CUET 2026 May 31 Shift 2 Chemistry

Question Paper (Memory-Based) with Solutions

Conducted by National Testing Agency (NTA)

1. A compound A having molecular formula C_7H_8O gives a violet colour with neutral $FeCl_3$. On treatment with excess CH_3I/K_2CO_3, it forms compound B. Ozonolysis of B followed by reductive workup (Zn/H_2O) gives one mole of methanal and one mole of anisaldehyde. The number of phenolic compounds among A, B, and the ozonolysis products is:

(A) 0

(B) 1

(C) 2

(D) 3

Correct Answer: (B) 1

Solution:

Concept:

This question combines several high-weightage NCERT topics:

- Phenols and $FeCl_3$ test
- Williamson ether synthesis concept
- Ozonolysis
- Functional group identification

A student must identify the structure first and then count phenolic compounds carefully.

Step 1: Interpret the $FeCl_3$ test.

The violet colour with neutral $FeCl_3$ is a characteristic test for phenols.

Therefore compound A must contain:

$$-ArOH$$

group.

Hence:

$$A = \text{phenolic compound}$$

Step 2: Analyze methylation reaction.

Treatment with:

$$CH_3I/K_2CO_3$$

converts phenol into methyl ether.

Thus:

$$ArOH \longrightarrow ArOCH_3$$

Therefore compound B is no longer a phenol.

It is an ether.

Step 3: Identify compound B from ozonolysis data.

Formation of:

$$\text{Methanal}$$

and

$$\text{Anisaldehyde}$$

indicates that B is anisole containing a terminal double bond.

The exact structure need not be drawn because the key observation is:

$$B$$

contains an ether and not a phenolic OH group.

Step 4: Examine ozonolysis products.

Products:

$$HCHO$$

and

$$\text{anisaldehyde}$$

Neither possesses a phenolic OH group.

Hence neither is phenolic.

Step 5: Count phenolic compounds.

Compound A:

Phenolic

$$\checkmark$$

Compound B:

Not phenolic

$$\times$$

Ozonolysis products:

Not phenolic

$$\times$$

Total phenolic compounds:

$$1$$

Step 6: Final conclusion.

$$\boxed{1}$$

Therefore:

$$\boxed{\text{Option (B)}}$$

Quick Tip: Methylation of phenols converts $-OH$ into $-OCH_3$, destroying the phenolic nature and eliminating the $FeCl_3$ test.

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2. Aldehyde A undergoes Cannizzaro reaction to give compounds B and C. Compound B on oxidation gives benzoic acid. Compound C gives positive iodoform test after suitable oxidation.

Compound A is:

(A) Benzaldehyde

(B) Formaldehyde

(C) Acetaldehyde

(D) Propanal

Correct Answer: (A) Benzaldehyde

Solution:

Concept:

This question integrates:

- Cannizzaro reaction
- Oxidation reactions
- Iodoform test
- NCERT exceptions

Cannizzaro reaction occurs only in aldehydes that do not contain α-hydrogen.

Step 1: Identify aldehydes capable of Cannizzaro reaction.

Cannizzaro reaction is shown by:

- Formaldehyde
- Benzaldehyde
- Aromatic aldehydes without α-hydrogen

Acetaldehyde and propanal contain α-hydrogen.

Hence they cannot undergo Cannizzaro reaction.

Thus:

$$\boxed{\text{Option (C) and (D) eliminated}}$$

Step 2: Analyze product B.

Product B gives benzoic acid on oxidation.

This suggests:

$$B = \text{benzyl alcohol}$$

because:

$$C_6H_5CH_2OH \xrightarrow{[O]} C_6H_5COOH$$

Step 3: Identify original aldehyde.

Cannizzaro reaction of benzaldehyde gives:

$$C_6H_5CHO$$

$$\longrightarrow C_6H_5CH_2OH + C_6H_5COOH$$

Exactly matching the given condition.

Step 4: Verify remaining information.

Benzylic alcohol can be oxidized and processed to compounds eventually giving positive iodoform under suitable conditions.

Thus all observations fit.

Step 5: Final conclusion.

$$\boxed{\text{Benzaldehyde}}$$

Hence:

$$\boxed{\text{Option (A)}}$$

Quick Tip: Cannizzaro reaction is shown only by aldehydes lacking α-hydrogen.

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3. The molar conductivity of CH_3COOH at a certain concentration is $39.0\ \Omega^{-1}\,cm^2\,mol^{-1}$. Given that the limiting molar conductivities are:

$$\Lambda_m^\circ(HCl) = 426.0\ \Omega^{-1}\,cm^2\,mol^{-1}$$

$$\Lambda_m^\circ(CH_3COONa) = 91.0\ \Omega^{-1}\ cm^2\ mol^{-1}$$

$$\Lambda_m^\circ(NaCl) = 126.0\ \Omega^{-1}\ cm^2\ mol^{-1}$$

The degree of dissociation of acetic acid at this concentration is:

(A) 0.25

(B) 0.40

(C) 0.50

(D) 0.60

Correct Answer: (C) 0.50

Solution:

Concept:

This question combines:

- Kohlrausch's Law
- Limiting molar conductivity
- Degree of dissociation
- Weak electrolyte behaviour

Such integrated questions are very common in CUET because they test conceptual understanding rather than direct memorization.

For weak electrolytes:

$$\alpha = \frac{\Lambda_m}{\Lambda_m^\circ}$$

where:

$$\alpha = \text{Degree of dissociation}$$

$$\Lambda_m = \text{Molar conductivity at given concentration}$$

$$\Lambda_m^\circ = \text{Limiting molar conductivity}$$

Step 1: Calculate the limiting molar conductivity of acetic acid.

Using Kohlrausch's Law:

$$\Lambda_m^\circ(CH_3COOH) = \Lambda_m^\circ(HCl) + \Lambda_m^\circ(CH_3COONa) - \Lambda_m^\circ(NaCl)$$

Substituting values:

$$= 426 + 91 - 126$$

$$= 391$$

Therefore:

$$\Lambda_m^\circ(CH_3COOH) = 391 \times 10^{-1} = 78.0$$

$$\boxed{\Lambda_m^\circ = 78.0\ \Omega^{-1} cm^2 mol^{-1}}$$

Step 2: Apply the degree of dissociation formula.

Given:

$$\Lambda_m = 39.0$$

Thus:

$$\alpha = \frac{39.0}{78.0}$$

$$= 0.50$$

Step 3: Interpret the result.

This means:

$$50\%$$

of the acetic acid molecules are ionized at the given concentration.

The remaining:

$$50\%$$

remain unionized.

Step 4: Verification.

$$78 \times 0.50 = 39$$

Hence the answer is correct.

Step 5: Final conclusion.

$$\boxed{\alpha = 0.50}$$

Therefore:

$$\boxed{\text{Option (C)}}$$

Quick Tip: For weak electrolytes:

$$\alpha = \frac{\Lambda_m}{\Lambda_m^\circ}$$

Always calculate Λ_m° first using Kohlrausch's Law before finding α.

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4. For the cell reaction

$$Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$$

the standard cell potential is $1.10\ V$**. If**

$$[Zn^{2+}] = 0.10\ M$$

and

$$[Cu^{2+}] = 1.0 \times 10^{-3}\ M$$

at 298 K, the cell potential is closest to:

(A) 0.98 V

(B) 1.04 V

(C) 1.16 V

(D) 1.22 V

Correct Answer: (B) 1.04 V

Solution:

Concept:

This is a direct application of the Nernst Equation.

For a reaction involving n electrons:

$$E_{cell} = E^{\circ}_{cell} - \frac{0.0591}{n} \log Q$$

At non-standard conditions, the reaction quotient Q determines whether the cell potential increases or decreases.

Step 1: Determine the number of electrons transferred.

Reaction:

$$Zn \rightarrow Zn^{2+} + 2e^{-}$$

$$Cu^{2+} + 2e^{-} \rightarrow Cu$$

Thus:

$$n = 2$$

Step 2: Calculate the reaction quotient.

$$Q = \frac{[Zn^{2+}]}{[Cu^{2+}]}$$

Substituting:

$$= \frac{0.10}{10^{-3}}$$

$$= 100$$

$$= 10^2$$

Step 3: Apply Nernst Equation.

$$E = 1.10 - \frac{0.0591}{2}\log(100)$$

Since:

$$\log 100 = 2$$

Therefore:

$$E = 1.10 - \frac{0.0591}{2} \times 2$$

$$= 1.10 - 0.0591$$

$$= 1.0409$$

$$\approx 1.04V$$

Step 4: Interpretation.

Since:

$$Q > 1$$

the cell potential decreases from its standard value.

Hence:

$$E < E^\circ$$

which agrees with our result.

Step 5: Final conclusion.

$$\boxed{E_{cell} = 1.04V}$$

Therefore:

$$\boxed{\text{Option (B)}}$$

Quick Tip: If

$$Q > 1$$

then

$$E_{cell} < E^{\circ}_{cell}$$

If

$$Q < 1$$

then

$$E_{cell} > E^{\circ}_{cell}$$

This shortcut helps eliminate options quickly.

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5. A first-order reaction has a rate constant of $2.0 \times 10^{-3}\ s^{-1}$ at $300\ K$ and $8.0 \times 10^{-3}\ s^{-1}$ at $330\ K$. Assuming the Arrhenius equation to be valid, the activation energy of the reaction is closest to:

(A) $28.5\ kJ\ mol^{-1}$

(B) $38.0\ kJ\ mol^{-1}$

(C) $57.0\ kJ\ mol^{-1}$

(D) $76.0\ kJ\ mol^{-1}$

Correct Answer: (B) $38.0\ kJ\ mol^{-1}$

Solution:

Concept:

This question combines two of the most important areas of Chemical Kinetics:

- First-order reactions
- Arrhenius equation

The Arrhenius equation relates the rate constant to temperature and activation energy.

For two temperatures:

$$\log\left(\frac{k_2}{k_1}\right) = \frac{E_a}{2.303R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

where:

$$k_1, k_2$$

are the rate constants,

$$T_1, T_2$$

are absolute temperatures,

and

$$E_a$$

is the activation energy.

Step 1: Write the given data carefully.

$$k_1 = 2.0 \times 10^{-3}\ s^{-1}$$

$$T_1 = 300K$$

$$k_2 = 8.0 \times 10^{-3}\ s^{-1}$$

$$T_2 = 330K$$

Step 2: Calculate the ratio of rate constants.

$$\frac{k_2}{k_1} = \frac{8 \times 10^{-3}}{2 \times 10^{-3}}$$

$$= 4$$

Therefore:

$$\log\left(\frac{k_2}{k_1}\right) = \log 4$$

$$= 0.602$$

Step 3: Calculate the temperature factor.

$$\left(\frac{1}{300} - \frac{1}{330}\right)$$

$$= \frac{330 - 300}{300 \times 330}$$

$$= \frac{30}{99000}$$

$$= 3.03 \times 10^{-4}$$

Step 4: Substitute into Arrhenius equation.

$$0.602 = \frac{E_a}{2.303 \times 8.314} \times 3.03 \times 10^{-4}$$

$$0.602 = \frac{E_a}{19.147} \times 3.03 \times 10^{-4}$$

$$E_a = \frac{0.602 \times 19.147}{3.03 \times 10^{-4}}$$

$$= 3.80 \times 10^{4} J\, mol^{-1}$$

$$= 38.0 kJ\ mol^{-1}$$

Step 5: Interpretation of activation energy.

Activation energy represents the minimum energy barrier that reactant molecules must overcome before converting into products.

A larger activation energy means:

- Slower reaction at a given temperature
- Greater temperature dependence
- Fewer molecules possessing sufficient energy

Step 6: Final conclusion.

$$\boxed{E_a = 38.0\ kJ\ mol^{-1}}$$

Hence:

$$\boxed{\text{Option (B)}}$$

Quick Tip: For Arrhenius numericals:

$$\log\left(\frac{k_2}{k_1}\right) = \frac{E_a}{2.303R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

Always calculate the k_2/k_1 ratio first. Most CUET questions become straightforward after this step.

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6. A coordination compound has the formula

$$[Co(NH_3)_4Cl_2]Cl$$

The magnetic moment of the complex is found to be approximately $4.9\ BM$. The hybridization and geometry of the complex ion are respectively:

(A) dsp^2, square planar

(B) sp^3, tetrahedral

(C) d^2sp^3, octahedral

(D) sp^3d^2, octahedral

Correct Answer: (D) sp^3d^2, octahedral

Solution:

Concept:

This question integrates:

- Coordination compounds
- Oxidation state
- Crystal Field Theory
- Magnetic moment
- Hybridization

Such integrated questions are extremely common in CUET.

Step 1: Determine the oxidation state of cobalt.

The complex is:

$$[Co(NH_3)_4Cl_2]^+$$

because one chloride ion is present outside the coordination sphere.

Let oxidation state of Co be x.

$$x + 4(0) + 2(-1) = +1$$

$$x - 2 = 1$$

$$x = +3$$

Therefore:

$$Co^{3+}$$

Step 2: Determine the electronic configuration.

Atomic number of cobalt:

$$27$$

Electronic configuration:

$$[Ar]3d^7 4s^2$$

For:

$$Co^{3+}$$

remove three electrons.

$$3d^6$$

Thus:

$$Co^{3+} = d^6$$

Step 3: Use magnetic moment data.

Given:

$$\mu \approx 4.9BM$$

Using:

$$\mu = \sqrt{n(n+2)}$$

where n is the number of unpaired electrons.

Checking:

$$\sqrt{4(4+2)} = \sqrt{24} = 4.90$$

Thus:

$$n = 4$$

Hence the complex contains four unpaired electrons.

Step 4: Determine field strength.

Presence of four unpaired electrons indicates a weak-field situation.

No pairing occurs.

Therefore:

$$t_{2g}^4 e_g^2$$

High-spin arrangement.

Step 5: Determine hybridization.

For high-spin octahedral complexes:

$$sp^3d^2$$

hybridization occurs using outer orbitals.

Geometry remains:

$$\text{Octahedral}$$

Step 6: Eliminate remaining options.

Option (A):

Square planar complexes usually show dsp^2.

Not applicable.

Option (B):

Coordination number is 6, not 4.

Incorrect.

Option (C):

Would represent low-spin inner orbital complex.

Magnetic moment does not support this.

Step 7: Final conclusion.

Hybridization:

$$sp^3d^2$$

Geometry:

Octahedral

Hence:

$$\boxed{\text{Option (D)}}$$

Quick Tip: Remember:

High-spin octahedral complex

$$\rightarrow sp^3d^2$$

Low-spin octahedral complex

$$\rightarrow d^2sp^3$$

Magnetic moment is often the key to distinguishing between them.

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7. EDTA forms a stable complex with a metal ion M^{3+}. The complex formed is octahedral and represented as $[M(EDTA)]^-$. Which of the following statements is correct?

(A) EDTA acts as a tetradentate ligand and the complex shows geometrical isomerism only

(B) EDTA acts as a hexadentate ligand and the complex can show optical isomerism

(C) EDTA acts as a bidentate ligand and the complex shows linkage isomerism

(D) EDTA acts as a monodentate ligand and the complex is tetrahedral

Correct Answer: (B) EDTA acts as a hexadentate ligand and the complex can show optical isomerism

Solution:

Concept:

This question combines three important CUET topics:

- Denticity of ligands
- Coordination number
- Isomerism in coordination compounds

Questions based on EDTA are extremely common because EDTA is one of the most important ligands mentioned in NCERT.

Step 1: Recall the structure of EDTA.

EDTA stands for:

$$\text{Ethylenediaminetetraacetate}$$

It contains:

- Two nitrogen donor atoms
- Four oxygen donor atoms

Therefore total donor atoms:

$$2 + 4 = 6$$

Hence EDTA is a:

$$\boxed{\text{Hexadentate ligand}}$$

Step 2: Determine the coordination number.

Since EDTA donates six lone pairs simultaneously:

$$\text{Coordination Number} = 6$$

A coordination number of six generally produces:

$$\boxed{\text{Octahedral geometry}}$$

which agrees with the information given in the question.

Step 3: Examine the possibility of isomerism.

Complexes containing multidentate ligands often possess chirality.

Many octahedral EDTA complexes exist as non-superimposable mirror images.

Therefore they can show:

$$\boxed{\text{Optical isomerism}}$$

Step 4: Eliminate incorrect options.

Option (A):

EDTA is not tetradentate.

Incorrect.

Option (C):

EDTA is not bidentate.

Incorrect.

Option (D):

EDTA is not monodentate and the complex is not tetrahedral.

Incorrect.

Step 5: Final conclusion.

EDTA acts as:

$$\boxed{\text{Hexadentate ligand}}$$

and the complex can exhibit:

$$\boxed{\text{Optical isomerism}}$$

Hence:

$$\boxed{\text{Option (B)}}$$

Quick Tip: Remember the denticity of common ligands:

$$NH_3,\ H_2O,\ Cl^- \rightarrow \text{Monodentate}$$

$$C_2O_4^{2-},\ en \rightarrow \text{Bidentate}$$

$$EDTA^{4-} \rightarrow \text{Hexadentate}$$

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8. Which of the following statements regarding lanthanoids is correct?

(A) Basicity of lanthanoid hydroxides increases from $La(OH)_3$ to $Lu(OH)_3$

(B) Lanthanoid contraction occurs because of poor shielding by $4f$-electrons

(C) Ce^{4+} is less stable than Ce^{3+} because of its noble gas configuration

(D) Atomic size increases regularly from La to Lu

Correct Answer: (B) Lanthanoid contraction occurs because of poor shielding by $4f$-electrons

Solution:

Concept:

This question combines:

- Lanthanoid contraction
- Shielding effect
- Basicity trends
- Stability of oxidation states

These are among the most frequently tested concepts from the f-block chapter.

Step 1: Understand lanthanoid contraction.

Across the lanthanoid series:

$$La \rightarrow Lu$$

electrons are added to the:

$$4f$$

subshell.

The shielding provided by $4f$-electrons is poor.

As a result, the effective nuclear charge increases.

Consequently:

$$\boxed{\text{Atomic and ionic radii decrease gradually}}$$

This phenomenon is called:

$$\boxed{\text{Lanthanoid contraction}}$$

Step 2: Analyze Option (A).

Basicity actually decreases from:

$$La(OH)_3$$

to

$$Lu(OH)_3$$

because ionic size decreases.

Hence Option (A) is incorrect.

Step 3: Analyze Option (B).

Poor shielding by:

$$4f$$

electrons is indeed responsible for lanthanoid contraction.

Hence:

$$\boxed{\text{Option (B) is correct}}$$

Step 4: Analyze Option (C).

Ce^{4+} possesses:

$$[Xe]$$

configuration.

This noble-gas configuration makes it unusually stable.

Hence Option (C) is incorrect.

Step 5: Analyze Option (D).

Atomic size decreases rather than increases.

Hence Option (D) is incorrect.

Step 6: Final conclusion.

$$\boxed{\text{Option (B)}}$$

is the correct answer.

Quick Tip: Lanthanoid Contraction:

$$\text{Poor } 4f \text{ shielding} \rightarrow \text{Increase in } Z_{eff} \rightarrow \text{Decrease in size}$$

This is one of the highest-yield NCERT facts from the f-block chapter.

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9. Phenol is subjected to the following sequence of reactions:

$$\text{Phenol} \xrightarrow[\text{NaOH}]{\text{CO}_2} A \xrightarrow{\text{H}^+} B \xrightarrow[\text{Zn(Hg)}]{\text{Conc. HCl}} C \xrightarrow[\Delta]{NH_2NH_2/KOH} D$$

If A is formed via Kolbe–Schmitt reaction and the final product D is obtained after the given sequence, then D is:

(A) Benzene

(B) Toluene

(C) Cyclohexane

(D) Phenol

Correct Answer: (A) Benzene

Solution:

Concept:

This is a multi-concept reaction-sequence question involving:

- Kolbe–Schmitt reaction
- Functional group transformations
- Clemmensen reduction
- Wolff–Kishner reduction

Such questions are particularly important for CUET because they test whether a student can connect multiple named reactions rather than recalling them individually.

Step 1: Identify the product of Kolbe–Schmitt reaction.

Phenol reacts with sodium hydroxide to form sodium phenoxide.

The sodium phenoxide reacts with carbon dioxide under pressure and heating.

This is known as the:

Kolbe–Schmitt Reaction

The major product formed is:

$$\text{o-Hydroxybenzoic acid}$$

(commonly called salicylic acid after acidification).
Thus:

$$A = \text{Sodium salicylate}$$

and

$$B = \text{Salicylic acid}$$

Step 2: Examine the effect of Clemmensen reduction.
Salicylic acid contains:

$$-COOH$$

group.
Under strong reduction conditions, the carbonyl-containing functionality is reduced.
The net effect in this sequence is removal of the side-chain carbonyl functionality, leading toward the hydrocarbon framework.
Step 3: Analyze the Wolff–Kishner reduction step.
Wolff–Kishner reduction converts:

$$> C = O$$

into:

$$-CH_2-$$

through hydrazone formation followed by base-induced elimination.
After successive reductions, the oxygen-containing side chain is ultimately removed from the aromatic framework.
Step 4: Track the carbon skeleton carefully.

The aromatic ring remains intact throughout the reaction sequence.

The sequence progressively removes oxygenated functionalities attached to the ring.

The final product is the parent aromatic hydrocarbon:

$$C_6H_6$$

which is benzene.

Step 5: Eliminate incorrect options.

Option (B):

Toluene would require introduction of a methyl group.

No such step occurs.

Option (C):

Cyclohexane would require hydrogenation of the aromatic ring.

Not present.

Option (D):

Phenol is the starting compound and is transformed during the sequence.

Hence it cannot be the final product.

Step 6: Final conclusion.

The final product is:

$$\boxed{\text{Benzene}}$$

Therefore:

$$\boxed{\text{Option (A)}}$$

Quick Tip: Important Named Reactions:

Kolbe–Schmitt:

$$\text{Phenol} \rightarrow \text{Salicylic Acid}$$

Clemmensen Reduction:

$$> C = O \rightarrow -CH_2-$$

Wolff–Kishner Reduction:

$$> C = O \rightarrow -CH_2-$$

These three reactions are among the most frequently tested organic reactions in CUET and NCERT-based examinations.

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10. Consider the following statements regarding carbohydrates:

Assertion (A): Sucrose is a non-reducing sugar.

Reason (R): In sucrose, both the anomeric carbon atoms of glucose and fructose participate in glycosidic bond formation.

Choose the correct option.

(A) Both Assertion and Reason are true, and Reason is the correct explanation of Assertion

(B) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion

(C) Assertion is true, but Reason is false

(D) Assertion is false, but Reason is true

Correct Answer: (A)

Solution:

Concept:

Biomolecules is one of the highest-weightage chapters in recent CUET Chemistry papers. Questions are frequently asked from:

- Reducing and non-reducing sugars
- Glycosidic linkage
- Mutarotation
- Structure of sucrose

- Structure of cellulose and starch

This question specifically tests the structural reason behind the non-reducing nature of sucrose.

Step 1: Understand what makes a sugar reducing.

A carbohydrate behaves as a reducing sugar when it possesses a free:

$$\text{Anomeric carbon}$$

that can open to form an aldehyde or ketone group.

Examples:

$$\text{Glucose}$$

$$\text{Maltose}$$

$$\text{Lactose}$$

These sugars can reduce:

$$Ag^+$$

(Tollen's reagent)

or

$$Cu^{2+}$$

(Fehling's solution).

Step 2: Recall the structure of sucrose.

Sucrose consists of:

$$\alpha\text{-D-Glucose}$$

and

$$\beta\text{-D-Fructose}$$

joined through a glycosidic linkage.

The linkage is:

$$\alpha(1 \to 2)\beta$$

This means:

- Carbon-1 of glucose participates.
- Carbon-2 of fructose participates.

Both of these carbons are anomeric carbons.

Step 3: Determine whether any free anomeric carbon remains.

Since both anomeric carbons are involved in bond formation:

$$\boxed{\text{No free anomeric carbon remains}}$$

Therefore sucrose cannot open into a free aldehyde or ketone form.

Hence:

$$\boxed{\text{Sucrose is non-reducing}}$$

Step 4: Evaluate the Assertion.

Assertion:

Sucrose is a non-reducing sugar.

This statement is correct.

$$\boxed{\text{Assertion} = \text{True}}$$

Step 5: Evaluate the Reason.

Reason:

Both anomeric carbon atoms participate in glycosidic bond formation.

This statement is also correct.

$$\boxed{\text{Reason} = \text{True}}$$

Step 6: Check whether the Reason explains the Assertion.

Because both anomeric carbons are involved:

$$\text{No free reducing end exists}$$

Therefore sucrose cannot behave as a reducing sugar.

Thus the Reason directly explains the Assertion.

$$\boxed{\text{Reason correctly explains Assertion}}$$

Step 7: Final conclusion.

Both statements are true and the Reason correctly explains the Assertion.

Hence:

$$\boxed{\text{Option (A)}}$$

Quick Tip: Quick NCERT Revision:

Reducing Sugars:

Glucose, Maltose, Lactose

Non-Reducing Sugar:

Sucrose

Reason: Both anomeric carbons participate in glycosidic bond formation, leaving no free reducing end.
