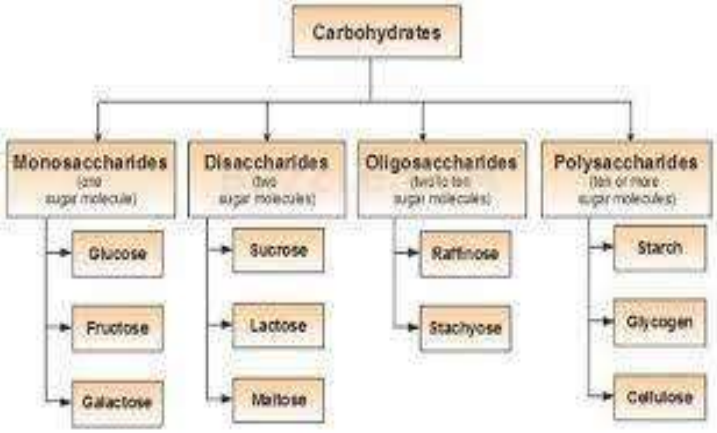
Chapter 14
Biomolecules

Biomolecules: A biomolecule is a compound of chemicals found in living things. These include chemicals composed mainly of carbon, hydrogen, oxygen, nitrogen, sulphur and phosphorus. Biomolecules are the building blocks of life and perform vital functions in living things.

OR

A biomolecule is any natural particle created by an organism, including large polymeric molecules, for example, proteins, polysaccharides, and nucleic acids such as small molecules, for example, basic metabolites, secondary metabolites, and products of nature.



1. Carbohydrates: Carbohydrates are mainly produced by plants and form the largest group of organisms that occur naturally. Other common examples of carbohydrates are sugar cane, sugar, starch, etc.
Chemically, carbohydrates can be defined as active polyhydroxy aldehydes or ketones or compounds that produce such units in hydrolysis. Some carbohydrates, which have a sweet taste, are also called sugars. The most common sugar, used in our homes is called sucrose and the sugar in milk is known as lactose. Carbohydrates are also called saccharides.

Carbohydrate Classification:

Depending on their behavior in hydrolysis, they are further divided into three categories:
Monosaccharides (e.g., glucose, fructose etc.), Oligosaccharides (e.g., raffinose, stachyose etc.) and polysaccharides (e.g., starch, cellulose, etc.).)

Monosaccharides:

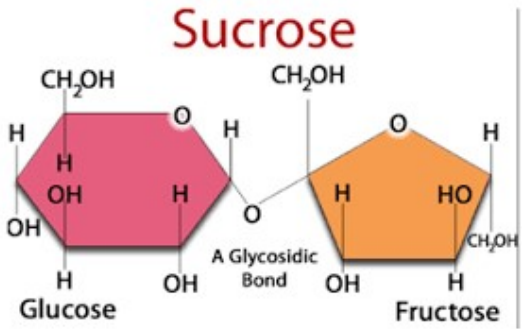
• A very simple group of carbohydrates and is often called simple sugar as it can no longer be added to water.
• Solid, water-soluble crystals and soluble in non-polar solvent.
• These are compounds containing free aldehyde or ketone group.
• The most common formula is Cn (H2O) n or CnH2nOn.
• They are divided by the number of carbon atoms contained and by the base of the existing active group.

Examples: Glucose, Fructose, Erythrulose, Ribulose.

Oligosaccharides:

- **Oligosaccharides is a composite sugar that produces 2 to 10 molecules of the same or different monosaccharides in hydrolysis.**
- **Monosaccharide units combined with glycosidic binding.**
- **Based on the number of monosaccharide units, it is also classified as disaccharide, trisaccharide, tetrasaccharide, etc.**
- **The most common formula for disaccharides is Cn (H2O) n-1 and that of trisaccharides is Cn (H2O) n-2 and so on.**
- **Examples: Disaccharides include sucrose, lactose, maltose, etc.**
- **Trisaccharides are Raffinose, Rabinose.**

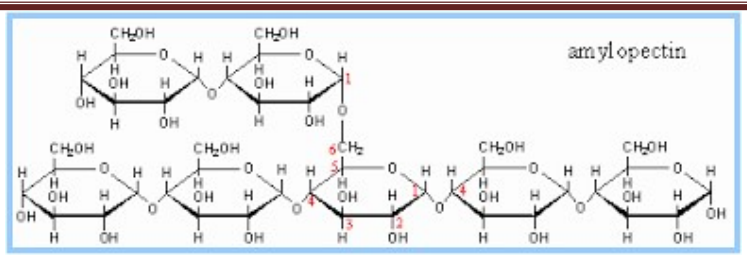
Sucrose: Sucrose is very rich in plants and is known as sugarcane sugar or table sugar or converts sugar as an equal mixture of glucose and fructose is obtained by hydrolysis of sucrose.

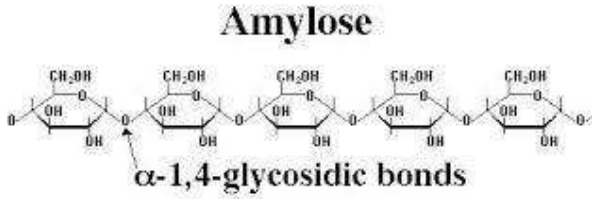


Polysaccharides:

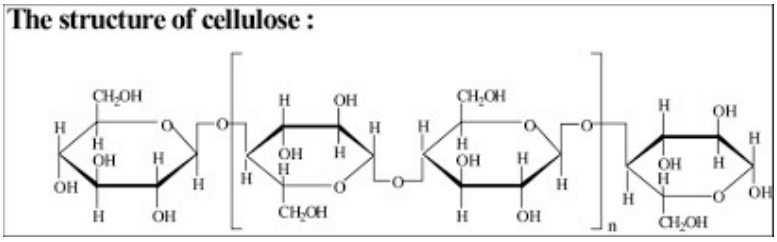
- **They are also called "glycans".**
- **Polysaccharides contain more than 10 monosaccharide units and can be hundreds of units of sugar in length.**
- **They produce more than 10 molecules of monosaccharides in hydrolysis.**
- **Polysaccharides differ from each other in their respective monosaccharide units, the length of their chains, the type of bonding units and the branching level.**
- **They are further divided according to the type of molecules produced by hydrolysis.**
- **They may be homopolysaccharidese, which contains monosaccharides of the same type or heteropolysaccharides i.e., monosaccharides of different types.**
- **Examples of Homopolysaccharides starch, glycogen, cellulose, pectin.**

Starch: A-glucose polymer and a staple food stored in plants. It turns blue with iodine. It is a mixture of two parts:
Amylose (20%), a water-soluble polymer with no branches.
Amylopectin (80%), a water-soluble polymer.



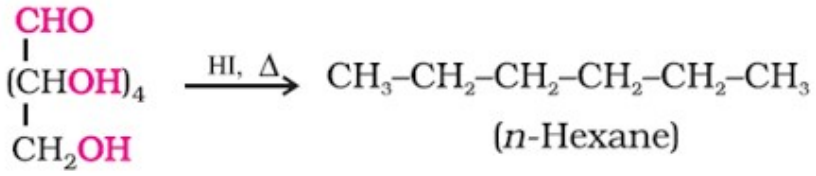


2 Cellulose: It is very rich and structural, plant polysaccharide. An important food source for other animals is the polymer D (+) β-glucose.
The main sources of cellulose are wood (Contains 50% cellulose resting lignin, resins, etc.) and cotton (contains 90% cellulose resting oil and wax).

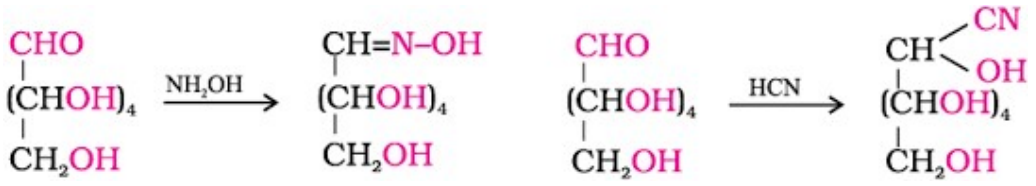


Another category of carbohydrates is sugar and non-sugar. Sugar is sweet in taste, crystalline, dissolved in water, especially combining mono and oligosaccharides. Non Sugars are tasteless, amorphous, without water and mainly contain polysaccharides.
Carbohydrates can also be classified as lowering and non-reducing sugars. Sugar reduction responds to Tollens 'and Fehling solution testing. All monosaccharides, aldoses and ketose, fall into this category. Some oligosaccharides can also be reduced. All polysaccharides do not decrease (starch, cellulose, glycogen etc.). Sucrose is a disaccharide and does not reduce sugar.

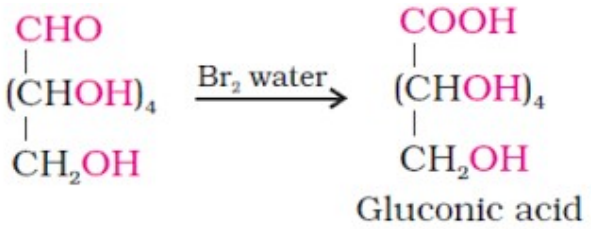
Glucose: It is an aldohexose and is also known as dextrose. It is prepared by boiling sucrose with dil HCl or dil H2SO4 in an alcohol solution or by starch hydrolysis with dil H2SO4 at 393 K under pressure.
Glucose Properties: Glucose contains one aldehyde group, one main hydroxyl (-CH2OH) and four secondary hydroxyl groups (-CHOH) and provides the following reaction:
1. For long-term heating with HI, form n-hexane



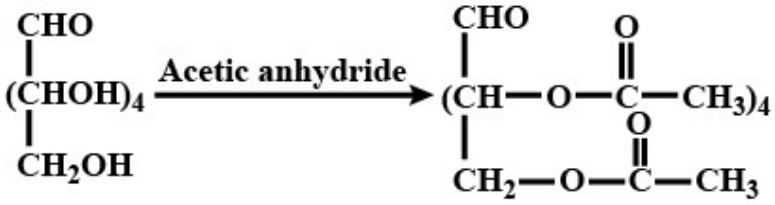
2. **Glucose reacts with his hydroxylamine oxime and adds a hydrogen cyanide molecule to give cyanohydrin**



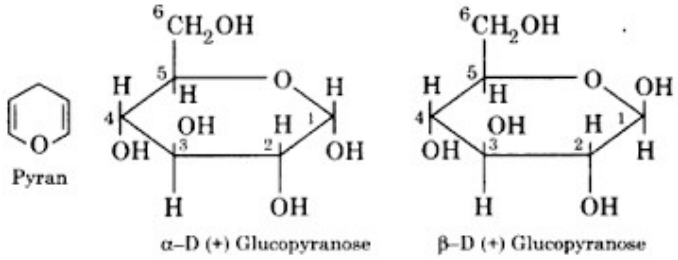
3. **Glucose is oxidized into six carbon carboxylic acids (gluconic acid) when it reacts with a soft oxidising agent such as bromine water.**



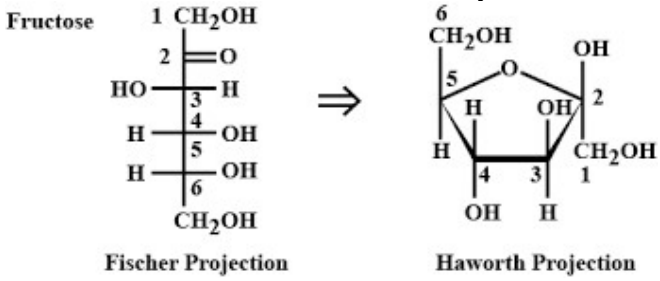
4. **Glucose acetylation with acetic anhydride provides glucose pentaacetate which ensures the presence of five -OH groups.**

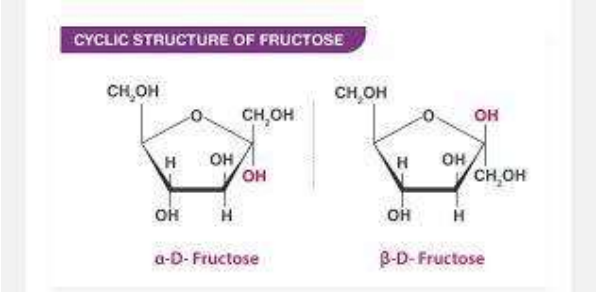


Cyclic glucose Structure Given by Haworth and Hirst.



Fructose: **Fructose is an essential ketohexose. It is found together with glucose by hydrolysis of disaccharide, sucrose. It is a natural monosaccharide found in fruits, honey and vegetables. In its purest form it is used as a sweetner. And ketohexose is important.**





Anomers: **Anomers are cyclic monosaccharides or eply glycosides, which differ from C-1 in aldose or C-2 in ketose. Epimeric carbon in anomers is known as anomeric carbon or anomeric center.**

Mutarotation: **Mutarotation conversion is defined as a change in a certain cyclic sugar cycle due to a change in the ratio between the isomer and the sugar anomer in the aqueous solution. An anomer is a type of geometric isomerism found in other carbohydrates such as glucose.**

Pyranose structure: **Pyranose is the common term for any cyclic isomer consisting of five carbon atoms and one oxygen atom thus forming a six-member ring structure.**

OR

Pyranose is a compound name of saccharides that has a chemical structure that includes a six-part ring consisting of five carbon atoms and one oxygen atom. There may be other carbon off the ring.

Inversion of sugar: **Hydrolysis of sucrose brings about a change in circulatory sign, from dextro (+) to laevo (-). Such a change is known as the inversion of sugar.**

Proteins: **Proteins are biopolymers molecular mass complex compounds made up of smaller units called amino acids. All proteins contain C, H, O, N and S. Some of these contain phosphorus, iodine and trace elements such as Fe, Cu, Zn, Mn. All the proteins in hydrolysis first provide polypeptides and eventually provide amino acids. All proteins are polymers of alpha amino acid.**

Protein Structure

(a) Primary structure

It simply produces a sequence of amino acids.

(b) The secondary α-helix structure is a structure maintained by hydrogen bonds formation when

R is a small group.

(c) Tertiary structure: The folding and placement of polypeptide chains creates a cohesive coating structure, called a higher education structure. It is reinforced with covalent, ionic, hydrogen and disulphide bonds.

Amino acids: (i) Amino acids are organic compounds of both the amino group and the carboxylic group.
(ii) Represented standard formula: R-CH (NH2) -COOH
(iii) These amino acids are very important because they are layers of protein.
(iv) Protein is a natural polymer α - amino acid as a monomer.

There are 20 different amino acids, each with a different group - R, which is commonly found in organic proteins. The human body is made up of 10 of the 20 amino acids found in proteins.
The amino acids that bind together molecules are proteins. Amino acids and proteins are the building blocks of health. When proteins are digested or broken down, amino acids remain. The human body uses amino acids to make proteins to help the body: Break down food.

Essential amino acids: These amino acids that are not made by our body are called essential amino acids. They should be part of our diet. For example, valine, leucine, phenylalanine, etc.

Non-essential amino acids: Amino acids, which can be synthesized in the body, are known as essential amino acids. For example, glycine, alanine, aspartic acid, etc.
In aqueous solution, the carboxyl group may lose protein and the amino group can receive a proton, leading to a dipolalar ion known as the zwitter ion.
In the form of zwitter ionic, amino acids exhibit amphoteric behavior as they react with both acids and bases.

Denaturation: Denaturation is the process by which the molecular structure of a protein changes without breaking the amide / peptide bonds that form the main structure. This causes mutations in protein structures and biological function is often lost.

OR

Denaturation, in biology, is the process of repairing the structure of cells in a protein. Denaturation involves the rupture of many weak connections, or bonds (e.g., hydrogen bonds), within a protein molecule responsible for a highly structured protein structure in its (natural) nature.
When food is cooked, some of its protein turns denatured. That is why boiled eggs become hard and cooked meat hardens. An old example of denaturing extracts from proteins comes from egg whites, usually egg albumin in water. Fresh in eggs, white eggs are visible and not liquid.

Enzymes: **Enzymes are naturally occurring simple or synthetic proteins that create biological reactions.**

OR

An enzyme is a catalyst that acts on living organisms, which controls the rate of chemical reactions unless they are modified in this process.
Examples of specific enzymes
There are thousands of enzymes in the human body, here are a few examples: Lipases - a collection of enzymes that help digest fat in the gut. Amylase - helps to convert starch into sugar. Amylase is found in saliva. Maltase - also found in saliva; breaks down sugar maltose into glucose.

Application of Enzymes

(i) Treatment of diseases Phenyl ketone congenital disease caused by phenylalanine hyroxylase can be treated with a diet low in phenylalanine. The enzyme streptokinase is used for blood clotting to prevent heart disease.
(ii) Industrial Skin tanning, fermentation process etc.

Vitamins: **Vitamins are things that our bodies need to develop and function normally. They include vitamins A, C, D, E, and K, choline, and B vitamins (thiamin, riboflavin, niacin, pantothenic acid, biotin, vitamin B6, vitamin B12, and folate / folic acid).**

Below are some of the many benefits of taking vitamins:

Promotes Healthy Aging.
Reduce Anxiety and Depression.
Improves Your Heart Health.
It covers Your Nutrition Foundations.
Supports Your Immune System.
Keeps the Body Working Well.
Improves Your Eyes.
Keeps Your Bones Strong.

Nucleic acids: **Nucleic acids are polymers that are repeated units called nucleotides. There are two types of nucleic acids: DNA (deoxyribonucleic acid) and RNA (ribonucleic acid). Nucleic acids play two important functions of multiplication and protein synthesis.**

The nucleotide consists of three components:

(a) A five-unit carbon atom, which is ribose and deoxyribose.
(b) Nitrogen containing a heterocyclic base, as well
(c) Phosphate group.

The nitrogen containing bases in nucleotides belong to the following two classes:

(i) Purines: The bases derived from purines are adenine (A) and guanine (G).
(ii) Pyrimidines: The bases found in pyrimidines are cytosine (C), thymine (T) and uracil (U).

Mutation: **Mutation occurs when a gene is damaged or altered in such a way that it alters the genetic message carried by that gene. Mutagen is a genetic agent that can cause permanent changes in the genetic makeup of DNA to alter the genetic message.**
Modification is the mutation that occurs in the sequence of our DNA, due to errors in DNA copying or due to natural factors such as UV light and cigarette smoke.
Genetic modification is a mutation in DNA, the genetic code of life. An organism's DNA affects its appearance, behaviour, and function. Changes in the DNA of living things can also cause changes in all aspects of their life. Changes are essential for evolution; they are immature genetic variants.

There are three types of DNA modification: **base modification, removal and insertion.**
1. Basic Exchange. A single base substitution is called point mutations, remember point mutation Glu → Val causes sickle-cell disease. Point conversion is the most common type of conversion and there are two types.

Biomolecules

1. **On oxidation with a mild oxidising agent like Br2/H20, the glucose is oxidized to**
   Option
   (a) Saccharic acid
   (b) Glucaric acid
   (c) Gluconic acid
   (d) Valeric acid

1. **Br2/H20 जैसे हल्के ऑक्सीकरण एजेंट के साथ ऑक्सीकरण पर, ग्लूकोज का ऑक्सीकरण होता है**
   विकल्प
   (ए) सैकरिक एसिड
   (बी) ग्लूकेरिक एसिड
   (सी) ग्लूकोनिक एसिड
   (डी) वैलेरिक एसिड

2. **Invert sugar is**
   Option
   (a) A type of cane sugar
   (b) Optically inactive form of sugar
   (c) Mixture of glucose and galactose
   (d) Mixture of glucose and fructose in equimolar quantities

2. **उलटा चीनी है**
   विकल्प
   (ए) एक प्रकार की गन्ना चीनी
   (बी) चीनी का वैकल्पिक रूप से निष्क्रिय रूप
   (सी) ग्लूकोज और गैलेक्टोज का मिश्रण
   (डी) समान मात्रा में ग्लूकोज और फ्रक्टोज का मिश्रण

3. **Which of the following compounds is found abundatly in nature?**
   Option
   (a) Fructose
   (b) Starch
   (c) Glucose
   (d) Cellulose

3. **निम्नलिखित में से कौन सा यौगिक प्रकृति में प्रचुर मात्रा में पाया जाता है?**
   विकल्प
   (ए) फ्रुक्टोज
   (बी) स्टार्च
   (सी) ग्लूकोज
   (डी) सेलूलोज़

4. **Starch is composed of two polysaccharides which arc**
   Option
   (a) Amylopectin and glycogen
   (b) Amylose and glycogen
   (c) Amylose (20%) and amylopectin (80%)
   (d) Cellulose and glycogen

4. **स्टार्च दो पॉलीसेकेराइड से बना होता है जो चाप**
   विकल्प
   (ए) एमाइलोपेक्टिन और ग्लाइकोजन
   (बी) एमाइलोज और ग्लाइकोजन
   (सी) एमाइलोज (20%) और एमाइलोपेक्टिन (80%)
   (डी) सेलूलोज़ और ग्लाइकोजन

5. **Which reagent is used to convert glucose into saccharic acid?**
Option
(a) Br2/H2O
(b) Nitric acid
(c) Alkaline solution of iodine
(d) Ammonium hydroxide

5. **ग्लूकोज को सैकेरिक एसिड में बदलने के लिए किस अभिकर्मक का उपयोग किया जाता है?**
विकल्प
(ए) Br2/H2O
(बी) नाइट्रिक एसिड
(सी) आयोडीन का क्षारीय समाधान
(डी) अमोनियम हाइड्रॉक्साइड

6. **Maltose is made up of**
Option
(a) Two α-D-glucose
(b) Normal β-D-glucose
(c) α- and β-D-glucose
(d) Fructose

6. **माल्टोस का बना होता है**
विकल्प
(ए) दोαडी-ग्लूकोज
(बी) सामान्यβडी-ग्लूकोज
(सी)α- तथा βडी-ग्लूकोज
(डी) फ्रुक्टोज

7. **Whicn of the following is an example of an aldopentose?**
Option
(a) D-Ribose
(b) Glyceraldehyde
(c) Fructose
(d) Erythrose

7. **निम्नलिखित में से कौन-सा एल्डोपेंटोस का उदाहरण है?**
विकल्प
(ए) डी-रिबोस
(बी) ग्लिसराल्डिहाइड
(सी) फ्रुक्टोज
(डी) एरिथ्रोस

8. **Identify Z.**
Option
(a) 2-lodoheptane
(b) Heptane-2-ol
(c) 2-lodohexane
(d) Heptanoic acid

$$\text{Glucose} \xrightarrow{HCN} X \xrightarrow{\text{Hydrolysis}} Y \xrightarrow[\text{Heat}]{HI} Z$$

8. **Z की पहचान करें।**
विकल्प
(ए) 2-लोडोहेप्टेन
(बी) हेप्टेन-2-ओएल
(सी) 2-लोडोहेक्सेन
(डी) हेप्टानोइक एसिड

$$\text{Glucose} \xrightarrow{HCN} X \xrightarrow{\text{Hydrolysis}} Y \xrightarrow[\text{Heat}]{HI} Z$$

9. **The general formula of carbohydrates is**
Option
(a) CnH2n+1O
(b) CnH2nO
(c) Cx(H2O)
(d) Cn(H2,O)2n

9. कार्बोहाइड्रेट का सामान्य सूत्र है
विकल्प
(ए) सीएनएच2एन+1ओ
(बी) सीएनएच2एनओ
(सी) सीएक्स (एच 2 ओ)
(डी) सीएन (एच 2, ओ) 2 एन

10. What are the hydrolysis products of sucrose?
Option
(a) Fructose + Fructose
(b) Glucose + Glucose
(c) Glucose + Galactose
(d) D-Glucose + D-Fructose

10. सुक्रोज के हाइड्रोलिसिस उत्पाद क्या हैं?
विकल्प
(ए) फ्रुक्टोज + फ्रुक्टोज
(बी) ग्लूकोज + ग्लूकोज
(सी) ग्लूकोज + गैलेक्टोज
(डी) डी-ग्लूकोज + डी-फ्रुक्टोज

11. Carbohydrates are stored in human body as the polysaccharide
Option
(a) Starch
(b) Glycogen
(c) Cellulose
(d) Amylose

11. मानव शरीर में कार्बोहाइड्रेट पॉलीसेकेराइड के रूप में जमा होते हैं
विकल्प
(ए) स्टार्च
(बी) ग्लाइकोजन
(सी) सेलूलोज़
(डी) एमाइलोज

12. The glycosidic linkage involved in linking the glucose units in amylose part of starch is
Option
(a) C1-C4 β-linkage
(b) C4-C6 β-linkage
(c) C1-C6 α-linkage
(d) C1-C4 α-linkage

12. स्टार्च के एमाइलोज भाग में ग्लूकोज इकाइयों को जोड़ने में शामिल ग्लाइकोसिडिक लिंकेज है
विकल्प
(ए) सी 1-सी 4 β-लिंकेज
(बी) सी 4-सी 6 β-लिंकेज
(सी) सी 1-सी 6 α-लिंकेज
(डी) सी 1-सी 4 α-लिंकेज

13. The conversion of maltose into glucose is possible by the enzyme
Option
(a) Zymase
(b) Lactase
(c) Maltase
(d) Diastase

13. ग्लूकोज में माल्टोस का रूपांतरण एंजाइम द्वारा संभव है
विकल्प
(ए) ज़ाइमेज़
(बी) लैक्टेज
(सी) माल्टेज़
(डी) डायस्टेस

14. In cellulose, D-glucose units are joined by
(a) α-1, 4 glycosidic linkage
(b) β-1, 6 glycosidic linkage
(c) β-1, 4 glycosidic linkage
(d) peptide linkage

14. सेल्युलोज में, डी-ग्लूकोज इकाइयाँ किसके द्वारा जुड़ती हैं
(ए) α-1, 4 ग्लाइकोसिडिक लिंकेज
(बी) β-1, 6 ग्लाइकोसिडिक लिंकेज
(सी) β-1, 4 ग्लाइकोसिडिक लिंकेज
(डी) पेप्टाइड लिंकेज

15. How many C-atoms are there is a pyranose ring?
(a) 3
(b) 5
(c) 6
(d) 7

15. पाइरोज़ वलय में कितने C-परमाणु होते हैं?
(ए) 3
(बी) 5
(सी) 6
(डी) 7

16. Cellulose is a
(a) Hexapolysaccharide
(b) Pentapolysaccharide
(c) Tripolysaccharide
(d) None of these

16. सेल्युलोज है a
(ए) हेक्सापॉलीसेकेराइड
(बी) पेंटापॉलीसेकेराइड
(सी) त्रिपोलीसेकेराइड
(डी) इनमें से कोई नहीं

17. The letter 'D' in carbohydrates signifies
(a) Dextrorotatory
(b) Configuration
(c) Diamagnetic nature
(d) Mode of synthesis

17. कार्बोहाइड्रेट में 'D' अक्षर का अर्थ है
(ए) डेक्सट्रोरोटेटरी
(बी) विन्यास
(सी) प्रतिचुंबकीय प्रकृति
(डी) संश्लेषण का तरीका

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

18. एक मधुमेह व्यक्ति हमेशा अपने साथ ग्लूकोज का एक पैकेट रखता है, क्योंकि
(ए) ग्लूकोज रक्त शर्करा के स्तर को धीरे-धीरे बढ़ाता है
(बी) ग्लूकोज रक्त शर्करा के स्तर को कम करता है
(सी) ग्लूकोज रक्त शर्करा के स्तर को लगभग तुरंत बढ़ा देता है
(डी) ग्लूकोज रक्त शर्करा के स्तर को धीरे-धीरे कम करता है

19. Among the naturally occurring carbohydrates, furanose ring is found in the
(a) Glucose unit of cane sugar
(b) Glucose unit of cellulose
(c) Fructose unit of cane sugar
(d) Galactose unit of lactose

19. प्राकृतिक रूप से पाए जाने वाले कार्बोहाइड्रेटों में फ़्यूरानोज़ वलय पाया जाता है
(ए) गन्ना चीनी की ग्लूकोज इकाई
(बी) सेलूलोज़ की ग्लूकोज इकाई
(सी) गन्ना चीनी की फ्रुक्टोज इकाई
(डी) लैक्टोज की गैलेक्टोज इकाई

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

20. गोलाकार प्रोटीन मौजूद होते हैं
(ए) रक्त
(बी) अंडे
(सी) दूध
(डी) ये सभी

21. Which one of the amino acids can be synthesised in the body?
(a) Alanine
(b) Lysine
(c) Valine
(d) Histidine

21. शरीर में कौन सा अमीनो एसिड संश्लेषित किया जा सकता है?
(ए) अलैनिन
(बी) लाइसिन
(सी) वेलिन
(डी) हिस्टिडीन

22. Which of the following is not true about amino acids?
(a) They are constituents of all proteins
(b) Alanine having one amino and one carboxylic group
(c) Most naturally occurring amino acids have D-configuration
(d) Glycine is the only naturally occuring amino acid which is optically inactive.

22. निम्नलिखित में से कौन अमीनो एसिड के बारे में सही नहीं है?
(ए) वे सभी प्रोटीन के घटक हैं
(बी) एलानिन जिसमें एक एमिनो और एक कार्बोक्जिलिक समूह होता है
(सी) अधिकांश प्राकृतिक रूप से पाए जाने वाले एमिनो एसिड में डी-कॉन्फ़िगरेशन होता है
(डी) ग्लाइसीन एकमात्र प्राकृतिक रूप से पाया जाने वाला एमिनो एसिड है जो वैकल्पिक रूप से निष्क्रिय है।

23. Proteins are condensation polymers of
(a) α-amino acids
(b) β-amino acids
(c) α-hydroxy acids
(d) β-hydroxy acids

23. प्रोटीन के संघनन बहुलक हैं

(ए) α-अमीनो अम्ल

(बी) β-अमीनो अम्ल

(सी) α-हाइड्रॉक्सी एसिड

(डी) β-हाइड्रॉक्सी एसिड

24. In fibrous proteins, polypeptide chains are held together

(a) Van der waals forces

(b) Electrostatic forces of attraction

(c) Hydrogen bonds

(d) Covalent bonds

24. रेशेदार प्रोटीन में, पॉलीपेप्टाइड श्रृंखलाएं एक साथ जुड़ी होती हैं

(ए) वैन डेर वाल्स फोर्स

(बी) आकर्षण के इलेक्ट्रोस्टैटिक बल

(सी) हाइड्रोजन बांड

(डी) सहसंयोजक बंधन

25. Which compound can exist in a dipolar (zwitter ion) structure?

(a) C6H5CH2CH (N = CH2) COOH

(b) (CH3)2CHCH (NH2) COOH

(c) C6H5CONHCH2COOH

(d) HOOCCH2CH2COCOOH

25. द्विध्रुवीय (ज़्विटर आयन) संरचना में कौन सा यौगिक मौजूद हो सकता है?

(ए) C6H5CH2CH (N = CH2) COOH

(बी) (सीएच 3)2सीएचसीएच (एनएच2) सीओओएच

(सी) C6H5CONHCH2COOH

(डी) HOOCCH2CH2COCOOH

26. Which of the following is an acidic amino acid?

(a) Glycine

(b) Valine

(c) Leucine

(d) Glutamic acid

26. निम्नलिखित में से कौन एक अम्लीय अमीनो अम्ल है?

(ए) ग्लाइसिन

(बी) वेलिन

(सी) ल्यूसीन

(डी) ग्लूटामिक एसिड

27. The melting points of amino acids are higher than the corresponding hal-acids because

(a) Amino acids exist as zwitter ions resulting in strong dipole-dipole attraction

(b) Amino acids are optically active

(c) Due to higher molecular mass of-NH2 group molecular mass of amino acids is higher

(d) They interact with water more than halo-acids and have salt like structure

27. ऐमीनो अम्लों के गलनांक संगत हैल-अम्लों से अधिक होते हैं क्योंकि

(ए) अमीनो एसिड zwitter आयनों के रूप में मौजूद हैं जिसके परिणामस्वरूप मजबूत द्विध्रुवीय-द्विध्रुवीय आकर्षण होता है

(बी) एमिनो एसिड वैकल्पिक रूप से सक्रिय हैं

(सी) एनएच 2 समूह के उच्च आणविक द्रव्यमान के कारण अमीनो एसिड का आणविक द्रव्यमान अधिक होता है

(डी) वे हेलो-एसिड से अधिक पानी के साथ बातचीत करते हैं और नमक जैसी संरचना रखते हैं

28. Mark the incorrect example
(a) Keratin and myosin-fibrous proteins
(b) Insulin and albumines-Globular proteins
(c) Glycylalanine-Djpeptide
(d) Enzymes and haemoglobin-Derived proteins

28. गलत उदाहरण को चिह्नित करें
(ए) केरातिन और मायोसिन-रेशेदार प्रोटीन
(बी) इंसुलिन और एल्बुमिन-ग्लोबुलर प्रोटीन
(सी) ग्लाइसीलानिन-डीजेपेप्टाइड
(डी) एंजाइम और हीमोग्लोबिन-व्युत्पन्न प्रोटीन

29. Which of the following gives positive Fehling solution test?
(a) Protein
(b) Sucrose
(c) Glucose
(d) Fats

29. निम्नलिखित में से कौन सा सकारात्मक फेलिंग समाधान परीक्षण देता है?
ए) प्रोटीन
बी) सुक्रोज
सी) ग्लूकोज
घ) वसा

30. The function of glucose is to
a) Provides energy
b) Promote growth
c) Prevent diseases
d) Perform all above

30. ग्लूकोज का कार्य है
(ए) ऊर्जा प्रदान करता है
(बी) विकास को बढ़ावा देना
(सी) रोगों को रोकें
(डी) उपरोक्त सभी कार्य करें

31. Glucose does not react with
a) Br2/H2O
b) H2NOH
c) HI
d) NaHSO3

31. ग्लूकोज किसके साथ प्रतिक्रिया नहीं करता है
(क) Br2/H2O
(ख) H2NOH
(सी) हाय
(डी) NaHSO3

32. Glucose react with acetic anhydride to give
a) Mono-acetate
b) Tetra-acetate
c) Pent-acetate
d) Hex-acetate

32. ग्लूकोज एसिटिक एनहाइड्राइड के साथ अभिक्रिया करके देता है
ए) मोनो-एसीटेट
बी) टेट्रा-एसीटेट
सी) पेंट-एसीटेट
डी।) हेक्स-एसीटेट

33. Biomolecules are
a) Aldehyde and ketones
b) Acids and esters
c) Carbohydrates, fats and proteins
d) Alcohols and phenols

33. जैव अणु हैं
ए) एल्डिहाइड और कीटोन्स
बी) एसिड और एस्टर
सी) कार्बोहाइड्रेट, वसा और प्रोटीन
डी) अल्कोहल और फिनोल

34. Which of the following is a disaccharides?
a) Lactose
b) Starch
c) Cellulose
d) Fructose

34. निम्नलिखित में से कौन एक डिसैकराइड है?
ए) लैक्टोज
ख.) स्टार्च
सी) सेलूलोज़
डी) फ्रुक्टोज

35. The sugar that is a characteristics of milk is
a) Maltose
b) Ribose
c) Lactose
d) Galactose

35. चीनी जो दूध की विशेषता है वह है
ए) माल्टोस
बी) राइबोज
सी) लैक्टोज
डी) गैलेक्टोज

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

36. निम्नलिखित में से कौन सा मोनोसैकेराइड पेन्टोज है
ए) ग्लूकोज
ख) फ्रुक्टोज
सी) अरेबिनोज
डी) गैलेक्टोज

37. A carbohydrate that cannot be hydrolysed into simpler units is called
a) polysaccharides
b) trisaccharides
c) disaccharides
d) monosaccharides

37. एक कार्बोहाइड्रेट जिसे सरल इकाइयों में हाइड्रोलाइज नहीं किया जा सकता है, कहलाता है
ए) पॉलीसेकेराइड्स
बी) ट्राइसेकेराइड्स
सी) डिसाकाईड्स
डी) मोनोसैकराइड्स

38. Which among the following is the simplest sugar
a) Glucose
b) Strach
c) Cellulose
d) None of these

38. निम्नलिखित में से कौन सबसे सरल चीनी है
(ए) ग्लूकोज
(ख) स्ट्रैच
(सी) सेलूलोज़
(डी) इनमें से कोई नहीं

39. Glucose cannot be characterised as
a) Hexose
b) Carbohydrate
c) Aldose
d) Oligosaccharide

39. ग्लूकोज की विशेषता नहीं हो सकती है
ए) हेक्सोज
बी) कार्बोहाइड्रेट
सी) एल्डोज
डी) ओलिगोसेकेराइड

40. Glucose gives similar mirror test with Tollen's reagent. It shows the presence of
a) Acidic group
b) alcoholic group
c) Ketonic group
d) Aldehyde group

40. टॉलेन अभिकर्मक के साथ ग्लूकोज समान दर्पण परीक्षण देता है। यह की उपस्थिति को दर्शाता है
ए) अम्लीय समूह
बी) शराबी समूह
सी) केटोनिक समूह
डी) एल्डिहाइड समूह

41. The number of tripeptide formed by 3 different amino acids.
(a) Three
(b) Four
(c) Five
(d) Six.

41. 3 विभिन्न अमीनो एसिड द्वारा गठित ट्रिपेप्टाइड की संख्या।
(ए) तीन
(बी) चार
(सी) पांच
(डी) छह।

42. The vitamins absorbed from intestine along with fats are
(a) A and D
(b) A, B
(c) A, C
(d) D, B

42. वसा के साथ आंत से अवशोषित विटामिन हैं
(ए) ए और डी
(बी) ए, बी
(सी) ए, सी
(डी) डी, बी

43. Which amino acids is a chiral?
(a) Alanine
(b) Valine
(c) Proline
(d) Histidine
(e) None of these.

43. कौन सा अमीनो एसिड एक चिरल है?
(ए) अलैनिन
(बी) वेलिन
(सी) प्रोलाइन
(डी) हिस्टिडीन
(ई) (इनमें से कोई नहीं।

44. Which of the following biomolecules is insoluble in water?
(a) a-Keratin
(b) Haemoglobin
(c) Ribonuclease
(d) Adenime

44. निम्नलिखित में से कौन सा जैव अणु पानी में अघुलनशील है?
(ए) ए-केरातिन
(बी) हीमोग्लोबिन
(सी) राइबोन्यूक्लिएज
(डी) एडनिमे

45. The protein responsible for blood clotting is
(a) Albumins
(b) Globulins
(c) Fibroin
(d) Fibrinogen

45. रक्त के थक्के के लिए जिम्मेदार प्रोटीन है
(ए) एल्बुमिन
(बी) ग्लोब्युलिन
(सी) फाइब्रोइन
(डी) फाइब्रिनोजेन

46. Which one of them is not a protein?
(a) Wool
(b) Nail
(c) Hair
(d) DNA

46. इनमें से कौन एक प्रोटीन नहीं है?
(ए) ऊनी
(बी) नाखून
(सी) कुर्सी
(डी) डीएनए

47. The helical structure of protein is stabilized by:
(a) Peptide bond
(b) Dipeptide bond
(c) Hydrogen bonds
(d) Vander Waal's forces

47. प्रोटीन की पेचदार संरचना को स्थिर किया जाता है:
(ए) पेप्टाइड बांड
(बी) डाइपेप्टाइड बांड
(सी) हाइड्रोजन बांड
(डी) वेंडर वाल की सेना

48. Which of the following has a branched chain structure
(a) Amylopectin
(b) Anylose
(c) Cellulose
(d) Nylon

48. निम्नलिखित में से किसकी एक शाखित श्रृंखला संरचना है
(ए) एमाइलोपेक्टिन
(बी) एनीलोज
(सी) सेलूलोज़
(डी) नायलॉन

49. Amino acids are the building blocks of
(a) Carbohydrates
(b) Vitamins
(c) Fats
(d) Proteins.

49. अमीनो एसिड के निर्माण खंड हैं

(ए) कार्बोहाइड्रेट

(बी) विटामिन

(सी) वसा

(डी) प्रोटीन।

50. Enzymes in the living system

(a) Provide energy

(b) Provide immunity

(c) Transport oxygen

(d) Catalyse biological reaction

50. जीवित प्रणाली में एंजाइम

(ए) ऊर्जा प्रदान करें

(बी) प्रतिरक्षा प्रदान करें

(सी) परिवहन ऑक्सीजन

(डी) जैविक प्रतिक्रिया उत्प्रेरित करें

Answers:

1. **Answer: Option (c) Gluconic acid**
2. **Answer: Option (d) Mixture of glucose and fructose in equimolar quantities**
3. **Answer: Option (b) or (d)**
4. **Answer: Option (c) Amylose(20%) and amylopectin (80%)**
5. **Answer: Option (b) Nitric Acid**
6. **Answer: Option (a) Two α-D-glucose**
7. **Answer: Option (a) D-Ribose**
8. **Answer: Option (d) Heptanoic acid**
9. **Answer: Option (c) Cx(H2O)**
10. **Answer: Option (d) D-Glucose + D-Fructose**
11. **Answer: Option (b) Glycogen**
12. **Answer: Option (d) C1-C4 α-linkage**
13. **Answer: Option (c) Maltase**
14. **Answer: Option (c) β-1, 4 glycosidic linkage**
15. **Answer: Option (c) 6**
16. **Answer: Option (d) None of these**
17. **Answer: Option (b) Configuration**
18. **Answer: Option (c) Glucose increases the blood sugar level almost instantaneously**
19. **Answer: Option (c) Fructose unit of cane sugar**
20. **Answer: Option (d) All of these**
21. **Answer: Option (a) Alanine**
22. **Answer: Option (c) Most naturally occurring amino acids have D-configuration**
23. **Answer: Option (a) α-amino acids**
24. **Answer: Option (c) Hydrogen bonds**
25. **Answer: Option (b) (CH3)2CHCH(NH2)COOH**
26. **Answer: Option (d) Glutamic acid**
27. **Answer: Option (a) Amino acids exist as zwitter ions resulting in strong dipole-dipole attraction**
28. **Answer: Option (d) Enzymes and haemoglobin-Derived proteins**
29. **Answer: Option (c) Glucose**
30. **Answer: Option (a) Provides energy**
31. **Answer: Option (d) NaHSO3**
32. **Answer: Option (c) Pent-acetate**
33. **Answer: Option (c) Carbohydrates, fats and proteins**
34. **Answer: Option (a) Lactose**
35. **Answer: Option (c) Lactose**
36. **Answer: Options (c) Arabinose**
37. **Answer: Option (d) Monosaccharides**
38. **Answer: Option (a) Glucose**
39. **Answer: Option (d) Oligosaccharide**
40. **Answer: Option (d) Aldehyde group**
41. **Answer: Option (d) Six**
42. **Answer: Option (a) A and D**
43. **Answer: Option (e) None of these**
44. **Answer: Option (a) a-Keratin**
45. **Answer: Option (d) Fibrinogen**
46. **Answer: Option (d) DNA**
47. **Answer: Option (c) Hydrogen bond**
48. **Answer: Option (a) Amylopectin**
49. **Answer: Option (d) Proteins**
50. **Answer: Option (d) Catalyst biological reaction**