

# Aldehyde and Ketone

## Question1

Identify the reagent used for Rosenmund reduction.

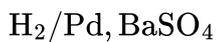
MHT CET 2025 5th May Evening Shift

Options:

A.



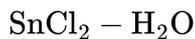
B.



C.



D.



**Answer: B**

**Solution:**

Acyl chloride is reduced to corresponding aldehyde by hydrogen using a palladium catalyst poisoned with barium sulfate. This reaction is known as Rosenmund reduction.

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## Question2

Identify the reaction so that carbonyl group of aldehydes and ketones is reduced to methylene group on treatment with Zinc-



**amalgam and concentrated hydrochloric acid.**

## **MHT CET 2025 5th May Evening Shift**

**Options:**

A.

Wolf-Kishner reduction.

B.

Stephan reaction.

C.

Clemmensen reduction.

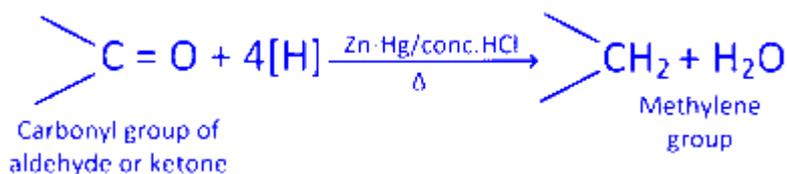
D.

Etard reaction.

**Answer: C**

**Solution:**

In Clemmensen reduction, oxygen is replaced by two hydrogen atoms. It can be given as follows:



### **Question3**

**Which of the following on reaction with Grignards reagent followed by hydrolysis forms tertiary alcohol?**

## **MHT CET 2025 5th May Evening Shift**

**Options:**

A.

Methanal

B.

Ethanal

C.

Propanal

D.

Propanone

**Answer: D**

**Solution:**

On reaction with Grignard's reagent followed by hydrolysis, methanal gives primary alcohol, other aldehydes (ethanal, propanal) give secondary alcohols while ketones (propanone) give tertiary alcohol.

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## Question4

**Identify the product formed when Hex-3-enitrile is reduced with diisobutylaluminium hydride followed by acid hydrolysis?**

### MHT CET 2025 26th April Evening Shift

**Options:**

A.

Hexanal

B.

Hexan-3-one

C.

Hex-3-enal

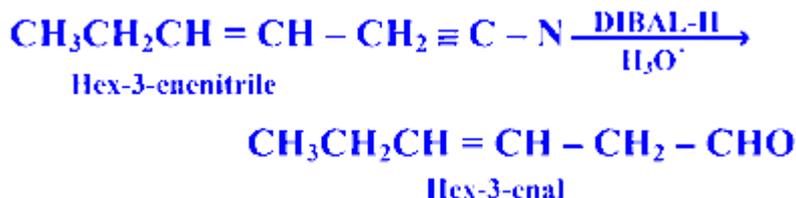
D.

Hexanoic acid

**Answer: C**

**Solution:**

Nitriles are reduced by diisobutylaluminium hydride (DIBAL-H) or  $\text{AlH}(\text{i-Bu})_2$  to imines followed by acid hydrolysis to form aldehydes.



## Question 5

Identify the products of following reaction?



**MHT CET 2025 26th April Morning Shift**

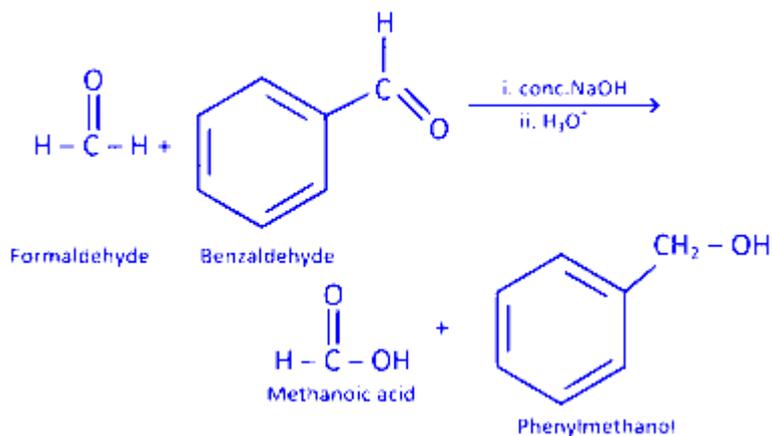
**Options:**

- A. Phenylmethanol and methanol
- B. Methanol and benzoic acid
- C. Methanoic acid and phenylmethanol
- D. Methanoic acid and benzoic acid

**Answer: C**

**Solution:**





## Question6

Which of the following does **NOT** exhibit haloform reaction?

**MHT CET 2025 26th April Morning Shift**

**Options:**

- A. Ethanal
- B. Propanal
- C. Propanone
- D. Butanone

**Answer: B**

**Solution:**

Haloform reaction is given by acetaldehyde, all methyl ketones ( $\text{CH}_3 - \text{CO} - \text{R}$ ) and alcohols containing  $\text{CH}_3(\text{CHOH}) - \text{R}/\text{H}$  group. Propanal ( $\text{CH}_3\text{CH}_2\text{CHO}$ ) does not have  $\text{CH}_3\text{CO}$  - group and hence does not give haloform reaction. Iodoform test is given by methyl aldehydes, methyl ketones and methyl carbinols.

## Question7

Which of the following is used as reagent in Etard reaction?

## MHT CET 2025 25th April Evening Shift

### Options:

- A. Chromium chloride
- B. Chromyl chloride
- C. Chromium oxide
- D. Chromic acid

**Answer: B**

### Solution:

Methyl group in methyl benzene (or methyl arene) is oxidized by oxidizing agent chromyl chloride in carbon disulfide as solvent, to form a chromium complex, from which the corresponding benzaldehyde is obtained on acid hydrolysis. This reaction is known as Etard reaction.

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## Question8

**Identify the name of reaction if carbonyl group of aldehydes and ketones is reduced to methylene group on treatment with hydrazine followed by heating with sodium hydroxide in ethylene glycol.**

## MHT CET 2025 25th April Morning Shift

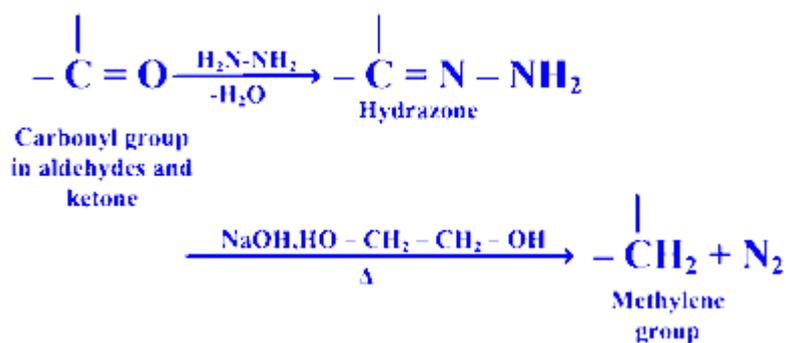
### Options:

- A. Wolf-Kishner reduction
- B. Clemmensen reduction
- C. Stephen reaction
- D. Etard reaction

**Answer: A**



## Solution:



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## Question9

Which of the following is structural formula of mesityl oxide?

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Options:

- A.  $(\text{CH}_3)_2\text{CH} - \text{CH} = \text{CH} - \text{CO} - \text{CH}_3$
- B.  $(\text{CH}_3)_2\text{C} = \text{CH} - \text{CO} - \text{CH}_3$
- C.  $(\text{CH}_3)_3\text{C} - \text{CH} = \text{CH} - \text{CO} - \text{CH}_3$
- D.  $(\text{CH}_3)_2\text{CH} - \text{CH} = \text{CH} - \text{CO} - \text{CH}(\text{CH}_3)_2$

**Answer: B**

## Solution:

Mesityl oxide is an  $\alpha, \beta$ -unsaturated ketone formed when acetone undergoes aldol condensation reaction.

Its IUPAC name is 4-Methylpent-3-en-2-one and its structural formula is:



## Question10

**Which among the following has lowest boiling point?**

**MHT CET 2025 23rd April Evening Shift**

**Options:**

- A. Pentanal
- B. Propanal
- C. Methanal
- D. Ethanal

**Answer: C**

**Solution:**

In the homologous series of aldehydes, the boiling point increases with the increase in the number of carbon atoms. Therefore, the increasing order of boiling point is: Methanal < Ethanal < Propanal < Pentanal

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## Question11

**Which among the following compounds has highest boiling point?**

**MHT CET 2025 23rd April Morning Shift**

**Options:**

- A. Propanal
- B. Ethanal
- C. Pentanal
- D. Hexanal

**Answer: D**



## Solution:

Options:

- A. Propanal (C<sub>3</sub>H<sub>6</sub>O)
- B. Ethanal (C<sub>2</sub>H<sub>4</sub>O)
- C. Pentanal (C<sub>5</sub>H<sub>10</sub>O)
- D. Hexanal (C<sub>6</sub>H<sub>12</sub>O)

### Step 1: Factors affecting boiling point

1. **Molecular weight and chain length:** Higher molecular mass and longer carbon chain generally increase boiling point because of stronger van der Waals forces.
2. **Polarity and functional groups:** All four are aldehydes, so their polarities are similar.

### Step 2: Compare molecules

- Ethanal (2C) → Smallest molecule, weakest van der Waals → lowest b.p.
- Propanal (3C) → Slightly higher b.p.
- Pentanal (5C) → Higher still.
- Hexanal (6C) → Highest, due to largest molar mass and surface area → stronger London dispersion forces.

### ✔ Final Answer:

Option D: Hexanal has the highest boiling point.

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## Question 12

Identify the reagent 'R' used in the following reaction.



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Options:

A. NH<sub>2</sub>OH





**Answer: B**

**Solution:**



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## Question13

Which among the following compounds forms pink colouration on addition of Schiff's reagent?

**MHT CET 2025 20th April Evening Shift**

**Options:**

A. Propanol

B. Propanone

C. Propanal

D. Propanoic acid

**Answer: C**

**Solution:**

Schiff's reagent turns pink when it reacts with an aldehyde.

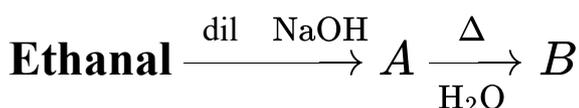
When you add Schiff's reagent to an aldehyde (such as propanal) in cold conditions, you will see a pink, red, or magenta color appear.

Aldehyde + Schiff's reagent  $\xrightarrow{\text{cold}}$  Pink/red/magenta colouration

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## Question 14

Identify the product ' B ' in following reaction.



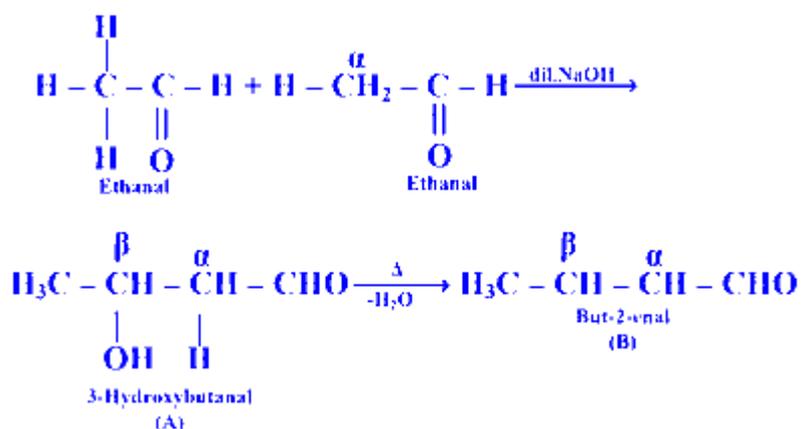
MHT CET 2025 20th April Evening Shift

Options:

- A. 3-Hydroxybutanal
- B. 4-Hydroxybutanal
- C. But-2-enal
- D. But-3-enal

Answer: C

Solution:



## Question15

Which from following compounds has highest boiling point?

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Options:

A. Acetaldehyde

B. Propionaldehyde

C. Butyraldehyde

D.

Valeraldehyde

**Answer: D**

**Solution:**

Boiling point increases with molecular weight, as van der Waal's forces with molecular weight.

Compound	Molecular Formula	Boiling Point
Acetaldehyde	$\text{CH}_3\text{CHO}$	$21^\circ\text{C}$
Propionaldehyde	$\text{CH}_3\text{CH}_2\text{CHO}$	$48^\circ\text{C}$
Butyraldehyde	$\text{CH}_3(\text{CH}_2)_2\text{CHO}$	$75^\circ\text{C}$
Valeraldehyde	$\text{CH}_3(\text{CH}_2)_3\text{CHO}$	$103^\circ\text{C}$

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## Question16

Which from following reagents is used in Gatterman-Koch formylation of arene?



## MHT CET 2025 20th April Morning Shift

### Options:

- A.  $\text{AlH}(\text{i-Bu})_2$
- B.  $\text{CO}, \text{HCl}$  (anhyd.  $\text{AlCl}_3$ )
- C.  $\text{CrO}_2\text{Cl}_2$  ( $\text{CS}_2$ )
- D. DIBAL – H

**Answer: B**

### Solution:

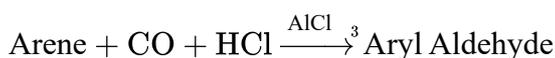
The correct answer is:

**Option B:**  $\text{CO}, \text{HCl}$  (anhyd.  $\text{AlCl}_3$ )

### Explanation:

- The Gattermann–Koch formylation is a reaction used to introduce a formyl group ( $-\text{CHO}$ ) to an aromatic ring (arene).
- The reagents used are **carbon monoxide (CO) and hydrogen chloride (HCl)**, in the presence of **anhydrous aluminium chloride ( $\text{AlCl}_3$ )** (sometimes with cuprous chloride as a co-catalyst).

### Reaction:



Therefore, the Gattermann-Koch reaction uses  $\text{CO}, \text{HCl}$  and **anhydrous  $\text{AlCl}_3$**  as reagents.

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## Question17

**Benzonitrile on reduction with stannous chloride in presence of hydrochloric acid followed by acid hydrolysis forms,**

## MHT CET 2025 19th April Evening Shift

### Options:

- A. Benzal chloride

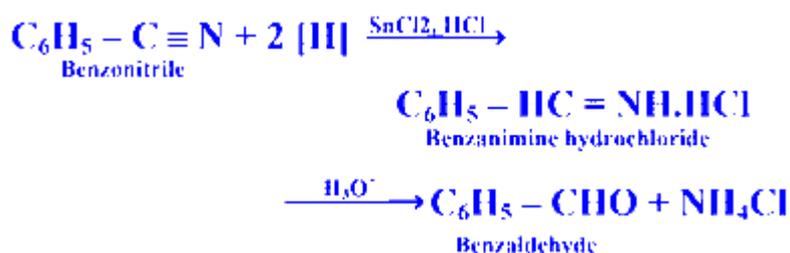
B. Benzoyl chloride

C. Benzophenone

D. Benzaldehyde

**Answer: D**

**Solution:**



This reaction is called Stephen reaction.

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## Question 18

Identify the product ' B ' in the following sequence of reactions.



**MHT CET 2025 19th April Evening Shift**

**Options:**

A. Dimethyl cadmium

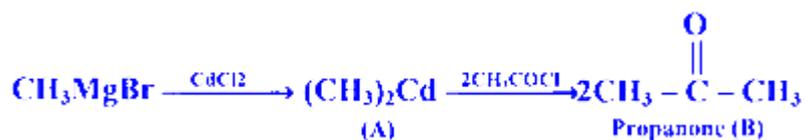
B. Propanone

C. Butanone

D. Propanal

**Answer: B**

**Solution:**



## Question19

Identify the compound formed by action of chromyl chloride on toluene in presence of  $\text{CS}_2$  and hydrolysed further?

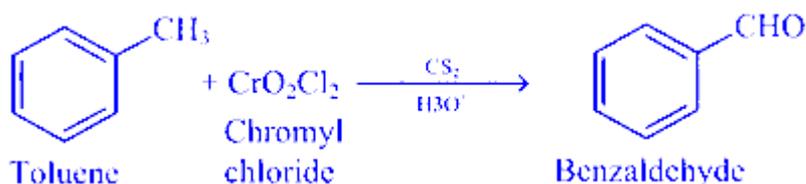
MHT CET 2025 19th April Morning Shift

Options:

- A. Chlorobenzene
- B. Benzal chloride
- C. Benzaldehyde
- D. Benzoic acid

Answer: C

Solution:



This is called as Etard reaction.

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## Question20

Identify the reagent  $R$  used in following reaction.



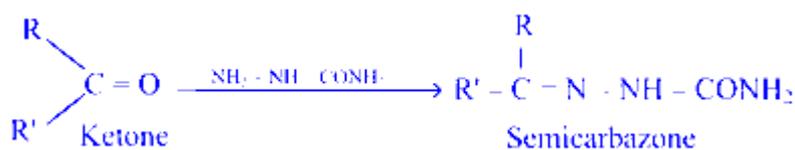
## MHT CET 2025 19th April Morning Shift

Options:

- A.  $\text{NH}_2\text{OH}$
- B.  $\text{NH}_2\text{NHCONH}_2$
- C.  $\text{NH}_2\text{NHC}_6\text{H}_5$
- D.  $\text{NH}_2 - \text{NH}_2$

Answer: B

Solution:



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## Question21

Identify the product of following reaction.



## MHT CET 2025 19th April Morning Shift

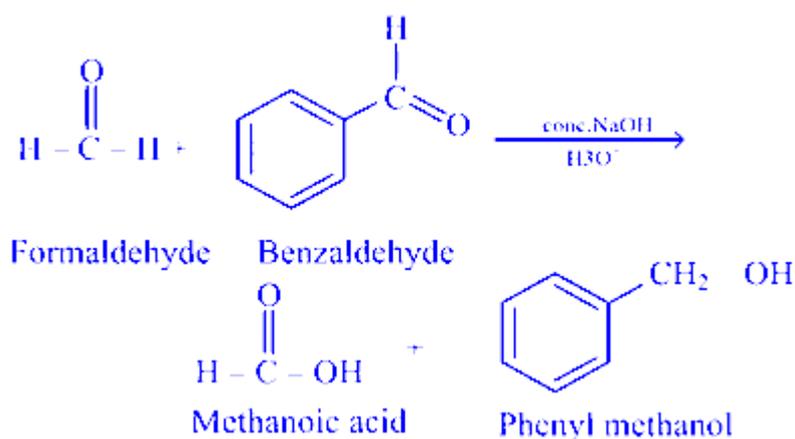
Options:

- A. Phenyl methanol and methanol
- B. Methanol and benzoic acid
- C. Methanoic acid and phenyl methanol
- D. Methanoic acid and benzoic acid

Answer: C



**Solution:**



## Question22

Identify name of reaction when aldehyde or ketone react with  $\text{Zn} - \text{Hg}/ \text{conc. HCl}$  to give alkane.

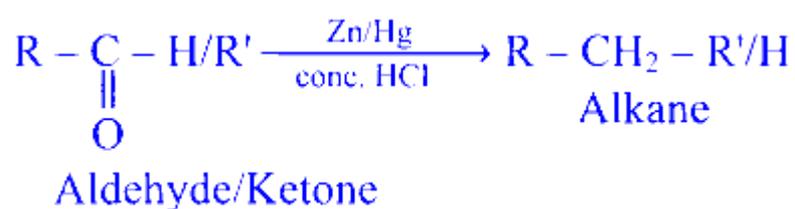
MHT CET 2024 16th May Evening Shift

**Options:**

- A. Stephen reduction
- B. Clemmensen reduction
- C. Wolf Kishner reduction
- D. Rosenmund reduction

**Answer: B**

**Solution:**

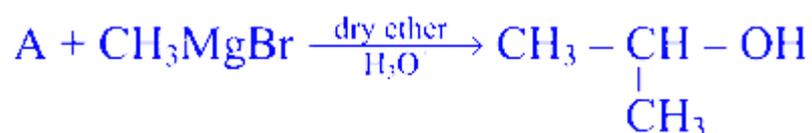


This is Clemmenson reduction.

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## Question23

Identify reactant 'A' in following reaction.



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Options:

A. HCHO

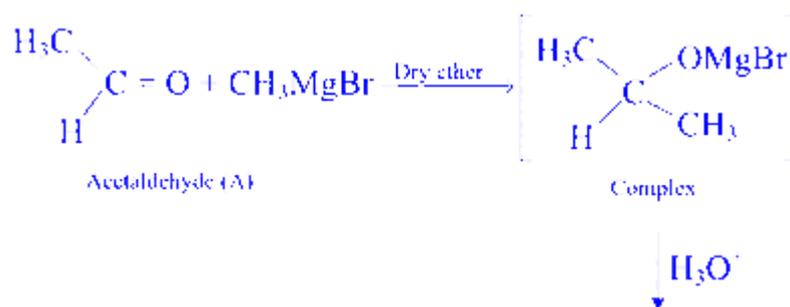
B.  $\text{CH}_3\text{CHO}$

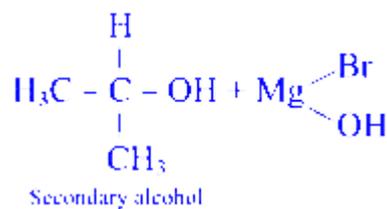
C.  $\begin{array}{c} \text{CH}_3 - \text{OH} \\ | \\ \text{CH}_3 - \text{OH} \end{array}$

D.  $\text{CH}_3\text{COOH}$

Answer: B

Solution:





## Question24

Which of the following is a simple ketone?

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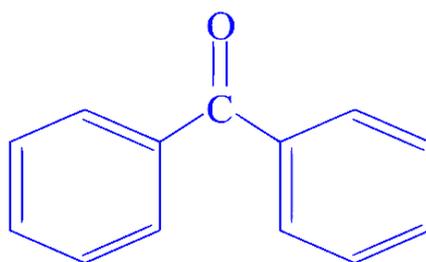
Options:

- A. Acetophenone
- B. Butanone
- C. Benzophenone
- D. Pentan-2-one

Answer: C

Solution:

Benzophenone is a simple ketone or symmetrical ketone.



Benzophenone  
(Diphenyl ketone)

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# Question25

**Aldol condensation reaction is**

**MHT CET 2024 15th May Morning Shift**

**Options:**

- A. Electrophilic substitution
- B. Nucleophilic substitution
- C. Electrophilic addition-elimination reaction
- D. Nucleophilic addition-elimination reaction

**Answer: D**

**Solution:**

**What is Aldol Condensation?**

Aldol condensation typically occurs between an aldehyde or a ketone that has an alpha ( $\alpha$ ) hydrogen and another carbonyl compound. Under basic or acidic conditions, the  $\alpha$ -hydrogen is abstracted, forming an enolate ion (in base) or an enol (in acid).

**Key Mechanistic Steps :**

**Nucleophilic Addition :** The enolate (or enol) formed acts as a nucleophile and attacks the electrophilic carbonyl carbon of another aldehyde or ketone molecule. This step is a nucleophilic addition to a carbonyl group.

**Formation of Aldol ( $\beta$ -hydroxy aldehyde or  $\beta$ -hydroxy ketone) :** After the nucleophilic addition step, a  $\beta$ -hydroxy carbonyl compound (the aldol) is formed.

**Dehydration (Elimination) Step :** Under certain conditions (heating or under acid/base catalysis), the aldol product undergoes the loss of a water molecule (an elimination reaction) to form an  $\alpha,\beta$ -unsaturated aldehyde or ketone.

**Type of Reaction :**

Because the overall aldol condensation involves a nucleophilic addition step to the carbonyl (to initially form the aldol) followed by an elimination of water, it is classified as a **nucleophilic addition-elimination reaction**.



Correct Answer :

D) Nucleophilic addition-elimination reaction

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## Question26

Identify the reagent ' R ' used in the following reaction.



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Options:

A.  $\text{NH}_2\text{OH}$

B.  $\text{NH}_2 - \text{NH} - \text{CONH}_2$

C.  $\text{NH}_2 - \text{NH} - \text{C}_6\text{H}_5$

D.  $\text{NH}_2 - \text{NH}_2$

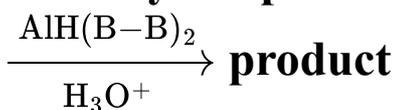
Answer: B

Solution:



## Question27

Identify the product in following reaction. Pent -3-enenitrile



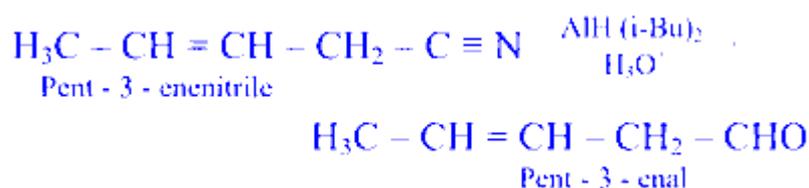
## MHT CET 2024 11th May Evening Shift

Options:

- A. Pent-3-en-1-amine
- B. Pentanal
- C. Pent-3-enal
- D. Pent-3-en-1-ol

Answer: C

Solution:

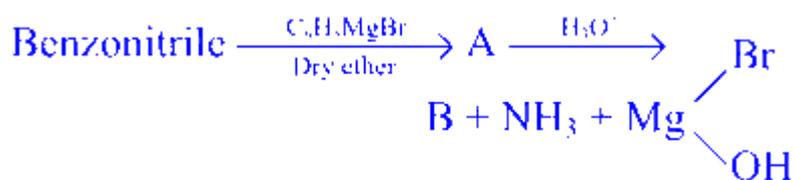


$\text{AlH}(\text{i-Bu})_2$  acts as a reducing agent.

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## Question28

Identify product 'B' in following reaction



## MHT CET 2024 11th May Evening Shift

Options:

- A. Benzophenone
- B. Benzaldehyde

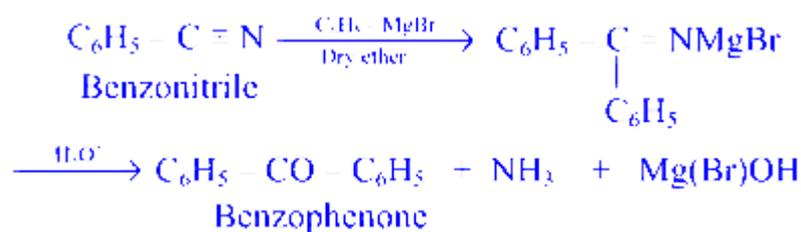


C. Benzyl alcohol

D. Benzoic acid

**Answer: A**

**Solution:**



## Question29

Identify the product obtained when excess of benzoyl chloride is treated with dimethyl cadmium.

**MHT CET 2024 11th May Morning Shift**

**Options:**

A. Acetophenone

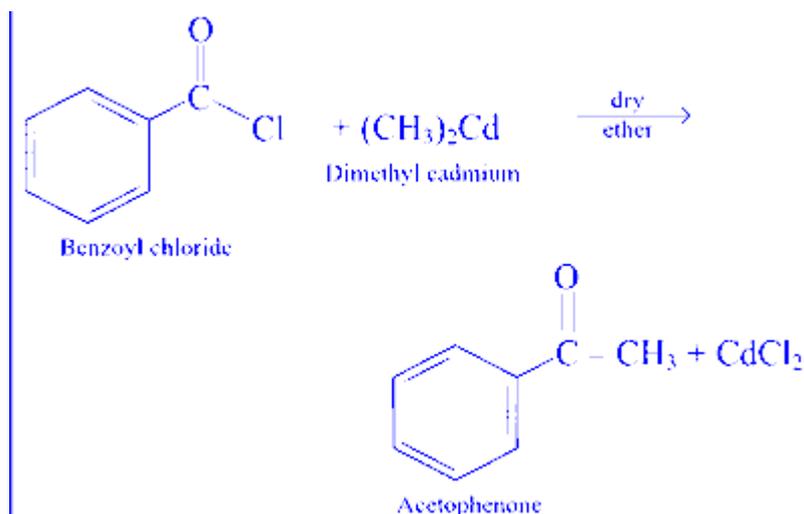
B. Benzoic acid

C. Benzophenone

D. Benzaldehyde

**Answer: A**

**Solution:**



## Question30

Identify an aldehyde used in margarine and in food for its buttery odour.

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Options:

- A. Benzaldehyde
- B. Butyraldehyde
- C. Cinnamaldehyde
- D. Oxaldehyde

**Answer: B**

**Solution:**

The aldehyde used in margarine and food for its buttery odor is **Butyraldehyde**.

Butyraldehyde, also known as butanal, has the chemical formula  $\text{C}_4\text{H}_8\text{O}$ . It is a clear liquid with a pungent odor that is reminiscent of butter. This compound is used in various applications in the food industry to impart a buttery flavor to products such as margarine.



Its ability to mimic the scent of butter makes it an important component in food flavoring, especially in cases where an authentic buttery aroma is desired without using actual dairy products. This characteristic makes it a popular choice for flavor chemists in the creation of margarine and other butter-flavored foods.

Additionally, butyraldehyde can undergo oxidation to form butyric acid, another compound known for its strong buttery smell, contributing further to its use in flavoring.

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## Question31

**What type of following compounds is obtained in first step of Wolf-Kishner reduction of carbonyl compounds?**

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**Options:**

A. Carboxylic Acids

B. Alcohols

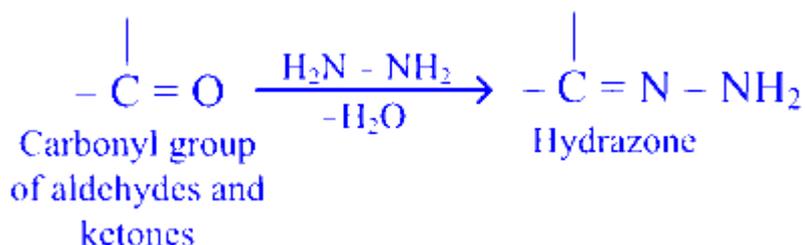
C. Hydrazones

D. Alkenes

**Answer: C**

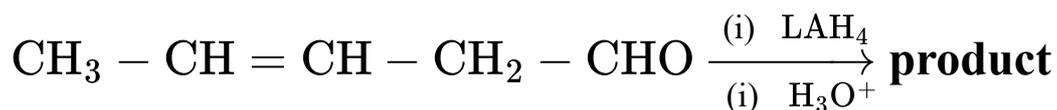
**Solution:**

Wolf-Kishner reduction:



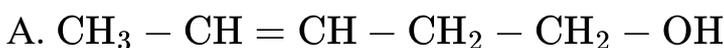
## Question32

What is the product obtained in the reaction?



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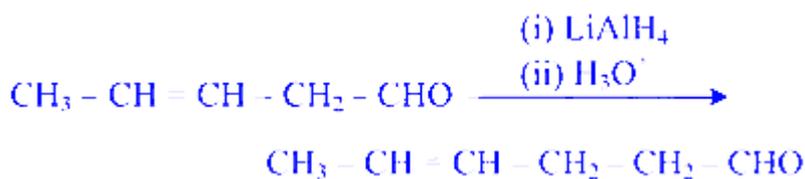
Options:



Answer: A

Solution:

The advantage of  $\text{LiAlH}_4$  is that it does not reduce the isolated olefinic bond and hence, it can reduce unsaturated aldehydes and ketones to unsaturated alcohols.



## Question33

Which of the following compounds is used to convert acetaldehyde into acetaldehyde cyanohydrin?

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**Options:**

A.  $\text{FeCl}_3$  (neutral)

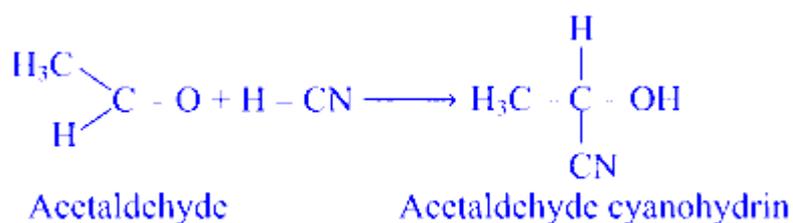
B.  $\text{H}_2\text{SO}_4$  (dil.)

C. HCN

D.  $\text{NaHSO}_3$

**Answer: C**

**Solution:**



## Question34

Identify the test from following so that aldehyde when boiled with ammoniacal silver nitrate solution deposits silver.

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**Options:**

A. Schiff's test

B. Tollen's test

C. Gehling test

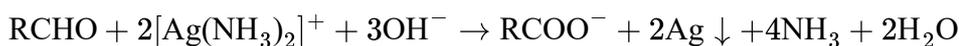
D. Iodoform test

**Answer: B**

**Solution:**

The test in which an aldehyde, when boiled with ammoniacal silver nitrate solution, deposits silver is known as the **Tollens' test** (Option B).

The Tollens' test is a qualitative test used to distinguish between aldehydes and ketones. In this test, the aldehyde reduces the Tollens' reagent, which is ammoniacal silver nitrate ( $\text{Ag}(\text{NH}_3)_2^+$ ), to metallic silver. This results in the deposition of a silver mirror on the inner walls of the test tube. The reaction can be represented as follows:



Here, RCHO represents the aldehyde, and  $\text{Ag} \downarrow$  indicates the formation of a silver precipitate. This classic test confirms the presence of an aldehyde group in a compound.

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## Question35

**What is the general molecular formula of aldehydes?**

**MHT CET 2024 4th May Evening Shift**

**Options:**

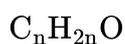
- A.  $\text{C}_n\text{H}_{2n+1}\text{O}$
- B.  $\text{C}_n\text{H}_{2n}\text{O}$
- C.  $\text{C}_n\text{H}_{2n+1}\text{O}_2$
- D.  $\text{C}_n\text{H}_{2n}\text{O}_2$

**Answer: B**

**Solution:**

The general molecular formula for aldehydes is:

Option B



This can be explained as follows: Aldehydes are organic compounds containing a carbonyl group ( $\text{C} = \text{O}$ ) bonded to at least one hydrogen atom. The simplest aldehyde, methanal (formaldehyde), has the structure  $\text{HCHO}$ . In general, for a straight-chain aliphatic aldehyde with  $n$  carbon atoms, the molecular structure can be linear from  $\text{CH}_3(\text{CH}_2)_{n-2}\text{CHO}$ , contributing to the formula  $\text{C}_n\text{H}_{2n}\text{O}$ .

For example, ethanal ( $\text{CH}_3\text{CHO}$ ) with  $n = 2$ , and propanal ( $\text{CH}_3\text{CH}_2\text{CHO}$ ) with  $n = 3$ , both fit the formula  $\text{C}_n\text{H}_{2n}\text{O}$ .



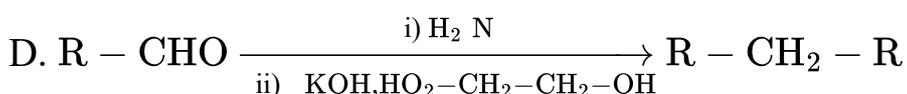
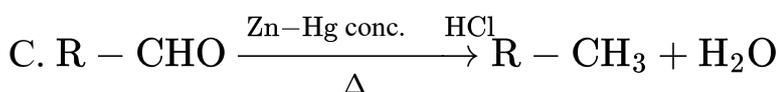
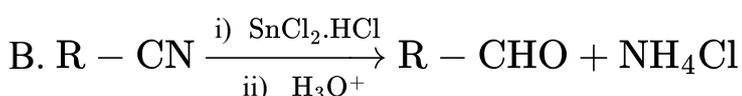
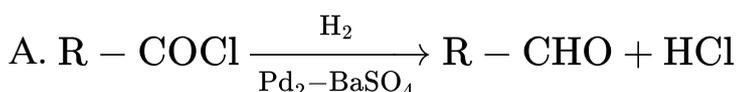
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## Question36

Which of the following is Stephen reaction?

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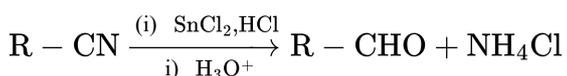
Options:



**Answer: B**

**Solution:**

Nitriles are reduced to imine hydrochloride by stannous chloride in presence of hydrochloric acid which on acid hydrolysis gives corresponding aldehydes. This reaction is called Stephen reaction.



## Question37

Which of the following compounds when treated with ammoniacal silver nitrate exhibits silver mirror test?

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**Options:**

- A. Ethanol
- B. Ethanal
- C. Ethoxyethane
- D. Ethanoic acid

**Answer: B**

**Solution:**

Tollen's reagent oxidises aldehyde to the corresponding carboxylate anion. Silver forms a greyish black precipitate. This test is termed as silver mirror test.

---

## Question38

**What type of product is obtained when formaldehyde reacts with  $\text{CH}_3\text{MgBr}$  in dry ether?**

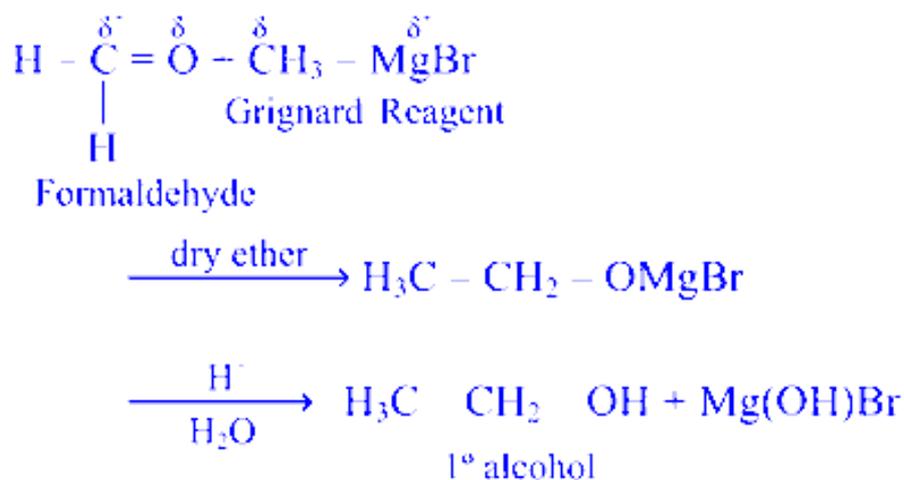
### MHT CET 2024 3rd May Evening Shift

**Options:**

- A. Primary alcohol with same number of carbon atoms as in aldehyde.
- B. Primary alcohol with one carbon atom more than aldehyde.
- C. Secondary alcohol with one carbon atom more than aldehyde.
- D. Tertiary alcohol with two carbon atoms more than aldehyde.

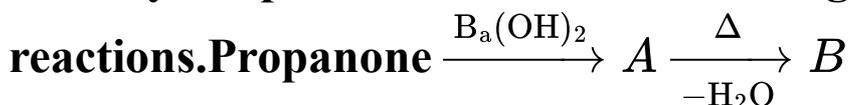
**Answer: B**

**Solution:**



## Question39

Identify the product ' B ' in the following sequence of



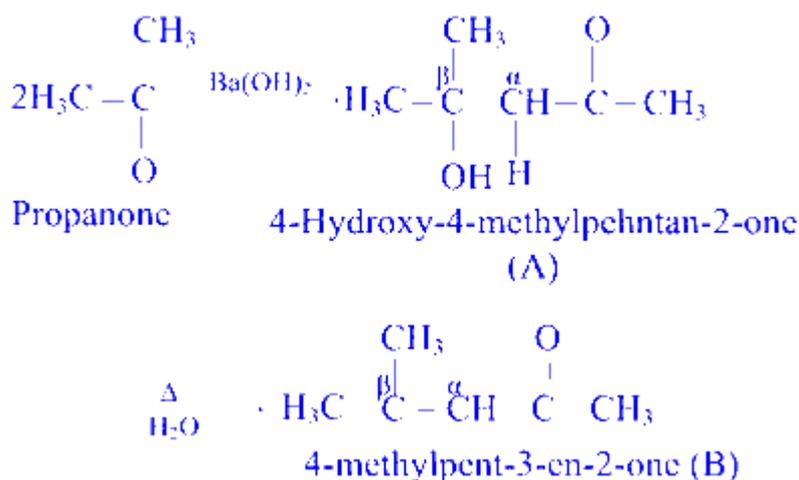
**MHT CET 2024 3rd May Morning Shift**

**Options:**

- A. 4-Hydroxy-4-methylpentan-2-one
- B. 2-methylpentan-3-one
- C. 2-methylpent-2-en-4-one
- D. 4-methylpent-3-en-2-one

**Answer: D**

**Solution:**



## Question40

Identify the reagent ' R ' used in the following reaction. Benzoyl chloride  $\rightarrow$  Benzaldehyde

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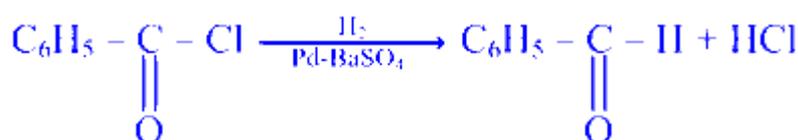
Options:

- A. CO, HCl
- B. H<sub>2</sub>, Pd – BaSO<sub>4</sub>
- C. DIBAL – H
- D. H<sub>2</sub>O

**Answer: B**

**Solution:**

Acyl chloride is reduced to corresponding aldehyde by hydrogen using a palladium catalyst poisoned with barium sulfate. This reaction is known as Rosenmund reduction.



## Question41

Which of the following compounds does not undergo haloform reaction?

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Options:

- A. Ethanal
- B. Propanal
- C. Propanone
- D. Butanone

**Answer: B**

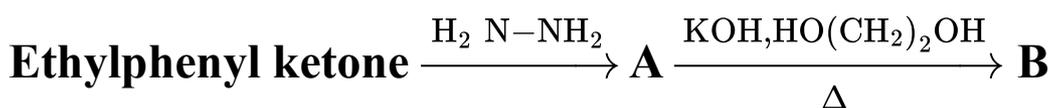
**Solution:**

Haloform reaction is given by acetaldehyde, all methyl ketones ( $\text{CH}_3 - \text{CO} - \text{R}$ ) and all alcohols containing  $\text{CH}_3(\text{CHOH})-$  group. Propanal ( $\text{CH}_3\text{CH}_2\text{CHO}$ ) does not have  $\text{CH}_3\text{CO}$  group and hence does not give haloform reaction.

---

## Question42

Identify the product 'B' in the following reaction.



MHT CET 2024 2nd May Evening Shift

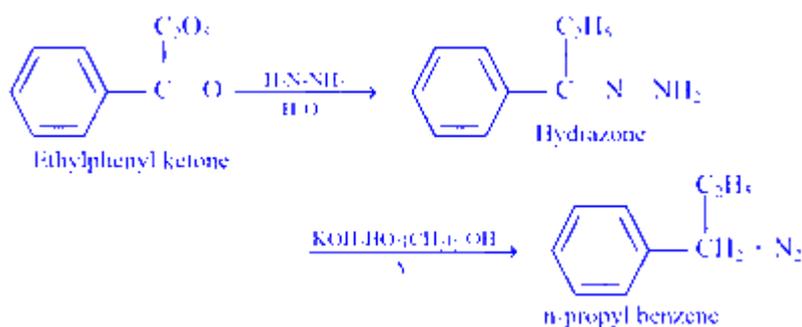
Options:

- A. Phenylhydrazone

- B. Ethylbenzene
- C. n-propylbenzene
- D. Isopropylbenzene

**Answer: C**

**Solution:**

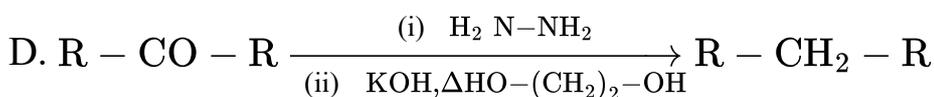
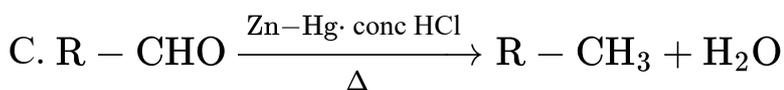
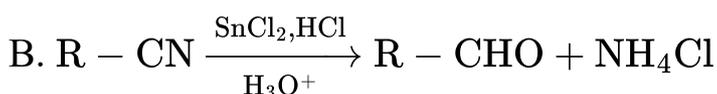
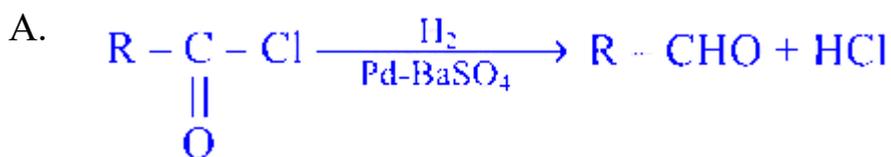


## Question43

Which of the following reactions represents Clemmensen reduction?

MHT CET 2024 2nd May Evening Shift

Options:

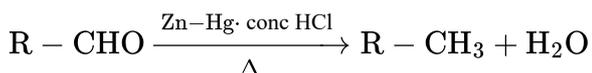


**Answer: C**

## Solution:

The Clemmensen reduction is a method used to convert carbonyl groups such as aldehydes and ketones into alkanes by treating them with zinc amalgam (Zn-Hg) and concentrated hydrochloric acid (HCl).

Option C correctly represents the Clemmensen reduction:

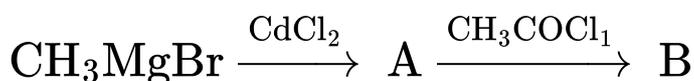


In this reaction, an aldehyde (R - CHO) is reduced to an alkane (R - CH<sub>3</sub>) while water (H<sub>2</sub>O) is produced as a byproduct.

---

## Question 44

Identify the product ' B ' in the following sequence of reactions.



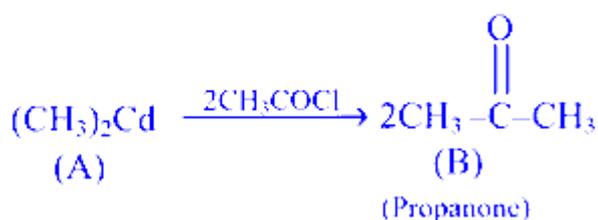
### MHT CET 2024 2nd May Morning Shift

Options:

- A. Dimethyl cadmium
- B. Propanone
- C. Butanone
- D. Propanal

**Answer: B**

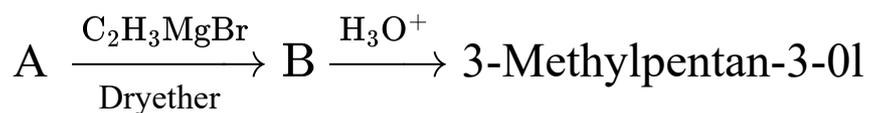
**Solution:**



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## Question45

Identify the compound 'A' in the following sequence of reactions.



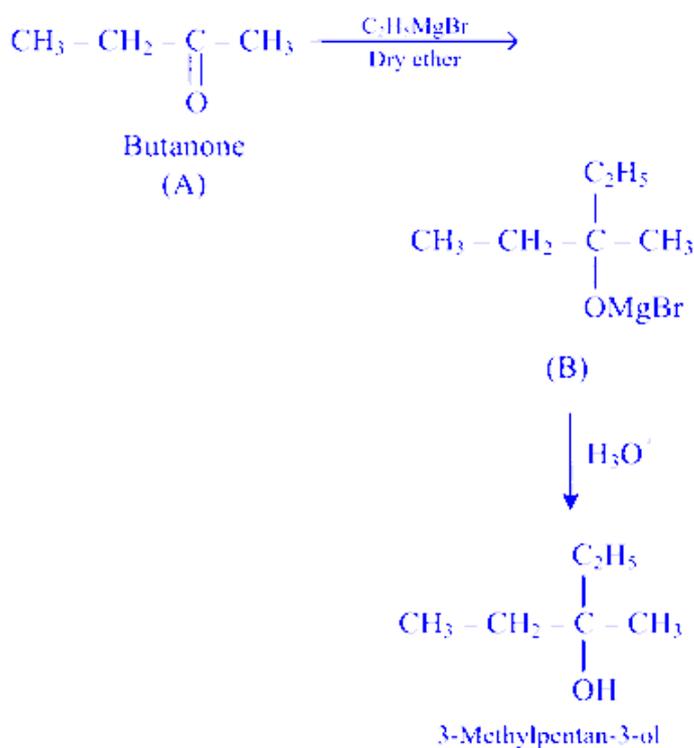
MHT CET 2023 14th May Evening Shift

Options:

- A. Propanal
- B. Propanone
- C. Butanal
- D. Butanone

Answer: D

Solution:



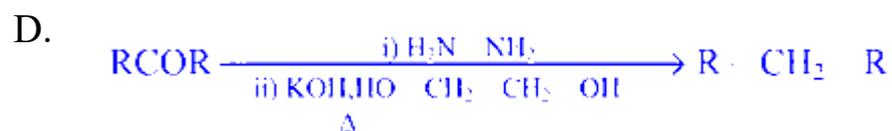
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## Question46

Which of the following is Clemmensen reduction?

MHT CET 2023 14th May Evening Shift

Options:



Answer: C

Solution:



## Question47

Identify substrate 'A' in the following reaction.



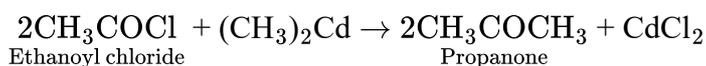
**MHT CET 2023 14th May Evening Shift**

**Options:**

- A. Ethyl chloride
- B. Ethylene dichloride
- C. Ethanoyl chloride
- D. Ethylidene dichloride

**Answer: C**

**Solution:**



Ketones are prepared from acyl chloride by reaction with dialkyl cadmium.

-----

## Question48

Identify the reaction in which carbonyl group of aldehydes and ketones is reduced to methylene group on treatment with hydrazine followed by heating with sodium hydroxide in ethylene glycol.

**MHT CET 2023 14th May Morning Shift**

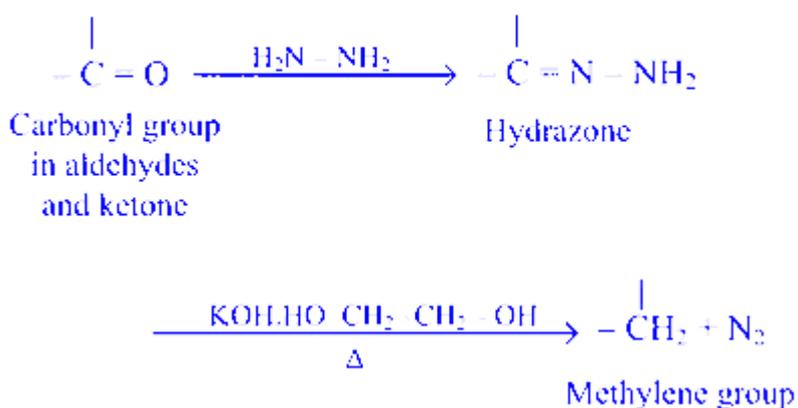
**Options:**

- A. Wolf-Kishner reduction
- B. Clemmensen reduction.
- C. Stephen reaction
- D. Etard reaction

**Answer: A**

**Solution:**

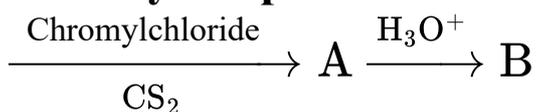
Wolf-Kishner reduction:



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## Question49

**Identify the product 'B' in the following reaction. Toluene**



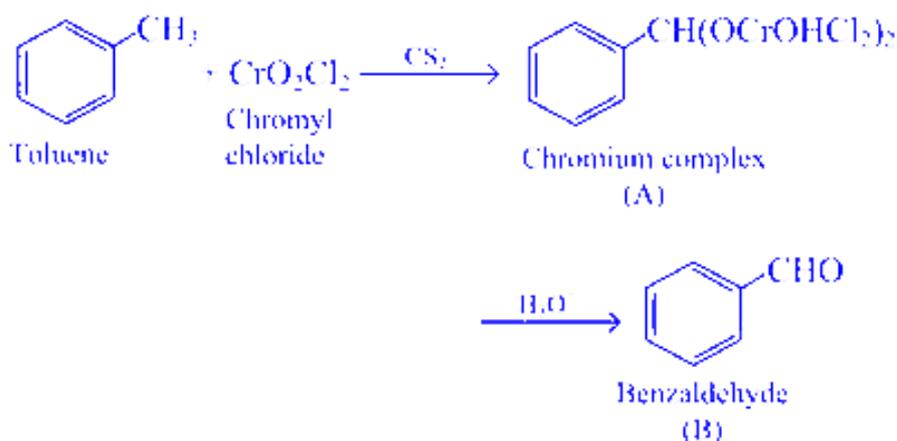
**MHT CET 2023 14th May Morning Shift**

**Options:**

- A. Benzal chloride
- B. Benzaldehyde
- C. Benzyl alcohol
- D. Benzoic acid

**Answer: B**

**Solution:**



---

## Question50

Which among the following is a simple ketone?

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**Options:**

- A. Acetophenone
- B. Butanone

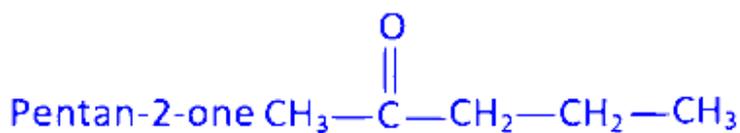
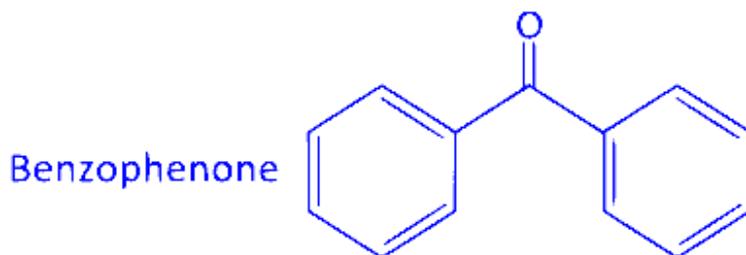
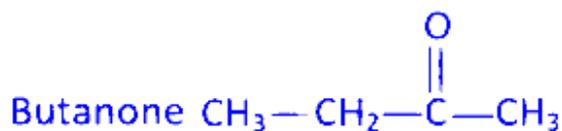
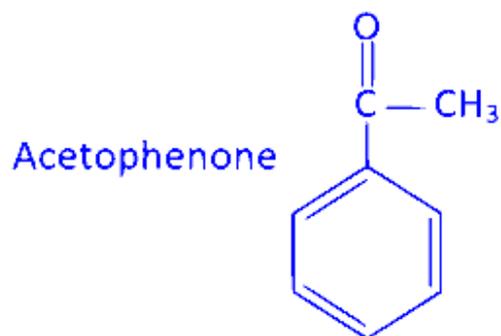


C. Benzophenone

D. Pentan-2-one

**Answer: C**

**Solution:**



Simple ketones are the ones in which both alkyl and aryl groups linked to carbonyl carbon are identical. Thus, among the given options benzophenone is a simple ketone.

---

## Question51

**Which from following compounds is obtained when toluene is treated with  $\text{CrO}_2\text{Cl}_2$  in presence of  $\text{CS}_2$  followed by acid hydrolysis?**

## MHT CET 2023 13th May Evening Shift

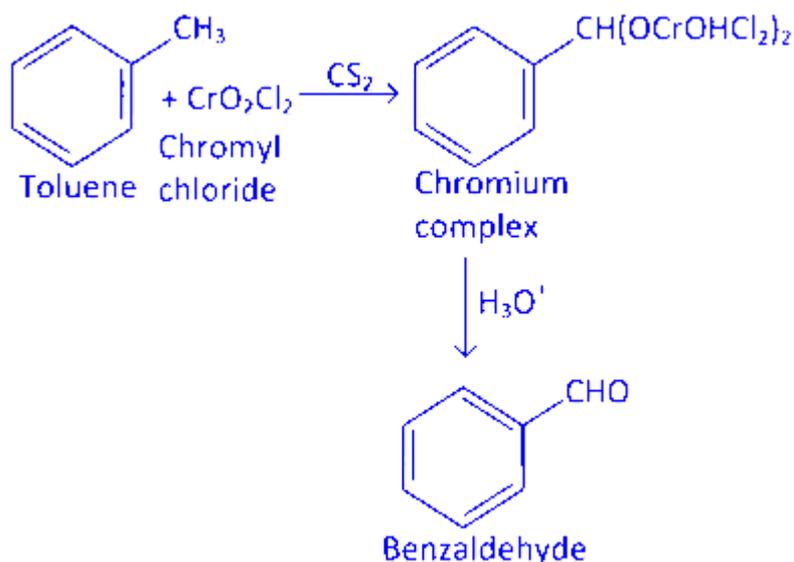
Options:

- A. Chlorobenzene
- B. Benzal chloride
- C. Benzaldehyde
- D. Benzoic acid

**Answer: C**

**Solution:**

When chromyl chloride reacts with toluene, it oxidises methyl group to a chromium complex, which on hydrolysis gives corresponding benzaldehyde. This reaction is called Etard reaction.



---

## Question52

Which of the following is NOT prepared by the action of Grignard's reagent on methanal?

## MHT CET 2023 13th May Evening Shift

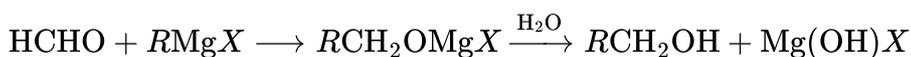
Options:

- A. Ethanol
- B. Propan-1-ol
- C. Propan-2-ol
- D. Butan-1-ol

**Answer: C**

### **Solution:**

Reaction of methanal with Grignard reagent is as follows :



From the above reaction, we can see that primary alcohol is produced as a product. Thus, among the given options propan-2-ol is not prepared by the action of Grignard's reagent on methanal as it is a secondary alcohol.

---

## **Question53**

**Which following reagent is used in Etard reaction?**

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**Options:**

- A. Chromium chloride
- B. Chromyl chloride
- C. Chromium oxide
- D. Chromic acid

**Answer: B**

### **Solution:**

Methyl group in methyl benzene (or methyl arene) is oxidized by oxidizing agent chromyl chloride in carbon disulfide as solvent, to form a chromium complex, from which the corresponding benzaldehyde is obtained on acid hydrolysis. This reaction is known as Etard reaction.

---

## Question54

Which of the following compounds is obtained by Rosenmund reduction of benzoyl chloride?

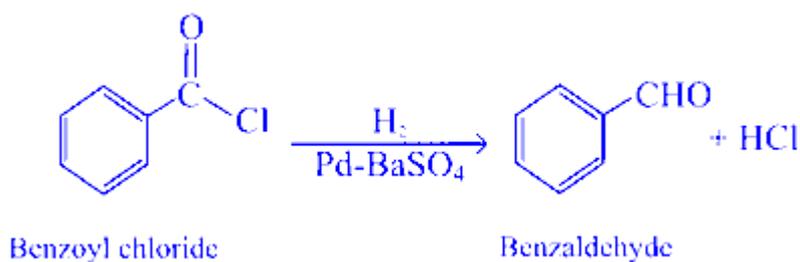
MHT CET 2023 12th May Evening Shift

Options:

- A. Benzene
- B. Benzyl alcohol
- C. Benzaldehyde
- D. Chlorobenzene

Answer: C

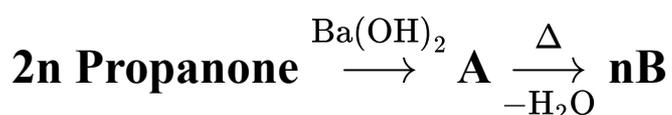
Solution:



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## Question55

Identify product 'B' in following sequence of reactions.



## MHT CET 2023 12th May Morning Shift

Options:

A. 4-Hydroxy-4-methylpentan-2-one

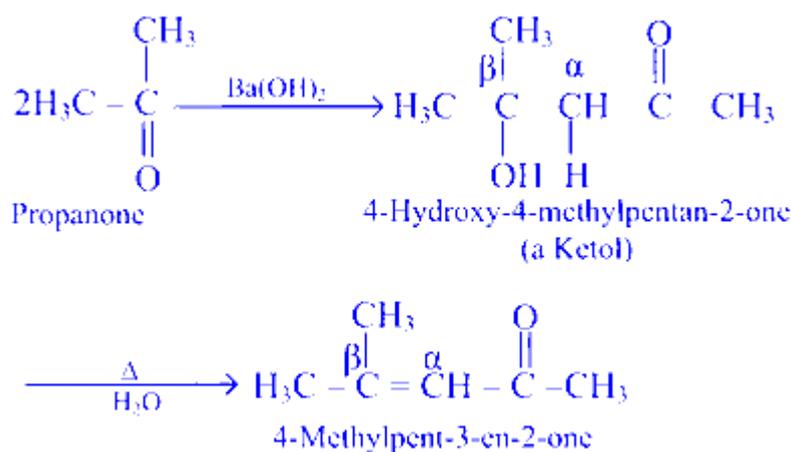
B. 2-Methylpentan-3-one

C. 2-Methylpent-2-en-4-one

D. 4-Methylpent-3-en-2-one

Answer: D

Solution:



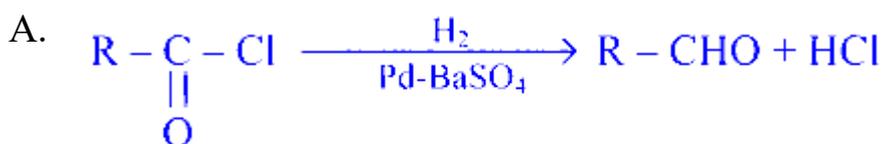
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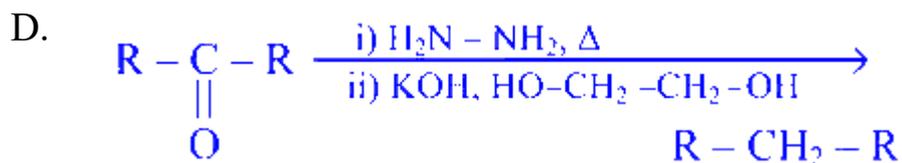
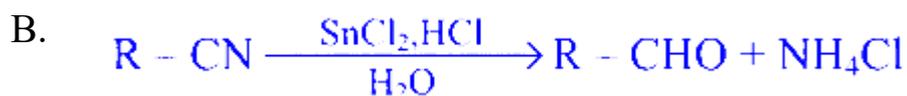
## Question56

Which of the following reactions is Rosenmund reduction?

## MHT CET 2023 12th May Morning Shift

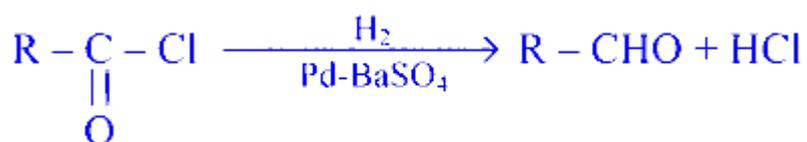
Options:





**Answer: A**

**Solution:**



## Question 57

What type of following phenomena does the Cannizzaro reaction exhibit?

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**Options:**

- A. Nucleophilic addition
- B. Elimination
- C. Disproportionation
- D. Decomposition

**Answer: C**



## Solution:

✔ Cannizzaro reaction exhibits disproportionation (self oxidation–reduction).

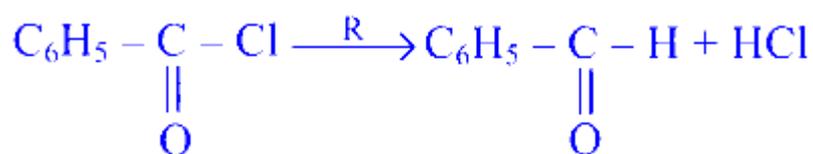
In it, one molecule of a non-enolizable aldehyde gets oxidized to a carboxylate, while another gets reduced to an alcohol.

Correct Answer: C) Disproportionation

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## Question58

Identify the reagent 'R' used in the following reaction.



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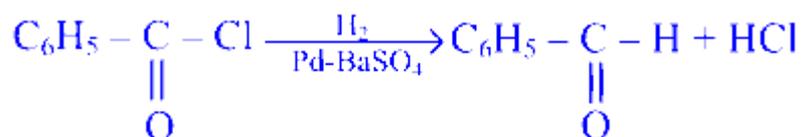
Options:

- A. CO, HCl
- B. H<sub>2</sub>, Pd-BaSO<sub>4</sub>
- C. H<sub>2</sub>O
- D. DIBAL-H

Answer: B

## Solution:

Acyl chloride is reduced to corresponding aldehyde by hydrogen using a palladium catalyst poisoned with barium sulfate. This reaction is known as Rosenmund reduction.



## Question59

Identify the products of following reaction:



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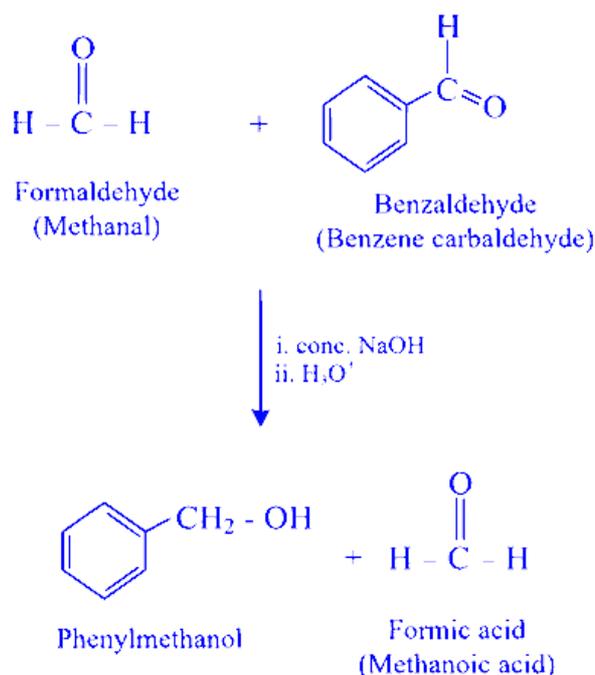
Options:

- A. Methanoic acid and phenyl methanol
- B. Methanol and benzoic acid
- C. Methanol and phenol
- D. Methanoic acid and phenol

Answer: A

Solution:

When a mixture of methanal and benzene carbaldehyde (aldehyde with no  $\alpha$ -hydrogen) is treated with a strong base, methanal is oxidized to methanoic acid while benzene carbaldehyde is reduced to phenyl methanol.



---

## Question60

Which of the following reagents is used in Gatterman-Koch formylation of arene?

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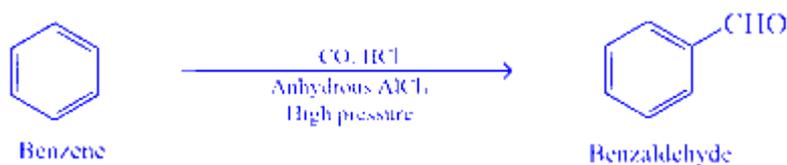
Options:

- A.  $\text{CrO}_3$
- B.  $\text{CO}, \text{HCl}/\text{AlCl}_3$  (anhydr.)
- C.  $\text{CrO}_2\text{Cl}_2, \text{CS}_2$
- D.  $\text{Cl}_2 h\nu, \text{H}_3\text{O}^+$

**Answer: B**

**Solution:**

Gatterman-Koch formylation of arene involves treatment of benzene or substituted benzene under high pressure with carbon monoxide and hydrogen chloride gives benzaldehyde or substituted benzaldehyde. The reaction is carried out in presence of anhydrous aluminium chloride or cuprous chloride.



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## Question61

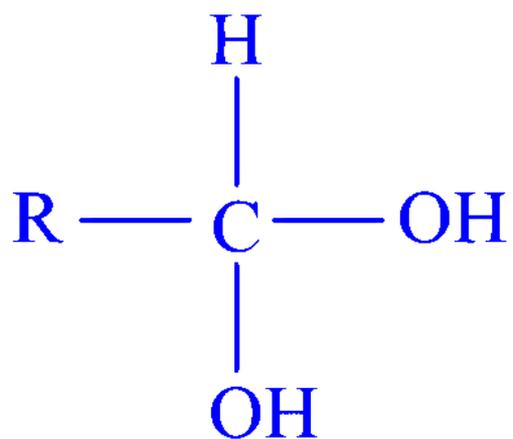
Which among the following compounds is hemiacetal?



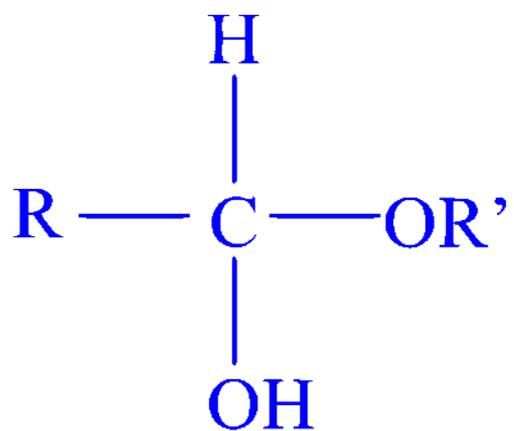
## MHT CET 2023 10th May Morning Shift

Options:

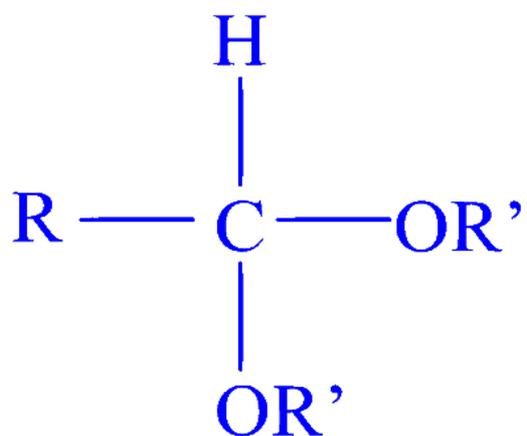
A.



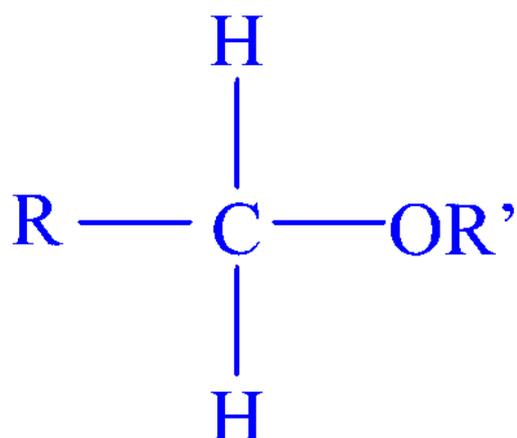
B.



C.



D.



**Answer: B**

**Solution:**

Hemiacetal is an alkoxyalcohol (has one  $-\text{OH}$  and one  $-\text{OR}'$  group bonded to the central carbon atom). Hence, compound (B) is a hemiacetal.

---

## Question62

Which among the following colours is obtained in Schiff test of aldehydes?

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**Options:**

- A. Blue
- B. Green
- C. Magenta
- D. Black

**Answer: C**



## Solution:

When alcoholic solution of aldehyde is treated with few drops of Schiff's reagent, pink or red or magenta colour appears.

---

## Question63

Identify ketone from the following.

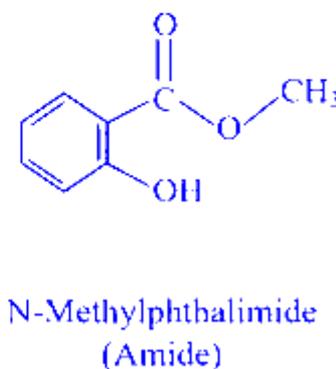
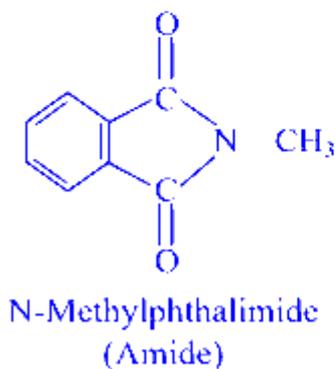
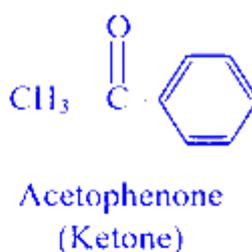
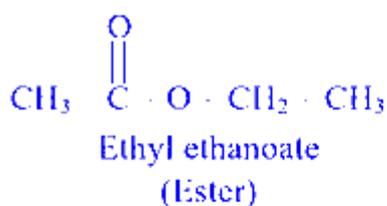
MHT CET 2023 10th May Morning Shift

Options:

- A. Ethyl ethanoate
- B. Acetophenone
- C. N-Methylphthalimide
- D. Methyl salicylate

Answer: B

Solution:



---

## Question64

Which of the following on reaction with ammoniacal silver nitrate forms silver precipitate?

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Options:

- A. Ethanol
- B. Ethanal
- C. Ethoxyethane
- D. Ethanoic acid

**Answer: B**

**Solution:**

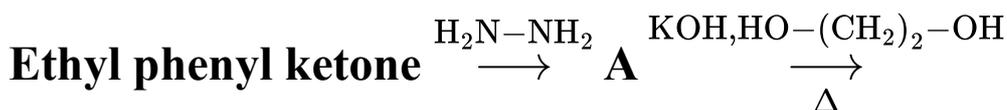
Tollens' reagent oxidises aldehyde to the corresponding carboxylate anion. Silver gets precipitated as greyish black precipitate.

Tollens' reagent is a mild oxidizing agent. Thus, simple hydrocarbons, ethers, ketones and alcohols do not get oxidized by Tollens' reagent.

---

## Question65

Identify the product 'B' in following reaction.



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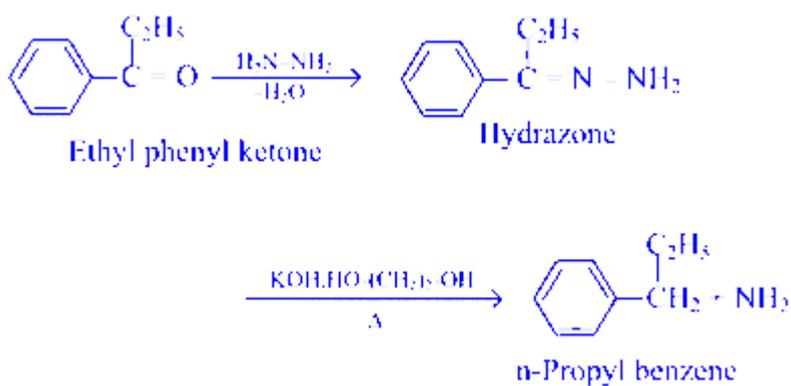


**Options:**

- A. Phenylhydrazone
- B. Ethyl benzene
- C. n-Propyl benzene
- D. Isopropyl benzene

**Answer: C**

**Solution:**



---

## Question66

**What type of reaction is the formation of aldol from aldehyde?**

**MHT CET 2023 9th May Morning Shift**

**Options:**

- A. Condensation reaction
- B. Addition reaction
- C. Substitution reaction
- D. Elimination reaction

**Answer: A**

## Solution:

The formation of aldol from an aldehyde is a :

Option A : Condensation reaction

This is because aldol formation involves the combination of two aldehyde molecules (or one aldehyde and one ketone) to form a  $\beta$ -hydroxyaldehyde (aldol) with the loss of a water molecule, which is characteristic of a condensation reaction.

---

## Question67

**What is the product formed when cumene is air oxidised in presence of Co-naphthenate and further treated with dilute acid?**

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**Options:**

- A. Cumene hydroperoxide
- B. Phenol and  $\text{CO}_2$
- C. Acetone and Benzoic acid
- D. Phenol + Acetone

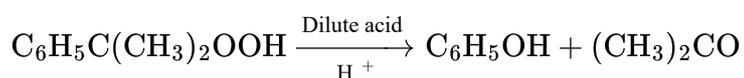
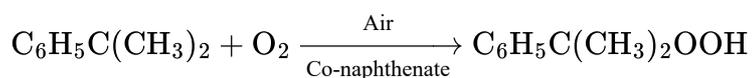
**Answer: D**

## Solution:

The oxidation of cumene (isopropylbenzene) in the presence of a catalyst like cobalt naphthenate followed by treatment with a dilute acid such as sulfuric acid leads to a process known as the cumene process. This process is used in the industrial production of two important chemicals: phenol and acetone. Here's how the process works:

1. Cumene is first oxidized by oxygen from the air to form cumene hydroperoxide ( $\text{C}_6\text{H}_5\text{C}(\text{CH}_3)_2\text{OOH}$ ) in the presence of a catalyst like cobalt naphthenate.
2. The cumene hydroperoxide is then treated with dilute acid to initiate a cleavage reaction. This reaction is a form of acid-catalyzed decomposition called heterolytic cleavage.
3. The cumene hydroperoxide splits or cleaves to form phenol ( $\text{C}_6\text{H}_5\text{OH}$ ) and acetone ( $\text{CH}_3\text{COCH}_3$ ).

The reaction scheme is as follows:



Thus, the correct product formed when cumene is air oxidized in the presence of cobalt naphthenate and further treated with dilute acid is Option D: Phenol + Acetone.

---

## Question68

Identify compound A in following reaction



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Options:

A. conc.  $\text{HNO}_3$

B. Ni

C.  $\text{Zn} + \text{H}_2\text{O}$

D. Zn

**Answer: C**

**Solution:**

$\text{Zn} + \text{H}_2\text{O}$  is used for ozonolysis.

---

## Question69

Which of the following aldehydes is less reactive towards nucleophilic addition reaction?



## MHT CET 2021 24th September Evening Shift

### Options:

- A. Benzaldehyde
- B. Formaldehyde
- C. Acetaldehyde
- D. Butyraldehyde

**Answer: A**

### Solution:

The answer is **Option A: Benzaldehyde**. Here's why:

Nucleophilic addition reactions involve the attack of a nucleophile (electron-rich species) on the electrophilic carbonyl carbon of an aldehyde. The reactivity of an aldehyde towards nucleophilic addition depends on the electron density on the carbonyl carbon.

Let's analyze the given options:

1. **Benzaldehyde:** The benzene ring attached to the carbonyl group in benzaldehyde exhibits resonance, delocalizing electron density away from the carbonyl carbon. This makes the carbonyl carbon less electrophilic and therefore less reactive towards nucleophilic addition.
2. **Formaldehyde:** Formaldehyde has only hydrogen atoms attached to the carbonyl carbon, no electron-withdrawing or electron-donating groups. It is highly reactive towards nucleophilic attack.
3. **Acetaldehyde:** Acetaldehyde has a methyl group attached to the carbonyl carbon, which is an electron-donating group. This slightly increases the electron density on the carbonyl carbon, making it more reactive than benzaldehyde but less reactive than formaldehyde.
4. **Butyraldehyde:** Butyraldehyde is similar to acetaldehyde, with an alkyl chain attached to the carbonyl carbon. Its reactivity is comparable to acetaldehyde.

In summary, the reactivity of aldehydes towards nucleophilic addition generally follows this trend:

Formaldehyde > Acetaldehyde/Butyraldehyde > Benzaldehyde

Therefore, benzaldehyde is the least reactive towards nucleophilic addition among the given options.

-----

## Question 70

**Cannizzaro reaction is an example of**



## MHT CET 2021 24th September Evening Shift

**Options:**

- A. Elimination reaction
- B. Disproportionation reaction
- C. Decomposition reaction
- D. Nucleophilic addition reaction

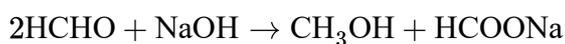
**Answer: B**

**Solution:**

The Cannizzaro reaction is an example of a Disproportionation reaction.

In the Cannizzaro reaction, a non-enolizable aldehyde undergoes a redox process where one molecule is reduced to an alcohol, while another molecule of the same aldehyde is oxidized to a carboxylic acid. This type of reaction, where a single substance undergoes both oxidation and reduction, is known as disproportionation.

Let's consider the Cannizzaro reaction of formaldehyde as an example. Two molecules of formaldehyde react in the presence of a strong base (like NaOH) to produce methanol and sodium formate:



In this reaction, one formaldehyde molecule is reduced to methanol and the other is oxidized to sodium formate.

Thus, the correct answer is:

**Option B: Disproportionation reaction**

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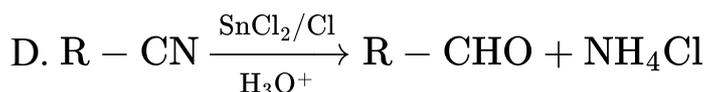
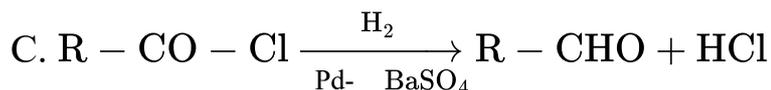
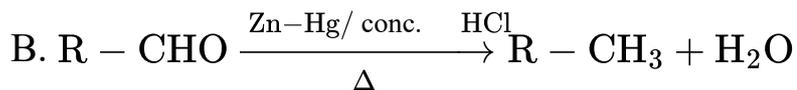
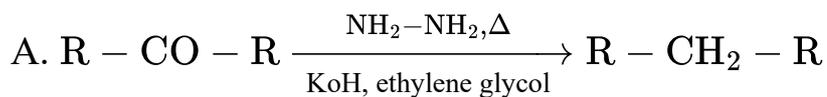
## Question 71

**Which of the following reaction is an example of Rosenmund reduction?**

## MHT CET 2021 24th September Morning Shift

**Options:**





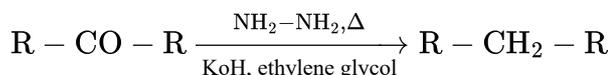
**Answer: C**

## Solution:

The Rosenmund reduction is a chemical reaction used to reduce acyl chlorides to aldehydes using hydrogen ( $\text{H}_2$ ) gas in the presence of a poisoned palladium on barium sulfate ( $\text{Pd-BaSO}_4$ ) catalyst. The reaction selectively reduces the acyl chloride to an aldehyde without further reduction to an alcohol.

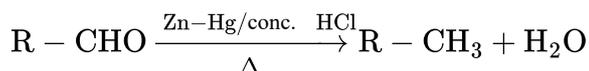
Let's analyze each option to identify the Rosenmund reduction:

Option A:



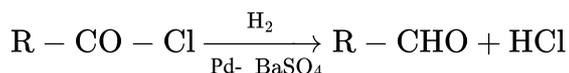
This reaction appears to be the Wolff-Kishner reduction, which reduces carbonyl compounds (like ketones and aldehydes) to alkanes, not an example of Rosenmund reduction.

Option B:



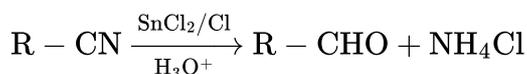
This reaction is the Clemmensen reduction, which reduces aldehydes (or ketones) to alkanes using zinc amalgam and hydrochloric acid, not an example of Rosenmund reduction.

Option C:



This reaction reduces an acyl chloride to an aldehyde in the presence of hydrogen gas and a poisoned palladium catalyst, **which is the defining reaction of the Rosenmund reduction.**

Option D:



This reaction involves the reduction of a nitrile to an aldehyde, which is not the Rosenmund reduction.

Based on this analysis, the correct answer is:

## Question 72

To obtain 3-methylbutan-2-ol from acetaldehyde, the Grignard's reagent used is

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Options:

A.  $\text{CH}_3\text{MgBr}$

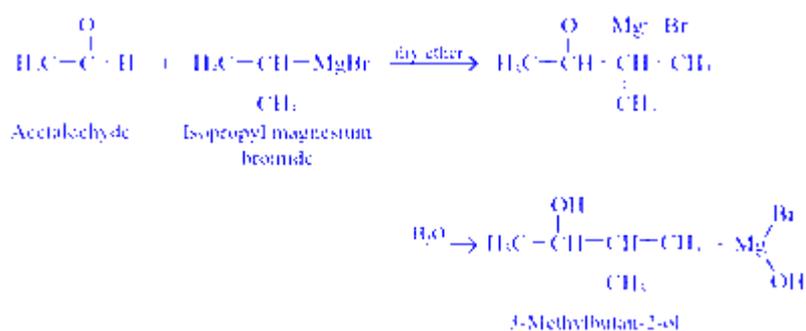
B.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{MgBr}$

C.  $\text{CH}_3\text{CH}_2\text{MgBr}$

D. 
$$\begin{array}{c} \text{H}_3\text{C}-\text{CH}-\text{MgBr} \\ | \\ \text{CH}_3 \end{array}$$

Answer: D

Solution:



## Question 73

**Which of the following aldehyde has buttery odour?**

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**Options:**

- A. Crotonaldehyde
- B. Benzaldehyde
- C. Butyraldehyde
- D. Cinnamaldehyde

**Answer: C**

**Solution:**

Among the given options, the aldehyde that has a buttery odor is Butyraldehyde.

Butyraldehyde, also known as butanal, is an aldehyde with the chemical formula  $C_4H_8O$ . It is a colorless liquid with a characteristic pungent odor that is often described as similar to that of butter.

Crotonaldehyde (Option A) has a pungent smell, benzaldehyde (Option B) has an almond-like odor, and cinnamaldehyde (Option D) has a sweet, spicy cinnamon odor.

Therefore, the correct answer is:

**Option C: Butyraldehyde**

---

## Question 74

**Which of the following statements about tropone is true?**

**MHT CET 2021 23rd September Evening Shift**

**Options:**

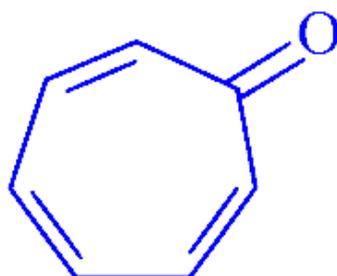
- A. It is heterocyclic having molecular formula  $C_5H_{10}O$ .
- B. It is benzenoid having molecular formula  $C_{10}H_8O$ .

C. It is non-benzenoid having molecular formula  $C_7H_6O$ .

D. It is heterocyclic having molecular formula  $C_7H_6O$ .

**Answer: C**

**Solution:**

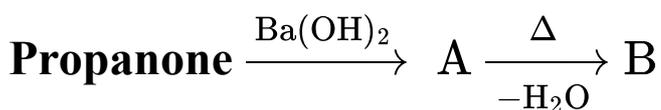


Tropone ( $C_7H_6O$ )  
(Non-benzenoid compound)

---

## Question 75

Identify product B in following reaction.



**MHT CET 2021 23rd September Evening Shift**

**Options:**

A. 2-Methylpentan-3-one

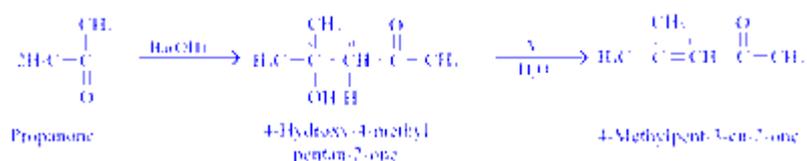
B. 4-Hydroxy-4-methylpentan-2-one

C. 4-Methylpent-3-en-2-one

D. 2-Methylpent-2-en-4-one

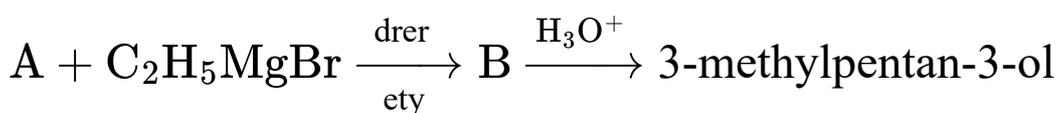
**Answer: C**

## Solution:



## Question 76

Identify compound A from following reaction.



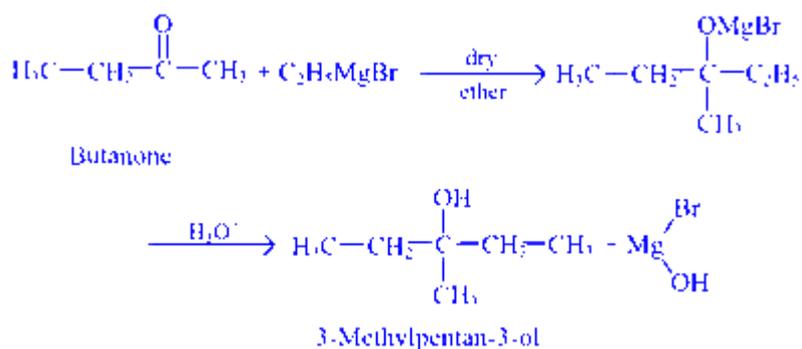
MHT CET 2021 23rd September Evening Shift

Options:

- A. Butanal
- B. Propanone
- C. Propanal
- D. Butanone

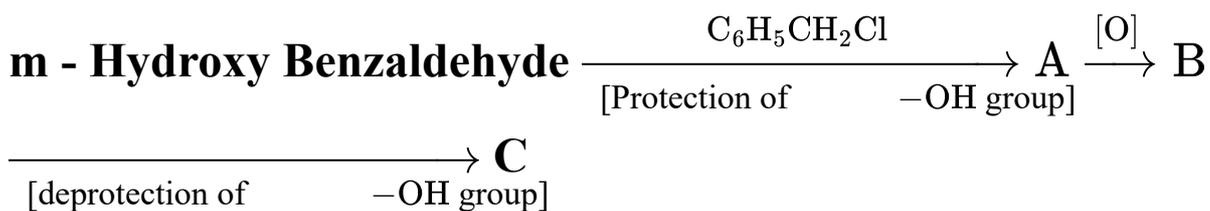
Answer: D

Solution:



## Question 77

Identify product C in following conversion.



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Options:

A. Benzoic acid

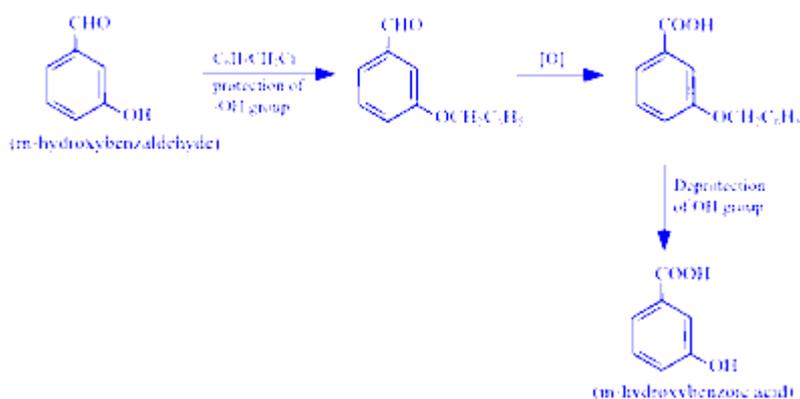
B. m-Hydroxybenzoic acid

C. Phenol

D. Phenyl benzoate

Answer: B

Solution:



## Question 78

Identify the reagent used in following conversion.

Pent -3 -enenitrile  $\xrightarrow{A}$  pent -3 -enal

**MHT CET 2021 23th September Morning Shift**

**Options:**

A.  $\text{AlH}(\text{i-Bu})_2/\text{H}_3\text{O}^+$

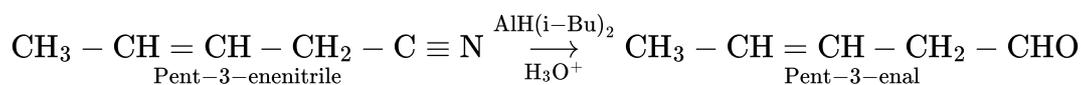
B.  $\text{K}_2\text{Cr}_2\text{O}_7/\text{H}_2\text{SO}_4$

C.  $\text{H}_2/\text{Pd. BaSO}_4$

D.  $\text{SnCl}_2 \cdot \text{HCl}$

**Answer: A**

**Solution:**



## Question 79

**What is the product formed when side chain chlorination of toluene is carried out followed by acid hydrolysis at 373 K ?**

**MHT CET 2021 23th September Morning Shift**

**Options:**

A. Benzaldehyde

B. Benzal chloride

C. Chlorobenzene

D. Benzoic acid

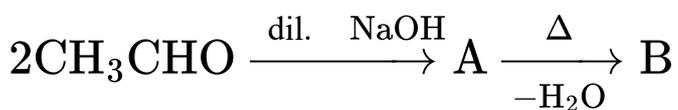
**Answer: A**

**Solution:**



## Question80

Identify the product 'B' in following reaction.



**MHT CET 2021 22th September Evening Shift**

**Options:**

- A. But-3-enal
- B. 3-Hydroxyl butanal
- C. But-2-enal
- D. 4-Hydroxyl butanal

**Answer: C**

**Solution:**

Aldol condensation



## Question81

Identify 'A' in following reaction.



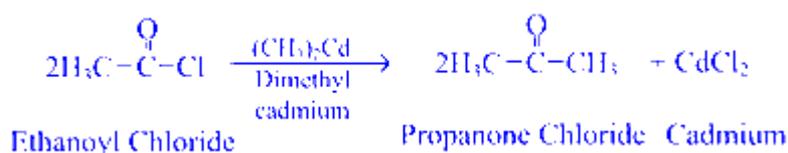
MHT CET 2021 22th September Morning Shift

Options:

- A. Ethyl chloride
- B. Ethylidene dichloride
- C. Ethanoyl chloride
- D. Ethylene dichloride

Answer: C

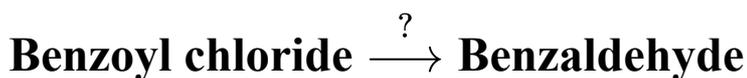
Solution:



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## Question82

Which of the following reagents is used in the reaction shown below?



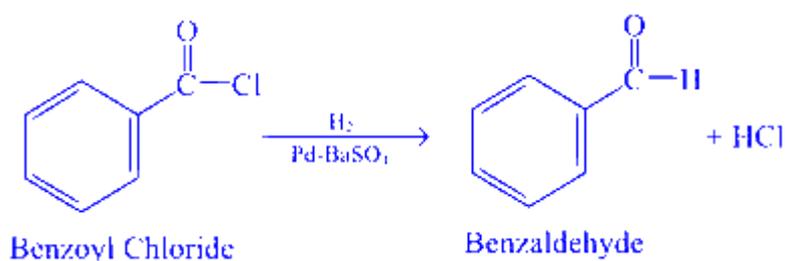
MHT CET 2021 21th September Evening Shift

Options:

- A. DIBAL-H
- B.  $\text{SnCl}_2/\text{HCl}$
- C.  $\text{H}_2/\text{Pd} - \text{BaSO}_4$
- D. Dimethyl cadmium

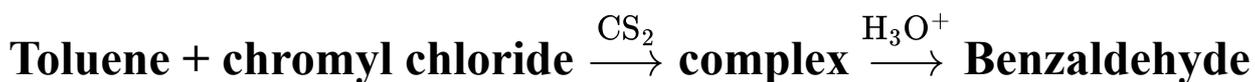
**Answer: C**

**Solution:**



## Question83

**Identify the name of following reaction.**



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**Options:**

- A. Stephen reaction
- B. Etard reaction
- C. Rosenmund reaction
- D. Wolf-Kishner reaction

**Answer: B**

**Solution:**



The reaction described involves the conversion of toluene to benzaldehyde using chromyl chloride ( $CrO_2Cl_2$ ) in the presence of a solvent such as carbon disulfide ( $CS_2$ ), followed by hydrolysis with acidic water ( $H_3O^+$ ). This transformation is characteristic of the **Etard reaction**.

The Etard reaction is a chemical reaction that selectively oxidizes methyl groups attached to an aromatic ring to the corresponding aldehydes. It is a specific and controlled oxidation process, notable for its use in synthetic organic chemistry for the formation of aldehydes from aromatic compounds.

Therefore, the correct option is:

**Option B: Etard reaction**

---

## Question84

**Identify the product formed when benzoyl chloride is reduced by hydrogen using palladium catalyst poisoned with barium sulphate?**

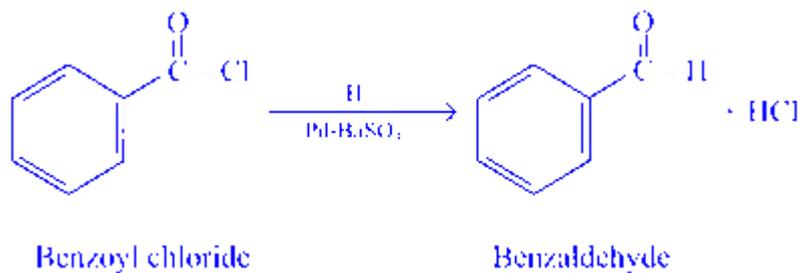
**MHT CET 2021 21th September Evening Shift**

**Options:**

- A. Chlorobenzene
- B. Benzyl alcohol
- C. Benzene
- D. Benzaldehyde

**Answer: D**

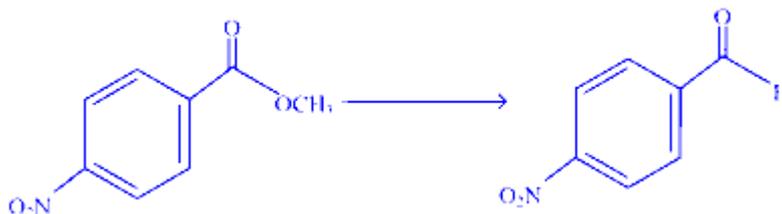
**Solution:**



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## Question85

Identify the reagent used in following conversion.



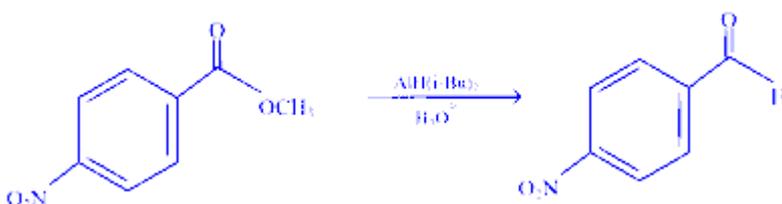
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Options:

- A. CO, HCl/AlCl<sub>3</sub>
- B. CrO<sub>2</sub>Cl<sub>2</sub> · H<sub>3</sub>O<sup>+</sup>
- C. AlH(i - Bu)<sub>2</sub>, H<sub>3</sub>O<sup>+</sup>
- D. CrO<sub>3</sub>, (CH<sub>3</sub>CO)<sub>2</sub>O

Answer: C

Solution:



## Question86

Which from following reactions converts carbonyl group of aldehydes and ketones to methylene group on treatment with zinc amalgam and concentrated HCl ?

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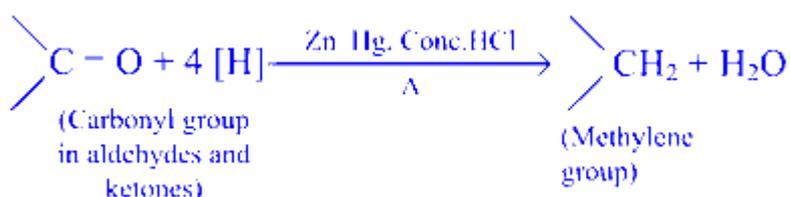
**Options:**

- A. Wolf-Kishner reaction
- B. Stephen reduction
- C. Clemmensen reduction
- D. Rosenmund reduction

**Answer: C**

**Solution:**

Clemmensen reduction



## Question87

Which among the following compounds has highest boiling point?

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**Options:**

- A. Hexanal
- B. Propanal
- C. Ethanal
- D. Pentanal

**Answer: A**

**Solution:**

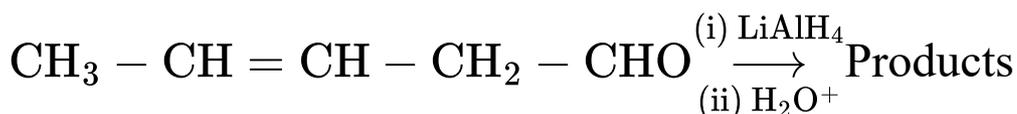
As the molecular mass increases, boiling point of aldehydes increases.

∴ Hexanal has the highest boiling point.

---

## Question88

Identify the product formed in the following reaction,



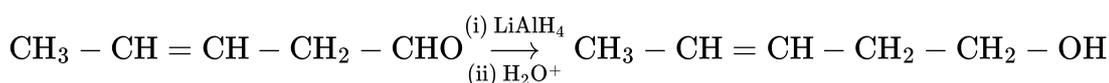
**MHT CET 2021 20th September Evening Shift**

**Options:**

- A.  $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_2 - \text{OH}$
- B.  $\text{CH}_3 - (\text{CH}_2)_3 - \text{CH}_2 - \text{OH}$
- C.  $\text{CH}_3 - \text{CH} - \text{CH} = \text{CH} - \text{CH}_2 - \text{OH}$
- D.  $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_2 - \text{CH}_2 - \text{OH}$

**Answer: D**

**Solution:**



$\text{LiAlH}_4$  does not reduce the isolated olefinic bond and hence it can reduce unsaturated aldehydes and ketones to unsaturated alcohols.

---

## Question89

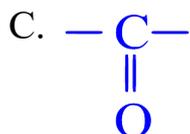
When alcoholic solution of an organic compound is treated with few drops of Schiff's reagent, pink colour appears. This confirms the presence of group

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Options:

A.  $-\text{COOH}$

B.  $-\text{CHO}$



D.  $-\text{CH}_2\text{OH}$

**Answer: B**

**Solution:**

Schiff test confirms the presence of aldehydic ( $-\text{CHO}$ ) group.

---

## Question90

Which of the following compounds on reaction with Grignard reagent followed by hydrolysis forms secondary alcohol?

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Options:

A.  $\text{CH}_3\text{CHO}$

B.  $\text{HCHO}$

C.  $\text{CH}_3\text{CH}_2\text{COCH}_3$

D.  $\text{CH}_3\text{COCH}_3$

**Answer: A**



## Solution:

Aldehydes (except formaldehyde) on reaction with Grignard reagent followed by hydrolysis forms secondary alcohol.

∴  $\text{CH}_3\text{CHO}$  forms secondary alcohol.

---

## Question91

The reagent used in Gatterman-Koch formylation of arene is

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Options:

A.  $\text{CO}_2, \text{HCl}$

B.  $\text{CrO}_2\text{Cl}_2$

C.  $\text{CO}, \text{HCl}$

D. DiBAL-H

**Answer: C**

**Solution:**

Gatterman-Koch formylation of arene



## Question92

Which of the following compounds on reaction with ammonical silver nitrate solution forms precipitate of silver?

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Options:

- A. Ethanal
- B. Ethanoic acid
- C. Ethanol
- D. Ethoxy ethane

Answer: A

Solution:

Silver mirror test or Tollen's test is given by only aldehydes.

Hence, ethanal on reaction with ammonical silver nitrate solution forms precipitate of silver.

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## Question93

Identify A in the following reaction.



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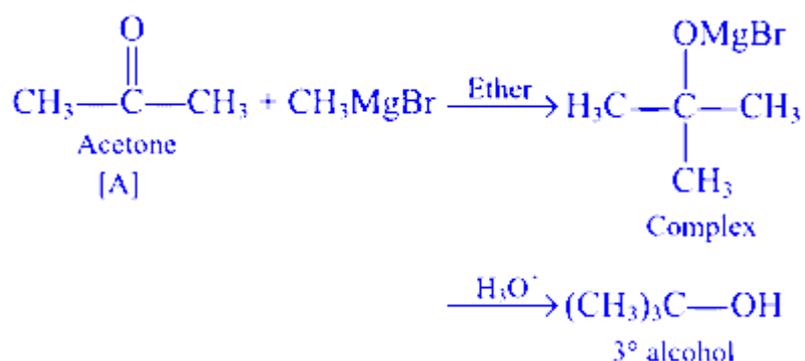
**Options:**

- A. Acetone
- B. Propionaldehyde
- C. Acetaldehyde
- D. Acetyl chloride

**Answer: A**

**Solution:**

Acetone ( $\text{CH}_3\text{COCH}_3$ ) react with methyl magnesium bromide to form magnesium hydroxy bromide complex followed by hydrolysis forms tertiary alcohol.



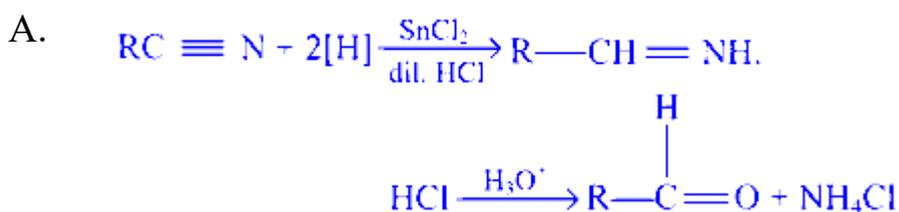
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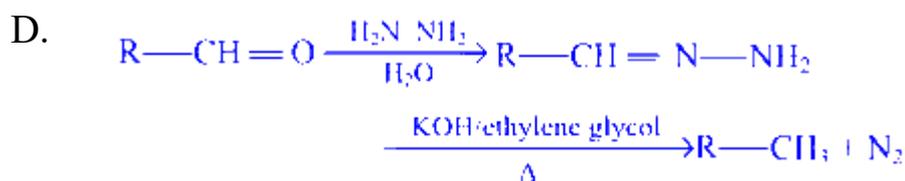
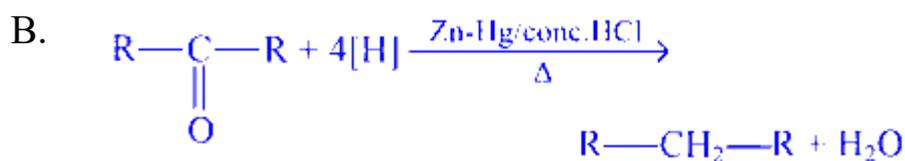
## Question94

**Which of the following is a Stephen reaction?**

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**Options:**

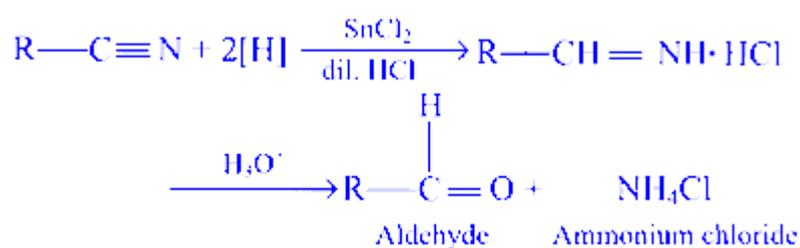




**Answer: A**

### Solution:

Given reaction is called as Stephen reaction. This reaction involves the preparation of aldehyde from nitriles using tin (II) chloride, hydrochloric acid and quenching the resulting iminium salt with water. During the synthesis, ammonium chloride is also produced.



## Question95

Which of the following compound is highly reactive towards HCN?

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**Options:**

- A.  $C_6H_5 - CHO$
- B.  $H - CHO$
- C.  $CH_3 - CHO$
- D.  $CH_3 - CO - CH_3$

**Answer: B**

**Solution:**

$H - CHO$  compound is highly reactive towards  $HCN$ . It is due to less hinderece by methylene group during nucleophilic substitution. The more the bulky methylene group the more the hinderece created for nucleophilic substitution and it is least stable so, due to this most reactive.

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## Question96

**Which of the following compounds reacts with ammonia to form urotropine?**

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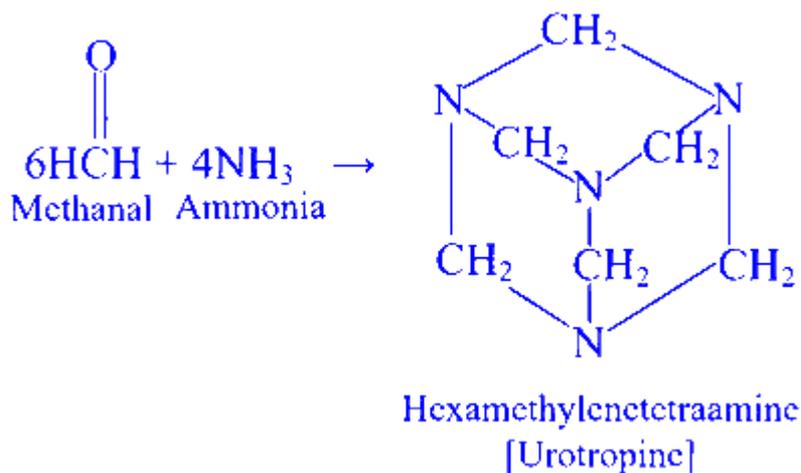
**Options:**

- A. Ethanal
- B. Propanone
- C. Propanal
- D. Methanal

**Answer: D**

**Solution:**

Methanal (HCHO) reacts with ammonia to form urotropine. Reaction is shown below:



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## Question97

Number of oxygen atoms present in salicylaldehyde are

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Options:

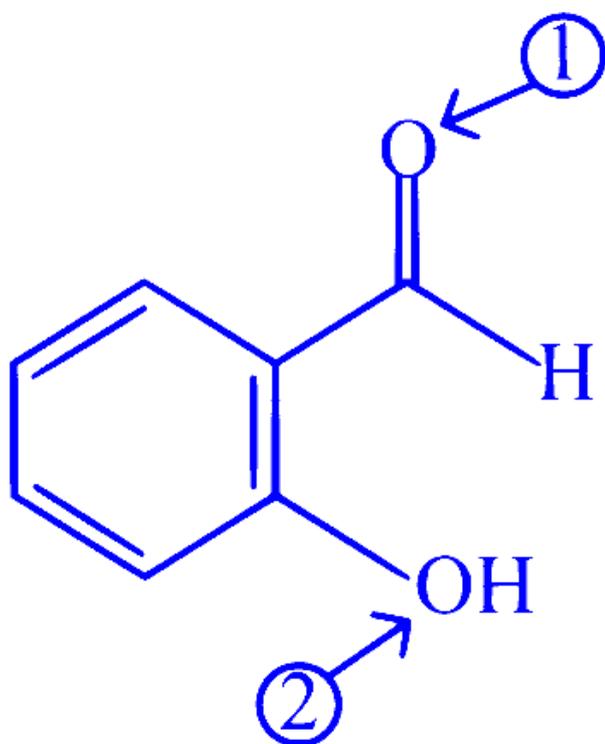
- A. 1
- B. 3
- C. 4
- D. 2

**Answer: D**

**Solution:**

Two oxygen atoms are present in salicylaldehyde. It is the organic compound with formula  $\text{C}_7\text{H}_6\text{O}_2$ . This colourless oily liquid has a bitter almond odour at higher concentration.





Salicylaldehyde

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## Question98

An acylchloride is hydrogenated over catalyst palladium on barium sulphate to form an aldehyde. This reaction is called as

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**Options:**

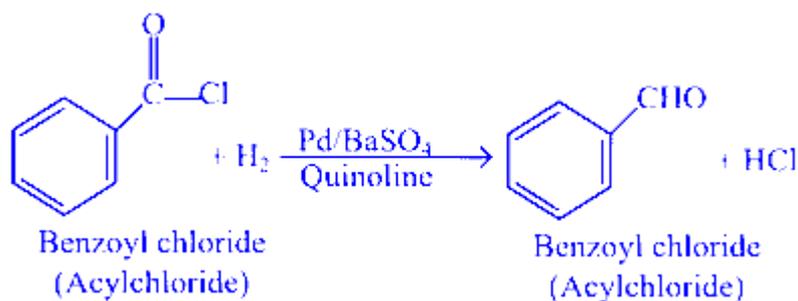
- A. Wolff-Kishner reduction
- B. Etard reaction
- C. Rosenmund reduction
- D. Stephen reaction



**Answer: C**

## Solution:

When acylchloride is hydrogenated over catalyst palladium on barium sulphate to form an aldehyde. This reaction is called Rosenmund reduction.



It is a hydrogenation process in which are acyl chlorides selectively reduced to an aldehyde.

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## Question99

**Propane nitrile on reaction with ethyl magnesium iodide in presence of dry ether gives complex. This imine complex on acid hydrolysis forms**

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**Options:**

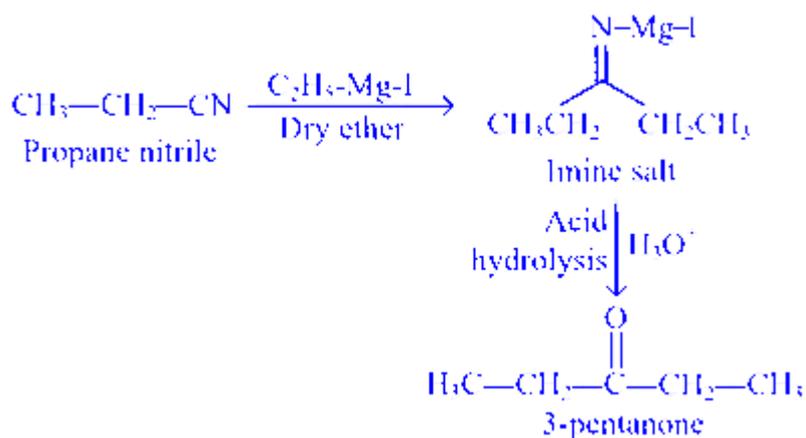
- A. propanone
- B. 2-pentanone
- C. butanone
- D. 3-pentanone

**Answer: D**

## Solution:

When, propane nitrite react with ethyl magnesium iodide in presence of dry ether followed by acid hydrolysis gives 3-pentanone.





## Question100

Which of the following alcohols needs acidic  $\text{KMnO}_4$  to convert it into aldehyde or ketone?

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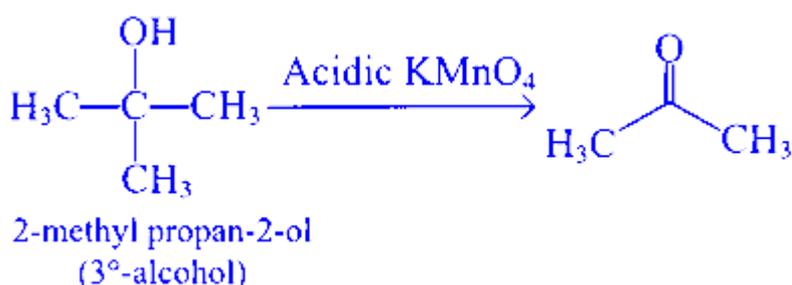
**Options:**

- A. Propan-2-ol
- B. Propan-1-ol
- C. Ethanol
- D. 2-methyl propan-2-ol

**Answer: D**

**Solution:**

2-methyl propan-2-ol needs acidic  $\text{KMnO}_4$  to convert into ketone.



Tertiary alcohol do not undergo oxidation reaction under strong reaction condition such as strong oxidising agents ( $\text{KMnO}_4$ ) and elevated temperature, cleavage of various C–C bonds take place.

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## Question101

Which of the following statements is true for carbonyl group?

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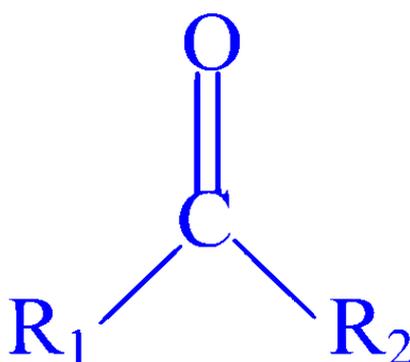
Options:

- A. The carbonyl bond is weaker as compared to double bond in alkene.
- B. C – C – O bond angle is  $90^\circ$ .
- C. Carbon atom forms three sigma bonds.
- D. Carbon atom is  $sp^3$  hybridised.

Answer: C

Solution:

In carbonyl group carbon atom forms three sigma bonds. It can be easily shown as below:



The carbonyl carbon atom is  $sp^2$ -hybridised contributes one electron to each of three hybrid orbitals, forming three sigma ( $\sigma$ ) bonds. The  $\pi$ -electron cloud is above and below the plane. The bond angles are approximately  $120^\circ$  as expected of a trigonal planar structure. Because of the greater electronegativity of oxygen, the carbonyl group is polar and form stable bond in comparison with non-polar double bond of alkene.

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## Question102

Which of the following does not give yellow solid on treatment with sodium hypoiodite?

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**Options:**

- A. Acetophenone
- B. Pentan-3-one
- C. Pentan-2-one
- D. Ethanal

**Answer: B**

**Solution:**

Pentan-3-one does not give yellow solid on treatment with sodium hypoiodite because this reaction is given by only methyl ketones. Ketones that have at least one methyl group linked to the carbonyl carbon atom are oxidised by sodium hypoiodite to sodium salts of corresponding carboxylic acids. This reaction is called iodoform reaction.

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## Question103

Mandelonitrile is obtained by the reaction between hydrogen cyanide and

**MHT CET 2019 2nd May Morning Shift**



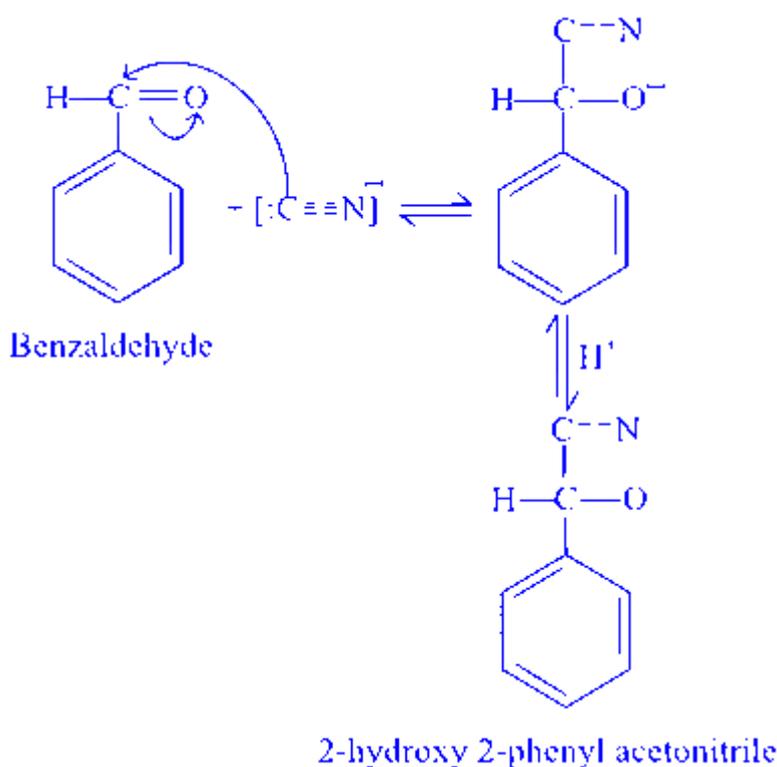
### Options:

- A. propionaldehyde
- B. benzaldehyde
- C. acetaldehyde
- D. acetone

**Answer: B**

### Solution:

Mandelonitrile is obtained by the reaction between hydrogen cyanide and benzaldehyde. Following is the reaction mechanism:



[Commonly known as mandelonitrile].

## Question104

In the reaction,  $\text{C}_6\text{H}_5\text{COCH}_3 \xrightarrow[\text{Zn-Hg/ conc. HCl}]{[\text{H}]} \text{X}$ , X is

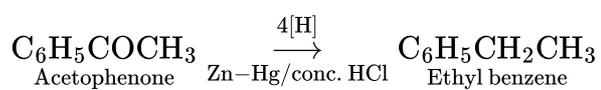
## MHT CET 2019 2nd May Morning Shift

### Options:

- A. toluene
- B. methyl benzene
- C. benzylalcohol
- D. ethyl benzene

**Answer: D**

### Solution:



The above reaction is known as Clemmensen reduction.

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