BIOMOLECULES- PAST PAPERS

YEAR 2022

1. Nucleosides are composed of
(a) a pentose sugar and phosphoric acid (b) a nitrogenous base and phosphoric acid
(c) a nitrogenous base and a pentose sugar. (d) a nitrogenous base, a pentose sugar and phosphoric acid
2. Amino acids which cannot be synthesized in the body and must be obtained through diet are known as
(a) Acidic amino acids. (b) Essential amino acids. (c) Basic amino acids. (d) Non-essential amino acids
3. Which of the following sugar is known as dextrose?
(a) Glucose. (b) Fructose. (c) Ribose. (c) Sucrose
4. The base which is present in DNA but not in RNA, is
(a) Cytosine. (b) Guanine. (c) Adenine. (d) Thymine
5. Nucleic acids are polymer of
(a) amino acids. (b) Nucleosides. (c) Nucleotides. (d) Glucose.
6. Glucose on reaction with Br_2 water gives:
(a) Saccharic acid. (a) Hexanoic acid. (c) Gluconic acid. (d) Salicylic acid
7. Complete the following analogy :
Curdling of milk : A :: α-helix : B
(a) A : Primary structure B : Secondary structure
(b) A : Denatured protein B : Primary structure
(c) A : Secondary structure B : Denatured protein
(d) A : Denatured protein B : Secondary structure

YEAR 2020

1. What type of **linkage is present in polysaccharides**?
2. Define the following terms with a suitable example in each:
(i) Polysaccharides (ii) Denatured protein (iii) Fibrous protein
3. Differentiate between following:
(i) **Amylose and Amylopectin**
(ii) **Globular protein and Fibrous protein**
(iii) **Nucleotide and Nucleoside**
4. Assertion (A) : Two strands in DNA are complementary to each other.
Reason (R): Two strands in DNA held by intermolecular H-bond between bases.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false.
(d) A is false but R is correct.

YEAR 2019

1. What is the **basic structural difference between glucose and fructose**?
2. Write the products obtained after hydrolysis of lactose.
Differentiate between the following:
(i) Amylose and Amylopectin (ii) Peptide linkage and Glycosidic linkage (iii) Fibrous proteins and Globular proteins
3. Write chemical **reactions to show that open structure** of D-glucose contains the following:
(i) Straight chain
(ii) Five alcohol groups
(iii) Aldehyde as carbonyl group
(iv) primary alcoholic group
4. Draw the structure α-D-glucose.

YEAR 2018

1. Define the following with a suitable example in each:
(i) Oligosaccharides. (ii) Denaturation of protein. (iii). Vitamins
2. Write the reactions involved when D-glucose is treated with the following reagents:
(i) Br_2 water (ii) H_2N-OH (iii) $(CH_3CO)_2O$ (iv) HI (v) HNO_3
3. Define the following with an example of each:
(i) Anomers. (ii) Inversion of sugars. (iii) Essential amino acids
4. Write the product when D-glucose **reacts with conc. HNO_3**.
5. **Amino acids show amphoteric behaviour**. Why?
6. Write one difference between **α-helix and β-pleated** structures of proteins.

YEAR 2017

1. After watching a programme on TV about the presence of carcinogens (cancer causing agents) Potassium bromate and Potassium iodate in bread and other bakery products, Ritu a class XII student decided to aware others about the adverse effects of these carcinogens in foods. She consultanted the school principal and requested him to instruct canteen contractor to stop selling sandwiches, pizza, burgers and other bakery products to the students. Principal took an immediate action and instructed the canteen contractor to replace the bakery products with some proteins and vitamins rich food like fruits, salads, sprouts etc. The decision waswelcomed by the parents and students.
After reading the above passage, answer the following questions:
(i) What are the values (at least two) displayed by Ritu?
(ii) Which **polysaccharide** component of carbohydrates is commonly present **in bread**?
(iii) Write the **two types of secondary** structure of proteins.
(iv) Give two examples of **water soluble vitamins.**

YEAR 2016

1. Write the name of two monosaccharides obtained on **hydrolysis of lactose sugar**.
2. Why **Vitamin C cannot be stored in our body** ?
3. What is the difference between a **nucleoside and nucleotide** ?
4. Write the structural difference between **starch and cellulose**.
5. What type of **linkage is present in Nucleic acids**?
6. Give one example each for **fibrous protein and globular protein.**

YEAR 2015

1. Write the product obtained when **D-glucose reacts with H_2N-OH**.
2. Amino acids show amphoteric behaviour. Why?
3. Why cannot vitamin C be stored in our body?
3. Which one of the following is a monosaccharide: **starch, maltose, fructose, cellulose?**
4. What is the difference between **acidic amino acids and basic amino acids**?
5. Write the name of the vitamin whose **deficiency causes bleeding of gums**.
6. What is the difference between fibrous protein and globular protein ?
7. Write the name of vitamin whose **deficiency causes bone deformities in children.**
8. Which one of the following is a disaccharide : **Starch, Maltose, Fructose, Glucose** ?

YEAR 2014

1. Write the products of the **hydrolysis of lactose**.
2. Define the following terms:

(i) Nucleotide (ii) Anomers (iii) Essential amino acids

3. Which **component of starch** is a branched polymer of α-glucose and **insoluble in water**?
4. **Deficiency of which vitamin causes rickets**?
6. Give an example each for fibrous protein and globular protein.
7. Write the product formed on reaction of D-glucose with Br_2 water.
8. Which of the two components of starch is water soluble?
9. Deficiency of which vitamin causes night-blindness?
10. Name the **base** that is found in nucleotide of **RNA only**.
11. Glucose on **reaction with HI gives n-hexane**. What does it suggest about the structure of glucose?
12. What are the products of hydrolysis of sucrose?
13. Define the following terms as related to proteins:

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

14. **Deficiency of which vitamin causes scurvy?**
15. What type of linkage is responsible for the formation of proteins?
16. Write the product formed when glucose is treated with HI.

YEAR 2013

1. Write the name of linkage joining two amino acids.
2. Shanti, a domestic helper of Mrs. Anuradha, fainted while mopping the floor. Mrs. Anuradha immediately took her to the nearby hospital where she was diagnosed to be severely 'anaemic'. The doctor prescribed an iron rich diet and multivitamins supplement to her. Mrs. Anuradha supported her financially to get the medicines. After a month, Shanti was diagnosed to be normal.

(i) What values are displayed by Mrs. Anuradha?
(ii) Name the vitamin whose deficiency causes 'pernicious anaemia'.
(iii) Give an example of a water soluble vitamin.

3. What are **three types of RNA molecules which perform different functions**?
4. What type of **bonding helps in stabilizing the α-helix structure** of proteins?
5. What is a **glycosidic linkage**?
6. What is meant by (i) **peptide linkage** (ii) **biocatalysts**?
7. Write any two reactions of glucose which cannot be explained by the open chain structure of glucose molecule.

YEAR 2012

1. Write the main structural difference between DNA and RNA. Of the two bases, thymine and uracil, which one is present in DNA?
2. Write any two reactions of glucose that cannot explain open structure.
3. A wide variety of reagents and conditions, such as heat, organic compounds, pH changes, and heavy metal ions can cause protein denaturation
4. Anyone who has fried an egg has observed denaturation. The clear egg white turns opaque as the albumin denatures and coagulates. No one has yet reversed that process. However, given the proper circumstances and enough time, a protein that has unfolded under sufficiently gentle conditions can refold and may again exhibit biological activity

After reading the above passage, answer the following questions:

(i) Define the term '**denaturation** of protein.
(ii) Which of the following **structures remains intact during denaturation**?
(a) Primary structure (b) Secondary structure (c) Tertiary structure (d) Quaternary structure
(iii) Write **two examples** of denaturation of proteins.
(iv) Differentiate fibrous proteins and globular proteins.