

Q1. JEE Main 2026 (21 January Shift 2)

The correct statements are :

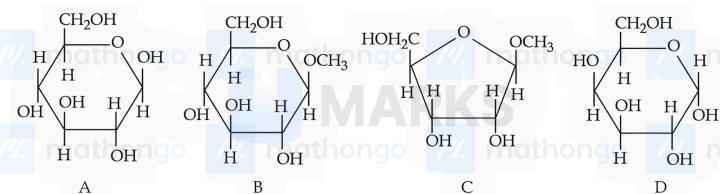
- A. Activation energy for enzyme catalysed hydrolysis of sucrose is lower than that of acid catalysed hydrolysis.
- B. During denaturation, secondary and tertiary structures of a protein are destroyed but primary structure remains intact.
- C. Nucleotides are joined together by glycosidic linkage between C_1 and C_4 carbons of the pentose sugar.
- D. Quaternary structure of proteins represents overall folding of the polypeptide chain.

Choose the correct answer from the options given below :

- (1) A and B Only
- (2) A, B and D Only
- (3) B and C Only
- (4) A, C and D Only

Q2. JEE Main 2026 (23 January Shift 1)

From the given following (A to D) cyclic structures, those which will not react with Tollen's reagent are :



- (1) A and B
- (2) A and D
- (3) B and D
- (4) B and C

Q3. JEE Main 2026 (28 January Shift 2)

Structures of four disaccharides are given below. Among the given disaccharides, the non-reducing sugar is :

**Q4. JEE Main 2026 (24 January Shift 2)**

The number of possible tripeptides formed involving alanine (ala), glycine (gly) and valine (val), where no amino acid has been used more than once is:

- (1) 3
- (2) 8
- (3) 6
- (4) 4

Q5. JEE Main 2026 (22 January Shift 2)

Match List - I with List - II.

List - I	List - II
Reaction of Glucose with	Product formed
A. Hydroxylamine	I. Gluconic acid
B. Br_2 water	II. Glucose pentacetate
C. Excess acetic anhydride	III. Saccharic acid
D. Concentrated HNO_3	IV. Glucosamine

Choose the correct answer from the options given below :

- (1) A-III, B-I, C-IV, D-II (2) A-I, B-III, C-IV, D-II
(3) A-IV, B-III, C-II, D-I (4) A-IV, B-I, C-II, D-III

Q6. JEE Main 2026 (22 January Shift 1)

Given below are two statements:

Statement I: Sucrose is dextrorotatory. However, sucrose upon hydrolysis gives a solution having mixture of products. This solution shows laevorotation.

Statement II: Hydrolysis of sucrose gives glucose and fructose. Since the laevorotation of glucose is more than the dextrorotation of fructose, the resulting solution becomes laevorotatory.

In the light of the above statements, choose the correct answer from the options given below

- (1) Statement I is true but Statement II is false
(2) Statement I is false but Statement II is true
(3) Both Statement I and Statement II are false
(4) Both Statement I and Statement II are true

Q7. JEE Main 2026 (23 January Shift 2)

Both human DNA and RNA are chiral molecules. The chirality in DNA and RNA arises due to the presence of

- (1) L-sugar component (2) Chiral phosphate unit
(3) Base unit (4) D-sugar component

Q8. JEE Main 2026 (21 January Shift 1)

Identify the correct statements.

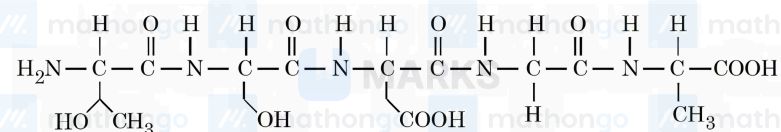
- A. Arginine and Tryptophan are essential amino acids.
B. Histidine does not contain heterocyclic ring in its structure.
C. Proline is a six membered cyclic ring amino acid.
D. Glycine does not have chiral centre.
E. Cysteine has characteristic feature of side chain as $\text{MeS} - \text{CH}_2 - \text{CH}_2 -$.

Choose the correct answer from the options given below :

- (1) A and D Only (2) B and E Only
(3) C and E Only (4) C and D Only

Q9. JEE Main 2026 (28 January Shift 1)

In the given pentapeptide, find out an essential amino acid (Y) and the sequence present in the pentapeptide:



Choose the correct answer from the options given below:

(1)	(Y)	Sequence
	Serine	Ser-Asp-Thr-Ala-Gly

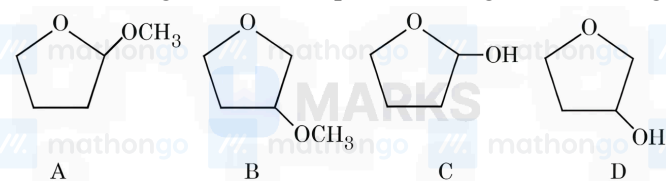
(2)	(Y)	Sequence
	Serine	Thr-Ser-Asp-Ala-Gly

(3)	(Y)	Sequence
	Threonine	Ser-Thr-Asp-Gly-Ala

(4)	(Y)	Sequence
	Threonine	Thr-Ser-Asp-Gly-Ala

Q10. JEE Main 2026 (24 January Shift 1)

A student is given one compound among the following compounds that gives positive test with Tollen's reagent.



The compound is :

(1) D

(2) A

(3) B

(4) C

ANSWERS AND SOLUTIONS

1. (1) 2. (4) 3. (3) 4. (3) 5. (4) 6. (1) 7. (4) 8. (1)
9. (4) 10. (4)

1. (1) Statement A is correct: Enzymes lower the activation energy barrier for reactions, making enzyme-catalyzed hydrolysis of sucrose have lower activation energy than acid-catalyzed hydrolysis.

Statement B is correct: Denaturation disrupts hydrogen bonds and hydrophobic interactions maintaining secondary and tertiary structures, but the covalent peptide bonds forming the primary structure remain intact.

Statement C is incorrect: Nucleotides are joined by phosphodiester linkages between the 3' and 5' carbons of adjacent sugar molecules, not between C1 and C4. Glycosidic linkages connect the nitrogenous base to the C1 carbon of the sugar.

Statement D is incorrect: Quaternary structure describes the arrangement of multiple polypeptide subunits; tertiary structure represents the overall folding of a single polypeptide chain.

Therefore only A and B are correct

2. (4) Tollen's reagent reacts with free aldehydes.

Structure A is a hemiacetal (reducing sugar) that exists in equilibrium with its open-chain aldehyde form, allowing it to react with Tollen's reagent.

Structure B is a glycoside (methyl glycoside or similar), where the anomeric carbon is locked in an acetal/ketal form with an $-OCH_3$ group, preventing ring opening and aldehyde formation, so it cannot react with Tollen's.

Structure C has a cyclic ether oxygen and lacks a free aldehyde group that can be generated under mild conditions, preventing reaction with Tollen's.

Structure D is a hemiacetal form of a reducing sugar with a free anomeric $-OH$, allowing equilibrium with the aldehyde form and reaction with Tollen's.

Structures B and C do not react with Tollen's reagent.

3. (3) Structure (3) given is of sucrose, which is a non-reducing sugar.

For a sugar to be non-reducing, it must have an acetal linkage (not a hemiacetal linkage).

In sucrose, both the anomeric carbons of glucose and fructose are involved in the glycosidic bond, so there is no free anomeric carbon available to open and act as a reducing agent.

The other three structures have at least one free hemiacetal group, making them reducing sugars.

Hence, the non-reducing sugar is structure (3).

4. (3) For tripeptides with 3 different amino acids (ala, gly, val) where no amino acid is used more than once, each tripeptide must contain all three amino acids exactly once. The number of distinct tripeptides is the number of permutations of 3 amino acids = $3! = 6$. These are: ala-gly-val, ala-val-gly, gly-ala-val, gly-val-ala, val-ala-gly, val-gly-ala.
5. (4) Glucose reactions: A + Hydroxylamine forms glucoxime (IV) via condensation with aldehyde group.
B + Br_2 water oxidizes aldehyde to carboxylic acid, forming gluconic acid (I).
C + Excess acetic anhydride acetylates all hydroxyl groups to form glucose pentaacetate (II).
D + Concentrated HNO_3 oxidizes both aldehyde and primary alcohol groups to form saccharic acid (III).
The correct matching is A-IV, B-I, C-II, D-III.
6. (1) Sucrose is dextrorotatory with a specific rotation of $+66.5^\circ$.
Upon hydrolysis, sucrose breaks down into an equimolar mixture of D-(+)-glucose and D-(-)-fructose.
The specific rotation of D-(+)-glucose is $+52.5^\circ$ (dextrorotatory).
The specific rotation of D-(-)-fructose is -92.4° (laevorotatory).
Since the magnitude of laevorotation of fructose (92.4°) is greater than the magnitude of dextrorotation of glucose (52.5°), the resulting mixture is laevorotatory. This process is called inversion of sugar.
Statement I is true because sucrose is dextrorotatory and its hydrolysis product is laevorotatory.
Statement II is false because it incorrectly claims that glucose is laevorotatory and fructose is dextrorotatory, and that the laevorotation of glucose is more than the dextrorotation of fructose. In reality, glucose is dextrorotatory and fructose is laevorotatory.
7. (4) DNA and RNA are chiral molecules due to their structural components. Both contain pentose sugars: DNA contains deoxyribose and RNA contains ribose. These are D-sugars with multiple chiral centers (at C_2 , C_3 , and C_4 in the furanose ring). The D-designation comes from the stereochemical configuration at the chiral center furthest from the carbonyl carbon. The chiral centers in these sugar moieties are the primary source of chirality in nucleic acids, making them optically active molecules. While the phosphate units and bases also contribute to molecular structure, the fundamental chirality arises from the D-sugar component.
8. (1) A. Arginine and Tryptophan are essential amino acids - True
B. Histidine contains imidazole ring (heterocyclic ring with N) - Statement is False
C. Proline has a 5-membered pyrrolidine ring, not 6-membered - False
D. Glycine ($\text{NH}_2 - \text{CH}_2 - \text{COOH}$) has no chiral center (α -carbon has two H atoms) - True
E. Cysteine side chain is $-\text{CH}_2 - \text{SH}$ (thiol). $\text{MeS} - \text{CH}_2 - \text{CH}_2 -$ is the side chain of Methionine, not Cysteine - False
Correct statements: A and D only
9. (4) Among the amino acids present (Serine, Aspartic acid, Glycine, Alanine, and Threonine), only Threonine is classified as an essential amino acid; the others are non-essential or conditionally essential. Therefore, Y = Threonine.

Examining the peptide sequence shown in the structure and cross-referencing with the provided options, the sequence is Thr-Ser-Asp-Gly-Ala from N-terminus to C-terminus.

The answer is option (4): Y is Threonine with sequence Thr-Ser-Asp-Gly-Ala.

10. (4) Tollen's reagent is a mild oxidizing agent that gives a positive test (silver mirror) with aldehydes and α -hydroxy ketones.

In cyclic structures, hemiacetals are in equilibrium with their open-chain hydroxy-aldehyde forms in aqueous solution, whereas acetals and ethers are stable and do not open up.

Compound A is a cyclic acetal (specifically a methyl glycoside type structure). It is stable and does not show Tollen's test.

Compound B is a cyclic ether with a methoxy group at a non-anomeric position. It is stable.

Compound C is a cyclic hemiacetal. The carbon attached to both the ring oxygen and the $-OH$ group is the hemiacetal carbon. In solution, it exists in equilibrium with its open-chain form which contains an aldehyde group: $HO-CH_2-CH_2-CH_2-CHO$. Therefore, it gives a positive Tollen's test.

Compound D is a cyclic ether with an alcohol group at a non-anomeric position. It does not have a hemiacetal linkage and will not give a positive Tollen's test.

Thus, the correct compound is C.