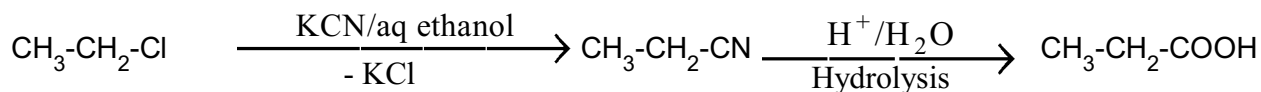


**CARBONYL COMPOUNDS AND CARBOXYLIC ACIDS**

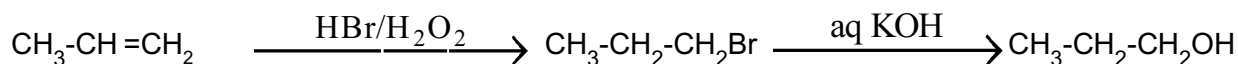
1. How is propanoic acid is prepared starting from  
 (a) an alcohol (b) an alkylhalide (c) an alkene  
**a) An Alcohol converted in to propanoic acid**



**b) An alkyl halide converted in to propanoic acid**

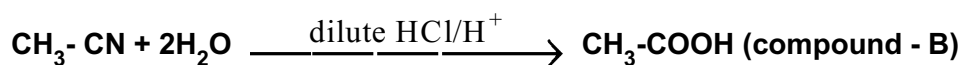


**c) An alkene converted in to propanoic acid**

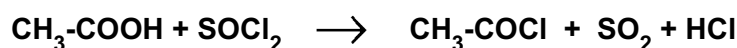


2. A Compound (A) with molecular formula  $\text{C}_2\text{H}_3\text{N}$  on acid hydrolysis gives (B) which reacts with thionylchloride to give compound (C). Benzene reacts with compound (C) in presence of anhydrous  $\text{AlCl}_3$  to give compound (D). Compound (D) on reduction with gives (E). Identify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

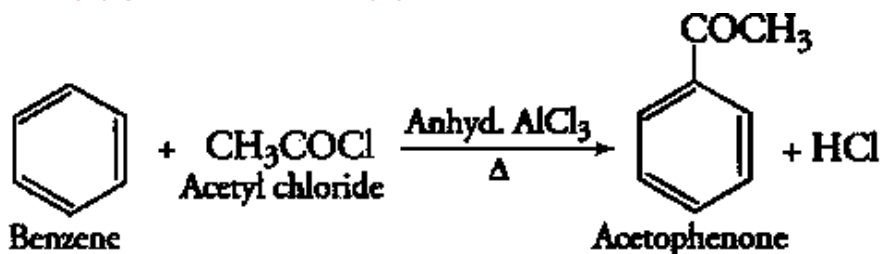
**Compound (A) is nitrile (  $\text{CH}_3\text{CN}$  )**



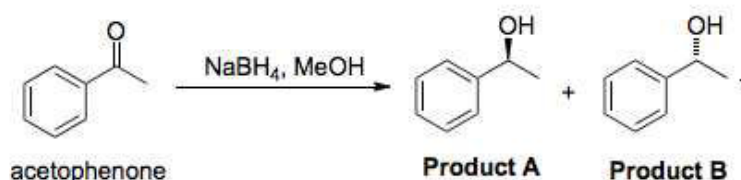
**Compound (B) gives Compound (C)**



**Compound (C) gives Compound (D)**



**Compound (D) gives Compound (E)**



**Compound (A)- Nitrile**

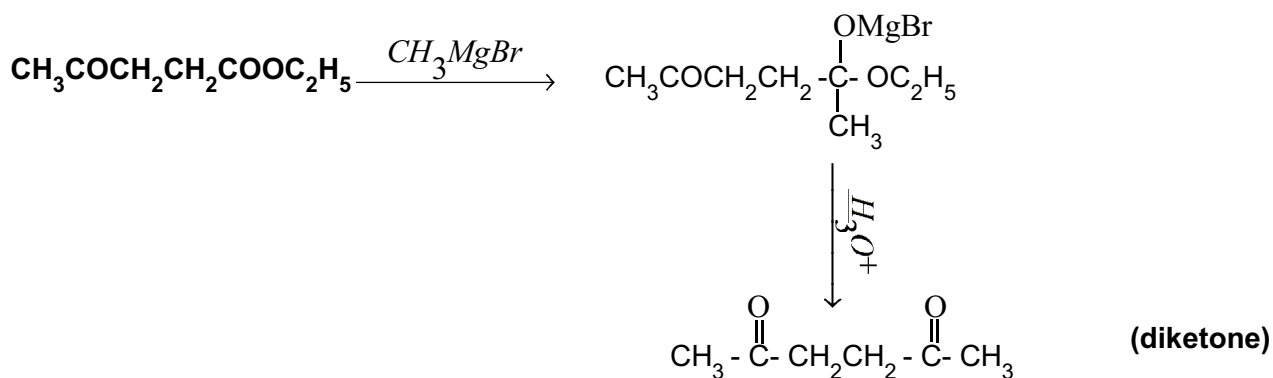
**Compound (C)- Acetyl chloride**

**Compound (E) - Methyl phenyl carbinol**

**Compound (B) - Acetic acid**

**Compound (D) - Acetophenone**

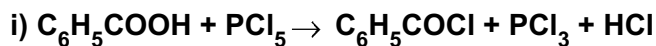
3. Identify X and Y.  $\xrightarrow{CH_3MgBr} X \xrightarrow{H_3O^+}$



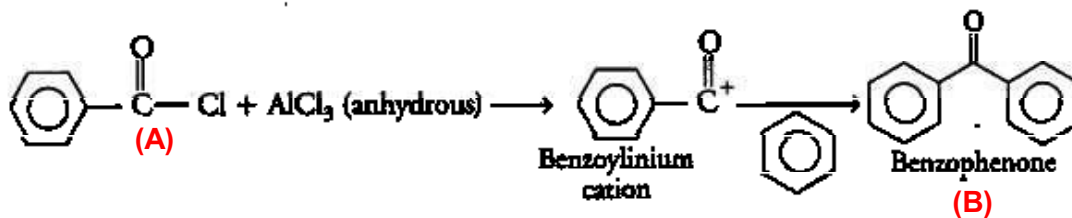
4. Identify A, B and C, Benzoic acid  $\xrightarrow{PCl_5}$  A  $\xrightarrow[\text{anhydrous } AlCl_3]{\text{benzene}}$  B

$\downarrow \begin{matrix} C_2H_5OH / H^+ \\ C \end{matrix}$ 
 $\xrightarrow{C_6H_5MgBr}$

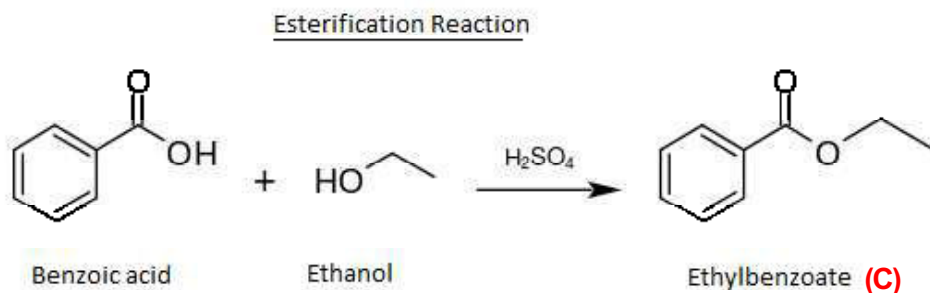
i) benzoic acid to A



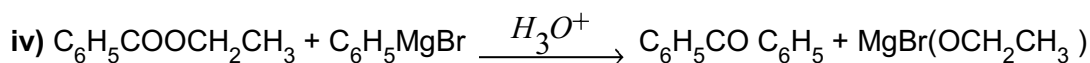
ii)  $C_6H_5COCl$  (A) to Benzophenone (B)



iii) benzoic acid to C



(C) to Benzophenone

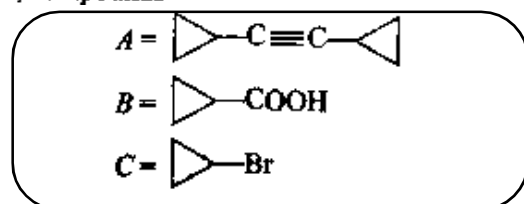
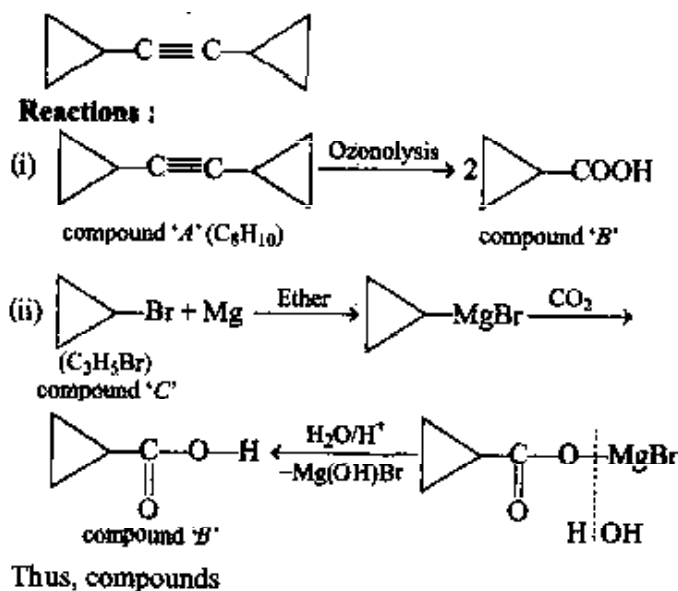


A -  $C_6H_5COCl$  ( Benzoyl chloride )

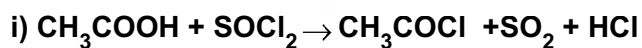
B- Benzophenone

C - Ethyl benzoate

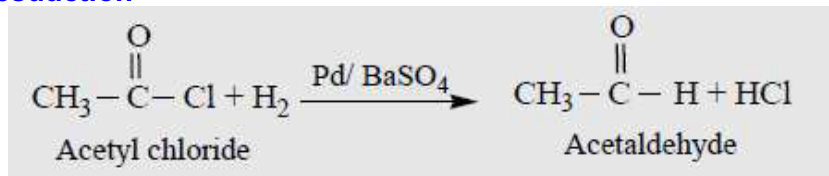
5. A hydrocarbon A (molecular formula  $C_8H_{10}$ ) on ozonolysis gives B ( $C_4H_6O_2$ ) only. Compound C ( $C_3H_5Br$ ) on treatment with magnesium in dry ether gives (D) which on treatment with  $CO_2$  followed by acidification gives (C). Identify A, B and C.



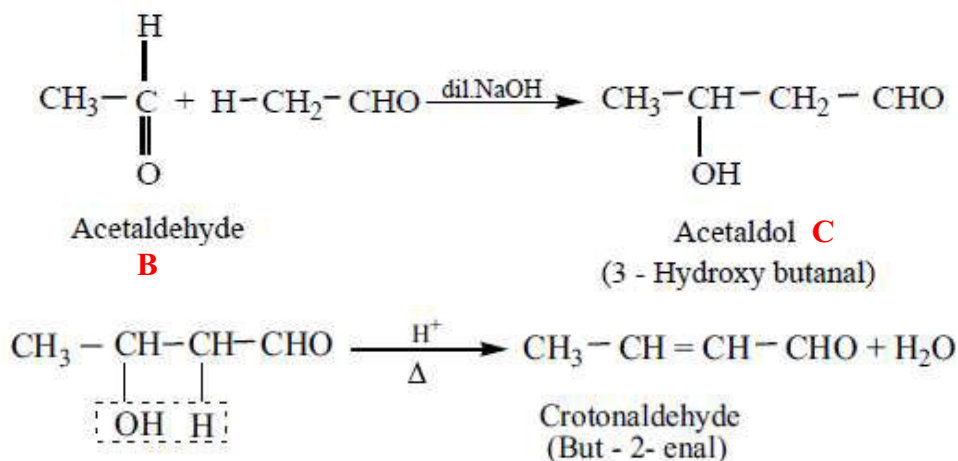
6. Identify A, B, C and D
- ethanoic acid  $\xrightarrow{SOCl_2}$  A  $\xrightarrow{Pd/BaSO_4}$  B  $\xrightarrow{NaOH}$  C  $\xrightarrow{\Delta}$  D



ii) **Rosenmund reduction**



iii) **Aldol condensation**



A- Acetyl Chloride

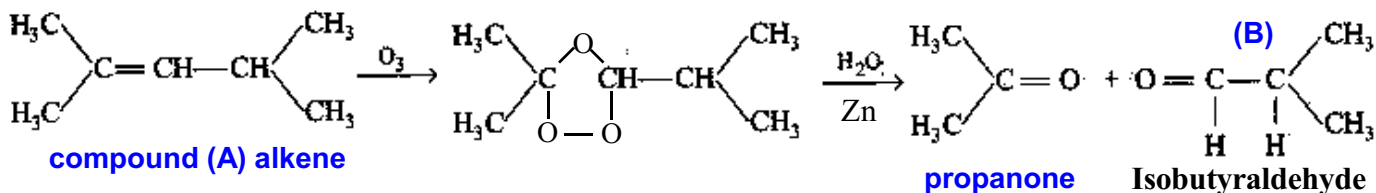
B- Acetaldehyde

C- Aldol

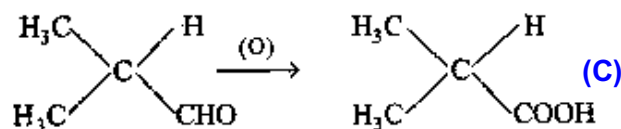
D - Crotonaldehyde

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  $\text{HCN}$  followed by hydrolysis gives (E). Identify A, B, C, D and E.

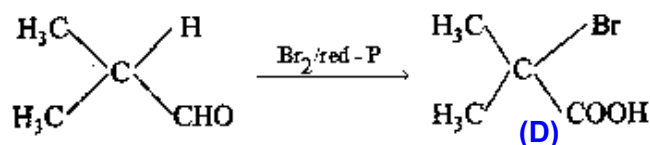
i) An alkene (A) on ozonolysis gives propanone and aldehyde (B) is



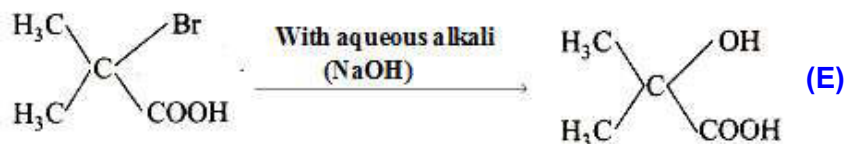
ii) (B) is oxidised to give (C) is Isobutyric acid



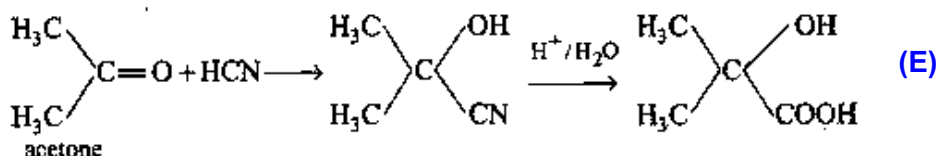
iii) Hell – Volhard – Zelinsky reaction (HVZ reaction) The  $\alpha$ - Halogenated acids are convenient starting materials for preparing  $\alpha$  - substituted acids.



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



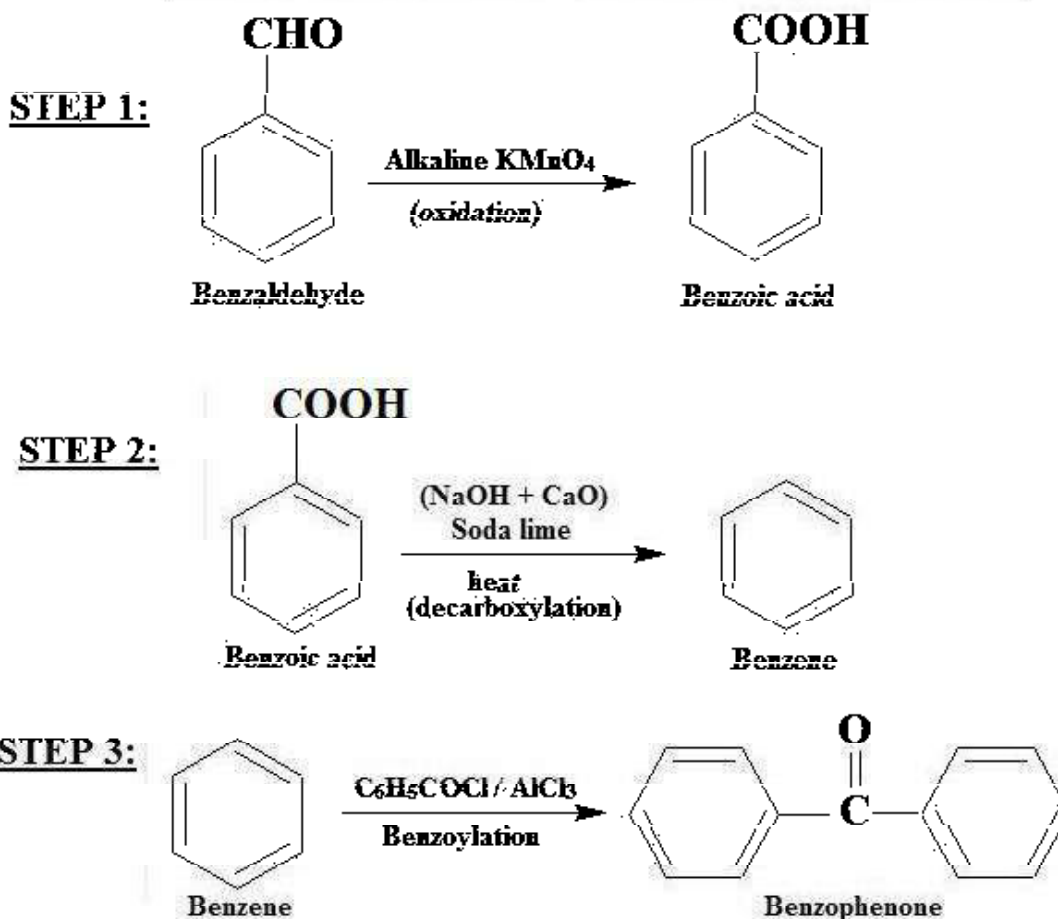
v) propanone is treated with  $\text{HCN}$  followed by hydrolysis gives (E)



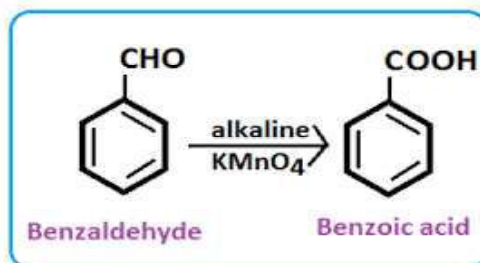
Compound - A	- unsymmetrical alkene
Compound - B	- Isobutyraldehyde
Compound - C	- Isobutyric acid
Compound - D	- 2-Bromo-2-methyl propionic acid
Compound - E	- 2-methyl -2- hydroxy propanoic acid

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

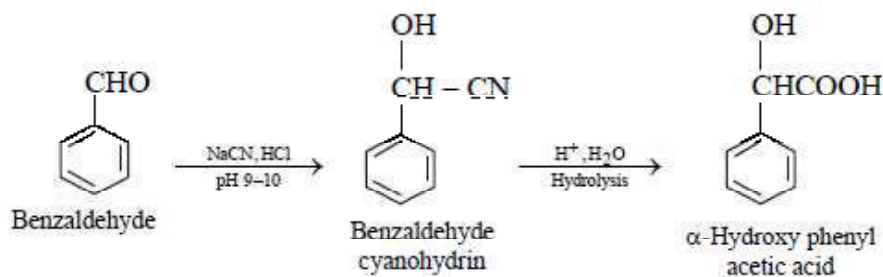
### Conversion of benzaldehyde to benzophenone



i) Benzaldehyde into Benzoic acid



i) Benzaldehyde into Benzoic acid



**S.SHANMUGAM , PG Assistant**

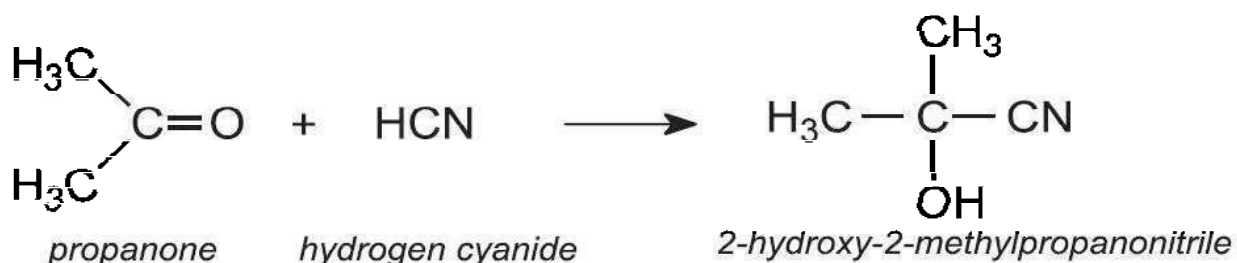
**Dept of Chemistry**

**St.John's M.H.S.S porur Chennai -116**

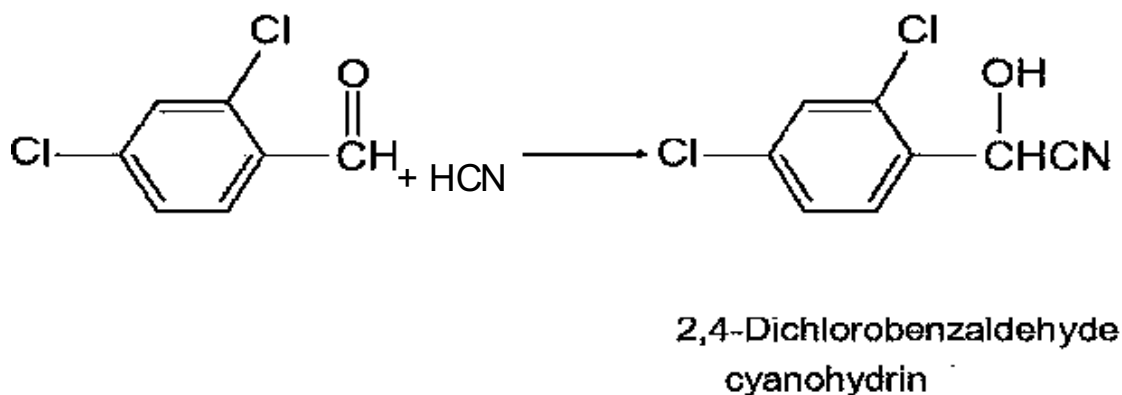
**Mob: 9841945665**

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

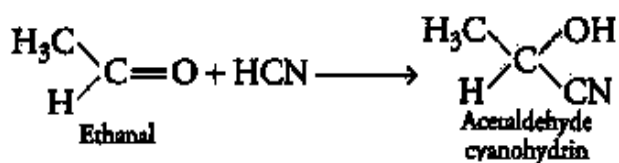
**i) Action of HCN on propanone**



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



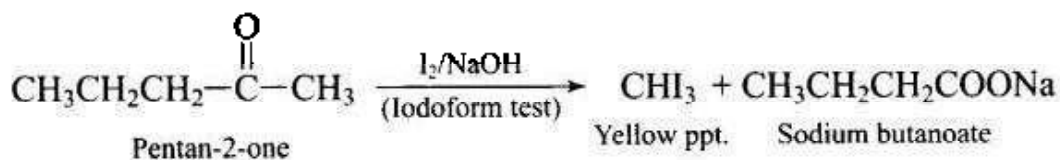
**iii) Action of HCN on ethanal**



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.

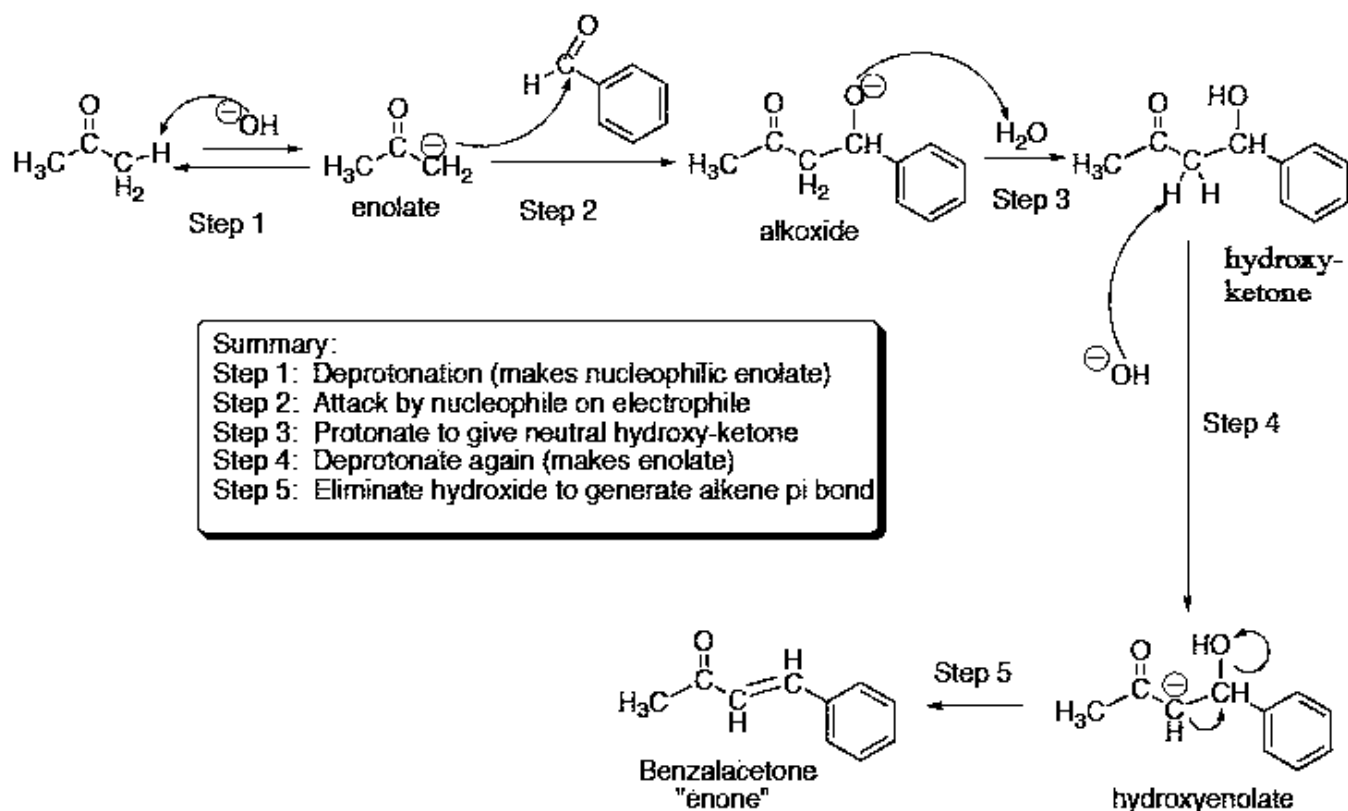
It does not reduce fehling's solution but forms bisulphite compound so it is a ketone therefore it gives positive iodoform test therefore it is methyl ketone.

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.

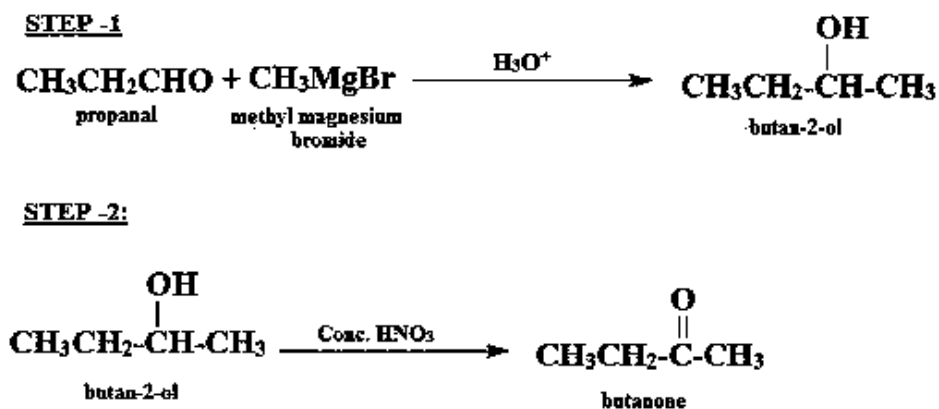


12. How are the following conversions effected

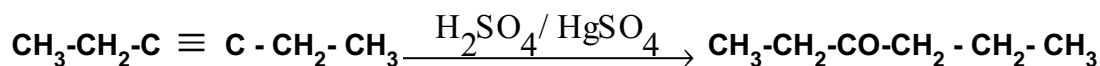
- (a) propanal into butanone (b) Hex-3-yne into hexan-3-one.  
 (c) phenylmethanal into benzoic acid (d) phenylmethanal into benzoin

(a) propanal into butanone

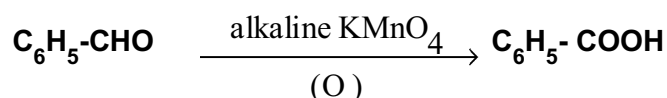
Conversion of propanal to butanone



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

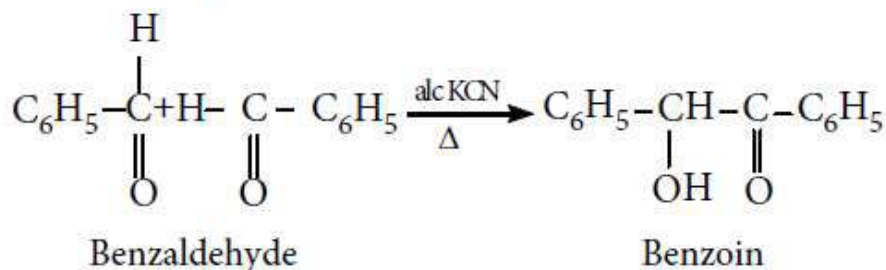
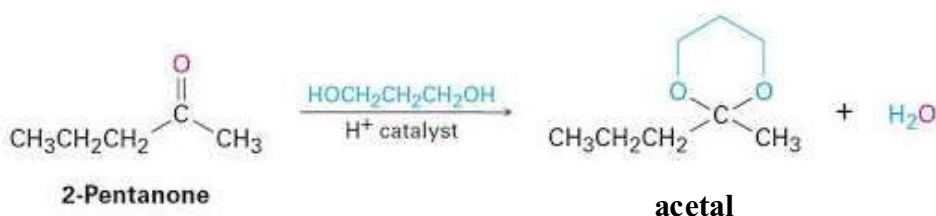
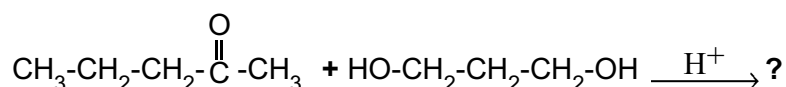
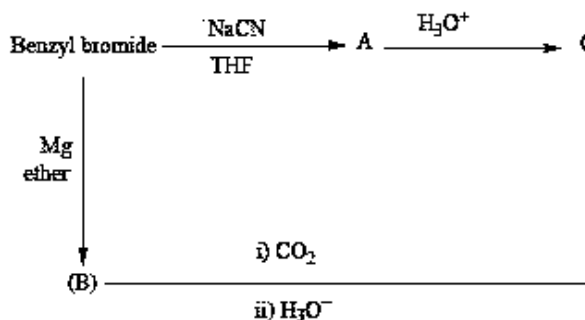


(c) phenylmethanal into benzoic acid

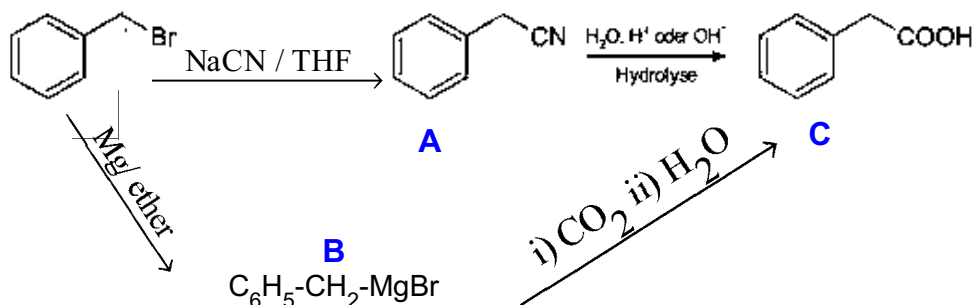
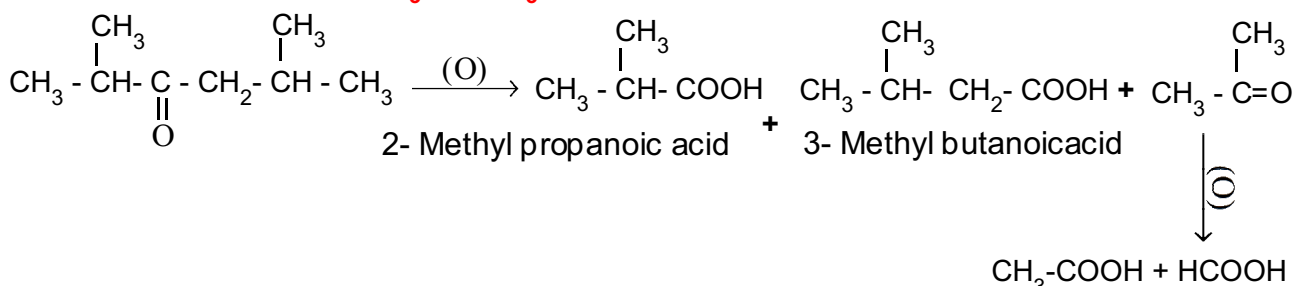


**Phenylmethanal into benzoin**

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 CH<sub>3</sub>-CH(CH<sub>3</sub>)-**

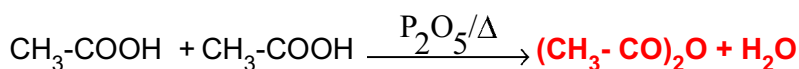


16. How will you prepare

- i. Acetic anhydride from acetic acid
- iii. Acetamide from methylcyanide
- v. Acetophenone from acetylchloride
- 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

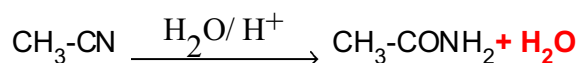
**i. Acetic anhydride from acetic acid**



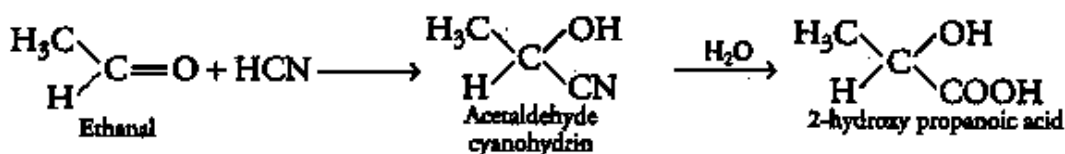
**ii. Ethylacetate from methylacetate**



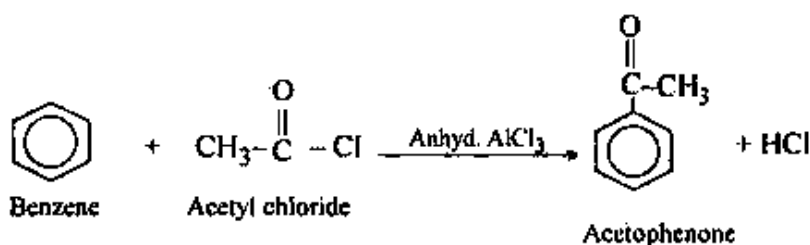
**iii. Acetamide from methylcyanide**



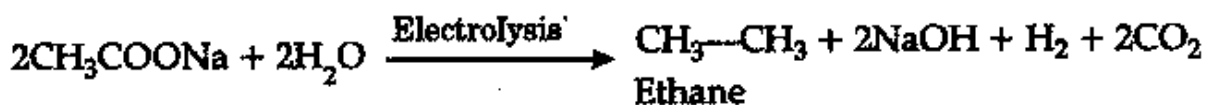
**iv. Lactic acid from ethanal**



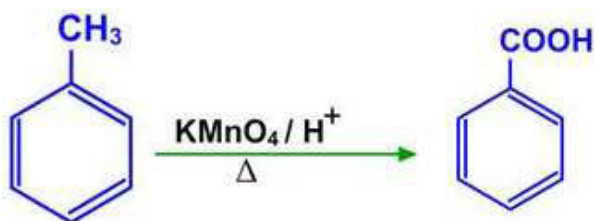
**v. Acetophenone from acetylchloride**



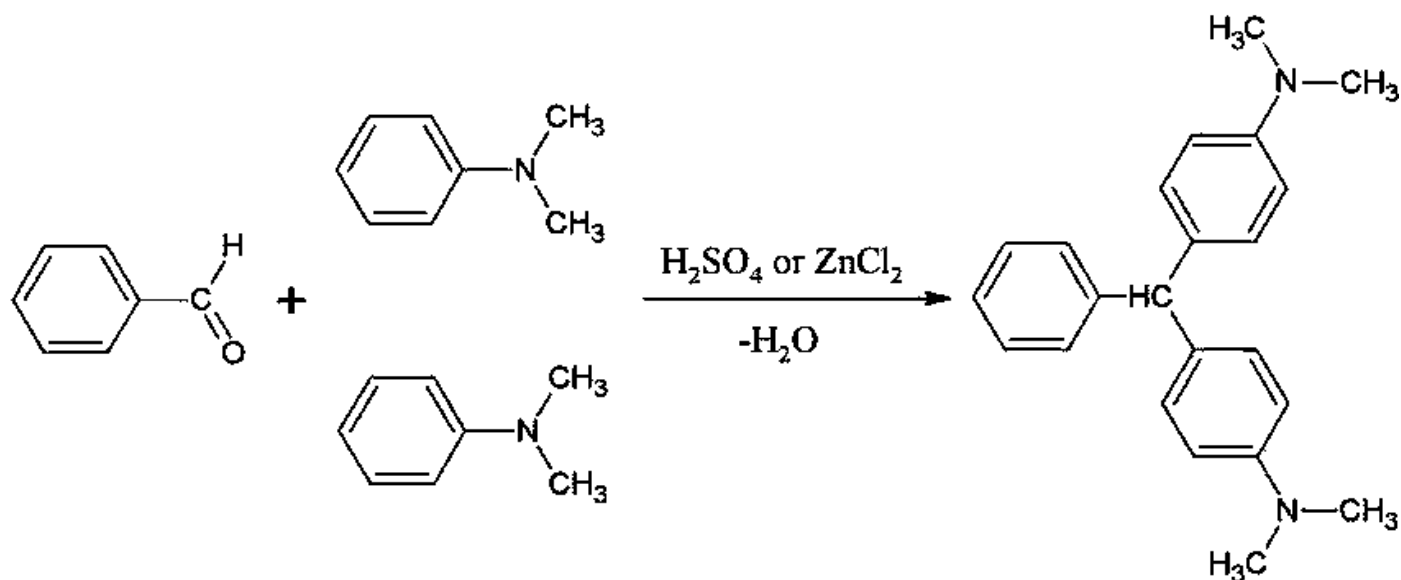
**vi. Ethane from sodium acetate**



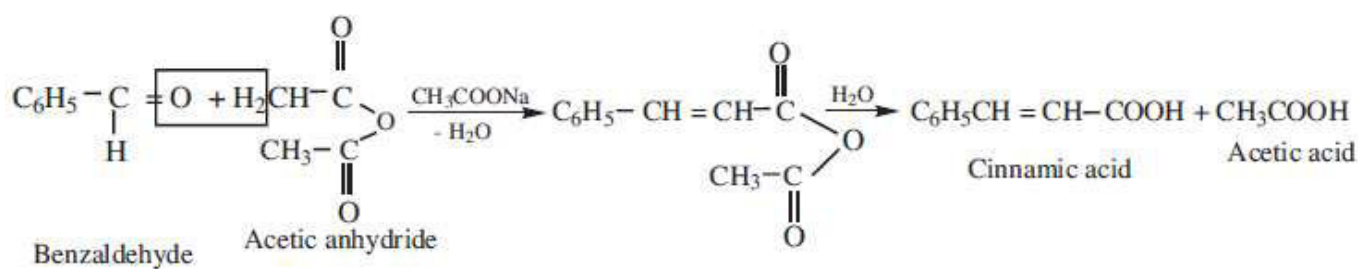
**vii. Benzoic acid from toluene**



## viii. Malachitegreen from benzaldehyde



## ix. Cinnamic acid from benzaldehyde



## x. Acetaldehyde from ethyne

