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Q1. What is a glycosidic linkage?

Q2. Define the following term: Invert sugar.

Q3. Define the following term: Polysaccharides.

Q4. Define the following term: Anomers.

Q5. Write the product formed when glucose is treated with HI.

Q6. Write the product formed on reaction of *D*-glucose with Br_2 water.

Q7. Which of two components of starch is water soluble?

Q8. Which one of the following is a monosaccharide: Starch, Maltose, Fructose, Cellulose.

Q9. Write the product obtained when *D*-glucose reacts with H_2N — OH.

Q10. Which one of the following is a disaccharide: Starch, Maltose, Frutose, Glucose?

Q11. Write the structural difference between starch and cellulose.

Q12. Write the name of two monosaccharides obtained on hydrolysis of lactose sugar.

Q13. Write a reaction which shows that all the carbon atoms in glucose are linked in a straight chain.

Q14. Write the structure of the product obtained when glucose is oxidised with nitric acid.

Q15. Name two components of starch.

Q16. What is the difference between fibrous protein and Globular protein?

Q17. Give one example each for fibrous protein and globular protein.

Q18. Describe the following, giving an example: Glycosidic linkage.

Q19. What is the structural feature characterising reducing sugar?

Q20. Name of the expected products of hydrolysis of lactose.

Q21. What are the products of hydrolysis of sucrose?

Q22. What is menat by 'reducing sugars'?

Q23. Explain what is meant by the following: Pyranose structure of glucose?

Q24. State two functions of carbohydrates.

Q25. Define a 'Peptide linkage'.

Q26. Define the folowing term: Anino acids.

Q27. Define the following term:Denaturation of proteins

Q28. Define the following term: Essential amino acids.

Q29. What type of lingake is responsible for the formation of proteins?

Q30. What is the difference between acidic amino acids adn basic amino acids?

Q31. Amino acids show amphoteric behaviour. Why?

Q32. Deficiency of which vitamin causes night-blindness?

Q33. Write the name of the vitamin whose deficiency causes bleeding of gums.

Q34. Write the name of vitamin whose deficiency causes bone deformities in children.

Q35. Why vitamin C cannot be stored in our body?

Q36. What is meant by biocatalysts?

Q37. What are enzymes?

Q38. Define the following term: Enzymes

Q39. Explain the following term: Polypeptides

Q40. Where does the water present in the egg go after boiling the egg?

Q41. Name the only vitamin which can be synthesized in our body. Name the disease caused dut to the deficienty of this vitamin.

Q42. How are hormones and vitamins different in respect of their source and functions?

Q43. Name the deficiency diseases resulting from lack of vitamins A and E in the diet.

Q44. Name one of the water soluble vitamin which is powerful antioxidant. Give its one natural source.

Q45. Why are vitamin A and vitamin C essential for us?

Q46. Define the following term: Vitamins.

Q47. Deficiency of which vitamin cause rickets?

Q48. Deficiency of which vitamin causes scurvy?

Q49. What are vitamins? Deficiency of which vitamins causes:

(a) Pernicious anaemia? (b) Convulsions?

Q50. The deficiency of which vitamin causes the disease, 'pernicious anaemia'?

Q51. Name the deficiency disease resulting from lack of vitamin A in the diet.

Q52. Name two water soluble vitamins, their sources and diseases caused due to their deficeiency in diet.

Q53. Mention one important function of nucleic acids in our body.

Q54. Define the following term: Nucleoside.

Q55. Name of the base that is found in nucleotide of RNA only.

Q56. What type of linkage is present in nucleic acids?

Q57. What is difference between a nucleoside and nucleotide?

Q58. Name of the purines present in DNA.

Q59. Write down the structures and names of the products formed wen *D*-glucose is treated with

(a) Hydroxylamine **(b) Acetic anhydride.**

Q60. Enumerate the reactions of glucose which cannot be explained by its open chain structures.

Q61. Write any two reactions of glucose which cannot be explained by the open chain structure of glucose molecule.

Q62. Name the products of hydrolysis of socrose. Why is sucrose not a reducing sugar?

Q63. Name the products of hydrolysis of (a) sucrose and (b) lactose.

Q64. Write such reactions and facts about glucose which can not be explained by open chain structure.

Q65. What is essentially the difference between α-form and β-form of glucose? Explain.

Q66. Write down the structures and names of the products formed when *D*-glucose is treated with

(a) Bromine water. **(b) Hydrogen Iodide (Prolonged heating)**

Q67. Mention the type of linkage responsible for the formation of the following:

(a) Primary structure of proteins **(b) Cross-linkage of polypeptide chains**

(c) α-helix formation **(d) β-sheet structure**

Q68. What are essential and non-essential amino acids? Give one example of each type.

Q69. Describe the following terms in reference of proteins:

(a) Primary structure. **(b) Denaturation.**

Q70. Define the following terms in relation to proteins:

(a) Peptide bond. **(b) Denaturation of proteins**

Q71. State what you understand by primary and secondary structure of proteins.

Q72. Describe what you understand by primary structure and secondary structure of proteins?

Q73. Answer the following question briefly: How are carbohydrates classified?

Q74. Explain what is meant by a peptide linkage.

Q75. What happens (write chemical equations) when *D*-glucose is treated with the following:

(a) HI **(b) Bromine water**

Q76. Answer the following:

(a) What type of linkage is responsible for the primary structure of proteins?

(b) Name the location where protein synthesis occurs in our body.

Q77. List two characteristic features of enzymes.

Q78. Write the structural and functional difference between DNA and RNA.

Q79. How are the vitamins classified? Mention the chief sources of vitamins A and C.

Q80. Name two fat soluble vitamins, their sources and the diseases caused due to their deficiency in diet.

Q81. B-complex is an often prescribed vitamin. What is complex about it and what is its usefulness?

Q82. Answer the following questions briefly:

(a) What are thetwo good sourves of vitamin A?

(b) Why is vitamin C essential to us? Give its important sources.

Q83. Write the main structural difference between DNA and RNA. Of the two bases, thymine and uracil, which one is present in DNA?

Q84. Name the bases present in RNA. Which on of these is not present in DNA?

Q85. Write the main structural difference between DNA and RNA. Of the four bases, name those which are common to both DNA and RNA.

Q86. When RNA is hydrolysed, there is no relationship among the quantities of different bases formed. What does this fact suggest about the structure of RNA?

Q87. (a) What is the structural difference between a nucleoside and a nucleotide?

(b) The two strands in DNA are not identical but are complementary. Explain.

Q88. Name the four bases present in DNA. Which one of these is not present in RNA?

Q89. What is essentially the difference between α-glucose and β-glucose? What is ment by pyranose structure of glucose?

Q90. Define the following terms:

(a) Glycosidic linkage (b) Invert sugar (c) Oligosaccharides

Q91. Mention the structural feature characterising reducing sugar.

Q92. (a) Give two differences between globular and fibrous proteins.

(b) What change occurs in the nature of egg protein on boiling?

Q93. What are essential and nonessential amino acids? Give two eamples of each.

Q94. Define the following terms as related to proteins:

(a) Peptide linkage. (b) Primary structure. (c) Denaturation.

Q95. What happens when *D*-glucose is treated with the following reagents:

(a) HI (b) Bromine water. (c) HNO_3.

Q96. Name the three major classes of carbohydrates & give an example of each f these classes.

Q97. How are vitamins classified? Name the vitamin responsible for the coagulation of blood.

Q98. What are proteings? State a difference between globular and fibrous proteins.

Q99. (a) What type of bonding helps in stabilising of α-helix structure of proteins?

(b) Differentiate between globular and fibrous proteins.

Q100 Differentiate between fibrous proteins and globular proteins. What is meant by the denaturation of a protein?

Q101 Amino acids may be acidic, alkaline or neutral. How does this happen? What are essential and non-essential amono acids? Name one of each type.

Q102 Shanti, a domestic helper of Mrs. Anuradha, fainted while mopping the floor. Mrs. Anuradha immediately took her to the nearby hospital where she was diagnosed to be severely 'anaemic'. The doctor prescribed an iron rich diet and multivitamins supplement to her. Mrs. Anuradha supported her financially to get the medicines. After a month, Shanti was diagnosed to be normal.

After reading the above passage, answer the following questions:

(a) What values are displayed by Mrs. Anuradha?

(b) Name the vitamin whose dificiency causes 'pernicious anaemia'.

(c) Give an example of water soluble vitamin.

Q103 What are the different types of RNA found in cells of organisms? State the functions of each type.

Q104 After watching a programme on TV about the adverse effects of junk food and soft drinks on the health of school children, Sonali, a student of Class XII, discussed the issue with the school principal. Principal immediately instructed the canteen contractor to replace the fast food with the fibre and vitamins rich food like sprouts, sald, fruits etc. This decision was welcomed by the parents and the students.

After reading the above passage, answer the following questions:

(a) What values are expressed by Sonali and the Principal of the schllo?

(b) Give two examples of water-soluble vitamins.

Q105 (a) Write the important structural difference between DNA and RNA.

(b) Mention the names of the bases produced on hydrolysis of DNA.

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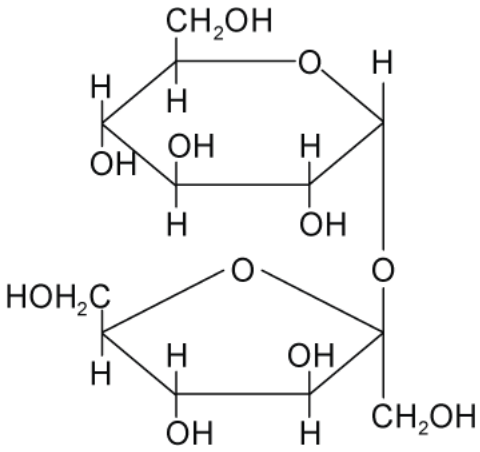
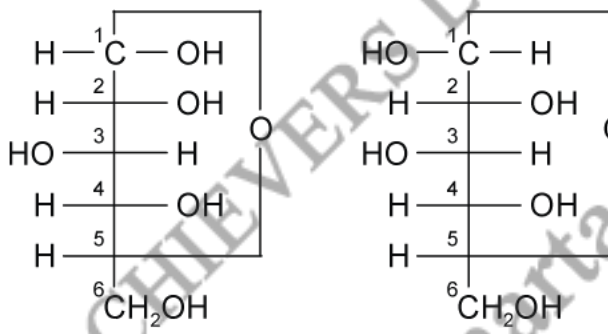
S1. The two monosaccharides are joined together by an oxide linkage formed by the loss of water molcecule. Such linkage is called glyosidic linkage.



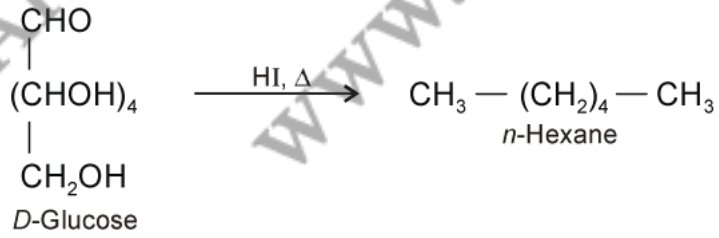
S2. An equimolar mixture of glucose and fructose, obtained by hydrolysis of sucrose in presence of an acid or the enzyme invertase is called invert sugar.

S3. Carbohydrates which yield a large number of monosaccharide units on hydrolysis are called polysaccharides.

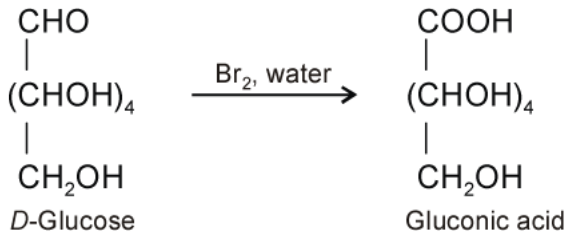
S4. The pair of stereoisomers which differ only in the configuration of the hydroxyl group at C_1 are called anomers.



S5. On prolonged heating with HI, *D*-glucose forms *n*-hexane.



S6. *D*-glucose gets oxidised to six carbon carboxylic acid (gluconic acid) on reaction with bromine water.

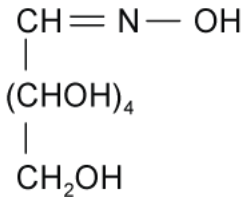


D-Glucose Gluconic acid

S7. Amylose is water soluble and amylopectin is insoluble in water.

S8. Fructose is a monosaccharide because it cannot be hydrolysed to simpler polyhydrozy aldehydes or ketones.

S9. *D*-glucose reacts with H_2N — OH to give glucose oxime.

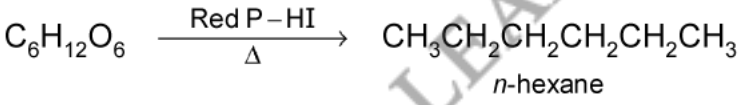


S10. Maltose is a disaccharide as it consists of two α-*D*-glucose units.

S11. The basic structural difference between starch and cellulose is of linkage between the glucose units. In starch, there is α-*D*-glycosidic linkage. Both the components of starch-amylose and anylopectin are polymer of α-*D*-glucose. On the other hand, cellulose is a linear polymer of β-*D*-glucose in which C_1 of one glucose unit is connected to C_4 of the other through β-*D*-glycosidic linkage.

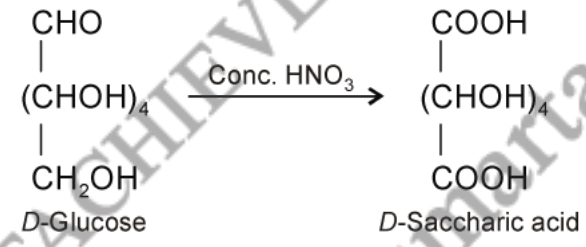
S12. Lactose on hydrolysis gives β-*D*-glucose and β-*D*-galactose.

S13. Glucose when heated with red P and HI gives *n*-hexane.



In indicates presence of straight chain of six carbon atoms in glucose.

S14. On oxidation with nitric acid, F-glucose yields saccharic acid.



D-Glucose *D*-Saccharic acid

S15. Amylose and amylopectin are the two components of starch.

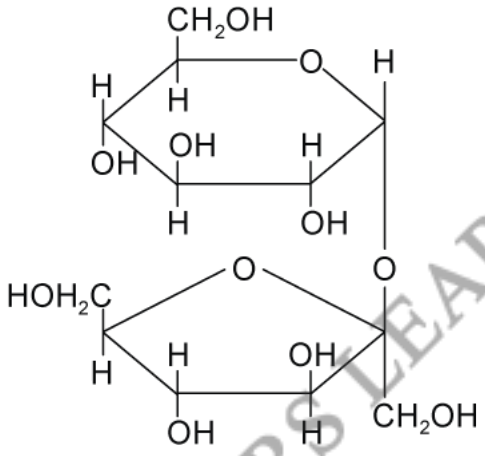
S16. Characteristic differences between globular and fibrous proteins can be given as:

Sl. No.	Globular protein	Fibrous protein
1.	These are cross-linked proteins and are condensation product of acidic and basic amino acids.	These are linear condensation polymer.
2.	These are soluble in water, mineral acids and bases.	These are insoluble in water but soluble in strong acids and bases.
3.	These protenins have three dimensional folded structure. These are stabilised by internal hydrogen bonding. *e.g.*, egg albumin, enzymes.	These are linear polymers held together by intermolecular hydrogen bonds. *e.g.*, hair, silk.

S17. Globular protein: Insulin.

Fibrous protein: Keratin.

S18. The two monosaccharides are joined together by an oxide linkage formed by the loss of water molcecule. Such linkage is called glyosidic linkage.



S19. The reducing sugars have free aldehudic or ketonic groups.

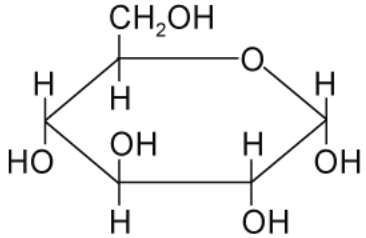
S20. Lactose on hydrolysis gives β-*D*-glucose and β-*D*-galactose.

S21. Glucose and fructose.

$$\underset{\text{Sucrose}}{C_{12}H_{22}O_{11}} + H_2O \xrightarrow{H^+} \underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\text{Fructose}}{C_6H_{12}O_6}$$

S22. Carbohydrates which reduce Tollen's reagent are reducing sugars. All monosaccharides, aldoses or ketoses are reducing sugars.

S23. The six membered cyclic structure of glucose is called pyranose structure (α- or β-), in analogy with heterocyclic compound pyran.

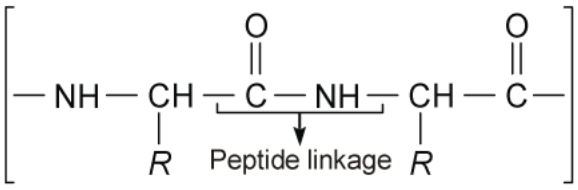


α-*D*-(+)-Glucopyranose

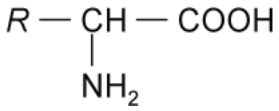
S24. (a) Carbohydrates act asstorage molecules as starch in plants and glycogen in animals.

(b) They act as constituent of cell membrane.

S25. Proteins are the polymers of α-amino acids linked by amide formation between carbozxyl and amino group. This is called peptide linkage or peptide bond e.g.,



S26. Organic compounds containing both amino (— NH_2) and carboxy (— COOH) functional groups are called amino acids.



S27. **Denaturation:** The loss of biological activity of a protein by changing the pH, temperature or by adding some salt due to disruption of the native structure of protein is called denaturation.

During denaturation secondary and tertiary structure of protein is destroyed but primary structure remains intact.

S28. **Essential amino acids:** Amino acids which cannot be synthesized in the body and moust be obtained through diet are known as essential amino acid. *e.g.*, valine, leucine, etc.

S29. Peptide linkage.

S30. Acidic amino acids are those which contain more number of carboxyl groups as compared to amino groups whereas basic amino acids are those which contains more number of amino groups than carboxyl groups.

S31. As amino acids have both acidic (carboxy group) and basic groups (amino group) in the same molecule, they react with both acids and bases. Hence, they show amphoteric behaviour.

S32. Vitamin A.

S33. Vitamin C.

S34. Vitamin D.

S35. Vitamin C is soluble in water and regularly excreted in urine and hence cannot be stored in body.

S36. Substances which catalyse chemical reactions taking place in living organisms are called biocatalysts. *e.g.*, enzymes.

S37. **Enzymes:** Most of the chemical reactions which occur in living systems process at very slow rates under mild condition of temperature and pH. These reactions are catalysed by a group of biomolecules called enzymes.

S38. **Enzymes:** Most of the chemical reactions which occur in living systems process at very slow rates under mild condition of temperature and pH. These reactions are catalysed by a group of biomolecules called enzymes.

S39. Polypeptides are the macromolecules formed by combination of 10 or more amino acids.

S40. An egg contains a soluble globular protein called allumin which is present in the white part. On boiling, denaturation (loss of biological activity) of this protein takes place which results in the formation of insoluble fibrous proteins. The water molecules are utilized in this process.

S41. Vitamin D.

Disease caused due to deficiency of Vitamin D is rickets.

S42.

	Hormones	Vitamins
(a)	The biomolecules which transfer information from one group of cell to distant tissue or organ.	These are essential dietary factors required by an organism in minute quantities.
(b)	They are produced in the body in ductless glands.	They are supplied to the body from the food eaten.

S43. Vitamin A : Night blindness.

Vitamin E : Muscular weakness.

S44. Vitamin C is water soluble and powerful antioxidant. Natural source of vitamin C is amla.

S45. The deficiency of vitamin A leads to xerophthalmia and night blindness. The deficiency of vitamin C leads to scurvy.

S46. Organic compounds required in the diet in small amounts to perform specific biological functions for normal maintainance of optimum growth and health of the organism are called vitamins.

S47. Vitamin D.

S48. Vitamin C.

S49. Organic compounds required in the diet in small amounts to perform specific biological functions for normal maintainance of optimum growth and health of the organism are called vitamins.

(a) Vitamin B_{12}. (b) Vitamin B_6.

S50. Vitamin B_{12}.

S51. Vitamin A : Night blindness.

S52. Examples of water soluble vitamins:

Vitamin B and Vitamin C

Name of vitamins	Sources	Deficiency diseases
Vitamin B_1	Yeast, milk, green vegetables, cereals etc.	Beri beri
Vitamin C	Citrus fruits, amla, and leafy vegatables.	Scurvy (bleeding gums)

S53. DNA is reserve of genetic information and responsible for heredity transmission.

S54. Nucleoside contains pentose sugar, and base whereas nucleotide contains pentose sugar, base as well as phosphate group.

Nucleoside = Base + Sugar

Nucleotide = Base + Sugar + Phosphate.

S55. Uracil.

S56. Easter linkage.

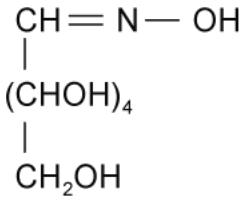
S57. Nucleoside contains pentose sugar, and base whereas nucleotide contains pentose sugar, base as well as phosphate group.

Nucleoside = Base + Sugar

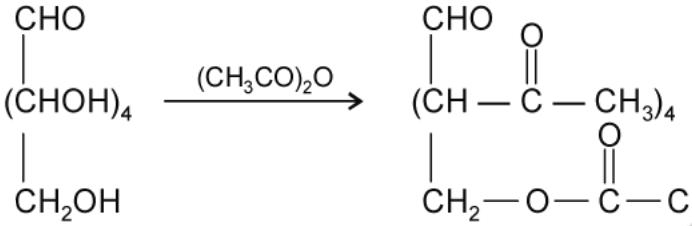
Nucleotide = Base + Sugar + Phosphate.

S58. Adenine and guanine.

S59. (a) *D*-glucose reacts with H_2N — OH to give glucose oxime.



(b)



S60. The following reactions of *D*-glucose cannot be explained on the basis of its open chain structure:

(a) *D*-Glucose does not react with sodium bisulphite ($NaHSO_3$).

(b) It does not give 2, 4-DNP test and Schiff's test.

(c) The pentaacetate of *D*-glucose does not react with hydroxylamine.

(d) *D*-Glucose shows the phenomenon of mutarotation, *i.e.*, when its aqueous solution is kept for sometime its optical acivity changes.

(e) On reaction with 1 mole of methanol, it yield two monomethyl derivatives which are known as methyl α-*D*-glucoside and methyl-β-*D*-glucoside.

S61. The following reactions of *D*-glucose cannot be explained on the basis of its open chain structure:

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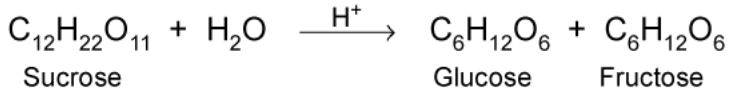
(e) On reaction with 1 mole of methanol, it yield two monomethyl derivatives which are known as methyl α-*D*-glucoside and methyl-β-*D*-glucoside.

S62. Glucose and fructose.



Sucrose is not a reducing sugar because reducing groups of glucose and fructose are involved in glycosidic bond formation.

S63. (a) Glucose and fructose.

$$\underset{\text{Sucrose}}{C_{12}H_{22}O_{11}} + H_2O \xrightarrow{H^+} \underset{\text{Glucose}}{C_6H_{12}O_6} + \underset{\text{Fructose}}{C_6H_{12}O_6}$$

(b) Lactose on hydrolysis gives β-*D*-glucose and β-*D*-galactose.

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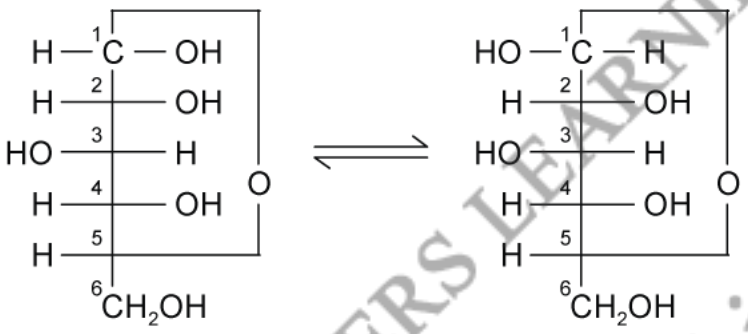
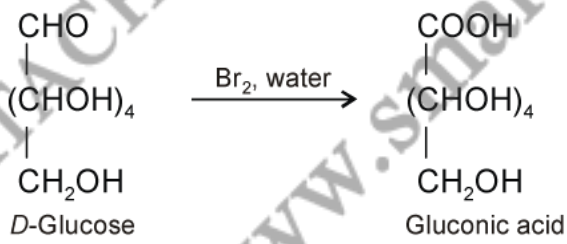
(e) On reaction with 1 mole of methanol, it yield two monomethyl derivatives which are known as methyl α-*D*-glucoside and methyl-β-*D*-glucoside.

S65. In α-*D*-Glucose, the — OH group at Cl is towards right whereas in β-glucose, the — OH group at Cl is towards left. Such a pair of stereoisomers which differ in the configuration only at Cl are called anomers.



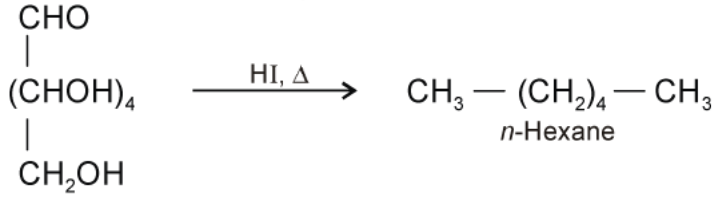
α-*D*-(+)-Glucose β-*D*-(+)-Glucose

S66. (a) *D*-glucose gets oxidised to six carbon carboxylic acid (gluconic acid) on reaction with bromine water.



D-Glucose Gluconic acid

(b) On prolonged heating with HI, *D*-glucose forms *n*-hexane.



D-Glucose *n*-Hexane

S67. (a) Primary structure of proteins: Peptide bond (linkage).

(b) Cross-linkage of polypeptide chains: Hydrogen gonds, disulphide linkage, electrostatic force of attraction.

(c) α-helix formation: Hydrogen bond.

(d) β-sheet structure Intermolecular hydrogen bonds.

S68. Amino acids which cannot be synthesied in the body and must be obtained through diet are known as essential amino acids, *e.g.*, valine and leucine. There are ten essential amino acids. Amino acids which can be synthesised in the body are known as non-essential amino acids, *e.g.*, alanine and glutamic acids.

S69. (a) **Primary structure:** The specific sequence in which the various amino acids present in a protein are linked to one another is called its primary structure. Any change in the primary structure creates a different protein.

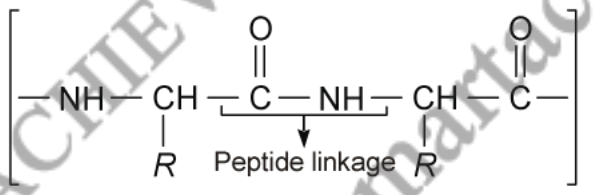
Secondary structure: The conformation of the polypeptide chain is known as secondary structure. The two types of secondary structure are α-helix and β-pleated sheet structure.

In α-helix structure, the polypeptide chain forms all the possible hydrogen bonds by twisting into a right handed screw (helix) with the — NH groups of each amino acid residue hydrogen bonded to the $>C=O$ group of an adjacent turn of the helix. In β-pleated sheet structure, all peptide chains are stretched out to nearly maximum extension and then laid side by side which are held together by intermolecular hydrogen bonds.

(b) **Denaturation:** The loss of biological activity of a protein by changing the pH, temperature or by adding some salt due to disruption of the native structure of protein is called denaturation.

During denaturation secondary and tertiary structure of protein is destroyed but primary structure remains intact.

S70. (a) Proteins are the polymers of α-amino acids linked by amide formation between carbozxyl and amino group. This is called peptide linkage or peptide bond e.g.,



(b) **Denaturation:** The loss of biological activity of a protein by changing the pH, temperature or by adding some salt due to disruption of the native structure of protein is called denaturation.

During denaturation secondary and tertiary structure of protein is destroyed but primary structure remains intact.

S71. **Primary structure:** The specific sequence in which the various amino acids present in a protein are linked to one another is called its primary structure. Any change in the primary structure creates a different protein.

Secondary structure: The conformation of the polypeptide chain is known as secondary structure. The two types of secondary structure are α-helix and β-pleated sheet structure.

In α-helix structure, the polypeptide chain forms all the possible hydrogen bonds by twisting into a right handed screw (helix) with the — NH groups of each amino acid residue hydrogen bonded to the $>C=O$ group of an adjacent turn of the helix. In β-pleated sheet structure, all peptide chains are stretched out to nearly maximum extension and then laid side by side which are held together by intermolecular hydrogen bonds.

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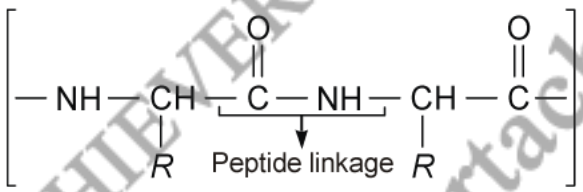
S73. On the basis of hydrolysis, carbohydrates can be divided in three major classes:

(a) **Monosaccharides:** These cannot be hydrolysed into simpler molecules. These are further classified as aldoses and ketones.

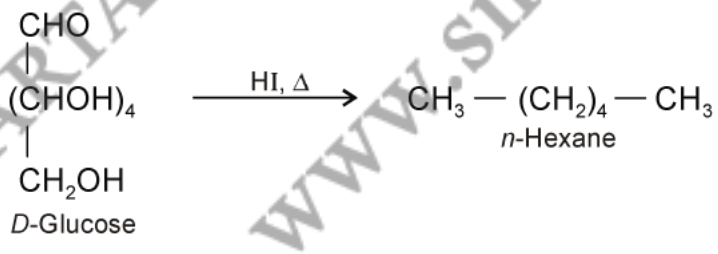
(b) **Oligosaccharides:** These are the carbohydrates which on hydrolysis give 2 – 10 monosaccharides. For example, sucrose, lactose, maltose, etc.

(c) **Polysaccharides:** These are high molecular mass carbohydrates which give many molecules of monosaccharides on hydrolysis. For example starch and cellulose.

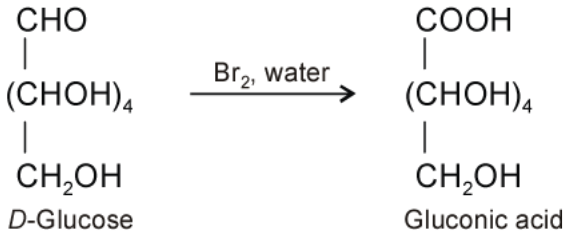
S74. Proteins are the polymers of α-amino acids linked by amide formation between carbozxyl and amino group. This is called peptide linkage or peptide bond e.g.,



S75. (a) On prolonged heating with HI, *D*-glucose forms *n*-hexane.



(b) *D*-glucose gets oxidised to six carbon carboxylic acid (gluconic acid) on reaction with bromine water.



D-Glucose Gluconic acid

S76. (a) Peptide linkage.

(b) Protein synthesis takes place in cytoplasm.

S77. (a) Enzymes are highly specific for a particular reaction and for a particlar substrate.

(b) Very small amount of enzyme is required for the process of a reaction.

S78. **Structural difference between DNA and RNA:**

(a) The sugar in DNA is deoxyribose while that in RNA is ribose.

(b) DNA has a double-stranded helical structure, while RNA has a single-stranded helical structure.

Functional difference between DNA and RNA:

(a) DNA is the chemical basis of heredity and is responsible for maintaining the identity of different species.

(b) RNA molecules are responsible for protein synthesis but the message for the synthesis of a particular protein is present in DNA.

S79. Vitamins are classifed into two groups depending upon their solubility in water or fat.

(a) Fat soluble vitamins. (b) Water soluble vitamins.

Sources of vitamin A: Fish, liver oil, carrots, butter and milk.

Sources of vitamin C: Citrus fruits, amola and green leafy vegetables.

S80. Examples of fat soluble vitamins are vitamin A and D.

Name of vitamins	Source	Deficiency diseases
Vitamin A	Fish, liver oil, carrots, butter etc.	Night blindness
Vitamin D	Fish and egg yolk	Rickets and osteomalacia

S81. B-complex is a group of vitamins which cotains vitamins B_1, B_2, B_6, B_{12} biotin, folic acid, pantothenic acid and nicotinic acid. It is required to release energy from food and to promote healthy skin and muscles. Its deficiency causes beri beri and pernicious anaemia.

S82. (a) Milk and butter are two good sources of vitamin A.

(b) Examples of fat soluble vitamins are vitamin A and D.

Name of vitamins	Source	Deficiency diseases
Vitamin A	Fish, liver oil, carrots, butter etc.	Night blindness
Vitamin D	Fish and egg yolk	Rickets and osteomalacia

S83. Structural difference between DNA and RNA:

(a) The sugar in DNA is deoxyribose while that in RNA is ribose.

(b) DNA has a double-stranded helical structure, while RNA has a single-stranded helical structure.

In SNA, thymine is present.

S84. The bases present in RNA are adenine (A), guanine (G) cytosine (C) and Uracil (U).

Uracil is not present in DNA.

S85. Structural difference between DNA and RNA:

(a) The sugar in DNA is deoxyribose while that in RNA is ribose.

(b) DNA has a double-stranded helical structure, while RNA has a single-stranded helical structure.

Common bases in DNA and RNA are adenine, guanine and cytosine.

S86. When a RNA molecule is hydrolysed then there is no relationship between the quantities of four bases *viz*. adenine (A), guanine (G), cytosine (C), and uracil (U). This fact suggests that RNA has single stranded structure.

S87. (a) Nucleoside contains pentose sugar, and base whereas nucleotide contains pentose sugar, base as well as phosphate group.

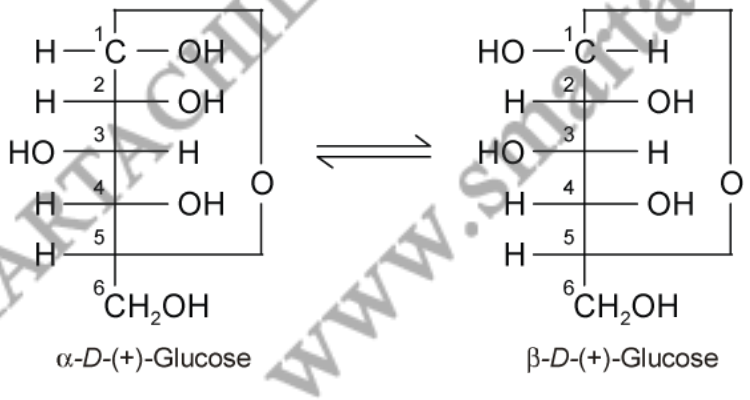
Nucleoside = Base + Sugar

Nucleotide = Base + Sugar + Phosphate.

(b) DNA is a double helix in which the two strands of DNA are held by the hydrogen bonds between the bases on the two strands. Thymine (T) pairs with adenine through two hydrogen bonds and cytosine (C) pairs with guanine (G) through three H-bonds. Hence, the two strands of DNA are complementary to each other.

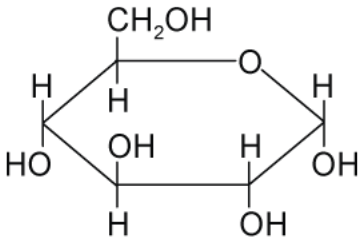
S88. DNA contains four bases viz. adenine (A), guanine (G), cytosine (C), and thymine (T). RNA also contains four bases but thymine is not present in RNA.

S89. (a) In α-*D*-Glucose, the — OH group at Cl is towards right whereas in β-glucose, the — OH group at Cl is towards left. Such a pair of stereoisomers which differ in the configuration only at Cl are called anomers.



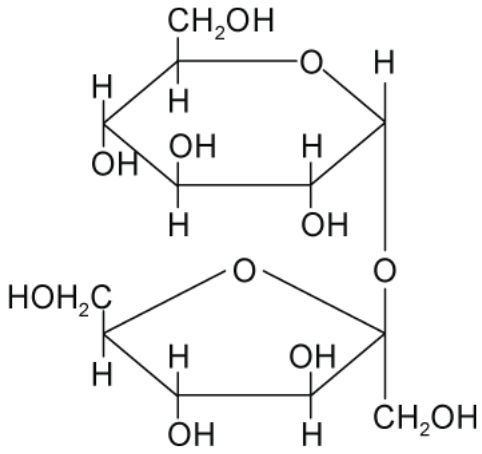
α-*D*-(+)-Glucose β-*D*-(+)-Glucose

(b) The six membered cyclic structure of glucose is called pyranose structure (α- or β-), in analogy with heterocyclic compound pyran.



α-*D*-(+)-Glucopyranose

S90. (a) The two monosaccharides are joined together by an oxide linkage formed by the loss of water molcecule. Such linkage is called glyosidic linkage.



(b) An equimolar mixture of glucose and fructose, obtained by hydrolysis of sucrose in presence of an acid or the enzyme invertase is called invert sugar.

(c) **Oligosaccharides:** These are the carbohydrates which on hydrolysis give 2 – 10 monosaccharides. For example, sucrose, lactose, maltose, etc.

S91. Reducing sugar: The sugars which reduce Fehling's solution and Tolen's reagent are called reducing sugars. For example, all monosaccharides cvontaining free $-CHO$ or $-\underset{|}{C}=O$ group are reducing sugars.

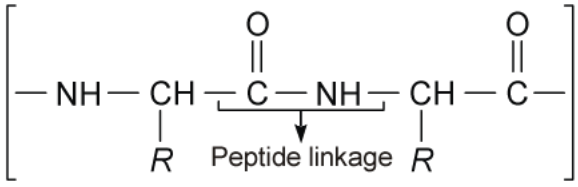
S92. (a) Characteristic differences between globular and fibrous proteins can be given as:

Sl. No.	Globular protein	Fibrous protein
1.	These are cross-linked proteins and are condensation product of acidic and basic amino acids.	These are linear condensation polymer.
2.	These are soluble in water, mineral acids and bases.	These are insoluble in water but soluble in strong acids and bases.
3.	These protenins have three dimensional folded structure. These are stabilised by internal hydrogen bonding. *e.g.*, egg albumin, enzymes.	These are linear polymers held together by intermolecular hydrogen bonds. *e.g.*, hair, silk.

(b) Protein is denatured and its biological acitivity is lost.

S93. Amino acids which cannot be synthesied in the body and must be obtained through diet are known as essential amino acids, *e.g.*, valine and leucine. There are ten essential amino acids. Amino acids which can be synthesised in the body are known as non-essential amino acids, *e.g.*, alanine and glutamic acids.

S94. (a) Proteins are the polymers of α-amino acids linked by amide formation between carbozxyl and amino group. This is called peptide linkage or peptide bond *e.g.*,



(b) **Primary structure:** The specific sequence in which the various amino acids present in a protein are linked to one another is called its primary structure. Any change in the primary structure creates a different protein.

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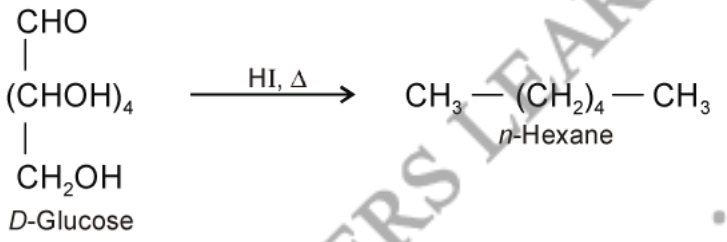
(c) **Denaturation:** The loss of biological activity of a protein by changing the pH, temperature or by adding some salt due to disruption of the native structure of protein is called denaturation.

During denaturation secondary and tertiary structure of protein is destroyed but primary structure remains intact.

S95. (a) On prolonged heating with HI, *D*-glucose forms *n*-hexane.



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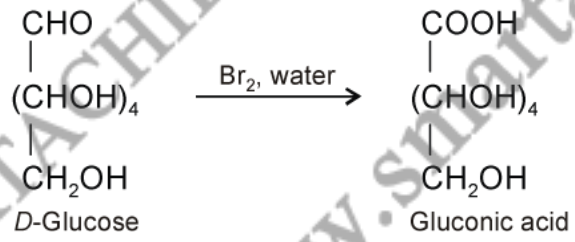
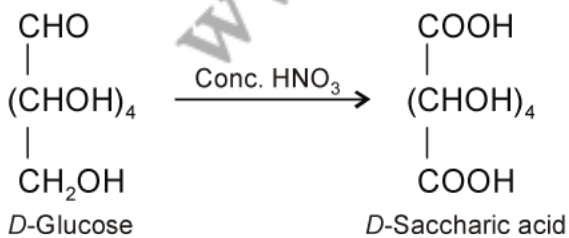


(c) On oxidation with nitric acid, F-glucose yields saccharic acid.



S96. On the basis of hydrolysis, carbohydrates can be divided in three major classes:

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(b) **Oligosaccharides:** These are the carbohydrates which on hydrolysis give 2 – 10 monosaccharides. For example, sucrose, lactose, maltose, etc.

(c) **Polysaccharides:** These are high molecular mass carbohydrates which give many molecules of monosaccharides on hydrolysis. For example starch and cellulose.

S97. Vitamins are classifed into two groups depending upon their solubility in water or fat.

(a) Fat soluble vitamins. (b) Water soluble vitamins.

Sources of vitamin A: Fish, liver oil, carrots, butter and milk.

Sources of vitamin C: Citrus fruits, amola and green leafy vegetables.

Vitamin K is responsible for the coagulation of blood.

S98. Macromolecules formed by the combination of 100 – 1000 amino acid groups in a proper conformation are called proteins.

Characteristic differences between globular and fibrous proteins can be given as:

Sl. No.	Globular protein	Fibrous protein
1.	These are cross-linked proteins and are condensation product of acidic and basic amino acids.	These are linear condensation polymer.
2.	These are soluble in water, mineral acids and bases.	These are insoluble in water but soluble in strong acids and bases.
3.	These protenins have three dimensional folded structure. These are stabilised by internal hydrogen bonding. *e.g.*, egg albumin, enzymes.	These are linear polymers held together by intermolecular hydrogen bonds. *e.g.*, hair, silk.

S99. (a) Hydrogen bonding.

(b) Characteristic differences between globular and fibrous proteins can be given as:

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Denaturation: The loss of biological activity of a protein by changing the pH, temperature or by adding some salt due to disruption of the native structure of protein is called denaturation.

During denaturation secondary and tertiary structure of protein is destroyed but primary structure remains intact.

S101. Amino acids are classified as acidic, basic or neutral depending upon the relative number of amino and carboxyl groups in their molecules.

(a) Equal number of amino and carboxyl groups makes it neutral.

(b) More number of amino groups than carboxyl groups make it basic.

(c) More carboxyl groups as compared to amino groups make it acidic.

S102. (a) Humanitarian (kindness and caring)

(b) Vitamin B_{12}.

(c) Examples of water soluble vitamins:

Vitamin B and Vitamin C

Name of vitamins	Sources	Deficiency diseases
Vitamin B_1	Yeast, milk, green vegetables, cereals etc.	Beri beri
Vitamin C	Citrus fruits, amla, and leafy vegatables.	Scurvy (bleeding gums)

S103. RNA are of three types:

(a) Messenger RNA (*m*-RNA) (b) Transfer RNA (*t*-RNA) (c) Ribosomal RNA (*r*-RNA)

Messenger RNA (*m*-RNA): Function as messenger carrying the information in a gene to the protein synthesizing machinery.

Transfer RNA (*t*-RNA): They transfer the amino acids from cytoplasm to the protein synthesizing machinery.

Ribosomal RNA (*r*-RNA): They associates with a set of proteins to form ribosomes. These complex structures, which physically move among an *m*-RNA molecule, catalyze the assembly of amino acids into protein chains. They also bind *t*-RNA and various molecules necessary for protein synthesis.

S104. (a) Awareness and social thinking (b) Vitamin B complex and vitamin C.

S105. (a) **Structural difference between DNA and RNA:**

(i) The sugar in DNA is deoxyribose while that in RNA is ribose.

(ii) DNA has a double-stranded helical structure, while RNA has a single-stranded helical structure.

(b) DNA an hydrolysis gives pentose sugar, phosphoric acid and nitrogen containing heterocylic bases *viz*. adenine, guanine, cytosine and thymine.