
	INDIAN SCHOOL AL WADI AL KABIR	
Class: XII	Department: SCIENCE 2022 – 23 SUBJECT : CHEMISTRY	Date of submission: 17.05.2022
Worksheet No: 03 WITH ANSWERS	Chapter: BIOMOLECULES	Note: A4 FILE FORMAT
NAME OF THE STUDENT	CLASS & SEC:	ROLL NO.

- Glucose on oxidation with $\text{Br}_2(\text{aq})$ gives
 - Gluconic acid
 - Tartaric acid
 - Saccharic acid
 - Meso-oxalic acid
- Which of the following is non-reducing sugar?
 - Glucose
 - Sucrose
 - Maltose
 - Lactose
- Globular proteins are present in
 - blood
 - eggs
 - milk
 - all of these
- Which one of the amino acids can be synthesised in the body?
 - Alanine
 - Lysine
 - Valine
 - Histidine
- Which of the following is not true about amino acids?
 - They are constituents of all proteins
 - Alanine has one amino and one carboxylic group
 - Most naturally occurring amino acids have D-configuration
 - Glycine is the only naturally occurring amino acid which is optically inactive.
- Denaturation of protein leads to loss of its biological activity by
 - formation of amino acids
 - loss of primary structure
 - loss of both primary and secondary structure
 - loss of both secondary and tertiary structures

7. The melting points of amino acids are higher than the corresponding halo-acids because
- amino acids exist as zwitter ions resulting in strong dipole-dipole attraction
 - amino acids are optically active
 - due to higher molecular mass of -NH_2 group molecular mass of amino acids is higher
 - they interact with water more than halo-acids and have salt like structure
8. Assertion: Glycine must be taken through diet.
Reason: It is a non-essential amino acid.
- Assertion and reason are correct and Reason is the correct explanation of Assertion.
 - Assertion and reason are correct and Reason is the correct explanation of Assertion.
 - Assertion is correct but the reason is wrong.
 - Assertion is wrong but the reason is correct.
9. Assertion: At the isoelectric point, the amino group does not migrate under the influence of the electric field.
Reason: At the isoelectric point, amino acid exists as a zwitter ion
- Assertion and reason are correct and Reason is the correct explanation of Assertion.
 - Assertion and reason are correct and Reason is the correct explanation of Assertion.
 - Assertion is correct but the reason is wrong.
 - Assertion is wrong but the reason is correct.
10. Assertion: D (+) Glucose is dextrorotatory in nature.
Reason: 'D' represents its dextrorotatory nature.
- Assertion and reason are correct and Reason is the correct explanation of Assertion.
 - Assertion and reason are correct and Reason is the correct explanation of Assertion.
 - Assertion is correct but the reason is wrong.
 - Assertion is wrong but the reason is correct.

1 Mark

11. Name the reagents used to check the reducing nature of carbohydrates.
12. Glucose pentaacetate does not react with hydroxylamine. Give reason.
13. Draw the Fischer projection of α D(+) Glucose.
14. Write one difference between α -Helix and β pleated structures of proteins.
15. Of the two bases, thymine and uracil, which one is present in DNA?

2 Marks

16. What happens when Glucose is treated with
- acetic anhydride
 - HCN?
17. Write chemical reactions to show the presence of
- straight chain
 - aldehyde functional group in Glucose.
18. Describe the following with an example of each
- Denatured protein

b. Essential amino acids

19. Write the structural difference between DNA and RNA.
20. a. What type of linkage holds together the monomers of DNA?
b. What do you mean by α and β amino acids?

3 Marks

21. a. What are anomers? Give the structures of two anomers of Glucose.
b. Give a chemical reaction to show the presence of a primary alcoholic group in Glucose.
c. Draw the pyranose structure of α -D-Glucose.
22. a. Write two differences between the α and β forms of Glucose.
b. Define the term -Peptide linkage
c. What is essentially the difference between α -form and β -form of fructose? Explain.
23. Name the forces that stabilize the secondary and tertiary structure of protein. What are the ultimate products of hydrolysis of proteins?

Paragraph based questions

24. Organic compounds containing amine as a functional group are present in a vivid variety of compounds, namely amino acids, hormones, neurotransmitters, DNA alkaloids dyes etc which have physiological effects on humans. Amines are basic because of the presence of lone pair of electrons on Nitrogen. Addition of Nitrogen into an organic framework leads to the formation of two families of molecules namely, amines and amides. As Chemistry students, we must appreciate the versatility of Nitrogen.
- a. What are amino acids?
b. Why are amino acids amphoteric?
c. Give one point of difference between acidic and basic amino acid.
d. What are essential amino acids?
e. Name the linkage formed when carboxyl end of one amino acid condenses with amino end of other amino acid.

Board Based questions

25. Define the terms
a. Peptide linkage
b. Denaturation
26. List the reactions of Glucose that cannot be explained by the open structure.
27. Name four bases present in DNA. Which one of these is present in RNA?
28. Name two fat soluble vitamins, their sources and the diseases caused due to their deficiency in diet.
29. a. Write the product obtained when D Glucose reacts with $\text{H}_2\text{N-OH}$.

- b. Amino acids show amphoteric behaviour. Why?
 c. Why cannot vitamin C be stored in our body?

30. Define the term polysaccharide with an example.

31. Assertion: Albumin is a globular protein.

Reason: Polypeptide chain coils around to give a straight chain.

- a. Assertion and reason are correct and Reason is the correct explanation of Assertion.
 b. Assertion and reason are correct and Reason is the correct explanation of Assertion.
 c. Assertion is correct but reason is wrong.
 d. Assertion is wrong but reason is correct.

Answers

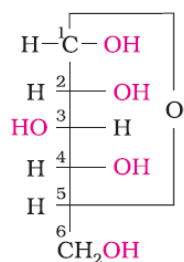
1. a
 2. b
 3. d
 4. a
 5. a
 6. d
 7. d
 8. d
 9. a
 10. c

11. Tollens reagent and Fehlings solution.

12. Absence of free aldehyde group due to the ring formation.

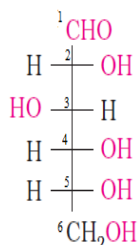
13.

Ring structure



α -D-(+)-Glucose

Open structure



14. In α Helix, the peptide chains are coiled up to form helix which is right handed involving H bonding.

Example: Myosin Keratin

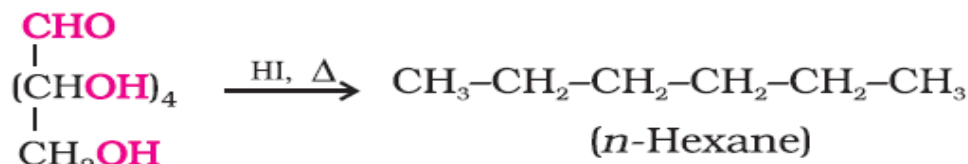
The peptide chains lie side by side held together by intermolecular hydrogen bonding

Eg Silk

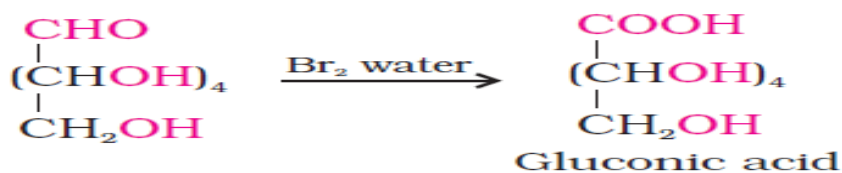
15. Thymine

16. a. Pentaacetate is formed, write the reaction.
 b. Cyanohydrin is formed, write the reaction.

17. a. Reaction with HI.



- b. Reaction with Br₂ water.



18. a. When a protein in its native form, is subjected to physical change like change in temperature or chemical change like change in pH, the hydrogen bonds are disturbed. Due to this, globules unfold and helix get uncoiled and protein loses its biological activity. This is called denaturation of proteins;
 Eg curdling of milk

- b. Those amino acids which cannot be synthesised in the body and must be obtained through diet, are known as essential amino acids.
 Eg. Valine

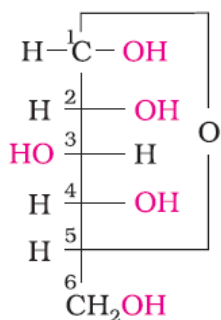
19.

DNA	RNA
Sugar – 2-Deoxyribose	Sugar- Ribose
N Bases- Adenine, Guanine, Cytosine, Thymine	N Bases- Adenine, Guanine, Cytosine, Uracil

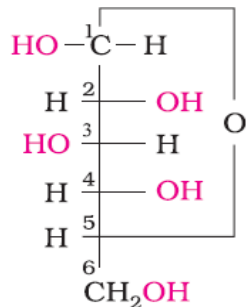
20. a. Phosphodiester linkage

- b. α amino acids have the amino group attached to the (alpha-) carbon atom next to the carboxyl group.
 β amino acids have the amino group attached to the (β) carbon atom next to the carboxyl group.

21. a. The compounds which differ in the configuration of only one carbon.

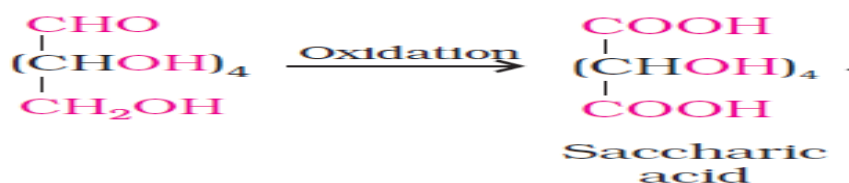


α - D - (+) - Glucose

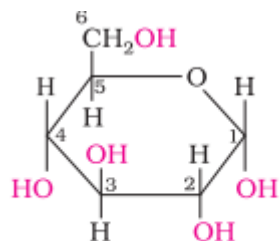


β - D - (+) - Glucose

- b. Reaction with con HNO₃



c.



α -D-(+)-Glucopyranose

22. Ans. a.

α -D-Glucose	β -D-Glucose
C1 – OH is on the right.	C1-OH is on the left.
Its melting point is 419K	Its melting point is 423K

b. A peptide linkage is an amide formed between $-\text{COOH}$ group and $-\text{NH}_2$ group. Eg in proteins

c. The configuration of C - 2 carbon.

23. The main forces which stabilise the 2° and 3° structures of proteins are hydrogen bonds, disulphide linkages, van der Waals and electrostatic forces of attraction.

Amino acids are the ultimate products of hydrolysis of proteins.

24. a. Amino acids contain amino ($-\text{NH}_2$) and carboxyl ($-\text{COOH}$) functional groups

b. NH_2 and COOH groups

c. Acidic- More COOH groups, Basic – More NH_2 groups

d. Those which cannot be synthesised in the body and must be obtained through diet, are known as essential amino acids.

e. Peptide linkage

25. a. When a protein in its native form, is subjected to physical change like change in temperature or chemical change like change in pH, the hydrogen bonds are disturbed. Due to this, globules unfold and helix get uncoiled and protein loses its biological activity. This is called denaturation of proteins;
Eg curdling of milk

b. The amide linkage formed between NH_2 group of one amino acid and COOH group of the other.

26. Glucose does not give

i. 2,4-DNP test

ii. Schiff's test

iii. form hydrogensulphite addition product with NaHSO_3 .

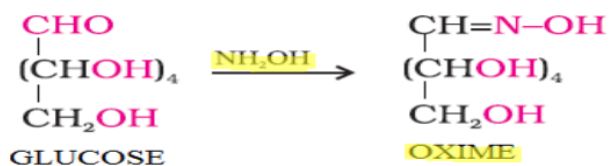
iv. The pentaacetate of glucose does not react with hydroxylamine (NH_2OH) indicating the absence of free $-\text{CHO}$ group.

27. Adenine, Guanine, Cytosine, Thymine.

RNA- Adenine, Guanine, Cytosine

28. Vitamin A- Fish liver oil, carrots, butter and milk- Xerophthalmia (hardening of cornea of eye)
 Vitamin D- Exposure to sunlight, fish and egg yolk- Rickets (bone deformities in children) and Osteomalacia (soft bones and joint pain in adults)

29. a



- b. In aqueous solution, the carboxyl group can lose a proton and amino group can accept a proton, giving rise to a dipolar ion known as zwitter ion. In zwitter ionic form, amino acids show amphoteric behaviour as they react both with acids and bases.
- c. Vitamin C- water soluble. Water soluble vitamins must be supplied regularly in the diet because they are readily excreted in urine and cannot be stored
30. Sugar with more than 10 monomer units. Starch
31. c. Assertion is correct but the reason is wrong

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