CHEMISTRY (CODE – 043)

Chapter-wise Test: Biomolecules

(NCERT Class XII Chemistry, Unit 10: Biomolecules)

PRACTICE QUESTION PAPER

CLASS XII (2026-27)

Time: 1½ hours **Max. Marks: 35**

GENERAL INSTRUCTIONS: Read the following instructions carefully.

1. There are 17 questions in this question paper with internal choice. All questions are based on Unit 10: Biomolecules.
2. SECTION A consists of 8 multiple-choice questions carrying 1 mark each.
3. SECTION B consists of 3 very short answer questions carrying 2 marks each.
4. SECTION C consists of 4 short answer questions carrying 3 marks each.
5. SECTION D consists of 1 case-based question carrying 4 marks.
6. SECTION E consists of 1 long answer question carrying 5 marks.
7. All questions are compulsory. Internal choice is provided in Questions 9 to 15, 16(iii) and 17.
8. Questions 2, 3, 9, 12, 13, 14 and 16 are based on figures, structures or data tables given in the paper.
9. Use of log tables and calculators is not allowed.

SECTION A

Questions 1 to 8 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions. Each question carries 1 mark.

1 Which of the following is a **non-reducing** sugar? — 1

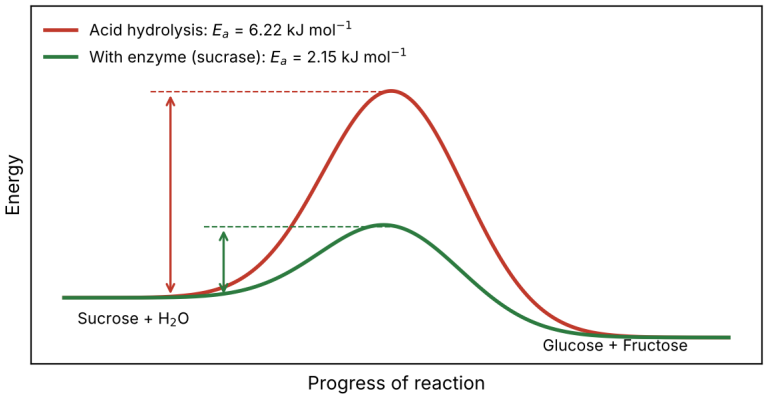
A. Sucrose
B. Maltose
C. Lactose
D. Glucose

2 The table lists some vitamins with the disease caused by their deficiency. — 1

Row	Vitamin	Deficiency disease
1	Vitamin A	Night blindness
2	Vitamin D	Rickets
3	Vitamin C	Beri beri
4	Vitamin K	Increased blood clotting time

Which row of the table is **incorrect**?

A. Row 1
B. Row 2
C. Row 3
D. Row 4

3	Fig. 1 shows the energy profile for the hydrolysis of sucrose with an acid and with the enzyme sucrase.  **Fig. 1** By how much does the enzyme lower the activation energy of the hydrolysis? A. 8.37 kJ mol^{-1} B. 2.15 kJ mol^{-1} C. 6.22 kJ mol^{-1} D. 4.07 kJ mol^{-1}	1
4	A tripeptide is formed from three different α-amino acids. The number of peptide linkages in it and the number of water molecules eliminated during its formation are, respectively: A. 3 and 3 B. 2 and 2 C. 2 and 3 D. 3 and 2	1
5	Increased blood clotting time is a deficiency symptom of which vitamin? A. Vitamin E B. Vitamin D C. Vitamin K D. Vitamin C	1
6	Which nitrogenous base is present in RNA but is **not** present in DNA? A. Uracil B. Thymine C. Adenine D. Cytosine	1
7	Glucose is oxidised to gluconic acid by bromine water. This reaction shows that glucose contains: A. five hydroxyl groups B. a ketonic group C. a primary alcoholic group D. an aldehydic group	1
8	Given below are two statements labelled Assertion (A) and Reason (R). **Assertion (A):** Denaturation of a protein destroys its biological activity. **Reason (R):** The primary structure of the protein remains intact during denaturation. Select the correct answer from the options below. 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 true.	1

SECTION B

Question Nos. 9 to 11 are very short answer questions carrying 2 marks each.

9 **Attempt either A or B.** 2

(A) The table shows some α-amino acids.

Amino acid	Side chain (R)	Symbol
Glycine	–H	Gly
Alanine	$-CH_3$	Ala
Lysine	$H_2N-(CH_2)_4-$	Lys
Glutamic acid	$HOOC-CH_2-CH_2-$	Glu

(i) Classify lysine and glutamic acid as acidic, basic or neutral amino acids, giving the reason.
(ii) Which amino acid in the table is optically inactive? Why?

OR

(B) (i) What is a zwitter ion? Write the zwitter ionic form of glycine.
(ii) Why do amino acids have high melting points and good solubility in water compared with the corresponding halo acids?

10 **Attempt either A or B.** 2

(A) Differentiate between fibrous proteins and globular proteins, giving one example of each.

OR

(B) What are essential amino acids? Give two examples of essential and two examples of non-essential amino acids.

11 **Attempt either A or B.** 2

(A) Define (i) glycosidic linkage and (ii) invert sugar.

OR

(B) What is the difference between a nucleoside and a nucleotide? Name the linkage that joins nucleotides in a nucleic acid chain.

SECTION C

Question Nos. 12 to 15 are short answer questions carrying 3 marks each.

12 **Attempt either A or B.** 3

(A) The table gives information about three disaccharides X, Y and Z.

Disaccharide	Products of hydrolysis	Glycosidic linkage
X	D-glucose + D-fructose	C1 of α-glucose and C2 of β-fructose
Y	Two molecules of D-glucose	C1 of one glucose and C4 of the other
Z	D-galactose + D-glucose	C1 of galactose and C4 of glucose

(i) Identify X, Y and Z.
(ii) Which of them is a non-reducing sugar? Give the reason.
(iii) Name the source of Z.

OR

(B) Give three reactions or facts that cannot be explained by the open-chain structure of glucose and name the structure that explains them.

13 **Attempt either A or B.** 3

(A) Study the reactions of D-glucose in Fig. 2 and answer the questions.

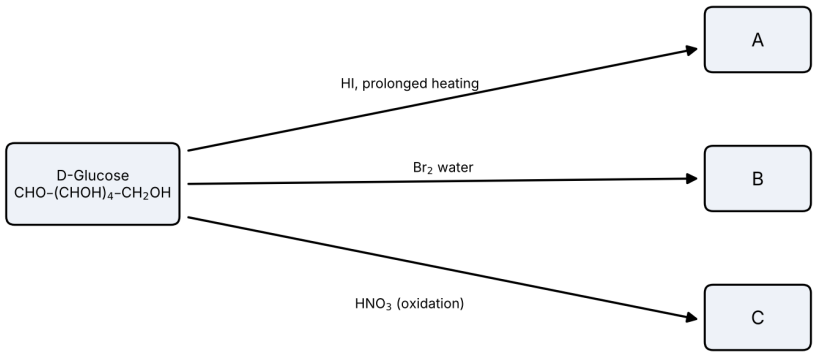
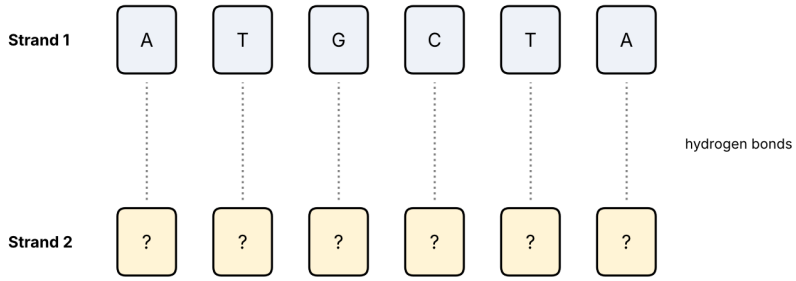


Fig. 2

(i) Name the products A, B and C.
(ii) What structural feature of glucose is established by each reaction?

OR

(B) What happens when sucrose is boiled with dilute HCl in alcoholic solution? Write the equation and explain why the product mixture is called invert sugar.

14	**Attempt either A or B.** **(A)** Fig. 3 shows a part of the base sequence of strand 1 of a DNA molecule.  **Fig. 3** (i) Write the base sequence of strand 2. (ii) What type of linkage joins the nucleotides within each strand? (iii) If the molecule were RNA, which base would replace thymine? **OR** **(B)** Write any three structural differences between DNA and RNA.	3
15	**Attempt either A or B.** **(A)** (i) What is meant by denaturation of a protein? Give one example. (ii) Which structures of the protein are destroyed and which remains unchanged on denaturation? **OR** **(B)** (i) What are enzymes? Name the enzyme that hydrolyses maltose and write the equation. (ii) Why are enzymes needed in small quantities only?	3

SECTION D

Question No. 16 is a case-based/data-based question carrying 4 marks.

16 **Read the passage and answer the questions that follow.** — 4

Vitamins are organic compounds required in small amounts in our diet for normal growth and health. Their deficiency causes specific diseases. Vitamins are classified by their solubility in fat or in water. The table shows some vitamins with their sources and deficiency diseases.

Vitamin	Sources	Deficiency disease
Vitamin A	Fish liver oil, carrots, butter and milk	Xerophthalmia, night blindness
Vitamin B_1	Yeast, milk, green vegetables, cereals	Beri beri
Vitamin C	Citrus fruits, amla, green leafy vegetables	Scurvy
Vitamin D	Exposure to sunlight, fish, egg yolk	Rickets, osteomalacia
Vitamin K	Green leafy vegetables	Increased blood clotting time

(i) Which vitamin is obtained from citrus fruits and amla? Give its chemical name and the disease caused by its deficiency.
(ii) Classify the five vitamins in the table into fat soluble and water soluble vitamins.
(iii) Why must vitamin C be supplied regularly in the diet?
OR
(iii) Why can vitamins A and D be stored in the body?
(iv) Why was the letter ‘e’ dropped from the term “vitamine”?

SECTION E		
Question No. 17 is a long answer question carrying 5 marks.		
17	**Attempt either A or B.** **(A)** (i) Write the reaction between glycine and alanine to form the dipeptide glycylalanine. Name the linkage formed. (ii) Name the four levels of structure of a protein. (iii) Name the two types of secondary structure and the type of bonding that stabilises the α-helix. (iv) Which of the four structures are destroyed on denaturation? **OR** **(B)** (i) What is the basic structural difference between starch and cellulose? (ii) Name the two components of starch and give two differences between them. (iii) What is glycogen? How does it differ from starch? (iv) Write two functions of carbohydrates in plants.	5

— End of Question Paper —