

Q1. JEE Main 2026 (21 January Shift 2)

Match List - I with List - II.

List - I

Reagents

A. H_2 , Pd — $BaSO_4$ B. $SnCl_2$, HClC. CrO_2Cl_2 , CS_2 D. CO, HCl, Anhyd. $AlCl_3$

List - II

Reaction Name (Involving aldehydes)

I. Etard Reaction

II. Rosenmund Reduction

III. Gatterman - Koch Reaction

IV. Stephen Reaction

Choose the correct answer from the options given below :

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

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

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

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

Q2. JEE Main 2026 (23 January Shift 1)

'x' is the product which is obtained from propanenitrile and stannous chloride in the presence of hydrochloric acid followed by hydrolysis. 'y' is the product which is obtained from the but-2-ene by the ozonolysis followed by hydrolysis. From the following, which product is not obtained when one mole of 'x' and one mole of 'y' react with each other in the presence of alkali followed by heating?

(1) 2-Methylpent-2-enal

(2) Pent-2-enal

(3) 2-Methylbut-2-enal

(4) 3-Methylbut-2-enal

Q3. JEE Main 2026 (24 January Shift 2)

Given below are two statements:

Statement I: Cross aldol condensation between two different aldehydes will always produce four different products.**Statement II:** When semicarbazide reacts with a mixture of benzaldehyde and acetophenone under optimum pH, it forms a condensation product with acetophenone only.

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

(1) Statement I is false but Statement II is true

(2) Both Statement I and Statement II are false

(3) Both Statement I and Statement II are true

(4) Statement I is true but Statement II is false

Q4. JEE Main 2026 (22 January Shift 2)

The compound A, $C_8H_8O_2$ reacts with acetophenone to form a single product via cross-Aldol condensation. The compound A on reaction with conc. NaOH forms a substituted benzyl alcohol as one of the two products. The compound A is :

(1) 2-hydroxy acetophenone

(2) 4-methyl benzoic acid

(3) 4-methoxy benzaldehyde

(4) 4-hydroxy benzaldehyde

Q5. JEE Main 2026 (22 January Shift 1)

Match the LIST-I with LIST-II

	List-I (Reagents)		List-II (Name of reaction involving carbonyl compounds)
A.	$\text{NH}_2\text{--NH}_2$, KOH	I.	Tollen's Test
B.	$\text{Ag}(\text{NH}_3)_2\text{OH}$	II.	Clemmensen Reduction
C.	Aq. CuSO_4 , Sodium potassium tartarate, KOH	III.	Wolff--Kishner Reduction
D.	Zn--Hg , HCl	IV.	Fehling's Test

Choose the correct answer from the options given below:

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

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

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

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

Q6. JEE Main 2026 (23 January Shift 2)

Which of the following statements are TRUE about Haloform reaction?:

A. Sodium hypochlorite reacts with KI to give KOI.

B. KOI is a reducing agent.

C. α, β -unsaturated methylketone $\left(\text{CH}_3 - \text{CH} = \text{CH} - \overset{\text{O}}{\parallel} - \text{CH}_3\right)$ will give iodoform reaction.

D. Isopropyl alcohol will not give iodoform test.

E. Methanoic acid will give positive iodoform test.

Choose the correct answer from the options given below:

(1) A, C & E Only

(2) B, D & E Only

(3) A & C Only

(4) A, B & C Only

Q7. JEE Main 2026 (23 January Shift 2)

Iodoform test can differentiate between

A. Methanol and Ethanol

B. CH_3COOH and $\text{CH}_3\text{CH}_2\text{COOH}$

C. Cyclohexene and cyclohexanone

D. Diethyl ether and Pentan-3-one

E. Anisole and acetone

Choose the correct answer from the options given below:

(1) B, C & E Only

(2) A & D Only

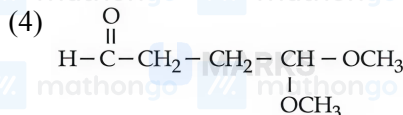
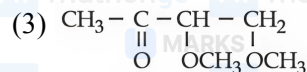
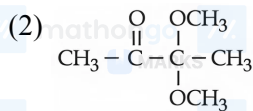
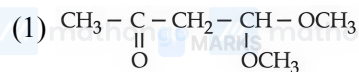
(3) A & E Only

(4) A, B & E Only

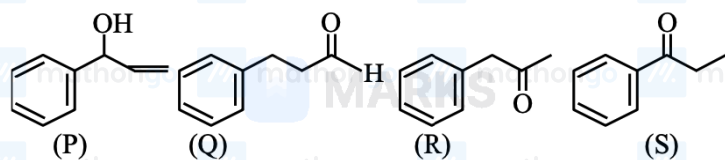
Q8. JEE Main 2026 (21 January Shift 1)

An organic compound "P" of molecular formula $C_6H_{12}O_3$ gives positive Iodoform test but negative Tollen's test.

When "P" is treated with dilute acid, it produces "Q". "Q" gives positive Tollen's test and also iodoform test. The structure of "P" is :

**Q9. JEE Main 2026 (28 January Shift 1)**

Given below are the four isomeric compounds (P, Q, R, S)



Identify correct statements from below.

- A. Q, R and S will give precipitate with 2, 4 – DNP.
B. P and Q will give positive Bayer's test.
C. Q and R will give sooty flame.
D. R and S will give yellow precipitate with $I_2/NaOH$.
E. Q alone will deposit silver with Tollen's reagent Choose the correct option.

(1) A, B, D and E only

(2) A and E only

(3) C and E only

(4) A, C and E only

ANSWERS AND SOLUTIONS

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

1. (2) Matching reagents with aldehyde reaction types:

A (H_2 , Pd-BaSO₄) is the Lindlar/Rosenmund catalyst used in Rosenmund Reduction to convert acyl chlorides to aldehydes, matching with II.

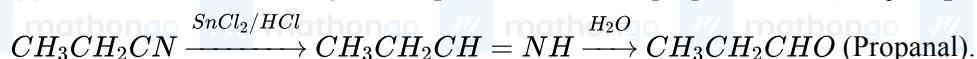
B ($SnCl_2$, HCl) is used in Stephen Reaction where nitriles are converted to aldehydes via imine intermediate, matching with IV.

C (CrO_2Cl_2 , CS₂) is Jones-like reagent used in Etard Reaction for oxidizing methyl groups on aromatic rings to aldehydes, matching with I.

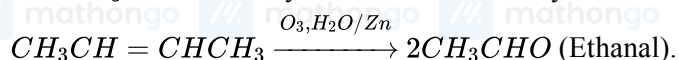
D (CO, HCl, Anhyd. AlCl₃) is the Gatterman-Koch Reaction which directly converts benzene to benzaldehyde using CO and AlCl₃ catalyst, matching with III.

Therefore the correct matching is A-II, B-IV, C-I, D-III

2. (4) Product x is obtained by the Stephen reduction of propanenitrile (CH_3CH_2CN).



Product y is obtained by the reductive ozonolysis of but-2-ene ($CH_3CH=CHCH_3$).



When propanal (x) and ethanal (y) react in the presence of alkali followed by heating, they undergo cross-aldol condensation.

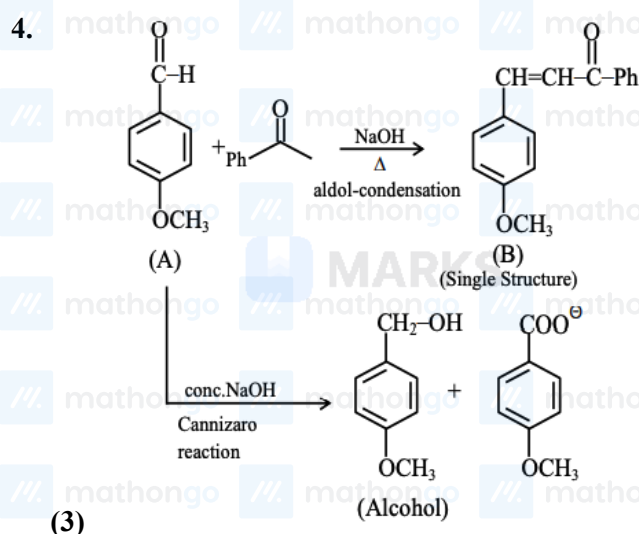
Possible products are:

- Self-aldol of propanal: $CH_3CH_2CHO + CH_3CH_2CHO \rightarrow CH_3CH_2CH=C(CH_3)CHO$ (2-Methylpent-2-enal).
- Self-aldol of ethanal: $CH_3CHO + CH_3CHO \rightarrow CH_3CH=CHCHO$ (But-2-enal).
- Cross-aldol (Ethanal as nucleophile): $CH_3CH_2CHO + CH_3CHO \rightarrow CH_3CH_2CH=CHCHO$ (Pent-2-enal).
- Cross-aldol (Propanal as nucleophile): $CH_3CHO + CH_3CH_2CHO \rightarrow CH_3CH=C(CH_3)CHO$ (2-Methylbut-2-enal).

Comparing with the options, 3-Methylbut-2-enal is not formed in any of these reactions.

3. (2) Statement I: Cross aldol condensation between two different aldehydes produces four products only if both aldehydes have α -hydrogen atoms. If one aldehyde lacks α -hydrogen (e.g., benzaldehyde and acetaldehyde), only two products are typically formed (one self and one cross). If neither has α -hydrogen, no aldol condensation occurs. Thus, it does not 'always' produce four products. Statement I is false.

Statement II: Benzaldehyde is an aldehyde and acetophenone is a ketone. Aldehydes are generally more reactive than ketones towards nucleophilic addition reactions due to less steric hindrance and greater electronic deficiency of the carbonyl carbon. Therefore, semicarbazide will react faster with benzaldehyde than with acetophenone. The statement claiming it forms a product with acetophenone only is incorrect. Statement II is false.



(On cross aldol reaction, a single structure is obtained but it can show geometrical isomerism).

5. (3) The matching of reagents with their respective named reactions is as follows:
- A. $NH_2 - NH_2, KOH$ (Hydrazine in basic medium) is the reagent for Wolff-Kishner Reduction, which reduces carbonyl groups to alkanes. So, A matches with III.
 - B. $[Ag(NH_3)_2]OH$ (Ammoniacal silver nitrate) is Tollen's reagent used for Tollen's Test to identify aldehydes. So, B matches with I.
 - C. Aqueous $CuSO_4$ (Fehling's A) and Sodium potassium tartarate in KOH (Fehling's B) are the components of Fehling's solution used for Fehling's Test. So, C matches with IV.
 - D. $Zn - Hg, HCl$ (Zinc amalgam in concentrated hydrochloric acid) is the reagent for Clemmensen Reduction, which reduces carbonyl groups to alkanes. So, D matches with II.
- The correct matching is A-III, B-I, C-IV, D-II.

6. (3) In the haloform reaction:

- (A) Sodium hypochlorite reacts with KI in acidic medium to generate the active halogenating species, forming KOI (potassium iodite/hypoidite). TRUE.
- (B) KOI serves as an oxidizing agent (not reducing) in the reaction, converting methyl ketones to carboxylic acids. FALSE.

(C) α, β -unsaturated methylketones possess the essential methyl ketone group ($\text{CH}_3\text{CO}-$) required for haloform reaction, allowing iodination and subsequent cleavage. TRUE.

(D) Isopropyl alcohol ($(\text{CH}_3)_2\text{CHOH}$) lacks a methyl ketone group, so it cannot undergo the haloform reaction. TRUE.

(E) Formic acid has no methyl ketone functionality, preventing haloform test. FALSE.

Therefore, statements A and C are true.

7. (3) The iodoform test is given by compounds containing the methyl ketone group ($\text{CH}_3\text{CO}-$) or alcohols that can be oxidized to methyl ketones ($\text{CH}_3\text{CH}(\text{OH})-$).

A. Methanol (CH_3OH) does not give the test, while Ethanol ($\text{CH}_3\text{CH}_2\text{OH}$) gives a positive iodoform test because it contains the $\text{CH}_3\text{CH}(\text{OH})-$ group. Thus, they can be differentiated.

B. Acetic acid (CH_3COOH) and Propanoic acid ($\text{CH}_3\text{CH}_2\text{COOH}$) both do not give the iodoform test. Carboxylic acids generally do not respond to this test. Thus, they cannot be differentiated.

C. Cyclohexene and cyclohexanone both do not give the iodoform test. Cyclohexanone lacks a methyl group adjacent to the carbonyl carbon. Thus, they cannot be differentiated.

D. Diethyl ether ($\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$) and Pentan-3-one ($\text{CH}_3\text{CH}_2\text{COCH}_2\text{CH}_3$) both do not give the iodoform test. Thus, they cannot be differentiated.

E. Anisole ($\text{C}_6\text{H}_5\text{OCH}_3$) does not give the test, while Acetone (CH_3COCH_3) gives a positive iodoform test as it is a methyl ketone. Thus, they can be differentiated.

Therefore, iodoform test can differentiate pairs A and E.

8. (1) P gives positive iodoform (has $\text{CH}_3\text{CO}-$) but negative Tollen's (no $-\text{CHO}$).

Q (after acid hydrolysis) gives both tests, meaning Q has both $\text{CH}_3\text{CO}-$ and $-\text{CHO}$.

This indicates P has an acetal protecting an aldehyde group.

Option (1): $\text{CH}_3 - \text{CO} - \text{CH}_2 - \text{CH}(\text{OCH}_3)_2$

Has $\text{CH}_3\text{CO}- \rightarrow$ positive iodoform

Has acetal $-\text{CH}(\text{OCH}_3)_2$, no free aldehyde $\rightarrow$ negative Tollen's

Hydrolysis: $-\text{CH}(\text{OCH}_3)_2 \xrightarrow{\text{H}^+/\text{H}_2\text{O}} -\text{CHO}$

$\text{Q} = \text{CH}_3 - \text{CO} - \text{CH}_2 - \text{CHO}$ gives both iodoform and Tollen's test

Molecular formula: $\text{C}_6\text{H}_{12}\text{O}_3$

9. (4) (A) Q, R, S all three give 2, 4 DNP test as they have Aldehyde/ketone group

(C) Q & R gives sooty flame

(E) Q gives Tollens reagent test