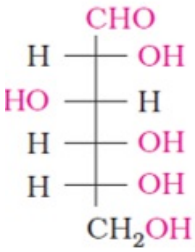
CBSE Test Paper-05

Class - 12 Chemistry (Biomolecules)

1. The bond –CO–NH– is called
   a. peptide linkage
   b. disulphide linkage
   c. glycosidic linkage
   d. phosphodiester linkage
2. The spatial arrangement of the given molecule is denoted by



   a. L -
   b. D or L sign before the molecule.
   c. + or - sign before the molecule
   d. D+
3. The carrier of hereditary character is.
   a. Lipids
   b. Cytochromes
   c. Nucleotides
   d. Nucleosides
4. Protein is a
   a. Addition polymer
   b. Copolymer
   c. Homopolymer
   d. Condensation polymer
5. Which one of the following is not a globular protein?
   a. Insulin
   b. Enzyme
   c. Haemoglobin
   d. Myosin

6. Write function of carbohydrates in plants.
7. Give one example of each- Monosaccharide, disaccharide and polysaccharide.
8. Name the enzyme which convert surcrose into glucose and fructose.
9. How are vitamins classified?
10. The melting points and solubility in water of amino acids are generally higher than that of the corresponding halo acids. Explain.
11. Name two water soluble vitamins, their sources and the diseases caused due to their deficiency in diet.
12. What are the hydrolysis products of
    i. sucrose and
    ii. lactose
13. Define enzymes. What is the most important reason for their specific in action.
14. What are enzymes?
15. What is the basic structural difference between starch and cellulose?

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Solutions

1. (a) peptide linkage

   Explanation: Proteins are the polymers of α-amino acids and they are connected to each other by peptide bond or peptide linkage. Chemically, peptide linkage is an amide formed between –COOH group and $–NH_2$ group. The reaction between two molecules of similar or different amino acids, proceeds through the combination of the amino group of one molecule with the carboxyl group of the other. This results in the elimination of a water molecule and formation of a peptide bond –CO–NH–
2. (b) D or L sign before the molecule.

   Explanation: The letters 'D' or 'L' before the name of any compound indicate the relative configuration of a particular stereoisomer of a compound with respect to configuration of some other compound, configuration of which is known. In the case of carbohydrates, this refers to their relation with a particular isomer of glyceraldehyde. When the -OH group lies on right hand side in the structure it is said to have D configuration. In L configuration -OH group is on left hand side of the asymmetric C.
3. (c) Nucleotides

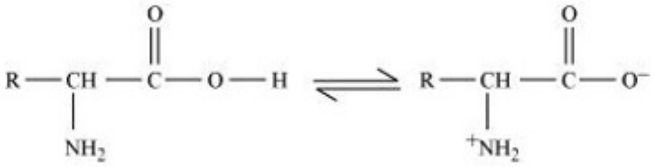
   Explanation: Information regarding the sequence of nucleotides in the chain of a nucleic acid is called its primary structure. This gives information about sequence of bases in DNA which is primarily responsible for the hereditary character. Thus nucleotides are carrier of hereditary character.
4. (d) Condensation polymer

   Explanation: In proteins α-amino acids are connected to each other by peptide bond or peptide linkage. Chemically, peptide linkage is an amide formed between –COOH group and $–NH_2$ group. The reaction between two molecules of similar or different amino acids, proceeds through the combination of the amino group of one molecule with the carboxyl group of the other. This results in the elimination of a water molecule and formation of a peptide bond –CO–NH–. So protein is condensation polymer.
5. (d) Myosin

   Explanation: Globular proteins are formed when the chains of polypeptides coil around

to give a spherical shape. These are usually soluble in water. When the polypeptide chains run parallel and are held together by hydrogen and disulphide bonds, then fibre–like structure is formed. Such proteins called fibrous proteins are generally insoluble in water. Myosin (present in muscles), is a fibrous protein and not a globular protein.

6. They store energy in the form of starch in plants.
7. Monosaccharide - Glucose, Fructose etc.
   Disaccharide - Sucrose, maltose etc.
   Polysaccharide - Cellulose, starch etc.
8. Invertase
9. Vitamins are classified into two groups depending upon their solubility's-
   i. Fat soluble vitamins - which are soluble in fats and oils. e.g. vitamins A, D, E & K.
   ii. Water soluble vitamins - which are soluble in water e.g. vitamins B& C.
10. Both acidic (carboxyl) as well as basic (amino) groups are present in the same molecule of amino acids. In aqueous solutions, the carboxyl group can lose a proton and the amino group can accept a proton, thus giving rise to a dipolar ion known as a zwitter ion.



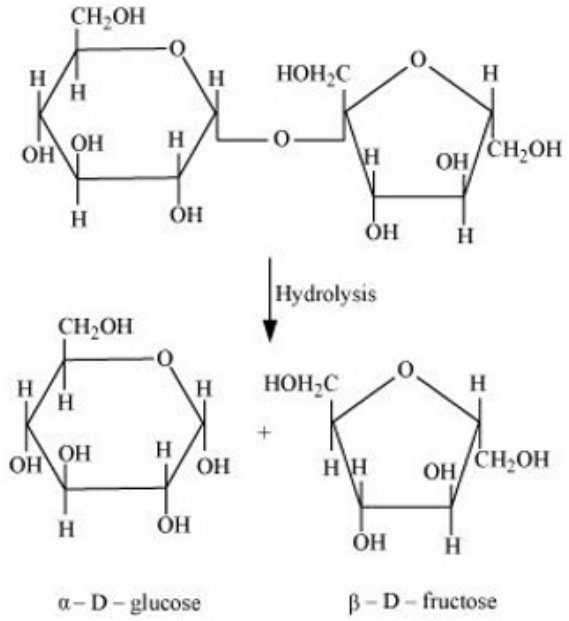
(Zwitter ion)

Due to this dipolar behaviour, they have strong electrostatic interactions within them and with water. But halo-acids do not exhibit such dipolar behaviour.
For this reason, the melting points and the solubility of amino acids in water is higher than those of the corresponding halo-acids.

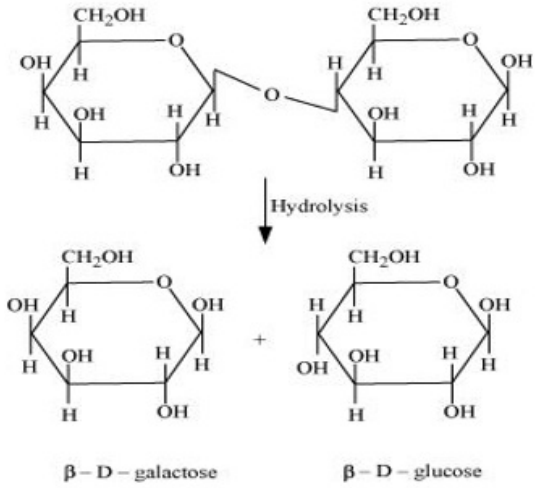
11.

	Sources	Deficiency Diseases
Vitamin B_1	Yeast, milk, vegetables	Beri-beri
Vitamin C	Citrus fruits, amla and green leafy vegetables	Scurvy (bleeding gums)

12. i. On hydrolysis, sucrose gives one molecule of $\propto$ -D glucose and one molecule of β -fructose.



ii. The hydrolysis of lactose gives β -galactose and β -glucose.



13. They are biological catalysts which catalyse specific biochemical reactions. They have active sites due to which they can bind to specific substrate that is why they are specific in their action.
14. Enzymes are proteins that catalyse biological reactions. They are very specific in nature and catalyse only a particular reaction for a particular substrate. Enzymes are usually named after the particular substrate or class of substrate and sometimes after the particular reaction.

    For example, the enzyme used to catalyse the hydrolysis of maltose into glucose is named as maltase.

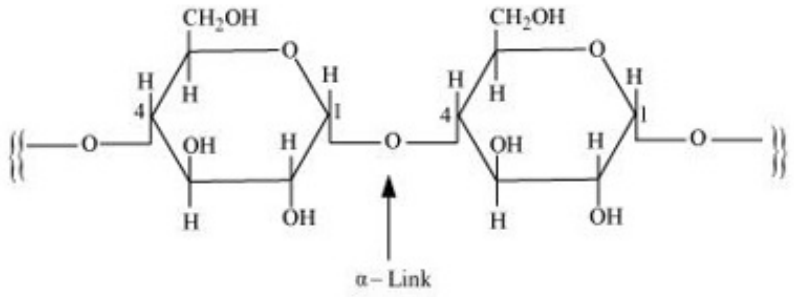
    $$\underset{Maltose}{C_{12}H_{22}O_{11}} \xrightarrow{Maltase} 2\underset{Glucose}{C_6H_{12}O_6}$$

    Again, the enzymes used to catalyse the oxidation of one substrate with the simultaneous

reduction of another substrate are named as oxidoreductase enzymes.

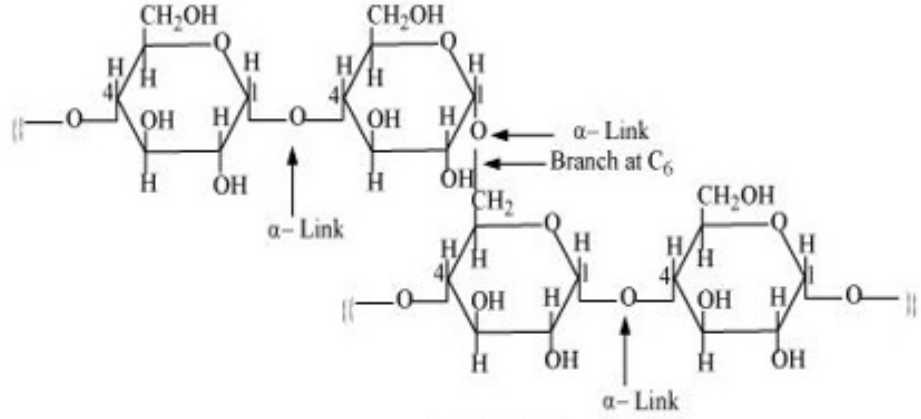
The name of an enzyme ends with $-\text{ase}'$.

15. Starch consists of two components - amylose and amylopectin. Amylose is a long linear chain of $\propto$ -D-(+)-glucose units joined by C_1 - C_4 glycosidic linkage ($\propto$ -link).



Amylose

Amylopectin is a branched-chain polymer of $\propto$ -D-glucose units, in which the chain is formed by C_1 - C_4 glycosidic linkage and the branching occurs by $C_1 - C_4$ glycosidic linkage.



Amylopectin

On the other hand, cellulose is a straight-chain polysaccharide of β -D-glucose units joined by C_1 - C_4 glycosidic linkage (β -link).