

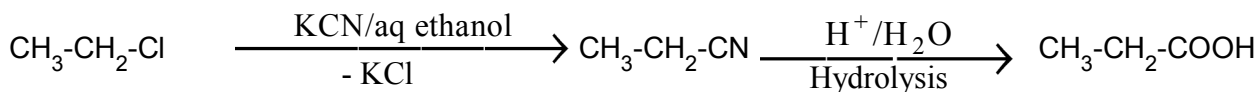
CARBONYL COMPOUNDS AND CARBOXYLIC ACIDS

1. How is propanoic acid is prepared starting from
 (a) an alcohol (b) an alkylhalide (c) an alkene

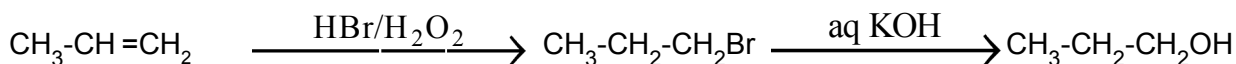
a) An Alcohol converted in to propanoic acid



b) An alkyl halide converted in to propanoic acid

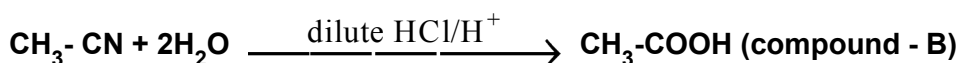


c) An alkene converted in to propanoic acid

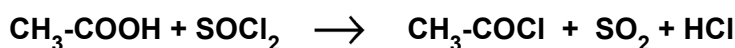


2. A Compound (A) with molecular formula $\text{C}_2\text{H}_3\text{N}$ on acid hydrolysis gives (B) which reacts with thionylchloride to give compound (C). Benzene reacts with compound (C) in presence of anhydrous AlCl_3 to give compound (D). Compound (D) on reduction with gives (E). Identify (A), (B), (C) and D, E Write the equations.

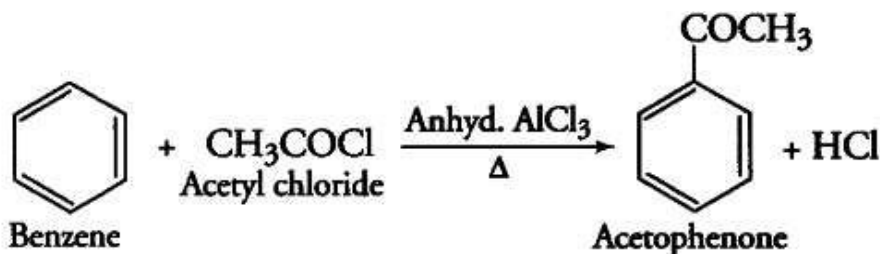
Compound (A) is nitrile (CH_3CN)



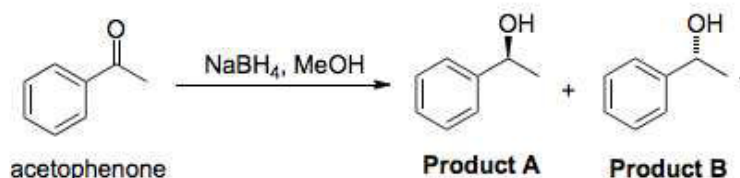
Compound (B) gives Compound (C)



Compound (C) gives Compound (D)



Compound (D) gives Compound (E)



Compound (A)- Nitrile

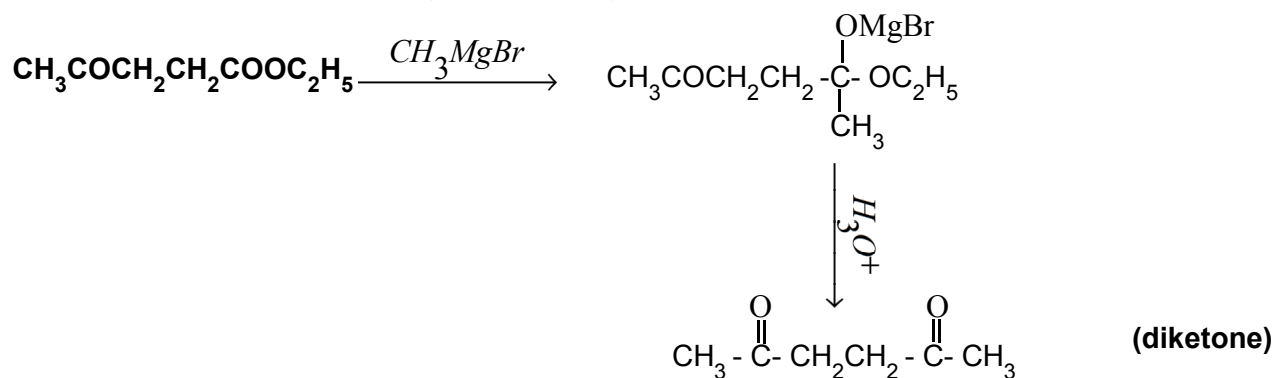
Compound (C)- Acetyl chloride

Compound (E) - Methyl phenyl carbinol

Compound (B) - Acetic acid

Compound (D) - Acetophenone

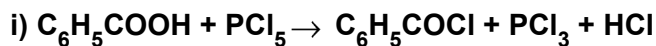
3. Identify X and Y. $\xrightarrow{CH_3MgBr} X \xrightarrow{H_3O^+}$



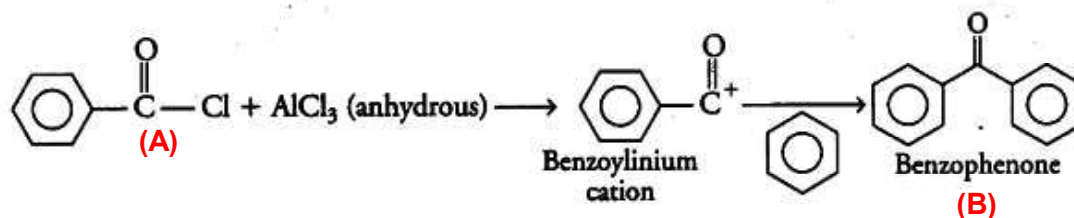
4. Identify A, B and C, Benzoic acid $\xrightarrow{PCl_5}$ A $\xrightarrow[\text{anhydrous } AlCl_3]{\text{benzene}}$ B

$\downarrow C_2H_5OH / H^+$
 C $\xrightarrow{C_6H_5MgBr}$ B

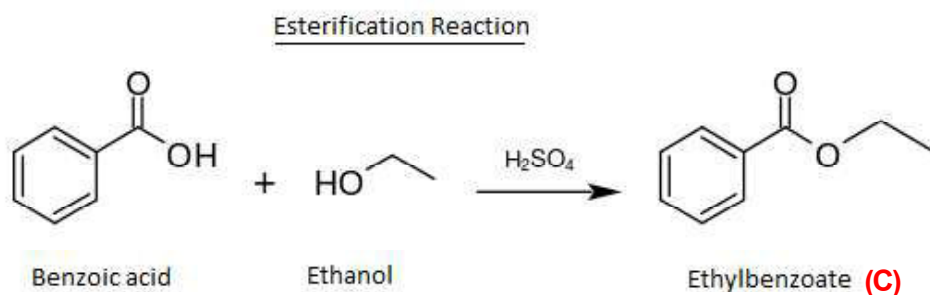
i) benzoic acid to A



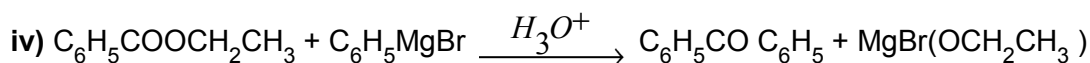
ii) C_6H_5COCl (A) to Benzophenone (B)



iii) benzoic acid to C



(C) to Benzophenone



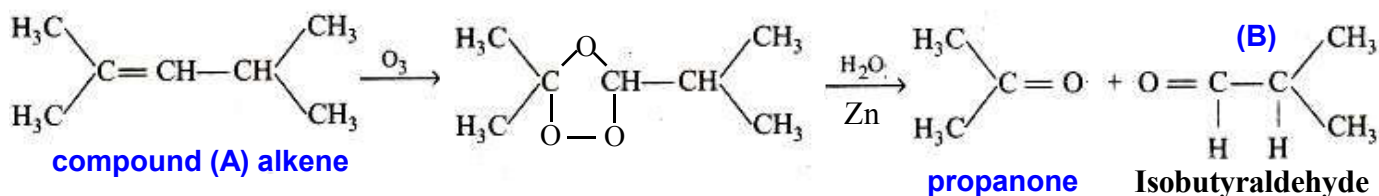
A - C_6H_5COCl (Benzoyl chloride)

B- Benzophenone

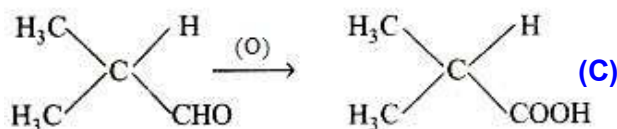
C - Ethyl benzoate

7. An alkene (A) on ozonolysis gives propanone and aldehyde (B). When (B) is oxidised (C) is obtained. (C) is treated with $\text{Br}_2/\text{red-P}$ gives (D) which on hydrolysis gives (E). When propanone is treated with HCN followed by hydrolysis gives (E). Identify A, B, C, D and E.

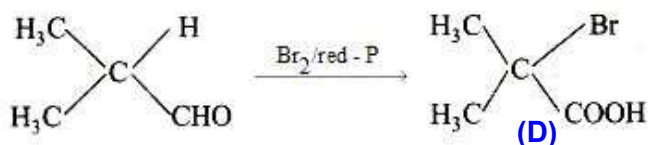
i) An alkene (A) on ozonolysis gives propanone and aldehyde (B) is



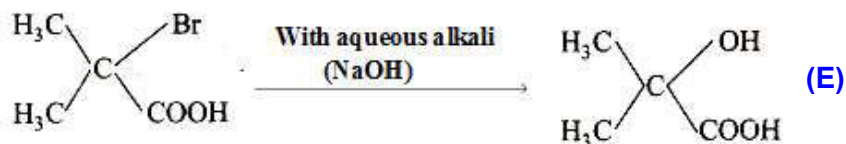
ii) (B) is oxidised to give (C) is Isobutyric acid



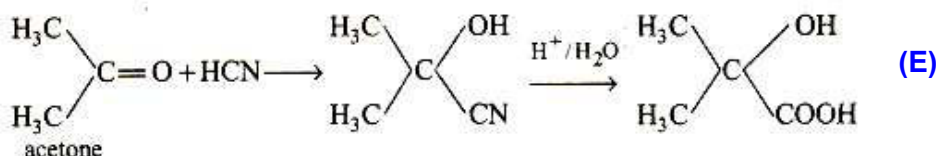
iii) Hell – Volhard – Zelinsky reaction (HVZ reaction) The α - Halogenated acids are convenient starting materials for preparing α - substituted acids.



iv) (D) which on hydrolysis gives (E). (hydrolysis of 'D' with aqueous alkali)



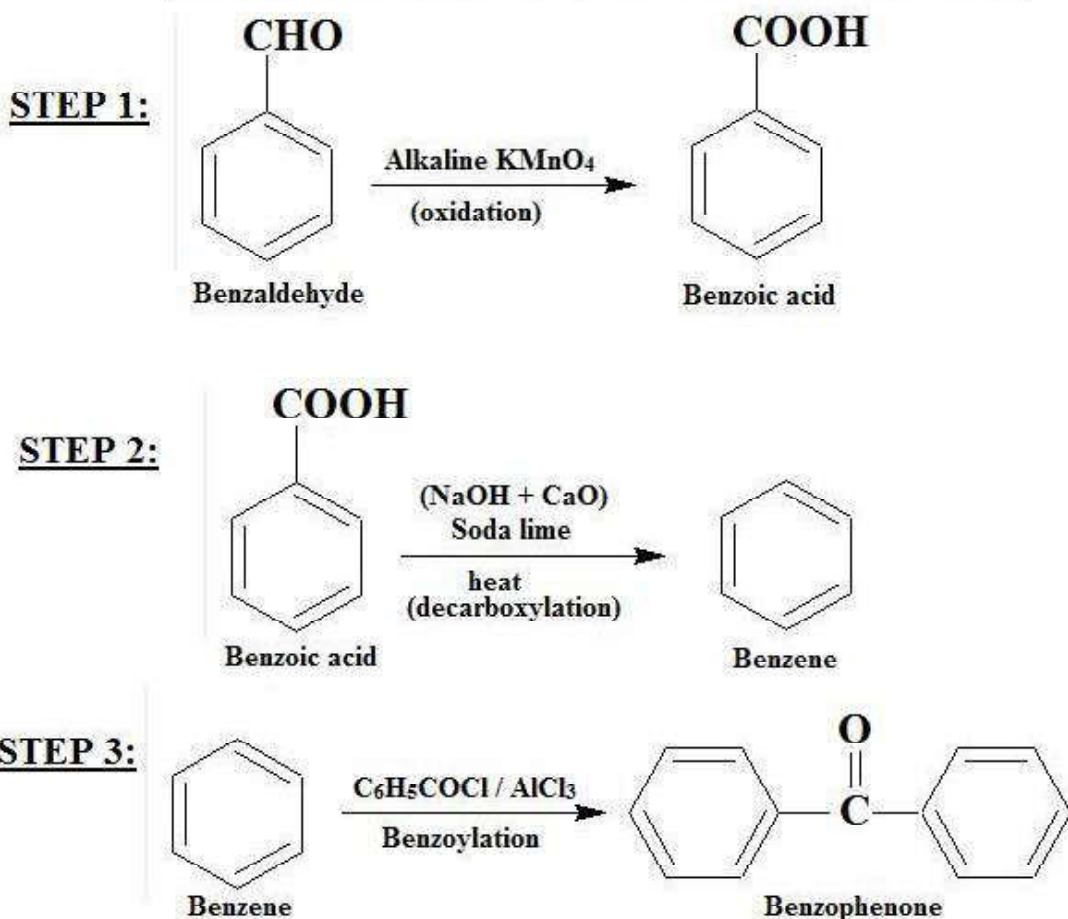
v) propanone is treated with HCN followed by hydrolysis gives (E)



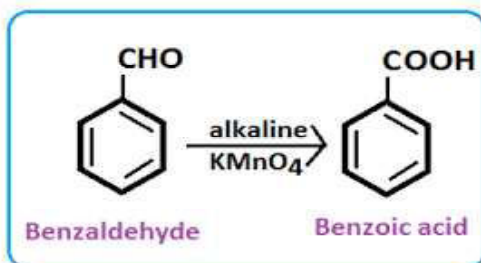
Compound - A	- unsymmetrical alkene
Compound - B	- Isobutyraldehyde
Compound - C	- Isobutyric acid
Compound - D	- 2-Bromo-2-methyl propionic acid
Compound - E	- 2-methyl -2- hydroxy propanoic acid

8. How will you convert benzaldehyde into the following compounds?
 (i) benzophenone (ii) benzoic acid (iii) α -hydroxyphenylacetic acid.

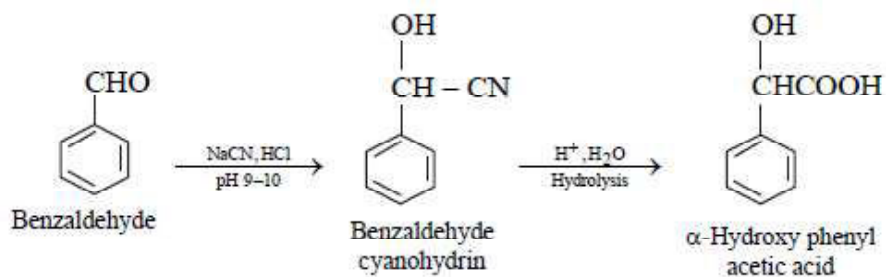
Conversion of benzaldehyde to benzophenone



i) Benzaldehyde into Benzoic acid



i) Benzaldehyde into Benzoic acid



S.SHANMUGAM , PG Assistant

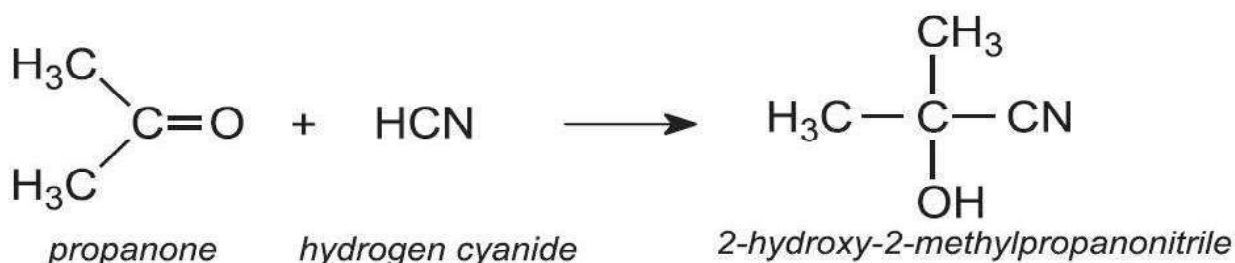
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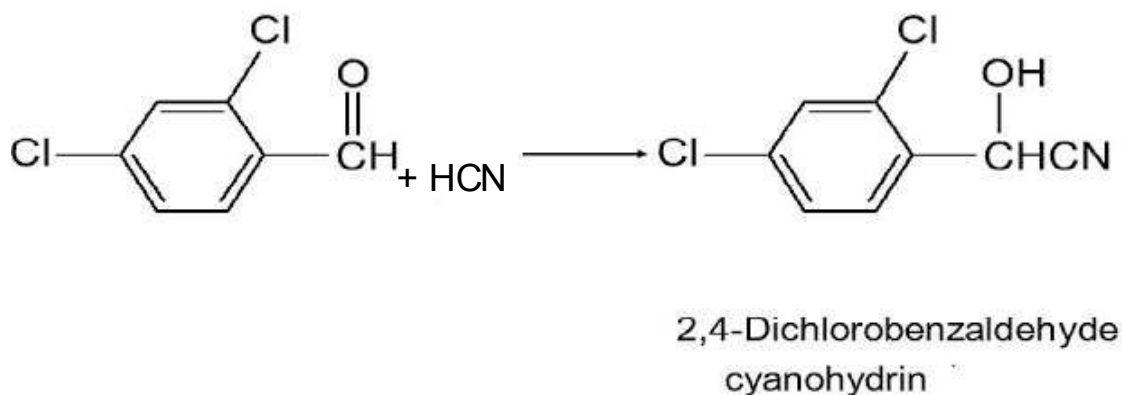
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9. What is the action of HCN on
 (i) propanone (ii) 2,4-dichlorobenzaldehyde. (iii) ethanal

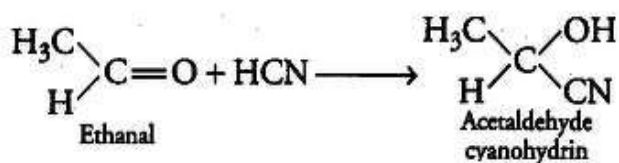
i) Action of HCN on propanone



ii) Action of HCN on 2,4-dichlorobenzaldehyde.



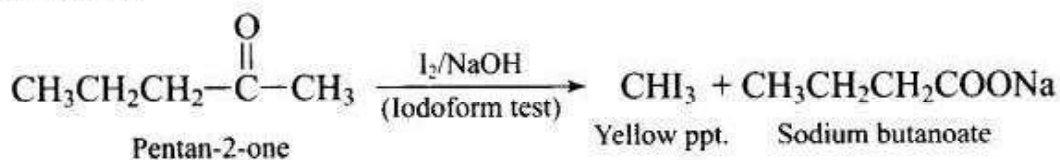
iii) Action of HCN on ethanal



10. A carbonyl compound A having molecular formula $\text{C}_5\text{H}_{10}\text{O}$ forms crystalline precipitate with sodium bisulphate and gives positive iodoform test. A does not reduce Fehling solution. Identify A.

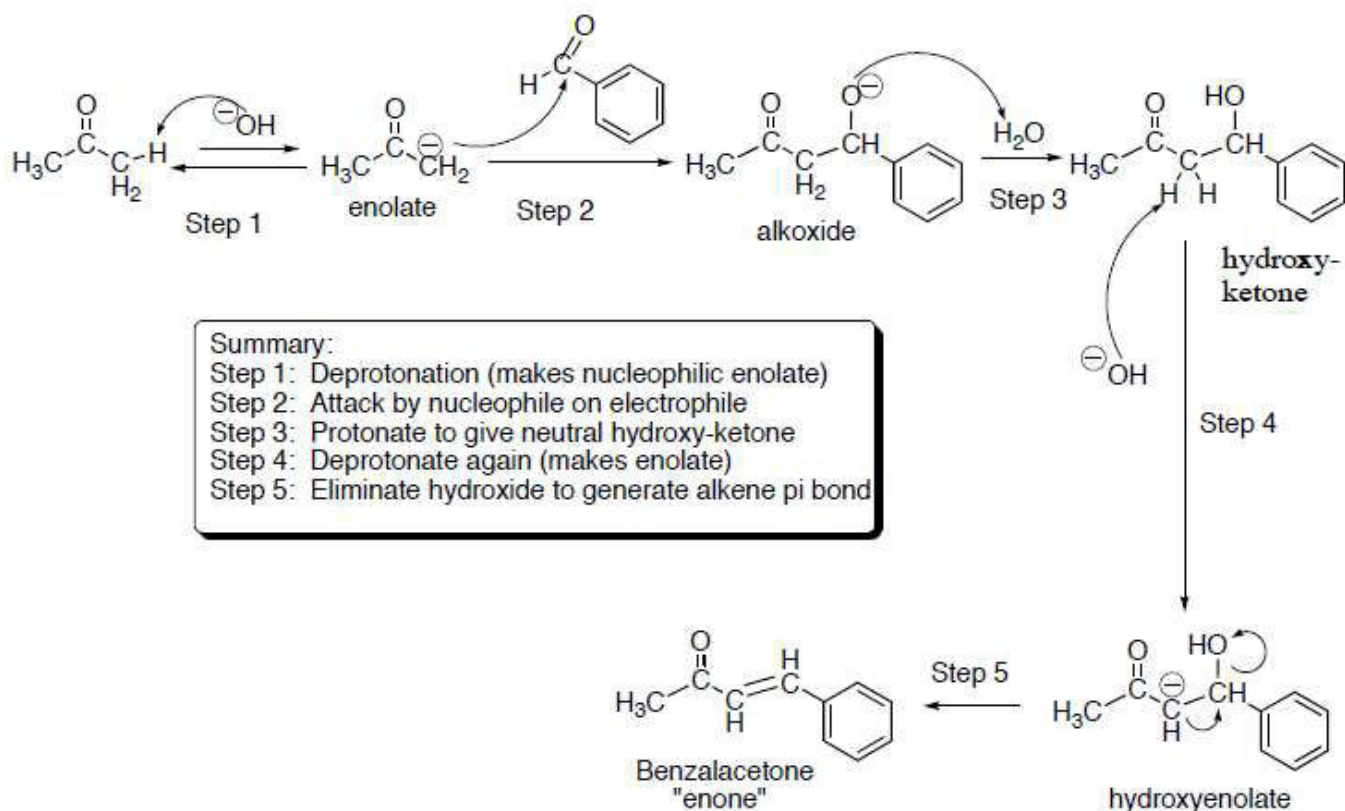
It does not reduce fehling's solution but forms bisulpphite compound so it is a ketone therefore it gives positive iodoform test therefore it is methyl ketone.

Pentan-2-one having a $\begin{array}{c} \text{O} \\ || \\ -\text{C}-\text{CH}_3 \end{array}$ group forms a yellow ppt. of iodoform with an alkaline solution of iodine (i.e., iodoform test) while pentan-3-one does not.



Ans: Compound A is Pentan-2-one

11. Write the structure of the major product of the aldol condensation of benzaldehyde with acetone.

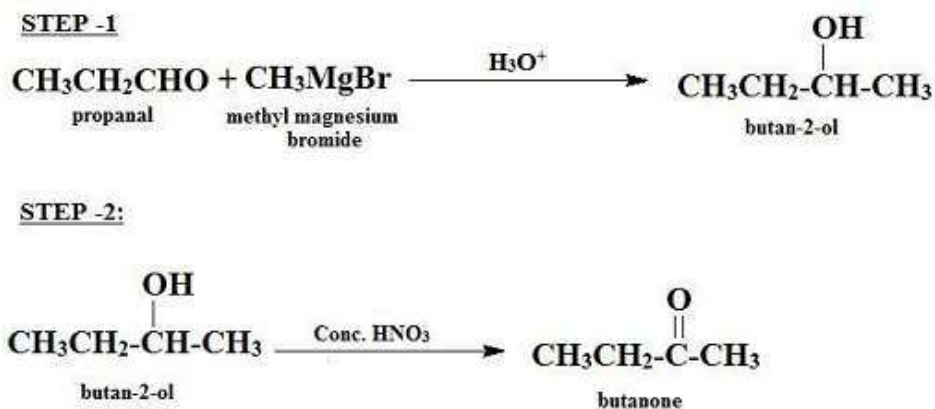


12. How are the following conversions effected

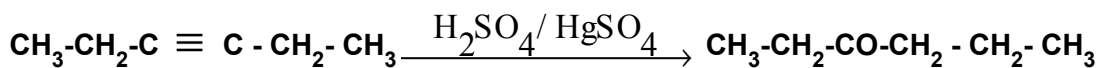
- (a) propanal into butanone (b) Hex-3-yne into hexan-3-one.
(c) phenylmethanal into benzoic acid (d) phenylmethanal into benzoin

(a) propanal into butanone

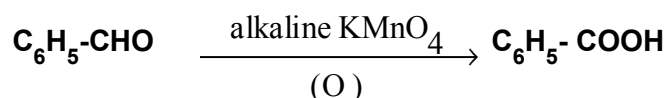
Conversion of propanal to butanone



(b) Hex-3-yne into hexan-3-one.

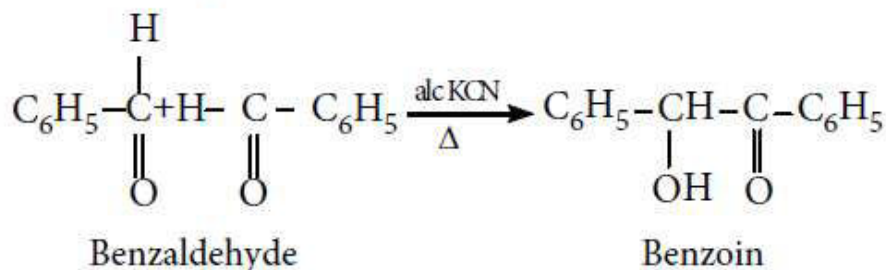
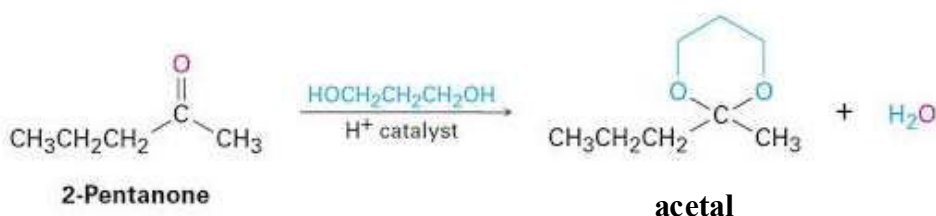
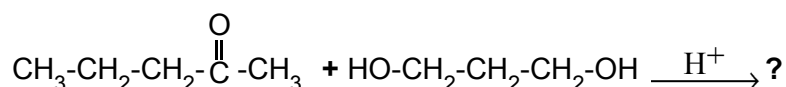
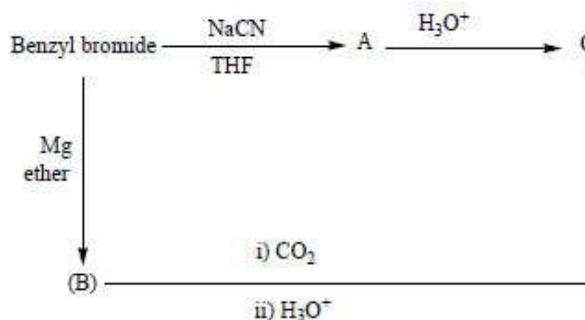


(c) phenylmethanal into benzoic acid

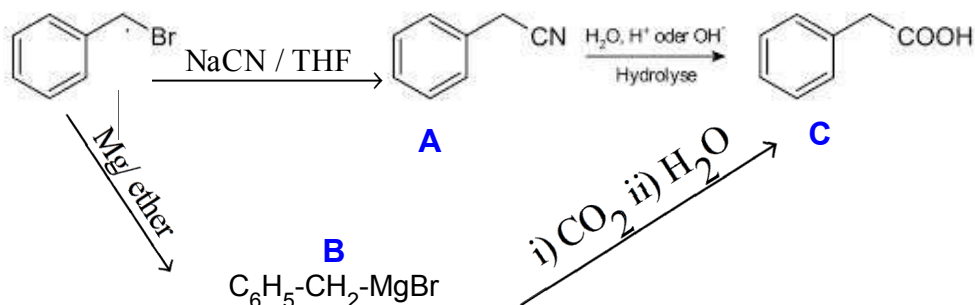
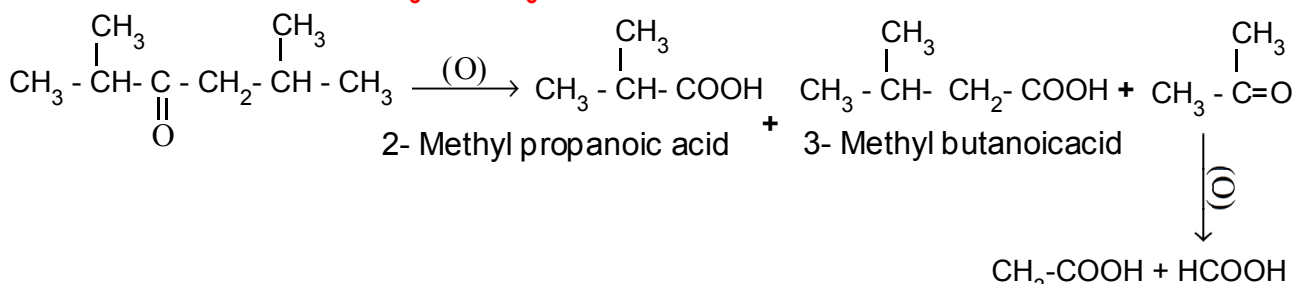


Phenylmethanal into benzoin

Benzaldehyde reacts with alcoholic KCN to form benzoin

**13. Complete the following reaction.****14. Identify A, B and C**

Soln:

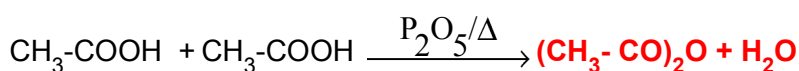
**A - Benzyl cyanide B - Benzyl magnesium bromide C) 2 - Phenyl ethanoic acid****15. Oxidation of ketones involves carbon – carbon bond cleavage. Name the product (s) is / are formed on oxidising 2,5 – dimethylhexan – 2- one using strong oxidising agent .****According to Popoff's rule, the unsymmetrical ketone on oxidation, C-C bond cleavage and keto group goes with CH₃-CH(CH₃)-**

16. How will you prepare

- i. Acetic anhydride from acetic acid
- iii. Acetamide from methylcyanide
- v. Acetophenone from acetyl chloride
- vii. Benzoic acid from toluene
- ix. Cinnamic acid from benzaldehyde

- ii. Ethylacetate from methylacetate
- iv. Lactic acid from ethanal
- vi. Ethane from sodium acetate
- viii. Malachitegreen from benzaldehyde
- x. Acetaldehyde from ethyne

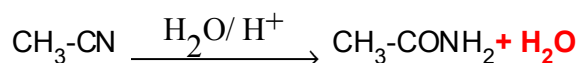
i. Acetic anhydride from acetic acid



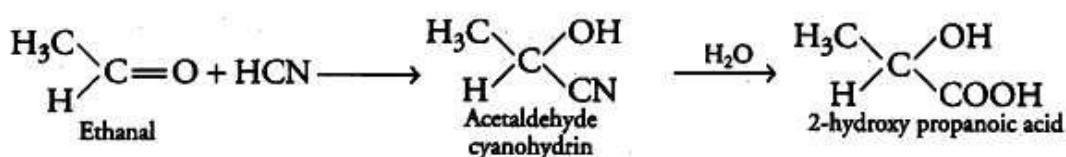
ii. Ethylacetate from methylacetate



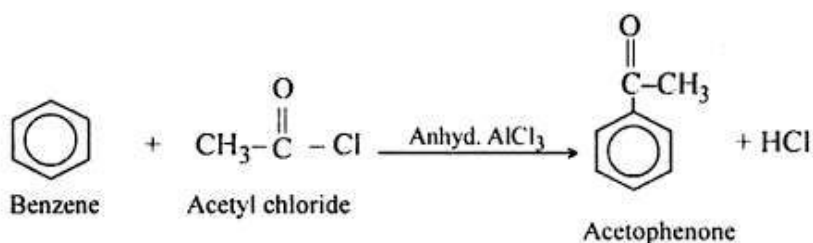
iii. Acetamide from methylcyanide



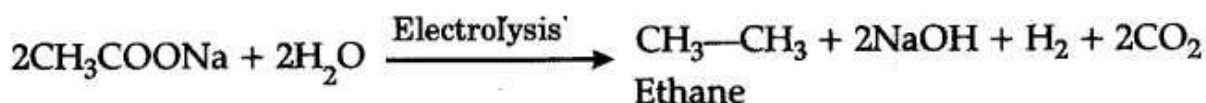
iv. Lactic acid from ethanal



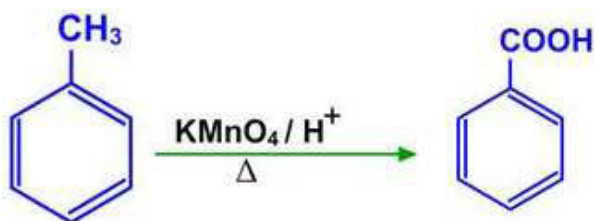
v. Acetophenone from acetyl chloride



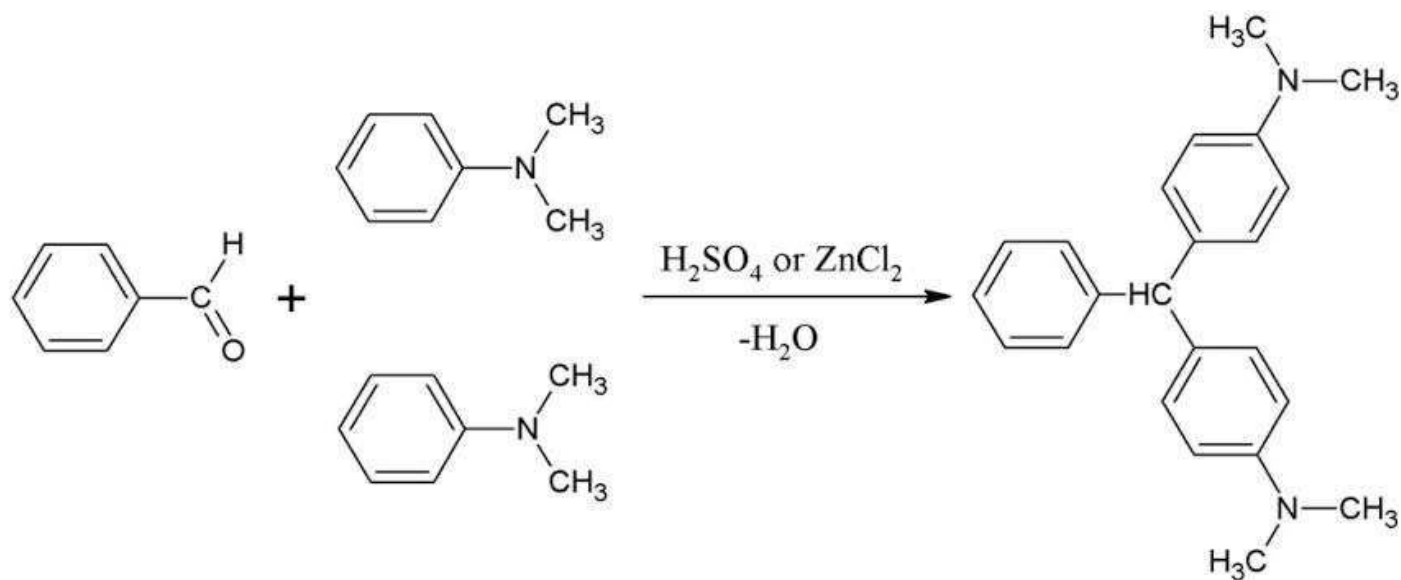
vi. Ethane from sodium acetate



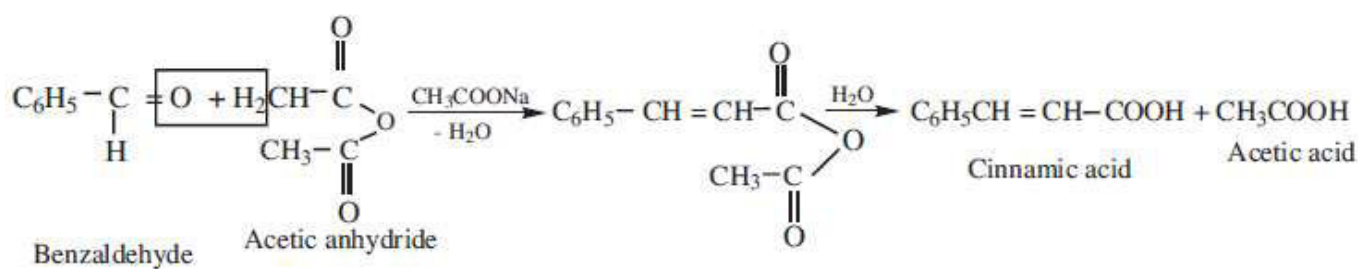
vii. Benzoic acid from toluene



viii. Malachitegreen from benzaldehyde



ix. Cinnamic acid from benzaldehyde



x. Acetaldehyde from ethyne

