Biomolecules JEE Main PYQ - 3

Total Time: 1 Hour **Total Marks:** 100

Instructions

Instructions

1. Test will auto submit when the Time is up.
2. The Test comprises of multiple choice questions (MCQ) with one or more correct answers.
3. The clock in the top right corner will display the remaining time available for you to complete the examination.

Navigating & Answering a Question

1. The answer will be saved automatically upon clicking on an option amongst the given choices of answer.
2. To deselect your chosen answer, click on the clear response button.
3. The marking scheme will be displayed for each question on the top right corner of the test window.

Biomolecules

1. Sugar moiety in DNA and RNA molecules, respectively are **(+4, -1)**

a. β-D-2-deoxyribose, β-D-deoxyribose

b. β-D-2-deoxyribose, β-D-ribose

c. β-D-ribose, β-D-2-deoxyribose

d. β-D-deoxyribose, β-D-2-deoxyribose

---

2. Which one of the following is a water soluble vitamin, that is not excreted easily? **(+4, -1)**

a. Vitamin B_2

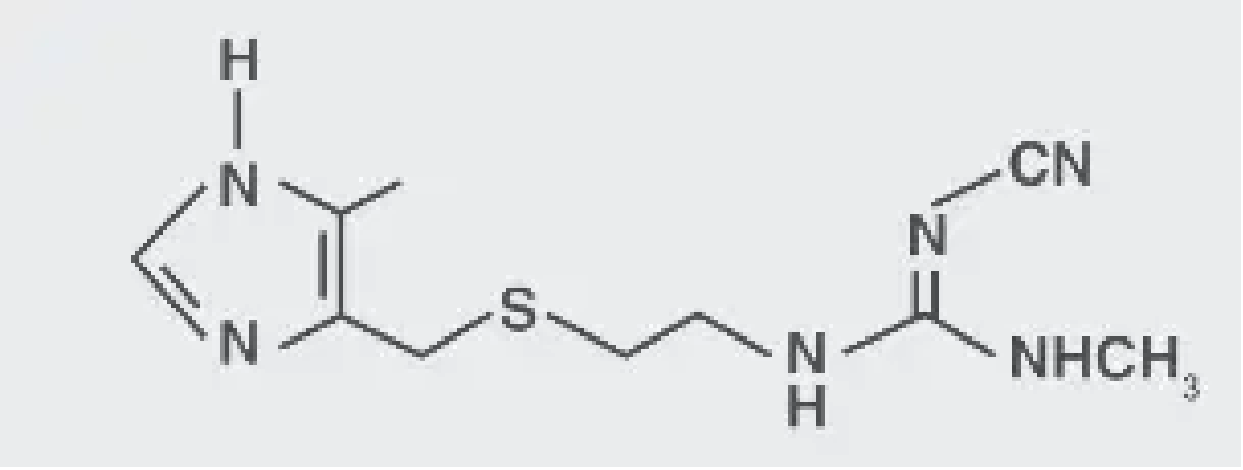
b. Vitamin B_1

c. Vitamin B_6

d. Vitamin B_{12}

---

3. The structure shown below is of which well-known drug molecule? **(+4, -1)**



a. Ranitidine

b. Seldane

c. Cimetidine

d. Codeine

---

4. During the denaturation of proteins, which of these structures will remain intact ? **(+4, -1)**

a. Primary

b. Secondary

c. Tertiary

d. Quaternary

---

5. Red ppt. by Benedict solution is? **(+4, -1)**

a. Glucose

b. RNA

c. DNA

d. Sucrose

---

6. We are given some diseases in Column II. Column-I contains name of some vitamins and their deficiencies will cause: **(+4, -1)**

Column-I		Column-II	
(A)	Vitamin A	(p)	Scurvy
(B)	Vitamin B_2	(q)	Xerophthalmia
(C)	Vitamin B_1 (Thiamine)	(r)	Cheilosis
(D)	Vitamin C	(s)	Beri Beri

a. A(q); B(r); C(s); D(p)

b. A(r); B(q); C(p); D(s)

c. A(q); B(r); C(p); D(s)

d. A(p); B(r); C(s); D(q)

7. One which does not stabilize secondary and tertiary protein? **(+4, -1)**

a. H-H linkage

b. S-S linkage

c. Vanderwoal's force

d. Hydrogen bonding

8. **Sulphur (S)-containing amino acids from the following are: (+4, -1)**
(a) Isoleucine
(b) Cysteine
(c) Lysine
(d) Methionine
(e) Glutamic acid

9. Match the terms in Column-I with their description in Column-II and choose the correct option : **(+4, -1)**

Column I		**Column II**	
(i)	Vitamin A	a	Beri-beri
(ii)	Vitamin C (Ascorbic acid)	b	Cheilosis
(iii)	Riboflavin	c	Xerophthalmia
(iv)	Thiamine	d	Scurvy

a. i→c, ii→d, iii→a, iv→b

b. i→c, ii→d, iii→b, iv→a

c. i→d, ii→c, iii→b, iv→a

d. i$\rightarrow$c, ii$\rightarrow$b, iii d, iv$\rightarrow$a

---

10. Glycosidic linkage between C_1 of α-glucose and C_2 of β-fructose is found in **(+4, -1)**

a. maltose

b. sucrose

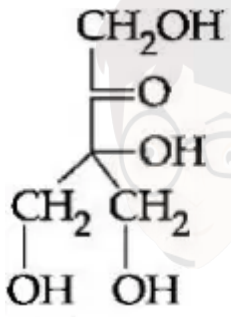
c. lactose

d. amylose

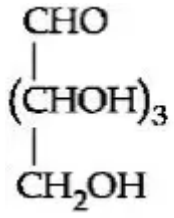
---

11. **Compound $A, C_5H_{10}O_5$, given a tetraacetate with AC_2O and oxidation of A with $Br_2 - H_2O$ gives an acid, $C_5H_{10}O_6$ Reduction of A with HI gives isopentane The possible structure of A is:** **(+4, -1)**

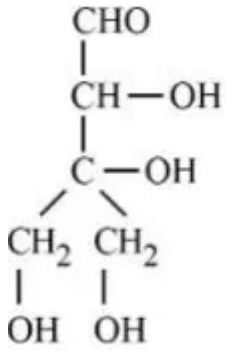
a.

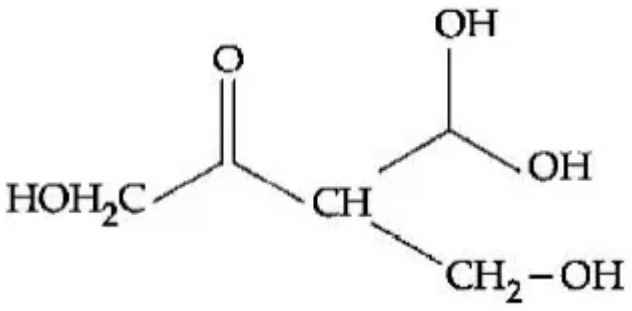


b.



c.



d. 

---

12. Natural glucose is termed D-glucose because : **(+4, -1)**

a. $-OH$ on the second carbon is on the right side in Fischer projection

b. $-OH$ on the sixth carbon is on the right side in Fischer projection

c. $-OH$ on the fifth carbon is on the right side in Fischer projection

d. It is dextrorotatory

---

13. Which of the following is not an essential amino acid: **(+4, -1)**

a. Valine

b. Leucine

c. Lysine

d. Tyrosine

---

14. Which of the following statement is not true for glucose? **(+4, -1)**

a. The pontaacetate of glucose does not react with hydroxylamine to give oxime.

b. Glucose reacts with hydroxylamine to form oxime.

c. Glucose gives Schiff's test for aldehyde.

d. Glucose exists in two crystalline forms α and β.

---

15. Which of the following statements is not true about RNA? **(+4, -1)**

a. It has always double stranded a-helix structure.

b. It usually does not replicate.

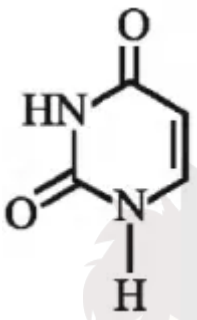
c. It is present in the nucleus of the cell.

d. It controls the synthesis of protein.

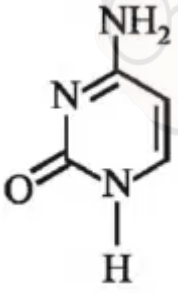
---

16. Which of the following structures represents thymine? **(+4, -1)**

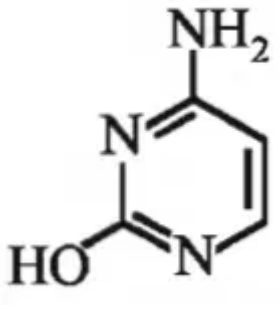
a.

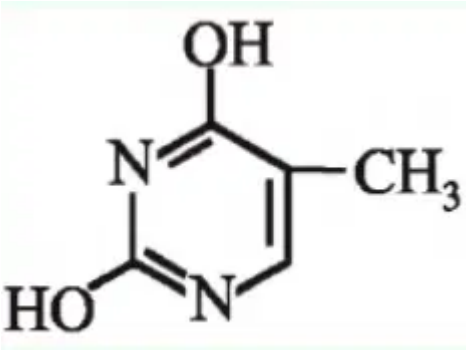


b.



c.



d. 

---

17. Which of the following will not show mutarotation? **(+4, -1)**

a. Maltose

b. Lactose

c. Glucose

d. Sucrose

---

18. Which of the vitamins given below is water soluble? **(+4, -1)**

a. Vitamin C

b. Vitamin D

c. Vitamin E

d. Vitamin K

---

19. Which of the following enzyme converts starch into maltose? **(+4, -1)**

a. Diastase

b. Maltase

c. Zymase

d. Invertase

---

20. Glycosidic linkage is actually an : **(+4, -1)**

a. Carbonyl bond

b. Ether bond

c. Ester bond

d. Amide bond

---

21. Glucose on prolonged heating with HI gives : **(+4, -1)**

a. n-Hexane

b. 1-Hexene

c. Hexanoic acid

d. 6-iodohexanal

---

22. Glucose and Galactose are having identical configuration in all the positions except position. **(+4, -1)**

a. $C-3$

b. $C-2$

c. $C-4$

d. $C-5$

---

23. Fructose and glucose can be distinguished by : **(+4, -1)**

a. Fehling's test

b. Barfoed's test

c. Benedict's test

d. Seliwanoff's test

24. Complete hydrolysis of starch gives : **(+4, -1)**

a. glucose and fructose in equimolar amounts

b. galactose and fructose in equimolar amounts

c. glucose only

d. glucose and galactose in equimolar amounts

25. Amylopectin is composed of : **(+4, -1)**

a. α-D-glucose, $C_1 - C_4$ and $C_1 - C_6$ linkages

b. α-D-glucose,$C_1 - C_4$ and $C_2 - C_6$ linkages

c. β-D-glucose, $C_1 - C_4$ and $C_2 - C_6$ linkages

d. β-D-Glucose, $C_1 - C_4$ and $C_1 - C_6$ linkages

Answers

1. **Answer: b**

Explanation:

The correct option is(B): β-D-2-deoxyribose, β-D-ribose.

DNA consists of β-D-2-deoxyribose sugar whereas RNA consists of β-D-ribose.

Concepts:

1. Structure of DNA and RNA:

DNA Structure:

Human DNA is unique and is made up of 3 billion base pairs. However, 99% of them are the same in all humans. The sequence of these bases determines what information needs to be coded that is necessary for the organism's growth and development. During the process of transcription (when DNA is replicated), a product is formed known as RNA (Ribonucleic Acid). This RNA is responsible for translating genetic information from DNA to protein followed by reading through ribosomes.

Read More: Structure of DNA

RNA Structure:

The ribonucleic acid has all the components same to that of the DNA with only 2 main differences within it. RNA has the same nitrogen bases called the adenine, Guanine, Cytosine as that of the DNA except for the Thymine which is replaced by the uracil. Adenine and uracil are considered as the major building blocks of RNA and both of them form base-pair with the help of 2 hydrogen bonds.

RNA resembles a hairpin structure and like the nucleotides in DNA, nucleotides are formed in this ribonucleic material(RNA). Nucleosides are nothing but the phosphate groups which sometimes also helps in the production of nucleotides in the DNA.

Read More: Structure of RNA

2. **Answer: d**

Explanation:

Vitamin B_{12} is water soluble and not excreted easily.

So, the correct option is (D) : Vitamin B_{12}

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

3. **Answer: c**

Explanation:

The above given structure is that of a well known antacid, **cimetidine** .

Hence, the correct option is (C): **cimetidine**

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

4. Answer: a

Explanation:

During the denaturation of proteins the primary structure stays intact.
Therefore, the correct option is (A): Primary

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

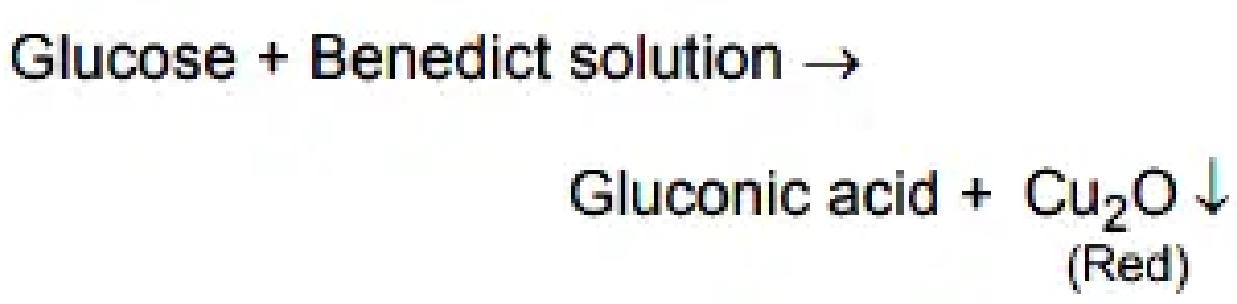
---

5. Answer: a

Explanation:

The correct answer is option (A): Glucose

Benedict solution oxidised in aldoses and ketoses to gluconic acid and itself gets reduced to red ppt. of Cu_2O.



Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

6. Answer: a

Explanation:

The correct answer is option (A) : A(q); B(r); C(s); D(p)

Vitamin A → Xerophthalmia

Vitamin B_2 → Cheilosis

Vitamin B_1 → Beri Beri

Vitamin C → Scurvy

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic

acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.

4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

7. Answer: a

Explanation:

Forces Stabilizing Protein Secondary and Tertiary Structures:

- **Hydrogen Bonds:** Formed between peptide bonds and side chain groups, stabilizing alpha helices and beta sheets.
- **Disulfide Linkages (-S-S-):** Covalent bonds formed between cysteine residues, providing structural stability to the protein.
- **van der Waals Forces:** Weak interactions between nonpolar side chains that help in folding and stability.
- **Electrostatic Forces of Attraction:** Ionic bonds between oppositely charged side chains (e.g., lysine and glutamate).

Exclusion:

Peroxide Linkages (-O-O-): These are not involved in stabilizing protein structures and do not contribute to secondary or tertiary structure stabilization.

Conclusion:

The secondary and tertiary structures of proteins are stabilized by hydrogen bonds, disulfide linkages, van der Waals forces, and electrostatic interactions. Peroxide linkages are not involved.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living

molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

8. Answer: 2 - 2

Explanation:

Sulphur-containing amino acids are those that have a sulphur atom in their side chain. From the given list:

Cysteine: Contains a thiol group (-SH) in its side chain.
Methionine: Contains a thioether (-S-) group in its side chain.

The remaining amino acids (Isoleucine, Lysine, and Glutamic acid) do not contain sulphur in their structures. Thus, the sulphur-containing amino acids are **b (Cysteine)** and **d (Methionine)**.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living

molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

9. **Answer: b**

Explanation:

Correct Answer:

i → c, ii → d, iii → b, iv → a

Explanation:

- **Vitamin A (i)**: Deficiency leads to **xerophthalmia**, which causes dryness of the eyes and can lead to blindness.
- **Vitamin C (ii)**: Deficiency causes **scurvy**, leading to symptoms like bleeding gums, weakness, and skin issues.
- **Riboflavin (iii)**: Deficiency leads to **cheilosis**, which is characterized by cracks at the corners of the mouth and other oral problems.
- **Thiamine (iv)**: Deficiency causes **beri-beri**, which affects the nervous system and cardiovascular system, leading to symptoms such as weakness, edema, and heart problems.

Conclusion:

The correct matching of vitamins with their deficiency/condition is: **i → c, ii → d, iii → b, iv → a**.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

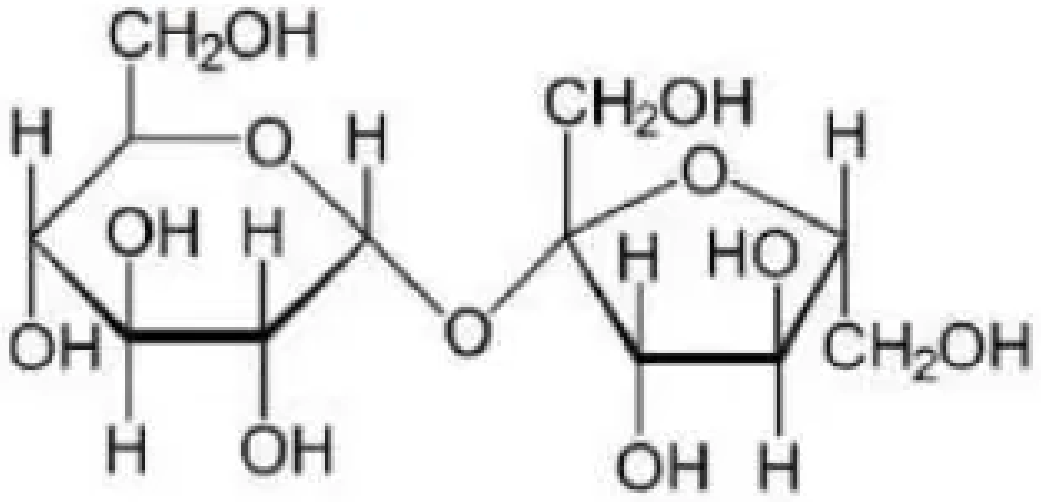
---

10. Answer: b

Explanation:

Correct answer is (b) sucrose

Theoretical



Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

11. **Answer: c**

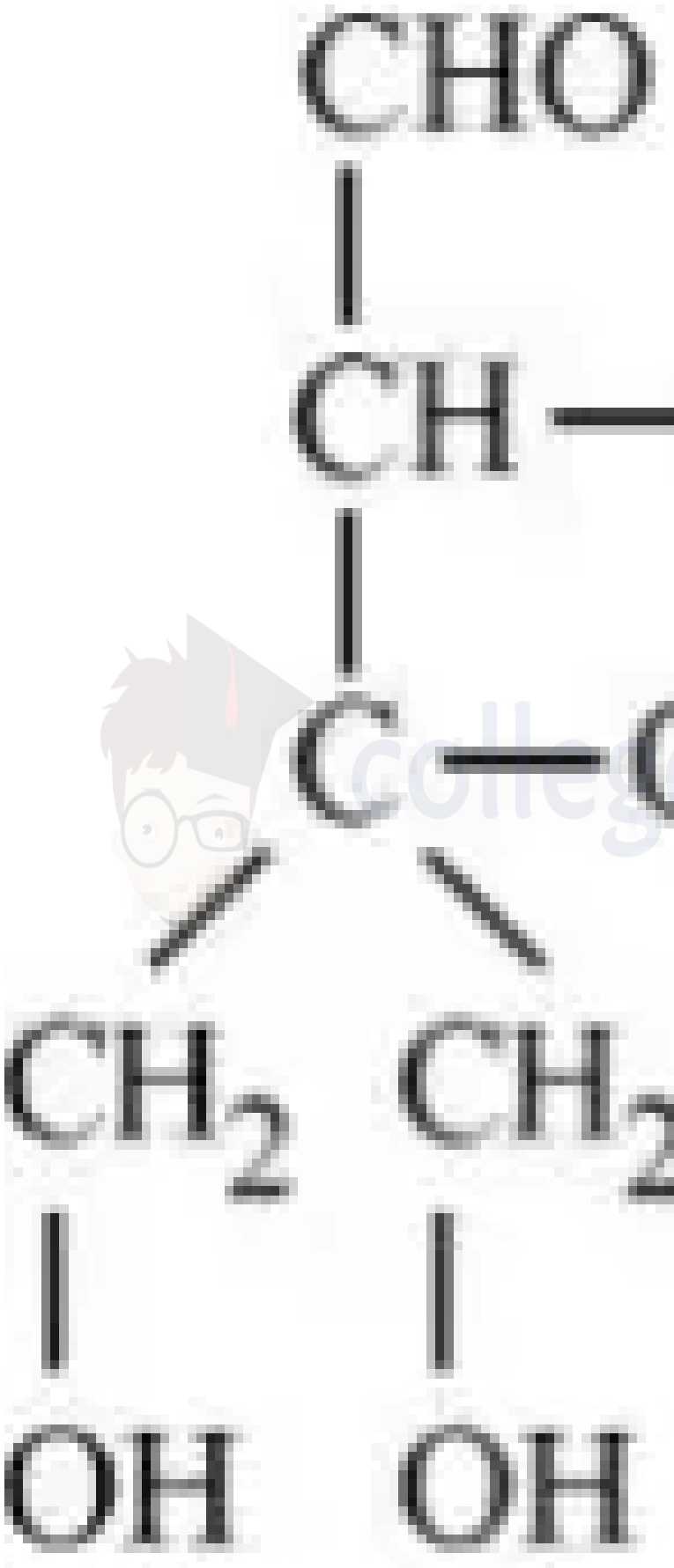
Explanation:

The compound A is a sugar derivative, and based on the given reactions:

- The reaction with $\mathrm{Ac_2O}$ suggests the presence of hydroxyl groups.
- Oxidation with $\mathrm{Br_2 - H_2O}$ gives an acid, indicating that a terminal hydroxyl group is present.
- Reduction with HI gives isopentane, suggesting a pentose structure.

The correct structure for A is option (1).

So , the correct option is (C) :


CHO
CH—OH
C—OH
CH2
CH2
OH
OH

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

12. Answer: c

Explanation:

Fischer gave the prefix "D" to compounds whose bottom chiral has its OH to the right. So natural glucose is called D-glucose or dextrose. Structure of D-Glucose:

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living

molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

13. **Answer: d**

Explanation:

Tyrosine is not an essential amino acid. While it is an important amino acid in the body, it is considered non-essential because it can be synthesized from the essential amino acid phenylalanine. The essential amino acids are those that cannot be synthesized by the body and must be obtained from the diet.

So, the correct option is (D): Tyrosine.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

14. **Answer: c**

Explanation:

Glucose does not give Schiff's test for aldehyde because it is not a free aldehyde. Instead, it reacts with Schiff's reagent (potassium metabisulfite and fuchsin) to give a negative result.

So, the correct option is (C): Glucose gives Schiff's test for aldehyde.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

15. Answer: a

Explanation:

The statement "It has always double-stranded α-helix structure" is not true about RNA. RNA typically does not possess a double-stranded α-helix structure; instead, it generally has a single-stranded structure, although it can form secondary structures such as hairpins or stem-loops.

Therefore, the correct option is (A): It has always double-stranded α-helix structure.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.

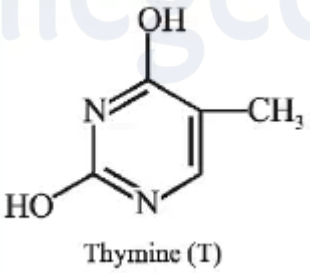
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

16. Answer: d

Explanation:

The structure of thymine is given below:



Thymine (T)

So, the correct option is (D).

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

17. Answer: d

Explanation:

Sucrose does not exhibit mutarotation because the glycosidic bond is between the anomeric carbon of glucose and anomeric carbon of fructose. Hence hemiacetal is not present in sucrose, while it is there in lactose, maltose and glucose.

So, the correct option is (D): Sucrose.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino

acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.

3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

18. Answer: a

Explanation:

Only Vitamine B and Vitamin C are water soluble while rest of fat soluble.

So, the correct option is (A): Vitamin C.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The

main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.

4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

19. Answer: a

Explanation:

Maltase is obtained by partial hydrolysis of starch by the enzyme diastase present in Malt.
Diastase, also known as α-amylase, is responsible for breaking down starch into maltose, which is a disaccharide composed of two glucose molecules. Maltase, on the other hand, breaks down maltose into two glucose molecules.

So, the correct option is (A): Diastase

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.

4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

20. Answer: b

Explanation:

Glycosidic linkage is actually an ether bond as the linkage forming the rings in an oligosaccharide or polysaccharide is not just one bond, but the two bonds sharing an oxygen atom e.g. sucrose

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

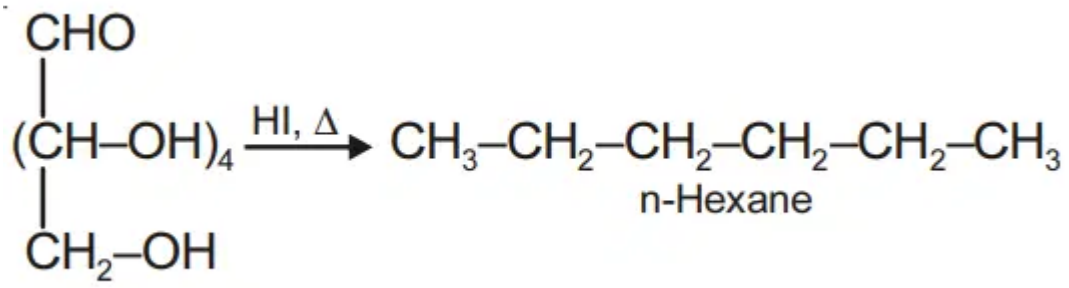
There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

21. Answer: a

Explanation:



Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

22. Answer: c

Explanation:

Glucose and galactose are $C-4$ Epimer's

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

23. Answer: d

Explanation:

Barfoed?s test ? Detecting presence of monosaccharides
Fehling?s test ? For aldehdyes
Benedict?s test ? For reducing sugars
Seliwanoff?s test ? Differentiate between aldose and ketose

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

24. Answer: c

Explanation:

Starch is a mixture of amylose & amylopectin polysaccharides and monomer is glucose. Thus on complete hydrolysis it gives only glucose.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living

molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.
2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.

---

25. Answer: a

Explanation:

Amylopetcin is a homopolymer of α-D-glucose where $C_1 - C_4$ linkage and $C_1 - C_6$ linkage are present.

Concepts:

1. Biomolecules:

Biomolecules are the most essential organic molecules, which are involved in the maintenance and metabolic processes of living organisms. These non-living molecules are the actual foot-soldiers of the battle of sustenance of life.

There are four major classes of Biomolecules – Carbohydrates, Proteins, Nucleic acids and Lipids.

1. **Carbohydrates** are chemically defined as polyhydroxy aldehydes or ketones or compounds which produce them on hydrolysis.

2. **Proteins** are another class of indispensable biomolecules, which make up around 50per cent of the cellular dry weight. Proteins are polymers of amino acids arranged in the form of polypeptide chains. The structure of proteins is classified as primary, secondary, tertiary and quaternary in some cases.
3. **Nucleic acids** refer to the genetic material found in the cell that carries all the hereditary information from parents to progeny. There are two types of nucleic acids namely, deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The main function of nucleic acid is the transfer of genetic information and synthesis of proteins by processes known as translation and transcription.
4. **Lipids** are organic substances that are insoluble in water, soluble in organic solvents, are related to fatty acids and are utilized by the living cell.