 **(d)**
These usually contain $-SO_3H$ gp. or SO_4 gp.

322 **(b)**
Carbohydrates are defined as polyhydroxy aldehydes (aldoses) or ketones (ketoses) along with all substances which produce these on hydrolysis.

323 **(d)**
Vitamin B_{12} contains cobalt metal. The chemical name of vitamin B_{12} is cyanocobalamin.

324 **(c)**
The general formula of carbohydrates is $C_x(H_2O)_y$ where x and y are integers; may be x = y.

325 **(c)**
Water is polar solvent and thus, dissolves polar part.

326 **(d)**
DNA is deoxyribonucleic acid.

327 **(d)**
These are characteristics of metallic soaps.

328 **(b)**
Fructose respond salvinoff test;

$$\text{Fructose} + \text{Resorcinol} + \text{Dil. HCl} \xrightarrow{Heat} \text{Red colour.}$$

329 **(a)**
Co reacts with haemoglobin to form carboxy haemoglobin which is not capable of absorbing O_2 and thus, suffocation takes place. This phenomenon is called Asphyxia.

330 **(b)**
Lactose is disaccharide. The two monosaccharide units are glucose and galactose.

331 **(a)**

$$\text{Carbohydrate} \xrightarrow{Digestion} \text{Glucose} \xrightarrow{Respiration} CO_2 + H_2O + \text{Energy}$$

332 **(c)**
Insulin is an important peptide hormone. Its structure was determined by Sangar. It has two polypeptide chains with 21 and 30 amino acids. Hence, total amino acids are 51

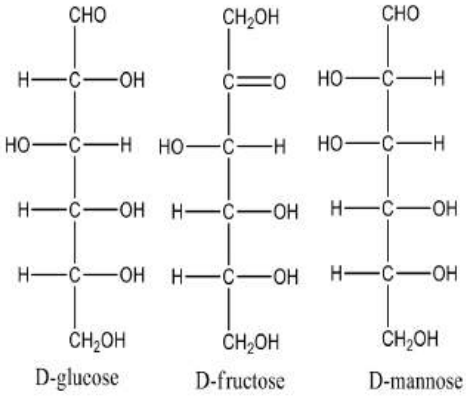
333 **(c)**
Candle wax is paraffins wax and stearic acid. The acid give strength to candles.

334 **(c)**
The prosthetic group of haemoglobin is heam (Fe^{2+})

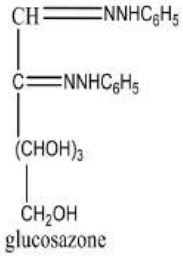
335 **(b)**
Monosaccharides of 3 to 9 carbon atom are known.

336 **(a)**
Two or more amino acids unite through a bond ($-CO-NH-$) which is known as peptide bond or peptide linkage.

338 **(b)**
D-glucose, D-fructose and D-mannose from the same osazone when treated with excess of phenyl hydrazine because they differ only in Ist and 2nd carbon atoms which are transformed to the same form.



They from the following osazone



339 **(a)**
Energy is stored in our body in the form of a adenosine triposphate (ATP) which release energy, by breaking phosphate bonds, when we require it.

340 **(a)**
It is a fact.

341 **(a)**
It is a fact.

342 **(a)**
It is the order of calorific value.

343 **(a)**
Nucleotides have phosphate units.

344 **(a)**
Coconut oil is glyceride of fatty acids.

345 **(a)**
Enzymes catalytic action is highly specific; one enzyme catalyses one reaction only.

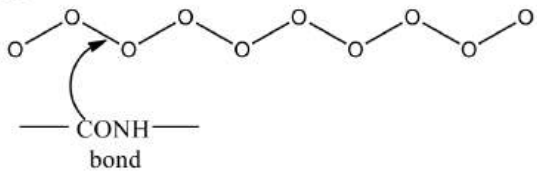
347 **(a)**
Nucleoside + phosphoester bond = Nucleotide

348 **(d)**
Vitamin E develops impotency.

349 **(d)**
All are true for oils.

350 **(c)**
It is $C_{21}H_{10}O_2$, a white crystalline steroid hormone responsible for preparing the reproductive organs of mammals for pregnancy and for protecting embryo.

352 **(d)**
A decapeptide has nine peptide (amide) linkage as



Therefore, on hydrolysis, it will absorb nine water molecules.

Hence, total mass of hydrolysis product

$$= 796 + 18 \times 9 = 958$$

$\Rightarrow$ mass of glycine in hydrolysis product

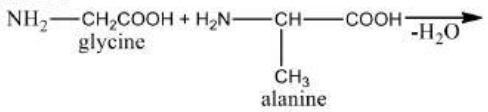
$$= \frac{958 \times 47}{100} = 450$$

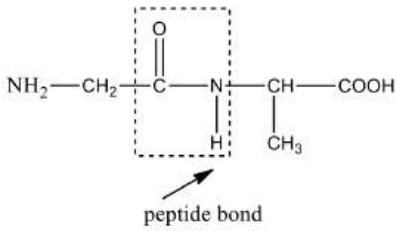
$\Rightarrow$ number of glycine molecule in one molecule of decapeptide

$$= \frac{450}{75} = 6$$

353 **(d)**
Vegetable oils are glycerides of unsaturated fatty acids. They are different than kerosene, lubricating oil (petroleum product) and essential oils.

355 **(b)**
Peptides are compounds formed by the condensation of two or more same or different α −amino acids. The condensation occurs between amino acids with the elimination of water





356 **(a)**
Amino acids are basic units (monomers) of proteins, the natural polymers.

357 **(b)**
Natural silk is protein fibre.

358 **(a)**
Glucose reacts with acetic anhydride in the presence of anhydrous $ZnCl_2$ to form penta-acetyl glucose which indicates the presence of 5-OH groups in glucose molecule and the open chain structure of glucose.

CHO

$$(CHOH)_4 + 5(CH_3CO)_2O \xrightarrow[\Delta]{ZnCl_2}$$

CH_2OH

glucose

$(CHOCOCH_3)_4 + 5CH_3COOH$

CH_2OCOCH_3

Pentaacetyl glucose

359 **(b)**
Fats are also known as triglycerides. These triglycerides are the trimesters of fatty acid with glycerol. So, the characteristics feature of fat is **ester group**.

360 **(a)**
pH (at isoelectric point)$=\frac{2.34+9.6}{2} = 5.97$

362 **(c)**
Oleic acid $C_{17}H_{33}COOH$, is obtained by hydrolysis of oil.

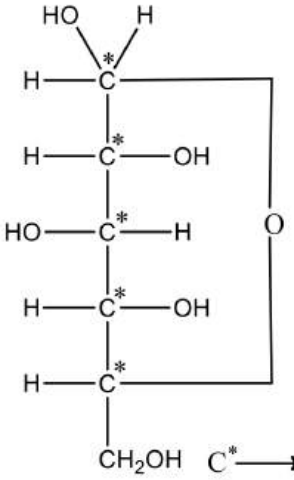
363 **(b)**
Glucose and fructose are epimers (which differ in configuration at C-2).

365 **(b)**
Antibodies are the proteins produced in response to the presence of foreign substances in the blood or tissues.

367 **(a)**
Ring *A* is pyranose (6 membered ring containing one O-atom) with α −glycosidic linkage and ring *B* is furanose with β −glycosidic linkage.

368 **(a)**
Naturally occurring amino acids are 20.
Hence, number of possible tripeptides
$= 20^3 = 8000$

369 **(a)**
The number of chiral carbon atoms in β − D (+) glucose are five.

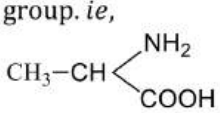


(Asymmetric carbon atom)

371 **(b)**
It is the phenomenon in which light energy is converted into chemical energy.

372 **(c)**
Haemoglobin acts as oxygen carrier in the blood because four Fe^{2+} ions of each haemoglobin can bind with four molecules of O_2 and form oxyhaemoglobin.
$4Hb + 4O_2 \rightarrow Hb_4O_8$
Oxyhaemoglobin

373 **(d)**
Amino acid alanine contains side chain of methyl group. *ie*,



Muscles contains; myoglobin protein

374 **(c)**
A process used to convert higher aldose to lower one; Fenton's reagent $Fe^{2+} + H_2O_2$.

376 **(a)**
Iodine value is related to oils and fats. Iodine value measures the drying quality of an oil. More the unsaturation better is the drying quality of an oil. When an oil treated with I_2 it adds to double bond. Iodine value is defined as the number of centigrams of I_2 that can be taken by 1 g of the oil.

377 **(c)**
Cellulose is a polysaccharide, composed of D-glucose units which are joined by β- glucosidic linkages. On complete hydrolysis cellulose produces D-glucose

$$(C_6H_{10}O_5)_n + nH_2O \xrightarrow{H^+} nC_6H_{12}O_6$$
Cellulose D-glucose

378 **(c)**
It does not contain asymmetric carbon.

379 **(b)**
Fats are glycerides of saturated fatty acids.

381 **(d)**
Conjugated proteins on hydrolysis give a non-protein portion is called prosthetic group.

Protein	Prosthetic group
Phosphoprotein	Lipid (*e.g.,* lecithin)
Glycoprotein	Sugar
Chromoprotein	Colouring matter such as red coloured protophyrin

Since, all of them have non-protein part hence, all of them are conjugated protein.

383 **(a)**
It is a solution of mercuric nitrate in nitric acid with some nitrous acid.

384 **(a)**
$C_6H_{12}O_6 \xrightarrow{\text{Zymase}} C_2H_5OH + CO_2 + H_2O$

385 **(b)**
Ninhydrin test is given by proteins (or amino acids). Benedict test is positive for aldehydes and monosaccharides. (Benedict's solution is Cu (II) sulphate complexed with citrate anion. Aldehydes and monosaccharides reduced it to red coloured (Cu_2O).
The compound is not protein because it gives negative ninhydrin test.
The compound is monosaccharide because it gives positive Benedict test.

386 **(d)**
These are functions of fat in body.

387 **(c)**
Insulin controls glucose metabolism.

389 **(b)**
Osazone formation involves oxidation of two carbon atoms.

391 **(c)**
Metal containing vitamin is vitamin B_{12}. It contains cobalt $(C_{63}H_{88}O_4N_{14}PCo)$

392 **(d)**
1 mole of glucose is oxidized to give 38 moles of ATP, So, 2 moles will give $2 \times 38 = 76$ moles of ATP.

393 **(b)**
Rest all are poisons for enzymes.

394 **(b)**
Sugar: Lactose glucose sucrose fructose
Relative sweetness: 16 74 100 173

395 **(c)**
The deficiency of essential amino acids causes disease like kwashiorkar in which water balance of body is disturbed.

396 **(b)**
They provide immediate energy needs of the body.

397 **(c)**
When fat is heated in presence of $KHSO_4$ (dehydrating agent) the glycerol portion of the molecule is dehydrated and form unsaturated aldehyde $CH_2 = CH— CHO$ (acrolein), a bed smelling compound. It is the test for fat.

398 **(a)**
At pH = 6, glutamic acid exists as a dianionic species and migrates to anode while arginine exists as cationic species and moves to cathode. Alanine does not migrate to any electrode at its isoelectric point.

399 **(c)**
A non-protein that plays an essential part in some reaction catalysed by enzymes are called co-enzymes or activators, e.g., non-proteinous vitamins.

400 **(a)**
Hard water contains Ca^{2+} and Mg^{2+} ion.
$Ca^{2+} + 2RCOONa \longrightarrow (RCOO)_2Ca + 2Na^+$
Insoluble Salt

401 **(d)**
Human digestive system lacks cellulose which is not hydrolysed.

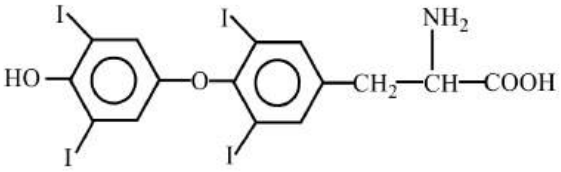
402 **(b)**
These are called soft soaps.

403 **(b)**
Insulin, an hormonal protein secreted by pancreas controls the metabolism of glucose.

404 **(c)**
Enzymes (proteins) are biocatalyst.

405 **(d)**
Fibrous proteins are made up of polypeptide chains that run parallel to the axis and are held together by strong hydrogen and disulphide bonds. They can be stretched and contracted like a thread. These are usually insoluble in water., e.g., α-keratin (hair, wool, silk and nails); myosin (muscles); collagen (tendons, bones), etc.

406 **(d)**
Thyroxine is



It is derived from tyrosine amino acid.

407 **(a)**

Gene is a part of DNA molecule. It codes for a specific protein or polypeptide

409 **(c)**

Oleic acid is 9-octadecenoic acid.

$CH_3(CH_2)_7CH = CH\ (CH_2)_7COOH$

410 **(d)**

Maltose gives Molisch's test as well as Benedict's test but it doesn't give wine red colour, on heating with a few crystals of resorcinol and conc. HCl (Scliwanoff's test). Sucrose and fructose give this test.

411 **(a)**

Rice is deficient in lysine (α – amino acid).

413 **(a)**

Sucrose does not show mutarotation.

414 **(a)**

It is the presence of iron in haeme pigment which makes it red.

415 **(b)**

Guanine is a purine base.

416 **(a)**

On increasing the pH by adding an alkali; H^+ will be lost from $-COOH$

417 **(b)**

Oils and fats are triglycerides. (esters of higher carboxylic acids with glycerol). *e.g.*, palmitin.

$CH_2OCOC_{15}H_{31}$
|
$CHOCOC_{15}H_{31}$
|
$CH_2OCOC_{15}H_{31}$

Palmitin (fat)

418 **(a)**

Amylose has α-D glucopyranose units.

419 **(d)**

It is a fact.

420 **(a)**

On hydrolysis with dilute aqueous sulphuric acid, sucrose gives a equimolar mixture of D-(+) glucose and D-(-)-fructose.

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow{H_2SO_4} C_6H_{12}O_6 + C_6H_{12}O_6$$

Sucrose D-(+)glucose D-(+)fructose

1. 1

Sucrose is dextrorotatory but after hydrolysis gives dextrorotatory glucose and laevorotatory fructose, laevorotatory fructose is more, so the mixture is laevorotatory.

421 **(a)**

Fat soluble vitamins are A, D, E and K.

422 **(d)**

Upon heating, the proteins get coagulated. This process is called denaturation of proteins. During this process, the secondary and tertiary structures get destroyed but primary structure remains intact.

423 **(c)**

It is a fact.

425 **(b)**

This is saponification;

$$\text{Fat or oil} \xrightarrow{NaOH} \text{Soap} + \text{Glycerol}$$

Also the process is alkaline hydrolysis of fats and oils.

426 **(a)**

Higher alkanes are solid (wax).

428 **(b)**

Cellulose is homopolysaccharide of glucose while maltose is disaccharide with 2 glucose units.

429 **(b)**

Lactose gives glucose and galactose on hydrolysis

$$\text{Lactose} \xrightarrow[H^+]{H_2O} \text{glucose} + \text{galactose}$$

430 **(d)**

When glucose reacts with Br_2 water, gluconic acid is obtained as main product

431 **(d)**

In presence of sunlight body manufactures vitamin D.

433 **(d)**

All are functions of DNA.

434 **(d)**

These are oils which on exposure to air changes into hard solids, e.g, linseed oil. All drying oils contain a large proportion of the unsaturated acids i.e., linoleic $C_{17}H_{31}COOH$ and linolenic acid $C_{17}H_{29}COOH$. This property is used in paint industry as vehicle for paints.

435 **(a)**

Maltose give two units of glucose on hydrolysis.

437 **(a)**
Natural glucose is dextrorotatory and thus, glucose is also known as dextrose.

438 **(d)**
Myristic acid is $C_{13}H_{27}COOH$.

440 **(d)**
It is $C_9H_{13}NO_3$ [3, 4-dihydroxy-α-(methyl amino methyl) benzyl alcohol] also known as epinephrine, a hormone produced by the medulla of the adrenal glands and synthetically. It functions as a heart stimulant and constricts blood vessels.

441 **(b)**
They are made up of mixtures of terpenes, aldehydes, acids, etc. In fact essential oils are acyclic or aromatic volatile liquids formed in the leaves and flowers of various plants.

442 **(b)**
Insulin, a hormonal protein secreted by pancreas controls the metabolism of glucose.

444 **(a)**
$CHOH(CHOH)_3\ CHCH_2OH$, i. e., 5 carbon and one oxygen atom.

445 **(b)**
On heating slowly sucrose melts and if allowed to cool, solidifies to pale-yellow glassy mass called **barley sugar**. At 483 K it loses water and forms a brown amorphous mass called **caramel.**

446 **(c)**
Because of size and geometries of the bases, the only possible pairings in DNA are between G (guanine) and C (cytosine) through three H-bonds and between A (adenine) and T (thymine) through two H-bonds. Hence,

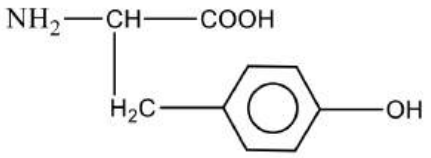
A T C G T A T G
| | | | | | | |
T A G C A T A C

447 **(d)**
The detergency of a substance is influenced by these factors.

448 **(d)**
It is defined as the number of millilitrr of $N/10$ KOH solution required to neutralise the distillate acid of 5 g of hydrolysed fat.

449 **(c)**
Both are protein hormones.

450 **(d)**
Tyrosine has phenyl – OH group. Its structure is as



451 **(b)**
These is saponification;

$$\text{Fat or oil} \xrightarrow{NaOH} \text{Soap} + \text{Glycerol}$$

Also the process is alkaline hydrolysis of fats and oils.

452 **(c)**
Streptokinase converts plasminogen into plasmin and used for dissolving blood clots.

453 **(d)**
Follow structure of proteins.

454 **(a)**
These are called hard soaps.

455 **(b)**
Nails are made up of simple proteins.

457 **(a)**
Immunoglobulins are gamma globulins responsible for immune response.

458 **(c)**
The name of a process in absence of free oxygen.

459 **(d)**
All are globular proteins. **Globular proteins:** These have more or less spherical shape (compact structure). α-helics are tightly held up by weak attractive forces of various types: hydrogen bonding, disulphide bridges, ionic or salt bridges. These are usually soluble in water, e.g., insulin, pepsin, haemoglobin, cytochromes, albumins, etc.

462 **(d)**
In presence of alkali, fructose is converted into mixture of mannose and glucose showing enolisation. Glucose than reduces Tollens' reagent.

463 **(a)**

$$CHO(CHOH)_4CH_2OH \xrightarrow{Red^n} CH_2OH(CHOH)_4CH_2OH$$

464 **(d)**
Insulin is secreted from pancreas.

465 **(a)**
It contains —OH gp.

466 **(a)**
Cations move towards cathode and when pH<pI, thus catonic form dominates
Thus, percentage of radioactive DNA after second replication is 50%

468 **(b)**

Zymase enzyme convert glucose into alcohol. It is found in yeast.

$$\underset{\text{Glucose}}{C_6H_{12}O_6} \xrightarrow{\text{Zymase}} \underset{\text{ethyl alcohol}}{2C_2H_5OH} + 2CO_2$$

469 **(c)**
Waxes are esters of monohydric alcohols with higher fatty acids.

470 **(d)**
The first is biuret test; the second is ninhydrin test and the third is xanthoproteic test; all are test of proteins.

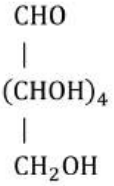
473 **(a)**

$$\text{Carbonic acid} \xrightarrow{\text{Anhydrase}} CO_2 + H_2O$$

474 **(b)**
Aldehydes and α –hydroxy ketones give positive Tollen's test. Glucose has an aldehyde group and fructose is an α –hydroxy ketone.

475 **(a)**
Follow text.

476 **(d)**
Glucose is a pentahydroxy aldehyde.



Glucose

479 **(d)**
All these are biomolecules (carbohydrates, lipids, proteins, nucleic acids, vitamins, hormones) since, they deal with chemistry of life process.

482 **(c)**
Partial hydrolysis of cellulose gives the disaccharide cellubiose ($C_{12}H_{22}O_{11}$). Cellobiose resembles maltose (which on acid catalysed hydrolysis yields two molar equivalents of D-glucose) in every respect except one the configuration of its glycosidic linkage.

483 **(d)**
These are oils which on exposure to air changes into hard solids, e.g, linseed oil. All drying oils contain a large proportion of the unsaturated acids *i.e.*, linoleic $C_{17}H_{31}COOH$ and linolenic acid $C_{17}H_{29}COOH$. This property is used in paint industry as vehicle for paints.

484 **(c)**
A polysaccharide containing glucose units.

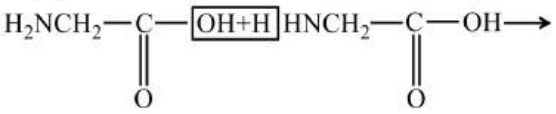
485 **(a)**
Cell wall of plant cells is made up of cellulose.

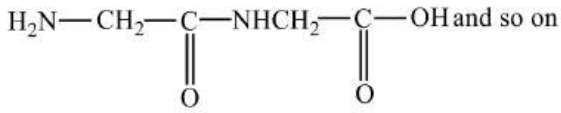
486 **(a)**
Maltose on hydrolysis give two units of glucose.

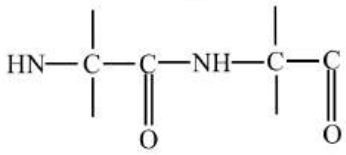
487 **(b)**
$H_2n - CH_2 - COOH$ (glycine) and $H_2N - (CH_2)_5 -$ (caproic acid) from biodegradable polymer Nylon-2-nylon-6.

488 **(d)**
The chemical name of vitamin B_1 is thiamine. Except vitamin A, D, E and K all vitamins are water soluble.

489 **(c)**
In peptide linkage $-CONH-$ gp. exists.







491 **(d)**
Vit. A and D are fat soluble vitamins.

492 **(d)**
Vitamin B_{12} gives dark pink colour in aqueous solution.

493 **(a)**

$$-CHO \xrightarrow{Ag_2O} -COOH + 2Ag$$

494 **(d)**
They are insoluble in H_2O.

495 **(c)**

$$\text{Starch} \xrightarrow{\text{Dil.HCl}} C_6H_{12}O_6$$

496 **(a)**
In alkaline medium, alanine exists as anion.

$$\underset{\text{COOH}}{\underset{|}{CH_3 - CH - NH_2}} \xrightarrow[(pH>7)]{\text{Basic medium}} \underset{\text{COO}^-}{\underset{|}{CH_3 - CH - NH_2}}$$

Alanine

499 **(a)**
Vitamin C is ascorbic acid ($C_6H_8O_6$).

500 **(d)**
Follow synthesis of proteins in nucleic acid.

501 **(a)**
Uracil, thymine and cytosine are pyrimidine bases while adenine and guanine are purine bases. RNA contains uracil in place of thymine.

502 **(c)**
A proteolytic enzyme hydrolyses or decomposes proteins. Pepsin converts proteins to peptones in acidic medium.

503 **(b)**
Upto 10 monosaccharide units, they are called oligosaccharides.

504 **(b)**
Derived fats like sterols (cholesterols), ketone bodies, hydrocarbons, terpenes, carotenoids etc. are obtained by the hydrolysis of simple lipids and compound lipids. Neutral fats (fats and oils) are not synthesized by this method.

505 **(b)**
Only coconut oil is glyceride.

506 **(c)**
(i) **Ketohexose** It is carbohydrate having 6C atoms and a ketonic group.
(ii) **Disaccharide** It is carbohydrate which on hydrolysis gives 2 molecules of monosaccharides.
(iii) **Polysaccharides** These carbohydrates give more than two molecules of monosaccharides on hydrolysis.
(iv) **Pentose** It is a 5 carbon atoms monosaccharide *e.g.,* Ribose ($C_5H_{10}O_5$).

507 **(c)**
Fructose is oxidized by ammoniacal $AgNO_3$

508 **(b)**
Essential amino acids (10) are as follows
(i) Arginine
(ii) Histidine
(iii) Isoleucine
(iv) Leucine
(v) Lysine
(vi) Methionine
(vii) Phenylalanine
(viii) Threonine
(ix) Tryptophane
(x) Valine

509 **(b)**
Cellulase enzyme is present in the stomach of grazing mammals. It digest cellulose.

510 **(d)**
Proteins $\xrightarrow{\text{Trysin}}$ Amino acids.

511 **(a)**
Oligosaccharides on hydrolysis give sugars.

512 **(b)**
1 g fat provide 37 kJ of energy on oxidation while 1 g carbohydrate on oxidation gives 17 kJ of energy. Hence, fat has highest calorific value

514 **(a)**
Glucose is monosaccharide; rest all are disaccharides.

515 **(c)**
Lactose present in milk change after digestion into glucose and galactose.

516 **(c)**
Arabinose is $CHO(CHOH)_3 \cdot CH_2OH$.

518 **(b)**
The heme ring system is synthesized from glycine and succinyl $-CoA$

519 **(b)**
It is an explosive material.

520 **(b)**
Sucrose molecule is made up of a glucose pyranose and a fructo furanose.

521 **(c)**
Carnauba wax is myricyl ceroate,
i.e., $C_{25}H_{51}COOC_{30}H_{61}$.

522 **(c)**
T A T G A C T G
⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮
A T A C T G A C
In the structure of DNA, thymine always joins with adenine by 2 H-bonds and guanine always joins with cytosine by 3 H-bonds.

523 **(b)**
Sodium or potassium salts of fatty acid are known as soap.

524 **(c)**
By the condensation of α $-$amino acids peptides are formed.

$$H_2N - CH_2COOH + H_2N - CH_2 - COOH$$

$$NH_2—CH_2COOH + H_2N—CH_2—COOH$$

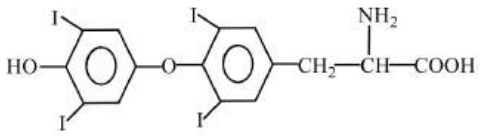
$$\xrightarrow{-H_2O} H_2N—CH_2—\underset{\text{peptide bond}}{CONH}—CH_2COOH$$

526 **(b)**
Wax contains ester group. These are the ester of high molecular weight of monohydric alcohol and high molecular mass of monocarboxylic acid.

527 **(a)**
Amylopectin is a polymer of α-D-glucose. It consists of branched chains of α-D-glucose involving about 1000 or more units per molecule

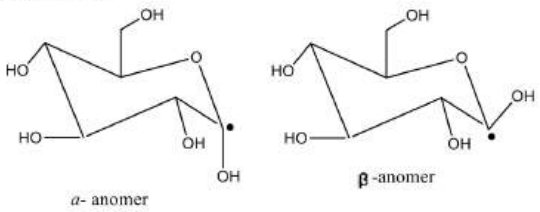
528 **(a)**
Digestion is a chemical change involving hydrolysis of complex food matter.

529 **(a)**
Thyroxine has $-COOH$ and $-NH_2$ groups.



530 **(c)**
It is $C_{15}H_{11}I_4NO_4$, an iodine containing amino acid hormone produced in thyroid glands, used in thyroid deficiency.

531 **(c)**
$\alpha - D(+)$ glucose and $\beta - D(+)$ glucose are anomers



532 **(a)**
The process of formation of RNA from DNA is called translation.

533 **(b)**
α-and β-glucose are anomers (which differ in configuration at C-1).

534 **(c)**
The calorific value order:
Fat > Carbohydrate > Protein.

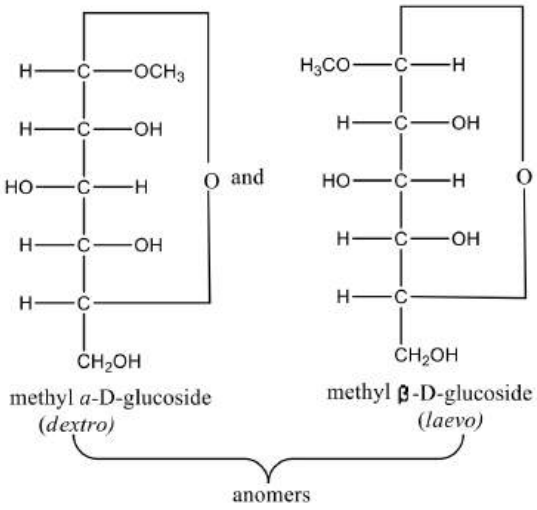
535 **(b)**
Insulin is proteinaceous hormone. It is secreted by pancreas and controls the metabolism of glucose and maintains glucose level in the blood

536 **(a)**
Cellulose is a polymer of glucose. $\beta - D(+) -$ glucose units are attached to each other by C_1 to C_4 bonds through $\beta -$glycosidic linkage in structure of cellulose.

537 **(d)**
It is obtained from sugar cane and is a disaccharide.

538 **(d)**
All are uses of glucose.

539 **(b)**
Methyl $\alpha - D -$glucoside and methyl $\beta -$ D $-$glucoside are anomers.



540 **(a)**
Glucose has six membered pyranose ring.

541 **(a)**
Monomer of nucleic acid (DNA or RNA) is nucleotides.

542 **(b)**
Oxytocin hormone plays an important role in child birth and milk ejection. It is secreted by posterior pituitary gland

543 **(d)**
Palmitic acid = $C_{15}H_{31}COOH$
Saturated monocarboxylic acids form a homologous series which has a general formula $C_n H_{2n+1} COOH$. Out of all the options only palmitic acid follows this .

545 **(b)**
Salvinoff test for fructose.

546 **(b)**
Soaps are salts of higher fatty acids.

547 **(b)**
K and Na regulates the body fluid.

548 **(d)**
All are source of vitamin A.

549 **(b)**
Sugar + alc. Solution of α–naphthol + $H_2SO_4 \rightarrow$ Violet ring.

550 **(b)**
The deficiency of insulin disturbs conversion of glucose to glycogen.

552 **(b)**
DNA has deoxyribose sugar; RNA has ribose sugar with three bases common as adenine, guanine and cytosine. DNA has fourth base thymine; RNA has uracil.

553 **(a)**

Haemoglobin act as an oxygen carrier in the blood because four Fe^{2+} ions of haemoglobin can bind with 4 molecules of O_2 and form oxyhaemoglobin

$Hb + O_2 \longrightarrow$ Oxyhaemoglobin

554 **(b)**

It is called glucoside. A glucoside linkage holds monosaccharides units in oligo- and polysaccharides.

555 **(c)**

The internal rearrangement of 3-phosphoglyceric acid into 2-phosphoglyceric acid takes place in the presence of enzyme phosphoglycero mutase

557 **(b)**

Pepsin, ptyalin and lipose are enzyme while cellulose is not the enzyme. It is a polysaccharide

558 **(d)**

Insulin hormone helps in the conversion of glucose into glycogen by the liver and skeletal muscle. Insulin is secreted by pancreas that lower blood glucose level.

559 **(a)**

Sweet taste of fruits is due to fructose.

561 **(d)**

It causes night blindness.

562 **(c)**

Follow DNA strand.

563 **(c)**

Nucleic acid (RNA and DNA) are the natural polymer of nucleotides. A nucleotide contains a nitrogenous (hetrocyclic) base, an aldopentose (generally ribose and deoxy-ribose) and a phosphate group. The combination of former two units is also called a nucleoside.

Phosphate + Pentose sugar + Base = Nucleotide

Sugar Base = Nucleoside

565 **(c)**

Glucosazone is yellow in colour.

566 **(a)**

Butter is butyric acid ester which on hydrolysis, oxidation converts to butyric acid and thus, acquires bad smell. The process is called rancidification.

569 **(c)**

Blood sugar is glucose.

570 **(a)**

It is a reason for the given fact. Butter is butyric acid ester which on hydrolysis, oxidation converts to butyric acid and thus, acquires bad smell. The process is called rancidification.

571 **(c)**

Fisher pointed out peptide linkage in proteins.

572 **(c)**

Charring of sugar when it is treated with conc.H_2SO_4 is due to dehydration. All water molecule is removed from the sugar

$C_{12}H_{22}O_{11} + \text{Conc. } H_2SO_4 \longrightarrow 12C + 11H_2O$

573 **(c)**

Vitamin B and C are water soluble and C is antioxidant.

574 **(d)**

Protein given blue-violet colour with ninhydrin while carbohydrate give negative test with ninhydrin. Carbohydrates give brown red ppt. with Benedict's solution. Hence, compound is a monosaccharide

575 **(d)**

Amino acids $\longrightarrow$ Dipeptides $\longrightarrow$ Polypeptides

577 **(c)**

$$(C_6H_{10}O_5)_n \xrightarrow{\text{Diastase}} C_{12}H_{22}O_{11} \xrightarrow{\text{Maltase}} C_6H_{12}O_6$$
$$\xrightarrow[\text{Zymase}]{} C_2H_5OH$$

578 **(d)**

All are conjugated proteins.

Conjugated proteins are composed of simple proteins and non-protein material. The non-protein material is called **prosthetic group** or **cofactor**. These proteins on hydrolysis yield amino acids and non-protein material. Examples are: mucin in saliva (Prosthetic group, carbohydrate), casein in milk (Prosthetic group, phosphoric acid), haemoglobin in blood (Prosthetic group, iron pigment).

579 **(a)**

Pepsin hydrolyses proteins to amino acids.

580 **(a)**

Glycine (NH_2CH_2COOH) is an amphoteric acid as it contains both acidic and basic groups.

581 **(c)**

Iso-electric point is a pH at which Zwitter ions do not migrate towards any of the electrode. Amino acids are also Zwitter ions hence, they do not migrate under electric field at *iso*-electric point

583 **(d)**

α −maltose is composed of two α − D −glucose units in which C-1 of one glucose is linked to C-4 of another glucose unit.

584 **(c)**

$C_{15}H_{31}COONa$ is soap (sodium palmitate).

585 **(b)**

Enzymes are biocatalysts.

586 **(d)**
Sucrose is a disaccharide and it yield one molecule each of glucose and fructose on hydrolysis.

$$\underset{\text{Sucrose}}{C_{12}H_{22}O_{11}} + H_2O \xrightarrow{H^+} \underset{\text{glucose}}{C_6H_{12}O_6} + \underset{\text{fructose}}{C_6H_{12}O_6}$$

587 **(c)**
These are oils which on exposure to air changes into hard solids, e.g, linseed oil. All drying oils contain a large proportion of the unsaturated acids i.e., linoleic $C_{17}H_{31}COOH$ and linolenic acid $C_{17}H_{29}COOH$. This property is used in paint industry as vehicle for paints.

591 **(a)**
Detergency means cleansing action.

592 **(d)**
Soaps are salts of higher fatty acids.

593 **(c)**
Glucose is reducing sugar.

594 **(a)**
Biuret test is characteristically given by the compound having

$$-\overset{\overset{O}{\|}}{C}-NH-$$ functional group.

595 **(a)**
Synthetic detergents are the chemical compounds synthesized in laboratory and possess properties like soaps. These are also surface active agents and possess cleansing capacity like soaps. These are generally sodium or potassium salts of long chain alkyl benzene sulphonic acids, or long chain alkyl sulphate.

596 **(b)**
Starch is homopolysaccharide of glucose having 24-30 glucose units.

597 **(c)**
Ghee has least iodine value among the given options because it is the least unsaturated.

598 **(d)**
Vitamin K deficiency causes excessive bleeding in injury.

599 **(a)**
Carbohydrates with 2-10 monosaccharide units are called oligosaccharides while higher carbohydrates are called polysaccharides.

600 **(b)**
Oils (liquid glycerides) react with hydrogen in the presence of metal catalyst (like nickel) to give saturated glycerides (semi-solid glycerides) *i.e.*, fats. Thus, vegetable ghee (dalda) is obtained by the hydrogenation (reduction) of oils.
Oils + $H_2 \longrightarrow$ dalda

601 **(a)**
The C-1 carbon of D (+) glucose is called anomeric carbon or glycosidic carbon and the pairs of stereoisomers differ in configuration around C-1 are called anomers.

603 **(c)**
Vitamin C is also called ascorbic acid. The deficiency of vitamin C causes scurvy. It is present in amla, tomatoes, orange, cabbage, lemon etc.

604 **(b)**
DNA has deoxyribose sugar; RNA has ribose sugar with three bases common as adenine, guanine and cytosine. DNA has fourth base thymine; RNA has uracil.

605 **(d)**
It is a fact.

607 **(b)**
Fructose is the sweetest sugar.

608 **(d)**
Saccharin is $C_6H_4SO_2CONH$, a white crystalline solid, 550 times more sweeter than sugar.

610 **(a)**
Cellulose is commonly used in manufacture of paper.

611 **(d)**
A use of starch.

612 **(d)**
Nucleic acids are polymers of nucleotides. They play an important role in all living cells. There are two types of nucleic acids
(I) DNA
(II) RNA

613 **(b)**
Glucose penta-acetate doesn't form an oxime because the glycosidic – OH group is not free since it is involved in ring formation. As a result, it cannot get converted into the open chain form required for the formation of oxime.

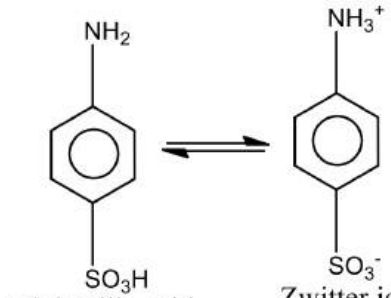
614 **(a)**
It is a fact.

615 **(b)**
Corn oil contains glycerides of oleic acid.

616 **(c)**
Zwitter ion an inner salt has acidic and basic groups in the same molecule.

A Zwitter ion is a dipolar ion with positive and negative charge at different points on it.

Example Sulphanilic acid exists as a Zwitter ion.



sulphanilic acid Zwitter ion structure (II)

617 **(a)**
Milk contains lactose which on hydrolysis gives glucose and galactose

618 **(a)**
A fact about glycogen.

619 **(c)**
This is the correct sequence in structure of nucleic acid.

620 **(a)**
Cellulose is a straight chain polysaccharide composed of D-glucose units which are joined by β −glycosidic linkages between C-1 of one glucose and C-4 of the next glucose. In one unit only three hydroxyl groups are free to form acetate, that's why called cellulose triacetate.

622 **(b)**
Glycine is CH_2COOH, having no asymmetric carbonation.

NH_2

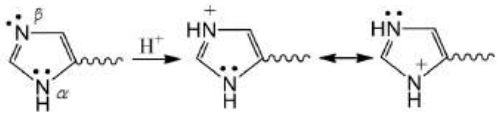
624 **(a)**
The correct pairing sets which are responsible for the structure of DNA are
Adenine – Thymine
Guanine – Cytosine

625 **(c)**
In DNA, cytosine and thymine are pyrimidine bases.

627 **(d)**
Toilet soaps are mixture of potassium salts (Soft soap) of higher fatty acids having carbolic acid.

628 **(b)**
A scale to measure unsaturation (content of double bonds) of a product. It is expressed in gram of iodine absorbed by 100 g of substance.

629 **(b)**
Protonation of β-N leads to imidazolium ion, which is stabilized by two equivalent resonating structures



equivalent resonating structure

630 **(d)**
Follow text

631 **(b)**
$\frac{15}{30} \times 100 = 50$
Thus, the mixture is 50% optically pure. Hence, the amount of
$A = 50 + 25 = 75$
$B = 0 + 25 = 25$
$A : B = 3 : 1$

633 **(c)**
A fact about structure of insulin. The two S—S bridges in between two chains are called interchain bridges.

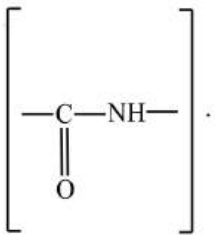
634 **(c)**
DNA has D(-)-2-deoxyribose and RNA has (D)-ribose, both are chiral.

635 **(d)**
Lipids are of two types: oils and fats; oils are glycerides or esters of unsaturated fatty acids while fats are glycerides of saturated fatty acids.

636 **(b)**
Insulin is a hormone built up of two polypeptide chains.

637 **(d)**
Oxytocin-hormone

639 **(c)**
In proteins, amino acids are linked through peptide bonds



640 **(d)**
All these are proteins.

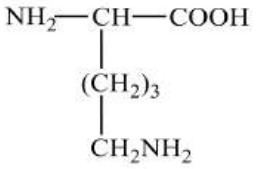
641 **(a)**
Adrenal glands are important endocrine glands in human-body. Its cortex part secretes the hormone 'cortisone'.

642 **(d)**

Enzymes are destroyed at high temperature. The optimum temperature range is 25-35°C.

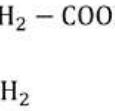
643 **(a)**

Lysine is one of the 10 essential amino acids. It is:



644 **(d)**

Glycine is optically inactive amino acid due to absence of chiral carbon atoms.



Glycine

645 **(a)**

Glucose is aldohexose and fructose is ketohexose.

646 **(b)**

Hormones are either proteins or steroids or simple organic compounds produced by the endocrine glands and are secreted to blood which are carried to all parts of body where they regulate many metabolic functions of the organisms.

647 **(a)**

Starch is homopolysaccharide of glucose.

$$\text{Starch} \xrightarrow{HOH} \text{Sugar} \xrightarrow{HOH} \text{Glucose}$$

648 **(d)**

Vitamin B_{12} or cyanocobalamine contains cobalt and not magnesium.

649 **(a)**

Hormones are either proteins or steroids or simple organic compounds produced by the endocrine glands and are secreted to blood which are carried to all parts of body where they regulate many metabolic functions of the organisms.

650 **(a)**

Hardening of fat (lipid) is due to hydrogenation.

$$\text{Oil (liquid)} + H_2 \xrightarrow{Ni} \text{Vanaspati ghee solid}$$

651 **(c)**

Arabinose is $C_5H_{10}O_5$.

653 **(b)**

Biomolecules	Metal ion
Vitamin B_{12}	Co (transition metal)
Chlorophyll	Mg(non – transition metal ion)
Haemoglobin	Fe (transition metal)
insulin	S(non-metal)

654 **(a)**

Primary structure involves sequence of α –amino acids polypeptide chain.

Secondary structure involves α –helical and β –pleated sheet like structure.

655 **(b)**

Liquid part of paint is called vehicle or carrier.

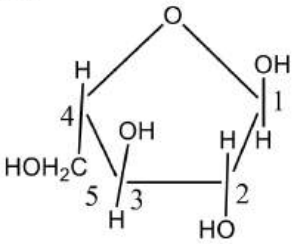
656 **(a)**

Vitamin D is also known as cholecalciferol.

657 **(b)**

Milk contains casein.

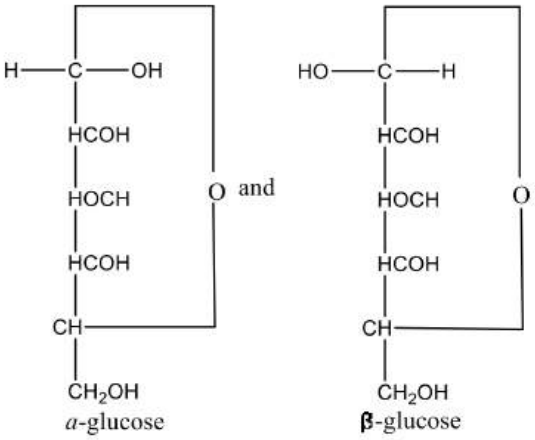
658 **(a)**



This compound contains five carbons atoms, so it is a pentose. Its first carbon contains – H and – OH group. This suggests that it is an aldose (*i.e.,* contains aldehyde group). Since, its structure is similar to furan (a heterocyclic conpound), so it has furanose structure.

Hence, this compound is a pentose, aldose and have furanose structure.

660 **(a)**



a-glucose β-glucose

These both the forms of glucose differ in the orientation of – OH group around C_1.

661 **(a)**

Fats and oils are esters of glycerol with higher fatty acids. Hence, coconut oil is an ester.

662 **(c)**

Glycogen serves as reserve glucose in body.

$\text{Glycogen} \xrightarrow{\text{HOH}} n(\text{glucose})$

663 **(b)**

DNA is called the master molecule since, it plays key role in life process.