

OPEN STUDENT FOUNDATION

Chapters: 10

STD:12th Chemistry

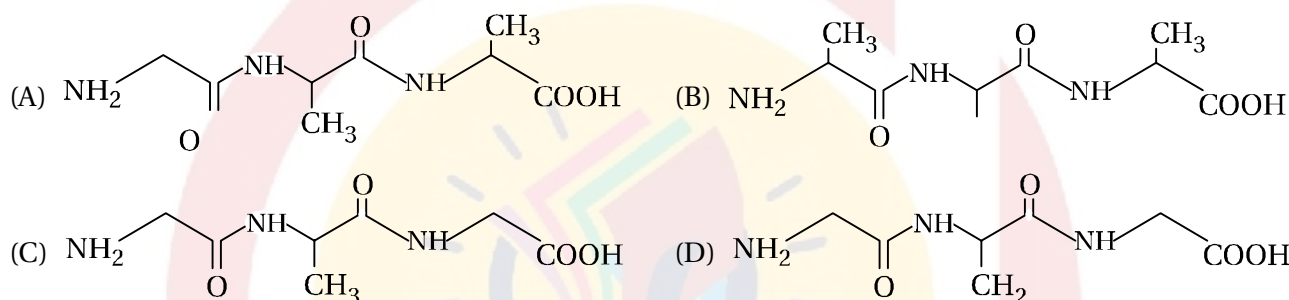
PRACTICE TEST-10

Section A

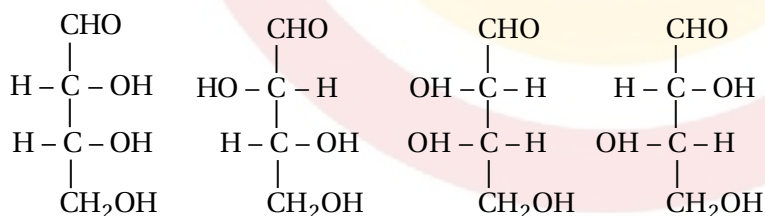
● Choose correct answer from the given options. [Each carries 1 Mark]

[10]

- Hydrolysis of sucrose is known as reaction.
 (A) Hydration (B) Saponification (C) Hydrogenation (D) Inversion
- Which vitamin is water soluble ?
 (A) Vitamin-E (B) Vitamin-K (C) Vitamin-A (D) Vitamin-B
- GLy-Al-Gly which formula is true for Tripeptide ?



- Which is not aldose ?
 (A) Glucose (B) Ribose (C) Fructose (D) Menose
- The DNA and RNA differs in arrangement of -OH group on which carbon atom ?
 (A) First (B) Second (C) Third (D) Fourth
- The correct corresponding order names of four aldoses with configuration given below.



respectively, is :

- Match :

List-I	List-II
(i) Riboflavin	(p) Beri beri
(ii) Thiamine	(q) Scurvy
(iii) Ascorbic acid	(r) Cheilosis
(iv) Pyridoxine	(s) Convulsions

- | | | | |
|-------|----|-----|----|
| i | ii | iii | iv |
| (A) s | q | p | r |
| (B) r | p | q | s |

(C) p r q s

(D) s r q p

8. Which is not true for glucose ?
(A) $-\text{CH}_2\text{OH}$ group (B) $-\text{CHO}$ group (C) Four $-\text{CHOH}$ group (D) One $\text{C}=\text{O}$ group
9. Which glycosidic linkage occurs in amylopectin ?
(A) $\text{C}_1-\text{O}-\text{C}_2$ and $\text{C}_1-\text{O}-\text{C}_6$ (B) $\text{C}_1-\text{O}-\text{C}_4$ and $\text{C}_1-\text{O}-\text{C}_6$
(C) $\text{C}_1-\text{O}-\text{C}_3$ and $\text{C}_1-\text{O}-\text{C}_4$ (D) $\text{C}_2-\text{O}-\text{C}_4$ and $\text{C}_4-\text{O}-\text{C}_6$
10. During the formation of nucleoside, which carbon of sugar gets bonded with base ?
(A) 1' (B) 2' (C) 3' (D) 5'

Section B

- Write the answer of the following questions. [Each carries 2 Marks] [8]

1. Write a note on vitamins.
2. What are hormones ? Give its classification.
3. What products would be formed when a nucleotide from DNA containing thymine is hydrolysed ?
4. What are hydrolysis products of (i) Sucrose and (ii) Lactose ?

Section C

- Write the answer of the following questions. [Each carries 3 Marks] [9]

5. Define the following as related to proteins :
(i) Peptide linkage
(ii) Primary structure
(iii) Denaturation
6. Write the important structural and functional differences between DNA and RNA. Structural differences
7. Write a note on preparation of glucose.

Section D

- Write the answer of the following questions. [Each carries 4 Marks] [8]

8. Give the suitable chemical tests that defines the open chain structure of glucose.
9. What will be obtained on reaction of following reactant with D-glucose ?
(i) HI (ii) Bromine water (iii) HNO_3

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PRACTICE TEST-10

Section A

● Choose correct answer from the given options. [Each carries 1 Mark]

[10]

1. Hydrolysis of sucrose is known as reaction.

- (A) Hydration (B) Saponification (C) Hydrogenation (D) Inversion

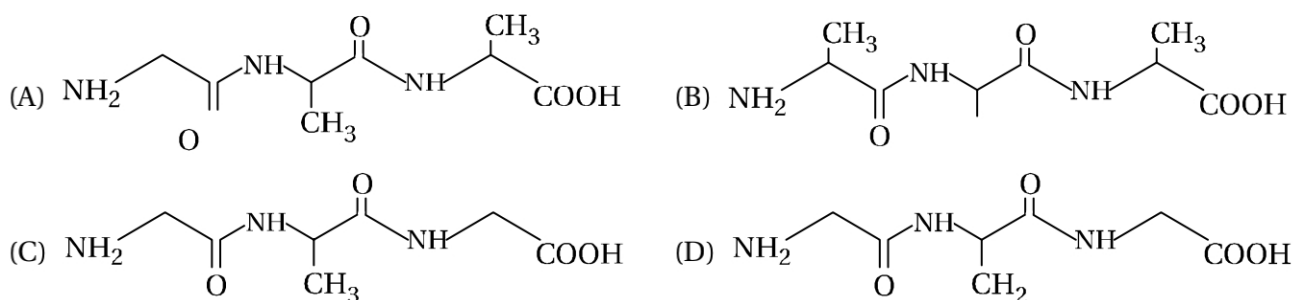
Ans. (D) Inversion

2. Which vitamin is water soluble ?

- (A) Vitamin-E (B) Vitamin-K (C) Vitamin-A (D) Vitamin-B

Ans. (D) Vitamin-B

3. GLy-Al-Gly which formula is true for Tripeptide ?



Ans. (C)

4. Which is not aldose ?

- (A) Glucose (B) Ribose (C) Fructose (D) Menose

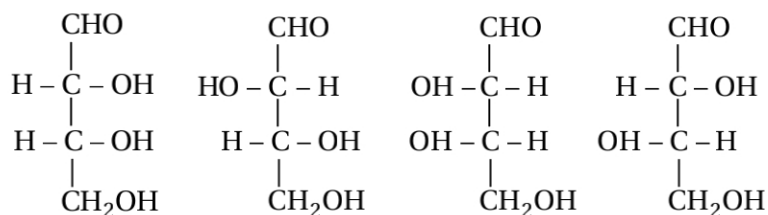
Ans. (C) Fructose

5. The DNA and RNA differs in arrangement of -OH group on which carbon atom ?

- (A) First (B) Second (C) Third (D) Fourth

Ans. (B) Second

6. The correct corresponding order names of four aldoses with configuration given below.



respectively, is :

- (A) L-erythrose, L-threose, D-erythrose, D-threose
 (B) D-erythrose, D-threose, L-erythrose, L-threose
 (C) L-erythrose, L-threose, L-erythrose, D-threose
 (D) D-threose, D-erythrose, L-threose, L-erythrose

Ans. (B) D-erythrose, D-threose, L-erythrose, L-threose

7. Match :

List-I	List-II
(i) Riboflavin	(p) Beri beri
(ii) Thiamine	(q) Scurvy
(iii) Ascorbic acid	(r) Cheilosis
(iv) Pyridoxine	(s) Convulsions

- i ii iii iv
 (A) s q p r
 (B) r p q s
 (C) p r q s
 (D) s r q p

Ans. (B) r p q s

➡ Riboflavin (Vitamin B₂) – Cheilosis

Thiamine (Vitamin B₁) – Beri beri

Ascorbic acid (Vitamin C) – Scurvy

Pyridoxine (Vitamin B₆) – Convulsions

8. Which is not true for glucose ?

- (A) –CH₂OH group (B) –CHO group (C) Four –CHOH group (D) One C = O group

Ans. (D) One C = O group

9. Which glycosidic linkage occurs in amylopectin ?

- (A) C₁–O–C₂ and C₁–O–C₆ (B) C₁–O–C₄ and C₁–O–C₆
 (C) C₁–O–C₃ and C₁–O–C₄ (D) C₂–O–C₄ and C₄–O–C₆

Ans. (B) C₁–O–C₄ and C₁–O–C₆

10. During the formation of nucleoside, which carbon of sugar gets bonded with base ?

- (A) 1' (B) 2' (C) 3' (D) 5'

Ans. (A) 1'

Section B

● Write the answer of the following questions. [Each carries 2 Marks]

[8]

1. Write a note on vitamins.

➡ Vitamins are the organic compounds that are required in the diet in small amounts to perform specific required biological functions for normal maintenance of optimum growth and health of the organism. Most of the vitamins cannot be synthesised in our body but plants can synthesise almost all of them, so they are considered essential food factors. However, bacteria guts produces some of the vitamins required by us. Vitamins are difficult to define based on of structure.

➡ Vitamins are designated by the alphabets A, B, C, D, etc. Some of them are further named sub groups, e.g., B₁, B₂, B₆, B₁₂, etc. Excess of vitamins is also harmful and vitamin pills should not be consumed without the advice of doctor. The term “Vitamine” was coined from the vital+amine since the earlier identified compounds had amino groups. Later work showed that most of them did not contain amino groups, so the letter ‘e’ was dropped and the term vitamin is used these days.

2. What are hormones ? Give its classification.

➡ Hormones are molecules that act as intercellular messengers. They are secreted by endocrine glands in

the body and are poured directly into the blood stream and are transported to the site of action.

- ➡ **Classification :** Chemically, hormones are classified as steroid hormone, peptide hormone and amine hormone. For example, estrogens and androgens are steroid hormones, insulin, endorphins etc. are peptide hormones and epinephrine and norepinephrine are amine hormones.
3. What products would be formed when a nucleotide from DNA containing thymine is hydrolysed ?
- ➡ On complete hydrolysis, the following products are obtained :
- (i) 2-deoxy-D-(-) ribose sugar
 - (ii) Two pyrimidine bases : Guanine (G) and Adenine (A).
 - (iii) Two purine bases : Cytosine (C) and Thymine (T)
 - (iv) Phosphoric acid.
4. What are hydrolysis products of (i) Sucrose and (ii) Lactose ?
- ➡ Sucrose on hydrolysis gives one unit of glucose and fructose in equimolar ration whereas lactose gives one unit of D-galactose and D-glucose in equimolar proportion.

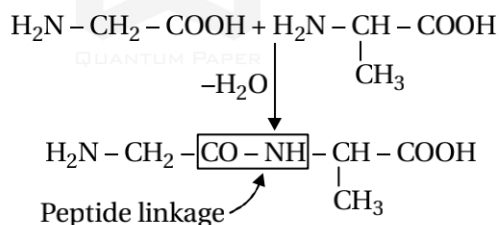
Section C

- Write the answer of the following questions. [Each carries 3 Marks] [9]

5. Define the following as related to proteins :

- (i) Peptide linkage
- (ii) Primary structure
- (iii) Denaturation

- ➡ (i) **Peptide linkage :** In proteins, the various amino acids are linked by an amide linkage (-CONH-) between two successive amino acids. Such amide linkages are known as peptide linkage.



Glycylalanine (Gly-Ala)

- ➡ (ii) **Primary structure :** Proteins may have one or more polypeptide chains. Each polypeptide in a protein has amino acids linked with each other in a specific sequence and it is this sequence of amino acids that is said to be the primary structure of protein. Any change in this primary structure creates the different proteins.
- ➡ (iii) **Denaturation :** The disruption of native structure and properties of proteins by change in pH, temperature or by addition of some salt is called denaturation of protein.
6. Write the important structural and functional differences between DNA and RNA. Structural differences

DNA		RNA	
(a)	The sugar present in DNA is 2-deoxy-D-(-)-ribose.	(a)	The sugar present in RNA is D-(-) ribose.
(b)	DNA contains cytosine and adenine as pyrimidine bases and guanine and adenine as purine bases.	(b)	RNA contains cytosine and uracil as pyrimidine bases and guanine and adenine as purine bases.
(c)	DNA has double stranded α -helix structure.	(c)	RNA has a single stranded α -helix structure.
(d)	DNA molecules are very large, their molecular mass may vary from $6 \times 10^6 - 16 \times 10^6$ u	(d)	RNA molecules are comparatively much smaller with molecular mass ranging from 20,000-40,000 u

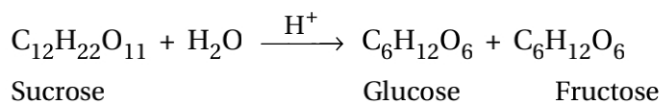
Functional differences

(a)	DNA has unique property of replication.	(a)	RNA usually does not replicate.
(b)	DNA controls the transmission of hereditary effects.	(b)	RNA controls the synthesis of proteins.

7. Write a note on preparation of glucose.

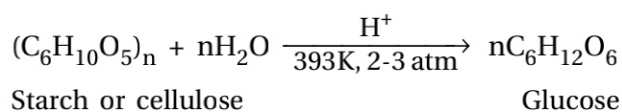
Glucose occur freely in nature as well as in a combined form. It is present in sweet fruits and honey. Ripe grapes contain glucose in large amounts and thus it is called "Grape Sugar". The glucose is prepared from cane sugar and starch as follows :

(i) **From cane sugar** : The glucose and fructose are obtained in equal amounts when an alcoholic solution of cane sugar is boiled with dilute HCl or H_2SO_4 .



After completion of this reaction, the alcohol is added in excess amount to this mixture. Glucose being insoluble in alcohol settles down at a bottom as precipitates and is filtered out whereas fructose is soluble in alcohol.

(ii) **From Starch** : Commercially, the glucose is manufactured by the hydrolysis of starch by boiling it with dilute H_2SO_4 at 393 K temperature and 2-3 atmospheric pressure.



After the hydrolysis, the calcium carbonate is added to reaction mixture as result of which the excess acid is neutralized and precipitates of $CaSO_4$ is formed which is filtered. Filtrate is made colourless by adsorption with charcoal and concentrated under reduced pressure. The crystals of glucose are obtained.

Section D

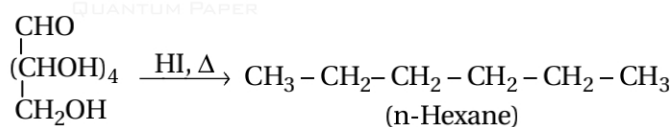
● Write the answer of the following questions. [Each carries 4 Marks]

[8]

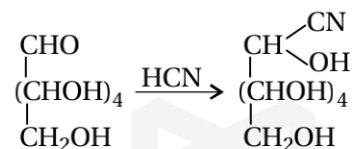
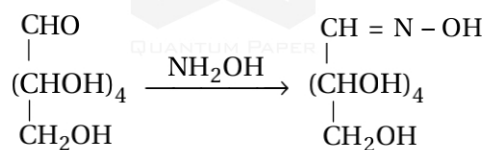
8. Give the suitable chemical tests that defines the open chain structure of glucose.

(i) The molecular formula of glucose is $C_6H_{12}O_6$.

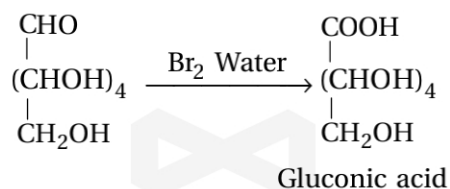
(ii) On prolonged reaction with HI, it forms n-hexane, suggesting that all the six carbons of glucose are linked in a straight chain.



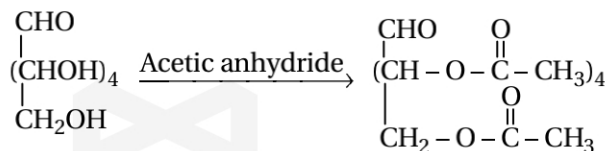
- ➡ (iii) Glucose reacts with hydroxyl amine to form an oxime and adds a molecule of hydrogen cyanide to form cyanohydrin. These reactions confirm the presence of carbonyl ($>\text{C} = \text{O}$) group in the glucose.



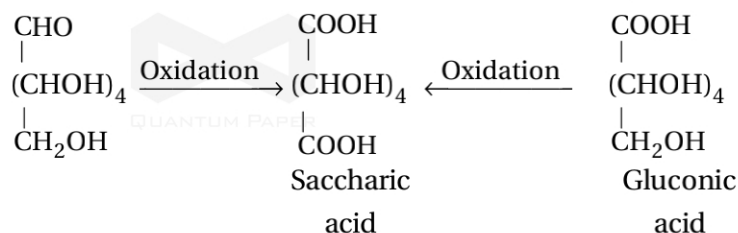
- ➡ (iv) Glucose gets oxidized to six carbon carboxylic acid (gluconic acid) on reaction with a mild oxidizing agent like bromine water. This indicates that carbonyl group present is the aldehydic group.



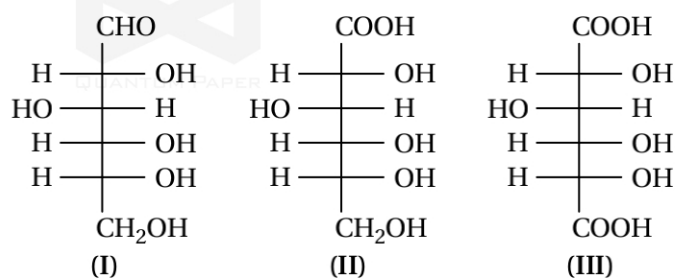
- ➡ (v) Acetylation of glucose with acetic anhydride gives glucose pentaacetate with confirms the presence of five -OH groups. Since it exists as a stable compound, the five -OH groups should be attached to the different carbon atoms.



- ➡ (vi) When oxidized by nitric acid, glucose as well as gluconic acid yields dicarboxylic acid, saccharic acid. This indicates the presence of primary alcoholic ($-\text{OH}$) group in glucose.



- ➡ The exact spatial arrangement of different -OH group was given by Fischer after studying many other properties. Its configuration is correctly represented as I. So, the gluconic acid is represented as II and saccharic acid as III



9. What will be obtained on reaction of following reactant with D-glucose ?

(i) HI (ii) Bromine water (iii) HNO_3

▣→ Try Yourself