



Padalsalai's Telegram Groups!

(தலைப்பிற்கு கீழே உள்ள லிங்கை கிளிக் செய்து குழுவில் இணையவும்!)

- Padalsalai's NEWS - Group
https://t.me/joinchat/NIfCqVRBNj9hhV4wu6_NqA
- Padalsalai's Channel - Group
<https://t.me/padasalaichannel>
- Lesson Plan - Group
<https://t.me/joinchat/NIfCqVWwo5iL-21gpzrXLw>
- 12th Standard - Group
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- 11th Standard - Group
https://t.me/Padalsalai_11th
- 10th Standard - Group
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- 9th Standard - Group
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- 6th to 8th Standard - Group
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- 1st to 5th Standard - Group
https://t.me/Padalsalai_1to5
- TET - Group
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- PGTRB - Group
https://t.me/Padalsalai_PGTRB
- TNPSC - Group
https://t.me/Padalsalai_TNPSC

Class : XII Sub: Chemistry Volume - II
Unit - II

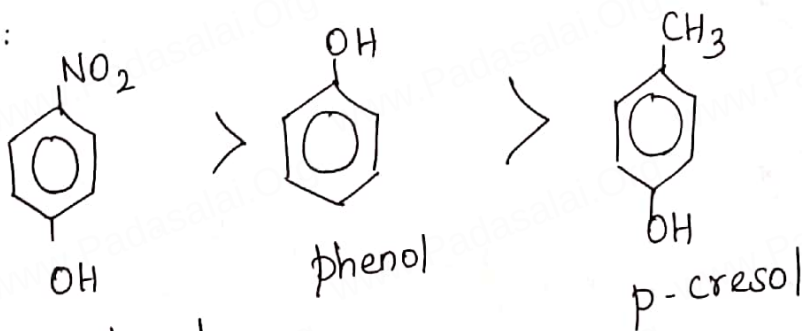
Alcohols, Phenols and Ethers

2 Marks :

1. Arrange the following compounds in the increasing order of their acid strength:

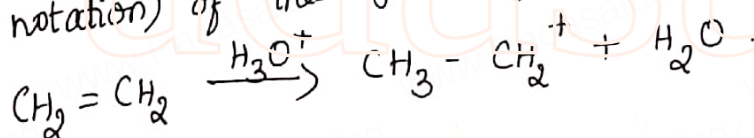
p-cresol, p-nitrophenol, phenol.

Ans:

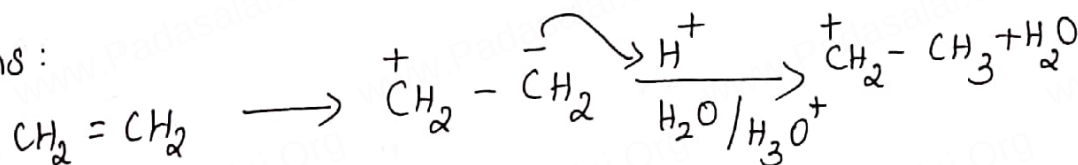


p-nitrophenol

2. Write the mechanism (using curved arrow notation) of the following reaction:

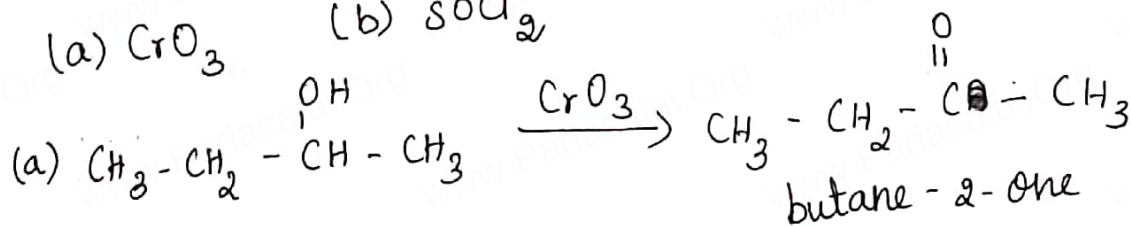


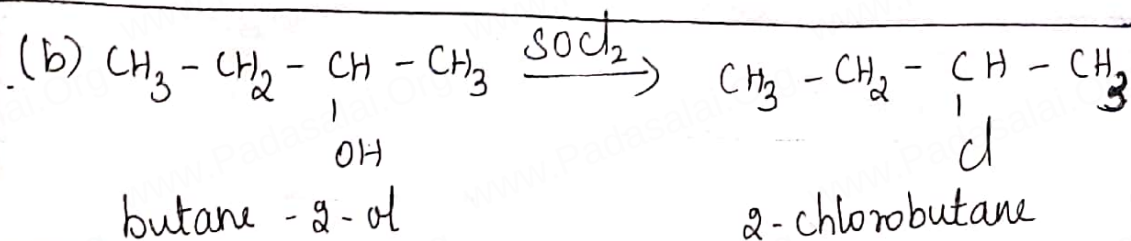
Ans:



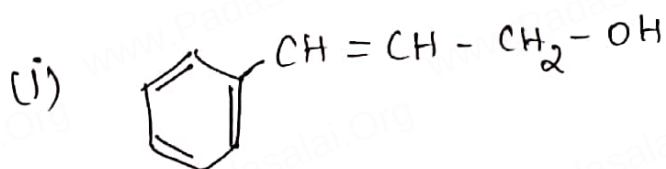
3. Write the structures of the products when butan-2-ol reacts with the following:

(a) CrO_3 (b) SOCl_2

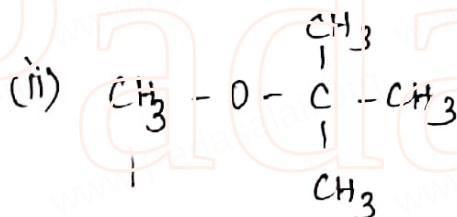
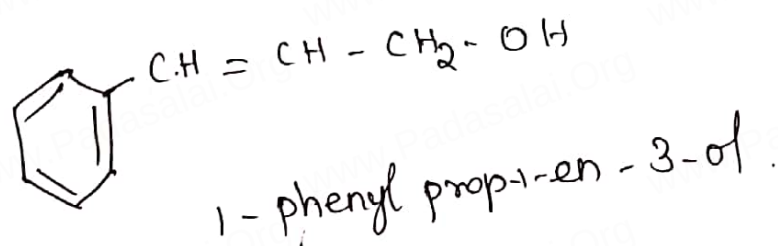




4. Write the IUPAC name of the following compound.

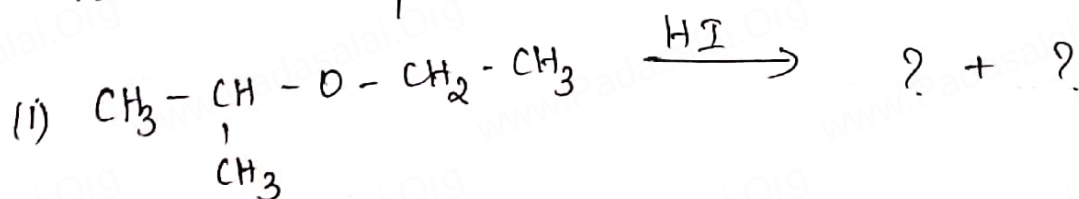


Ans:

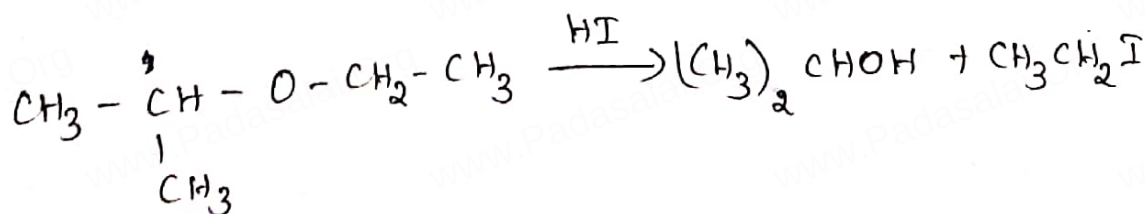


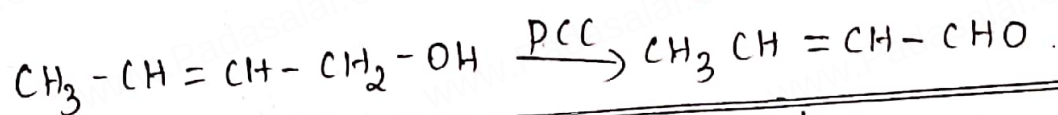
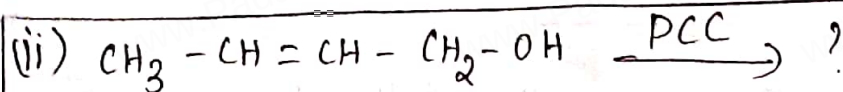
Ans: tert-butyl methyl ether

5. Write the products in the following reaction:



Ans:





6. Give simple chemical tests to distinguish between the following pairs of compounds:
(i) Ethanol and phenol.

Ans:

When neutral ferric chloride is added to both the compounds phenol gives violet coloured complex whereas ethanol does not give this complex when treated with ferric chloride solution.

(ii) Propanol and 2-methyl propan-2-ol

Ans: When both the solutions were treated with anhydrous ZnCl_2 and conc. HCl (Lucas test), the 2-methyl propan-2-ol gives the turbidity immediately whereas propanol does not give the turbidity immediately.

7. (a) Write the formula of reagents used in the following reactions:

(i) Bromination of phenol to 2,4,6-tribromophenol.

Ans: Aq. Br_2

(ii) Hydroboration of propene and then oxidation to propanol.

Ans: B_2H_6 and then H_2O_2 and OH^-

(b) Q: Arrange the following compound groups in the increasing order of their property indicated:

(i) p-nitrophenol, ethanol, phenol (acidic character)

Ans:

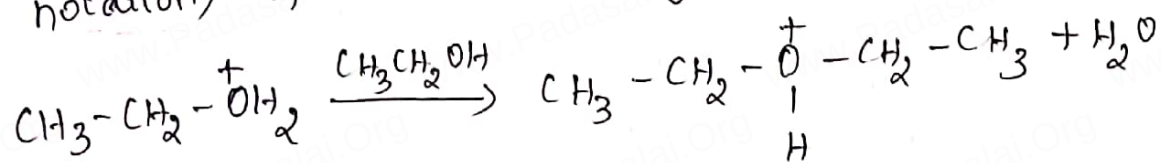
Ethanol < phenol < p-nitrophenol.

(ii) propanol, propane, propanal (boiling point)

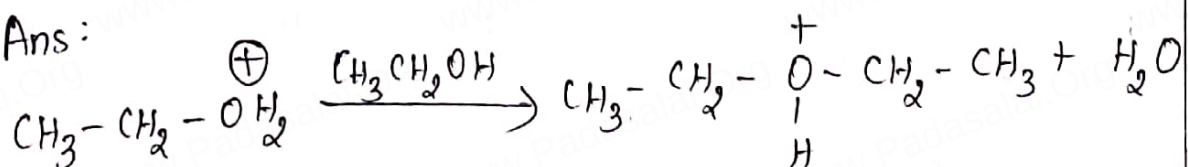
Ans:

propane < propanal < propanol

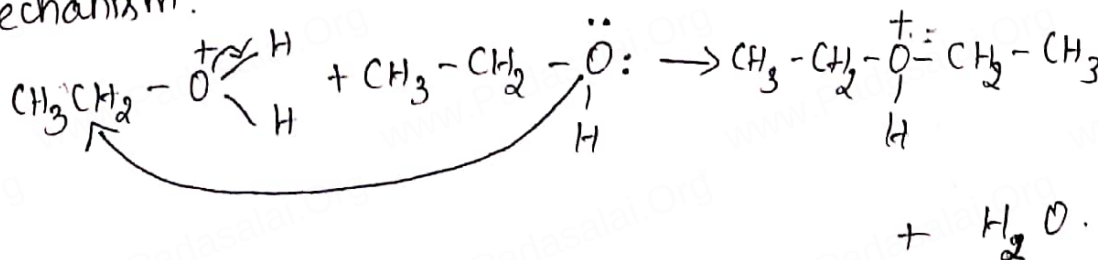
(c) Q: Write the mechanism (using curved arrow notation) of the following reaction:



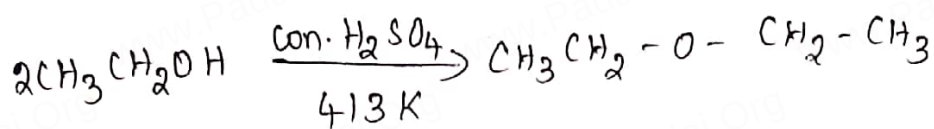
Ans:



Mechanism:



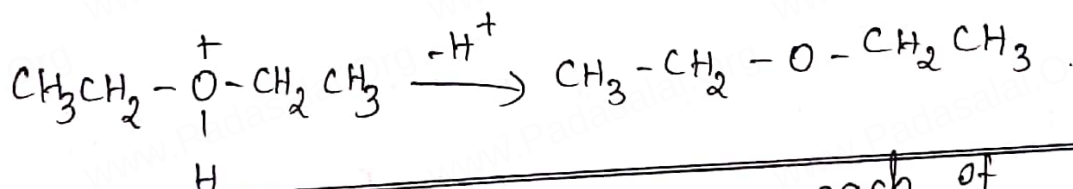
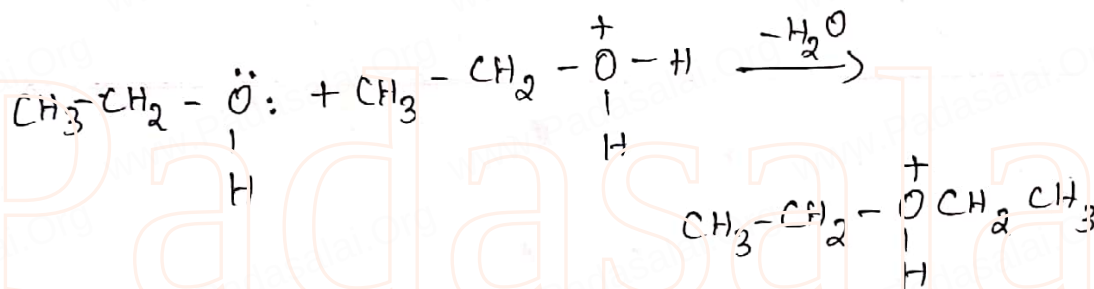
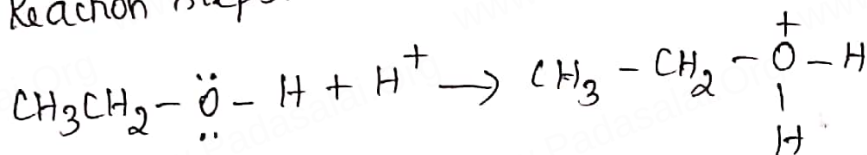
8 Q: Write the mechanism of the following reaction:



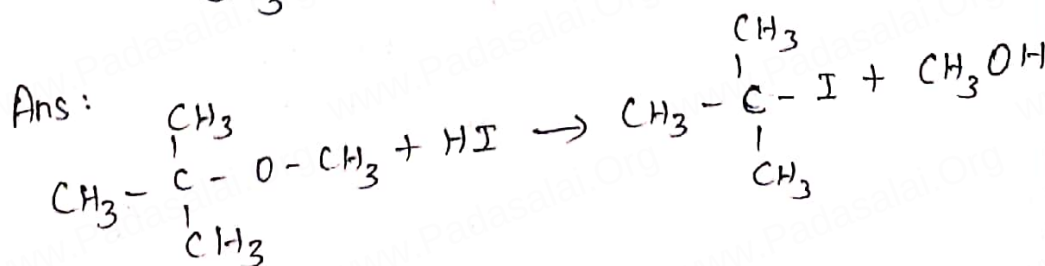
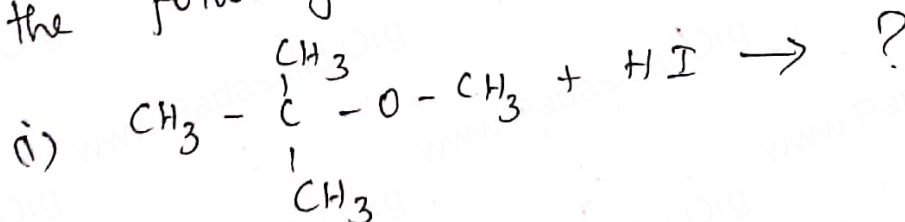
Ans:

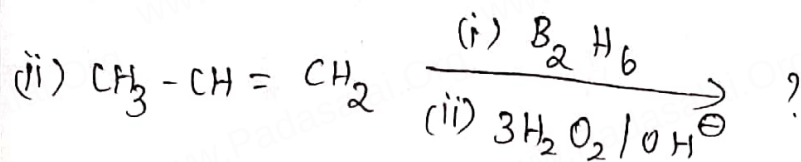
Formation of ether from alcohol is a nucleophilic bimolecular reaction ($\text{S}_\text{N}2$). A protonated alcohol is attacked by another alcohol molecule.

Reaction steps:

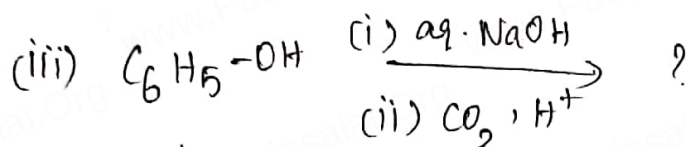
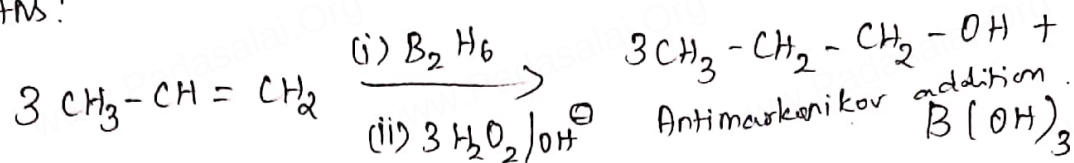


9 Q: Write the main products in each of the following reactions:



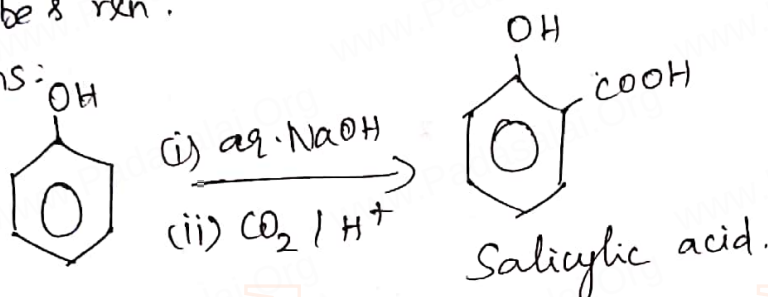


Ans:

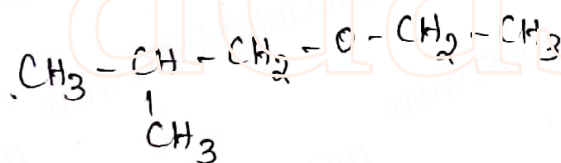


Kolbe's rxn.

Ans:

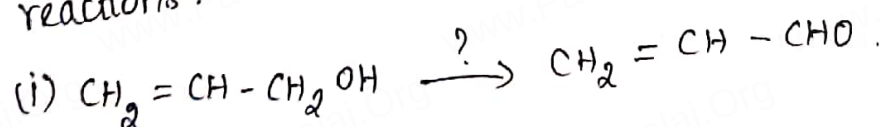


10 Q: Write IUPAC name of the given compound:

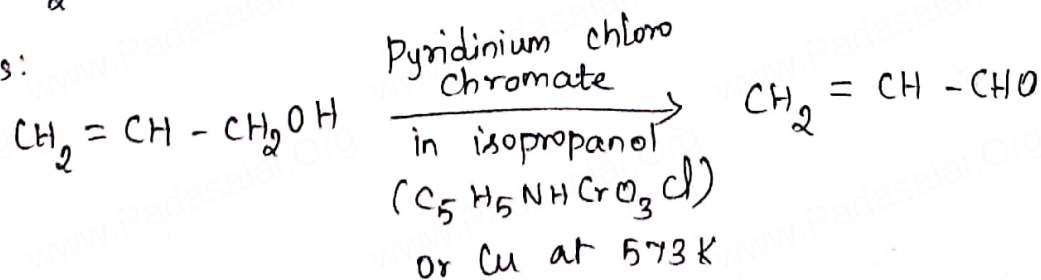


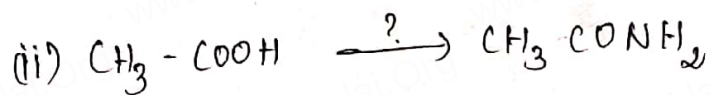
Ans: Ethoxy - 2-methyl propane

11 Q: Write the reagents required in the following reactions:

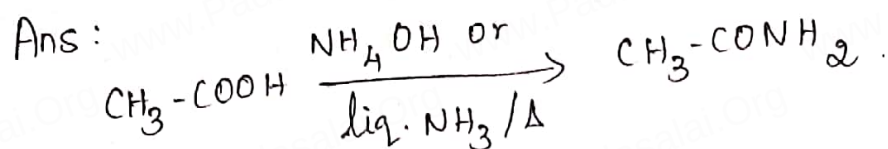


Ans:



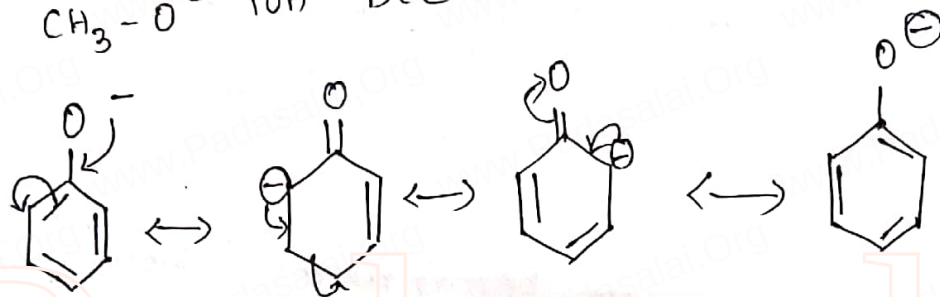


Ans:



12. Give reasons for the following:

(i) Phenol is more acidic than methanol
 - phenoxide ion is more stabilized than $\text{CH}_3 - \text{O}^\ominus$ ion because of resonance:



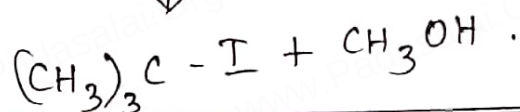
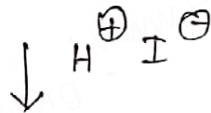
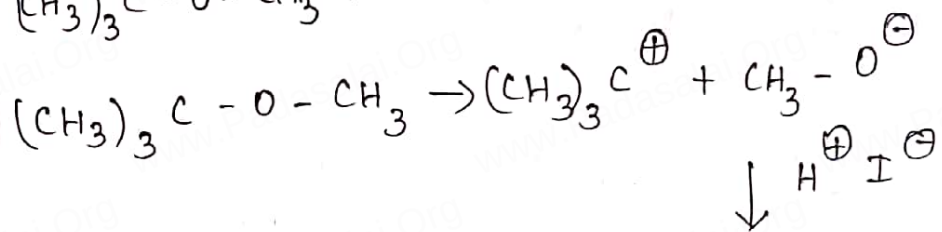
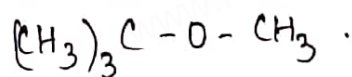
Thus phenol is more acidic than $\text{CH}_3 - \text{OH}$.

(ii) The $\text{C}-\text{O}-\text{H}$ bond angle in alcohols is slightly less than the tetrahedral angle ($109^\circ 28'$).

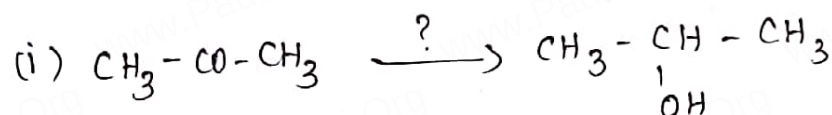
Due to presence of lone pair on oxygen which causes repulsion, the bond angle in alcohol is slightly less than tetrahedral angle ($109^\circ 28'$).

(iii) $(\text{CH}_3)_3\text{C}-\text{O}-\text{CH}_3$ on reaction with HI gives $(\text{CH}_3)_3\text{C}-\text{I}$ and CH_3-OH as the main products and not $(\text{CH}_3)_3\text{C}-\text{OH}$ and CH_3-I .

Since $(\text{CH}_3)_3\text{C}^\oplus$ is more stabilized through +I effect of three methyl groups thus $(\text{CH}_3)_3\text{C}-\text{I}$ and CH_3-OH formed on treatment of HI with

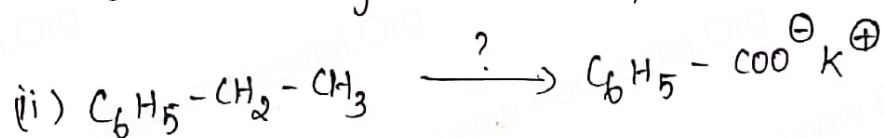


13 Q: Name the reagents used in the following reactions:



Ans:

Sodium borohydride NaBH_4 / LiAlH_4 / H_2 , Pt



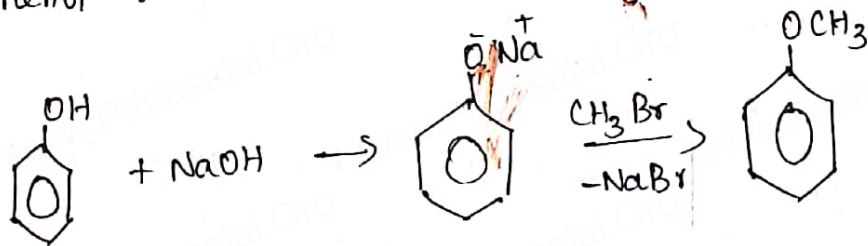
Ans:

Alkaline potassium permanganate (KMnO_4 , KOH)

14 How do you convert the following:

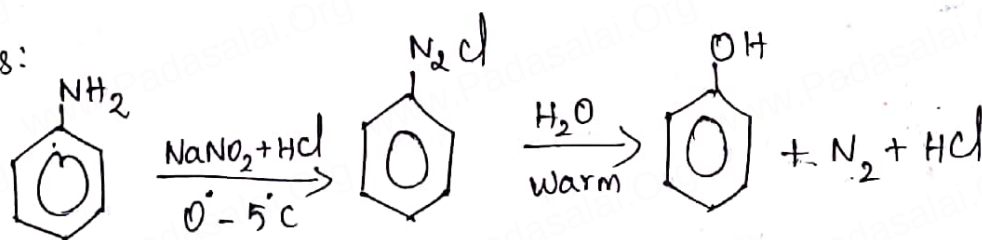
(i) Phenol to anisole

Ans:

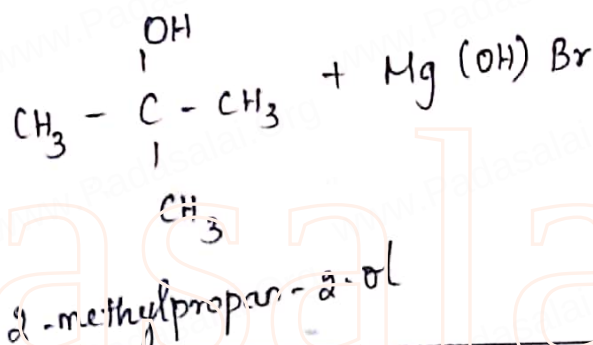
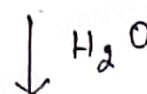
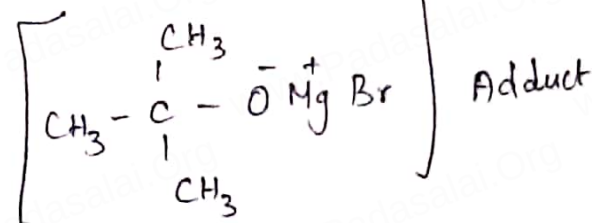
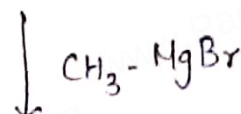
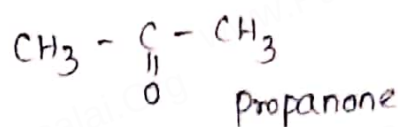
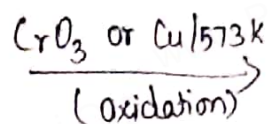
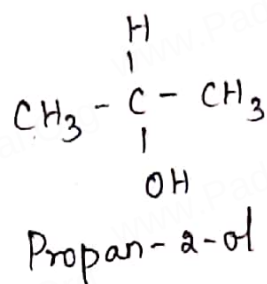


(ii) Aniline to phenol

Ans:

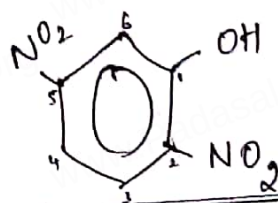


(iii) Propan-2-ol to 2-methylpropan-2-ol



15

Q: Write the IUPAC name of the given compound.



Ans:

2,5-dinitrophenol

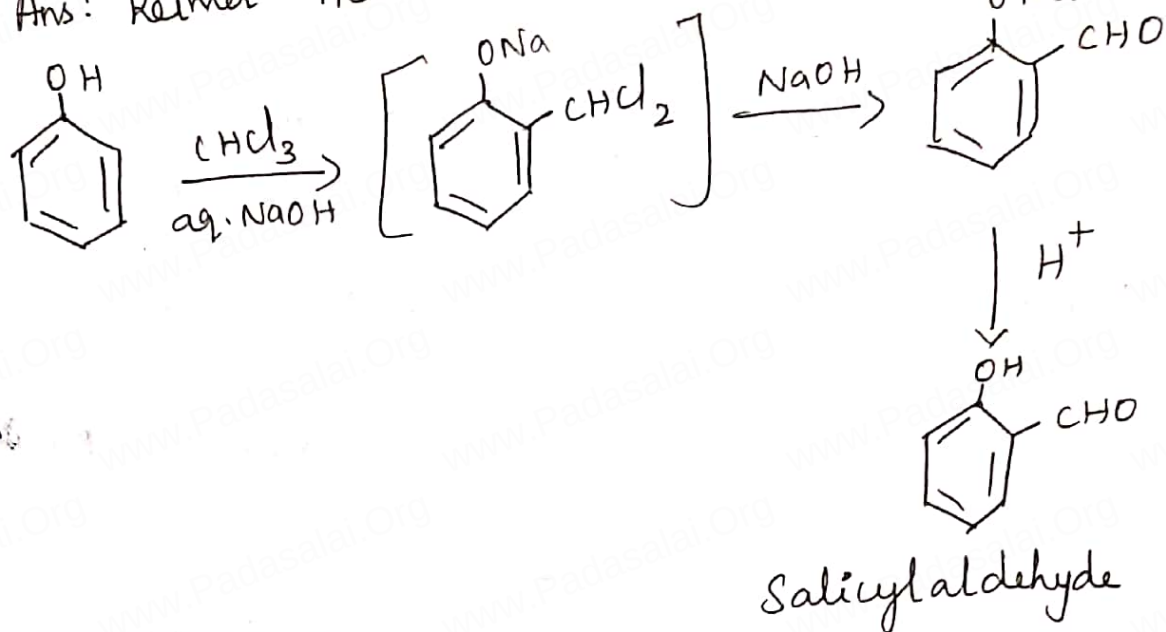
16 Q: Write the equations involved in the following reactions:

(i) Reimer-Tiemann reaction

(ii) Williamson synthesis.

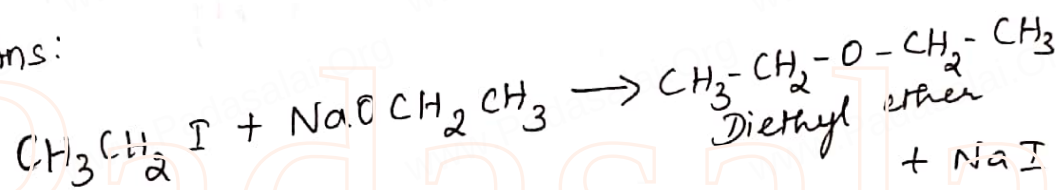
(i)

Ans: Reimer Tiemann reaction.

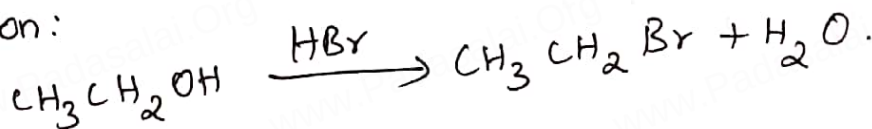
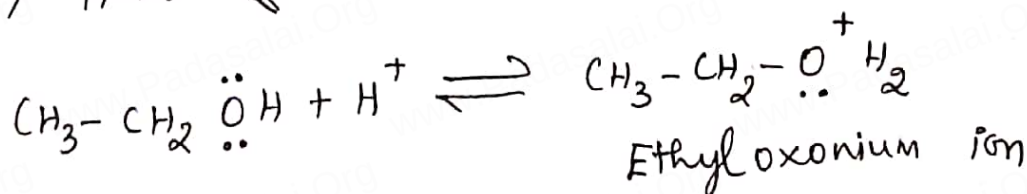


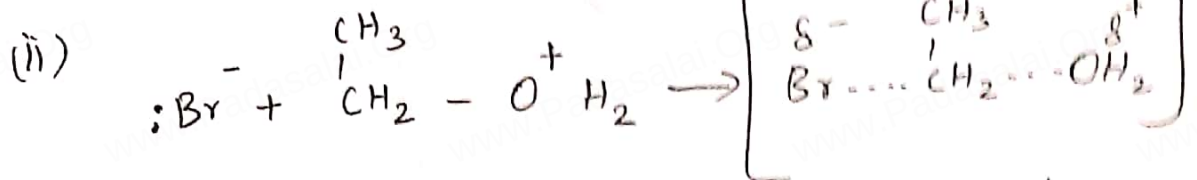
(ii) Williamson synthesis

Ans:

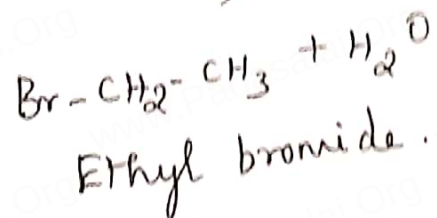


17Q: Write the mechanism of the following reaction:

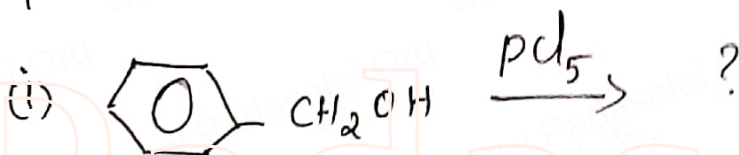
Ans: $\text{S}_{\text{N}}2$ mechanism:



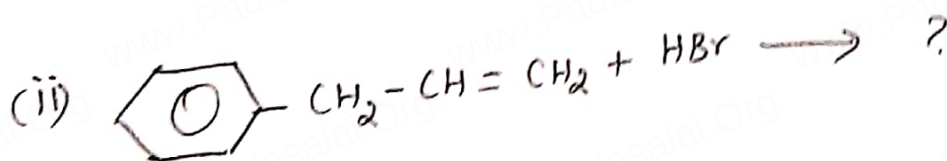
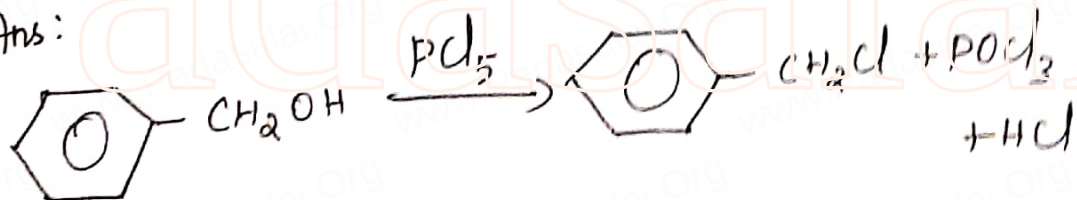
Transition state



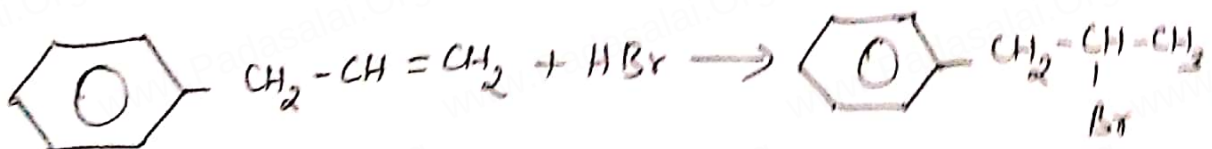
18 Q: Draw the structure of major monohalo products in each of the following reactions:



Ans:



Ans:



(b) which halogen compound in each of the following pairs will react faster in S_N2 reaction:

(i) CH_3Br or CH_3I

Ans: CH_3-I will react faster because I^- is a better leaving group.

(ii) $(CH_3)_3C-Cl$ or CH_3-Cl

Ans: CH_3-Cl will react faster because it is a primary halide and it undergoes S_N2 reaction faster.

Prepared by,

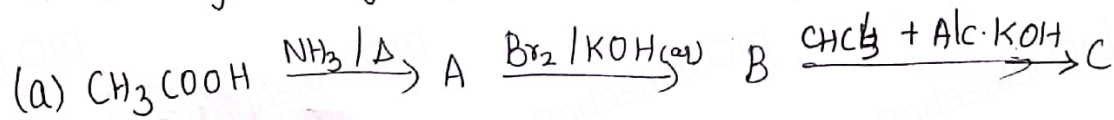
M. SHEELA JEBAKANI,
PGT Asst in Chemistry,
JAZZ PUBLIC SCHOOL
[MATRIC HR. SEC]
MADURAI.

Class: 12 Sub: Chemistry - Volume - II

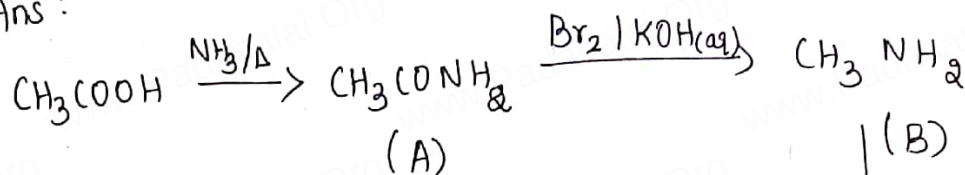
Unit - 12

Aldehydes, ketones and Carboxylic acids

Q: Write the structures of compounds A, B and C in the following reactions:

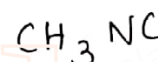
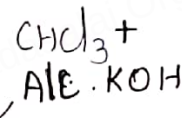


Ans:



(A)

(B)



(C)

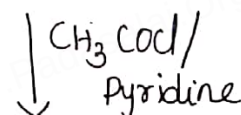
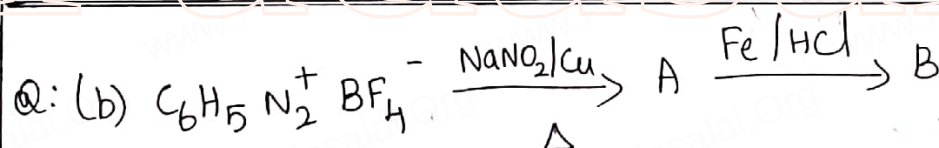
(A) $\text{CH}_3\text{CONH}_2 \rightarrow$ Acetamide

$\rightarrow$ Methylamine

(B) CH_3NH_2

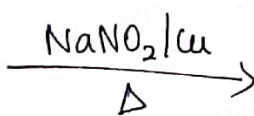
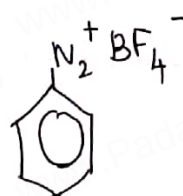
$\rightarrow$ Methyl isocyanide

(C) CH_3NC

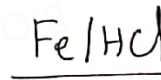


C

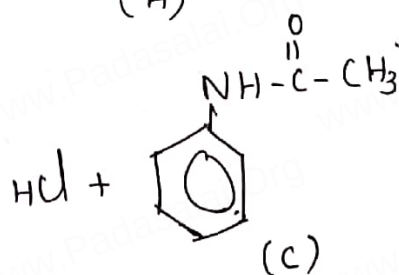
Ans:



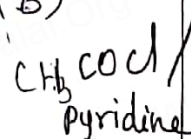
(A)



(B)



(C)



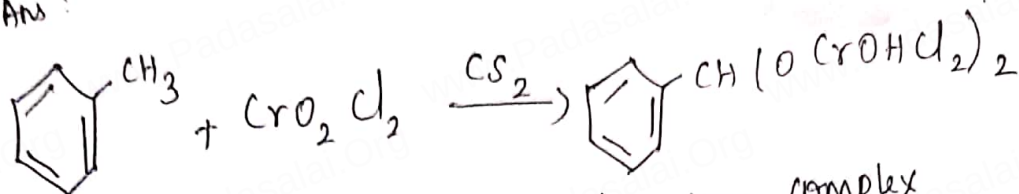
(A) Nitrobenzene - $C_6H_5NO_2$

(B) Aniline - $C_6H_5NH_2$

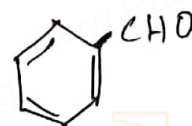
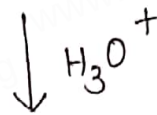
(C) Acetanilide - $C_6H_5NHCOCH_3$

Q: Write the equations involved in Etard reaction

Ans:



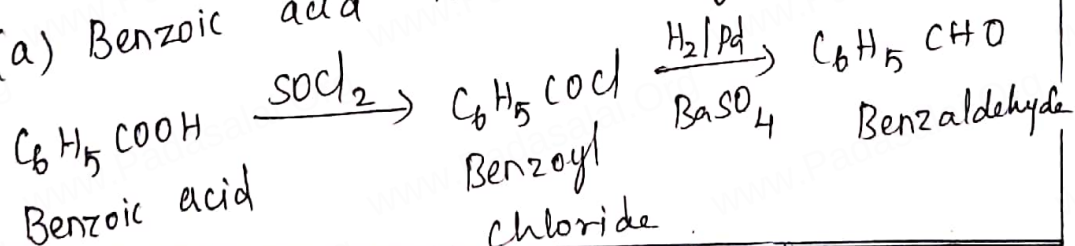
Chromium complex



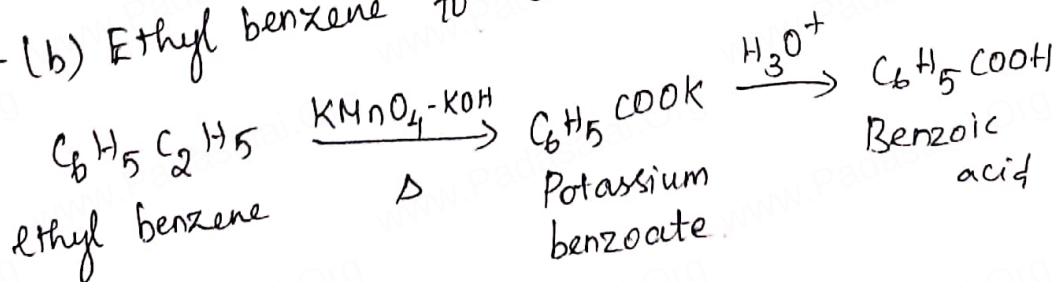
Benzaldehyde

Q: Do the following conversions in not more than two steps:

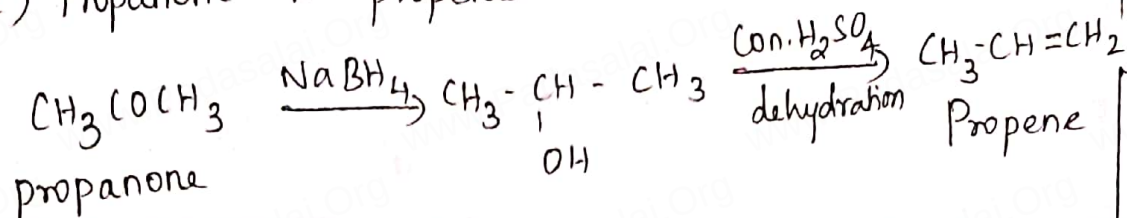
(a) Benzoic acid to benzaldehyde



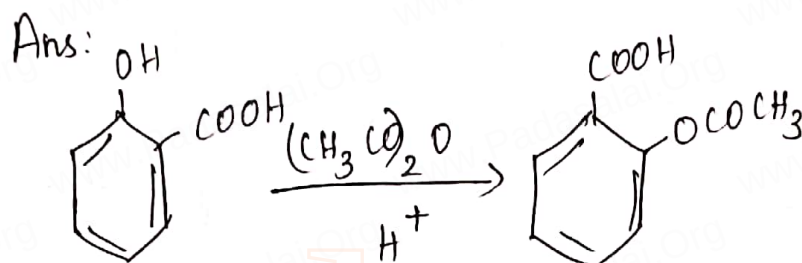
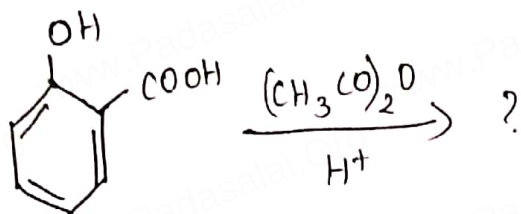
(b) Ethyl benzene to benzoic acid



Q: (c) Propanone to propene

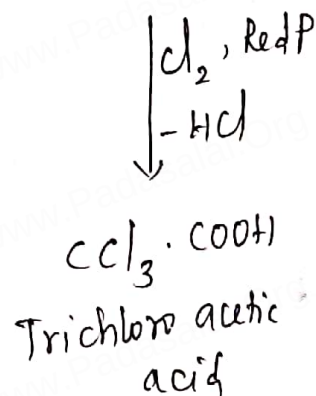
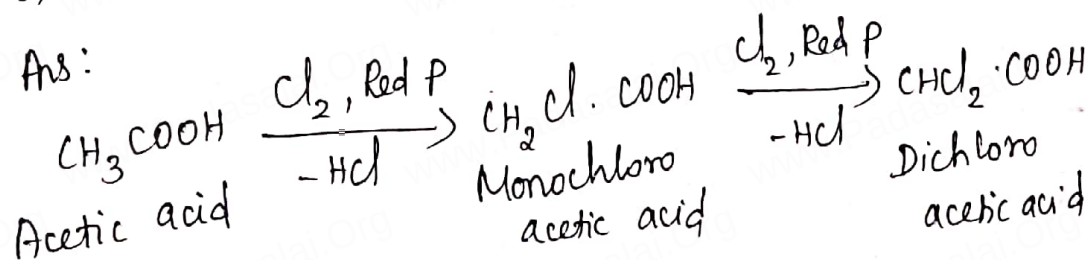


4 Q: Write the products in the following reaction.

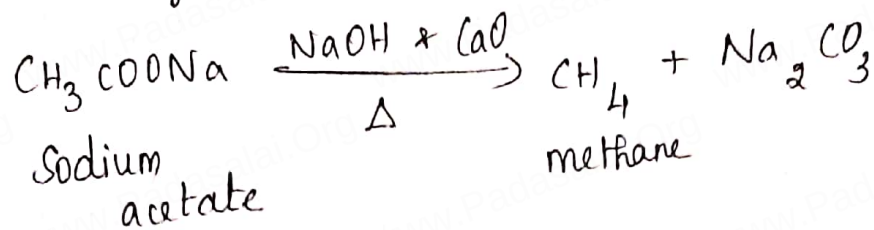


5 Q: Write the reactions involved in the following:

(i) Hell-Volhard Zelinsey reaction.



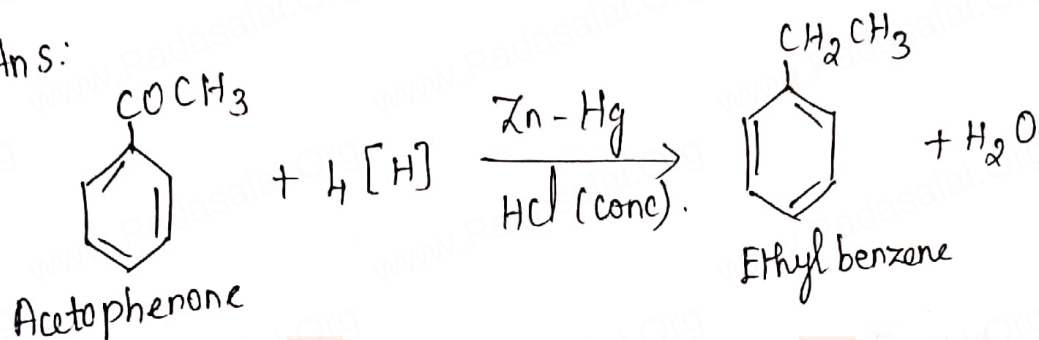
(ii) Decarboxylation reaction:



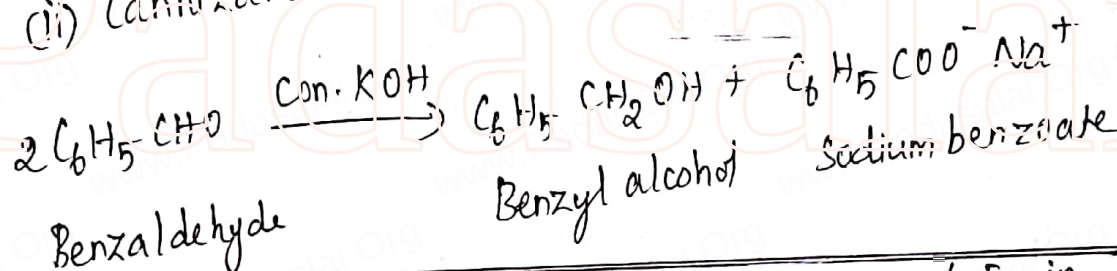
6 Q: Write the following reactions:

(i) Clemmensen reduction.

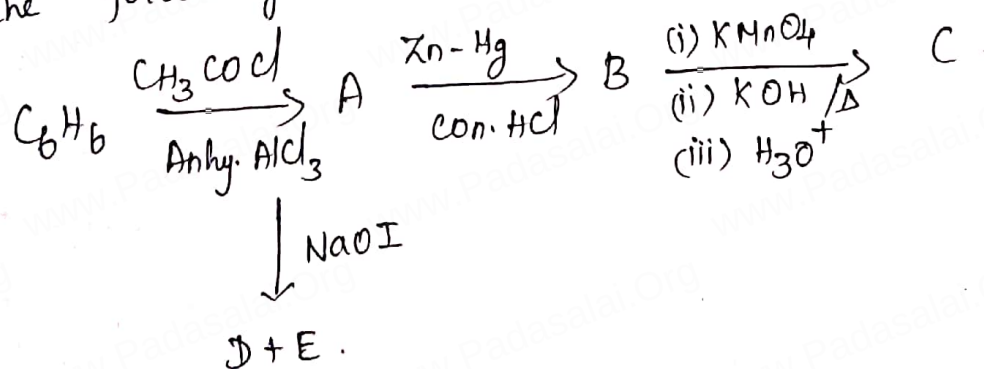
Ans:



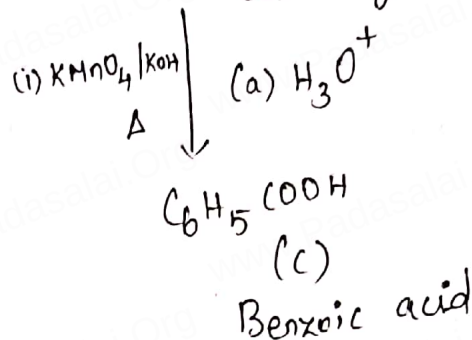
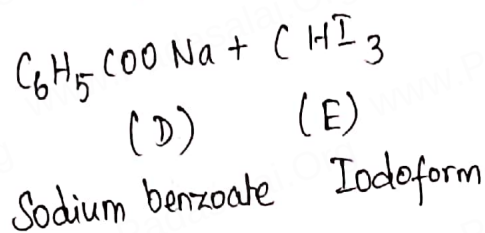
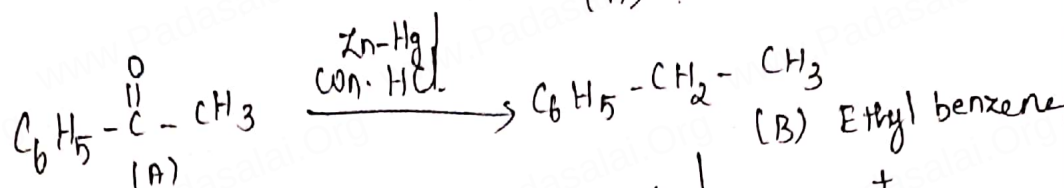
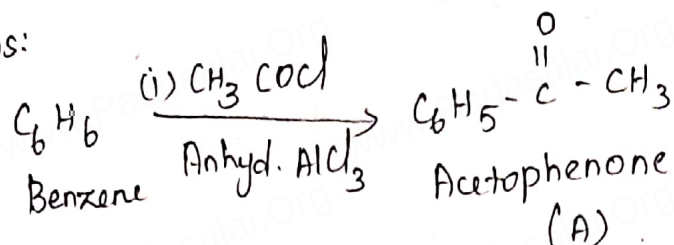
(ii) Cannizzaro reaction:



7 Q: Write the structures of A, B, C, D and E in the following reactions:



Ans:



A - Acetophenone

D - Sodium benzoate

B - Ethylbenzene

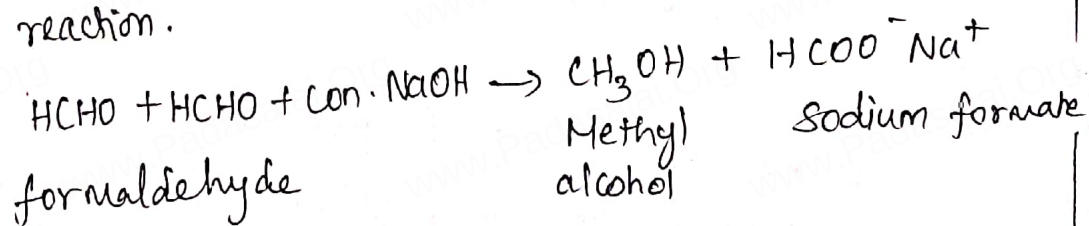
E - Iodoform

C - Benzoic acid

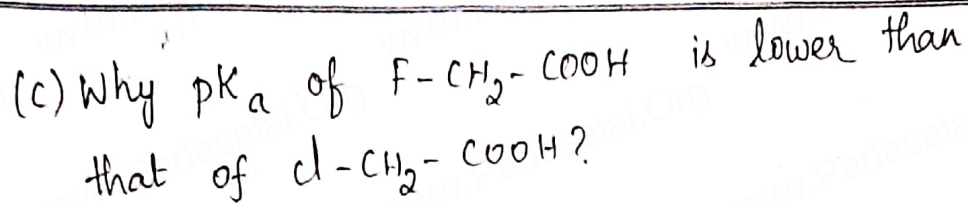
8(a) Write the chemical equation for the reaction involved in Cannizzaro rxn.

Ans:

For aldehydes which do not have α -hydrogen atom self oxidation and reduction takes place in presence of con. alkali. This produces one mole of alcohol and one mole of salt of carboxylic acid. This is called Cannizzaro's reaction.



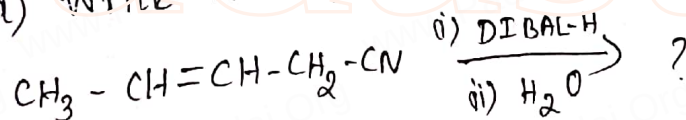
Ans :-



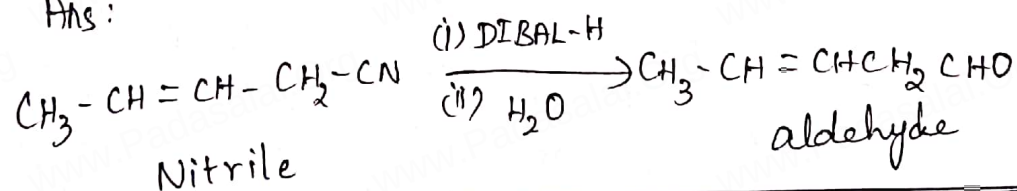
Ans :

Ans: pK_a of $F-CH_2-COOH$ is lower than that of pK_a of $Cl-CH_2-COOH$ as $F-CH_2-COOH$ is a stronger acid. This is because of higher electronegativity of F -atom than Cl atom.

(d) Write the product in the following reaction:



Ans :

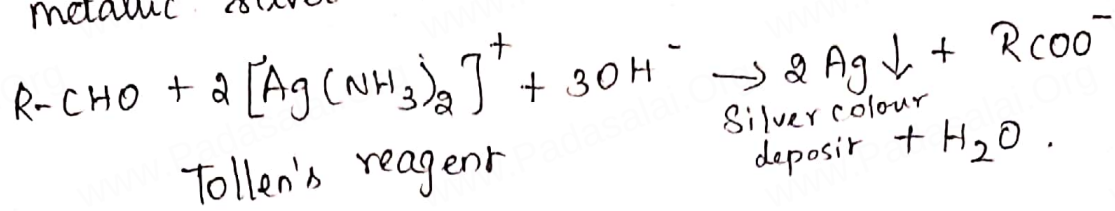


(e) How can you distinguish between propanal and propanone?

Ans :

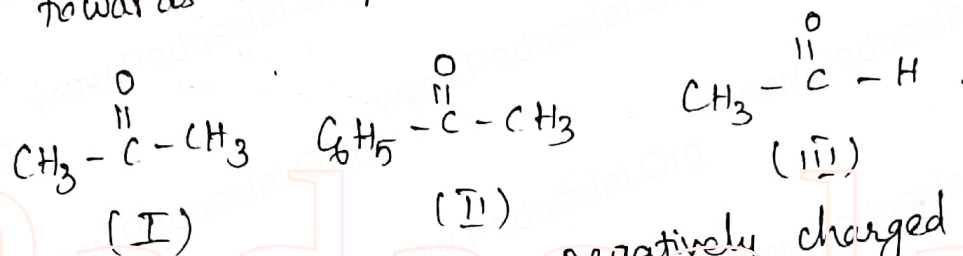
Ans: Tollen's reagent will give a positive test of silver mirror formations with propanal, while propane does not gives this test since

aldehydes can oxidise Tollens' reagent to metallic silver but ketones cannot.



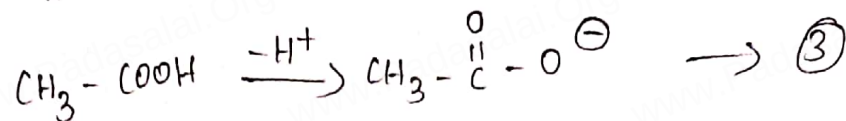
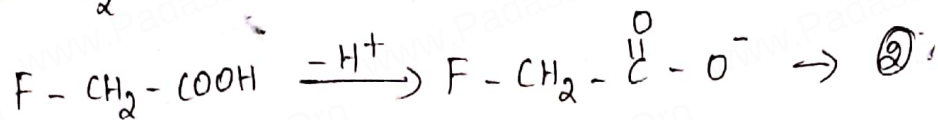
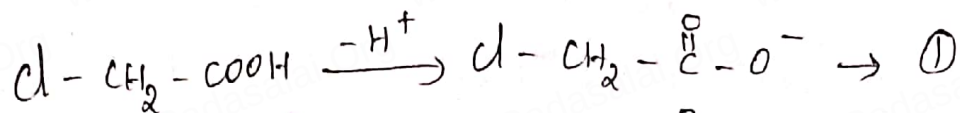
9. Arrange the following compounds in increasing order of their property as indicated:

(i) $C_6H_5COCH_3$, CH_3COCH_3 , CH_3CHO (reactivity towards nucleophilic addition reaction).



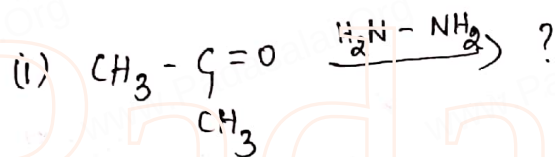
Nucleophiles are negatively charged entity, positivity of carbon is carbonyl group facilitates nucleophilic addition. Thus positivity of carbon in carbonyl group is in order $\text{III} > \text{I} > \text{II}$. Due to +I effect of $-CH_3$ group and benzene ring cloud, positivity of carbonyl carbon is so much decrease than (I) and (II). Thus nucleophilic addition order $\text{III} > \text{I} > \text{II}$.

(ii) $Cl-CH_2-COOH$, $F-CH_2-COOH$, CH_3-COOH (acidic character).

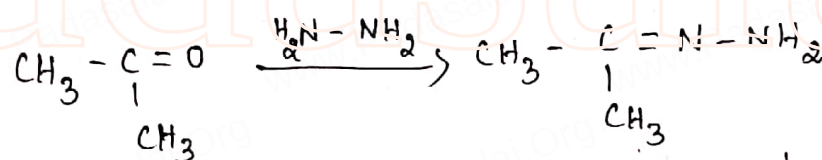


The stability order $\textcircled{2} > \textcircled{1} > \textcircled{3}$. Due to +I effect of $-\text{CH}_3$ group electron density of oxygen is more. But in (1 & 2), -I effect of $-\text{F}$ is more than $-\text{Cl}$. Thus $\textcircled{2}$ is more stabilized than $\textcircled{1}$. Thus acidity order is $\textcircled{2} > \textcircled{1} > \textcircled{3}$.

Q: Predict the products of the following reactions:

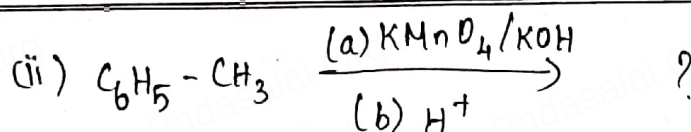


Ans:

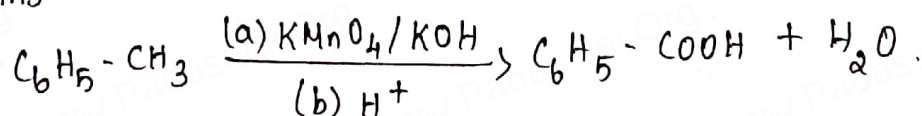


Propanone

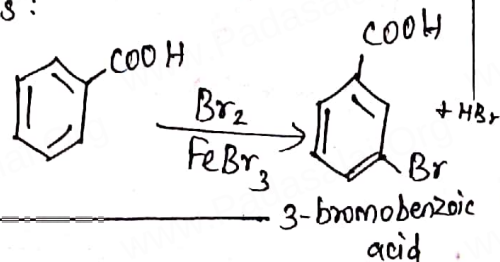
Propanone hydrazone



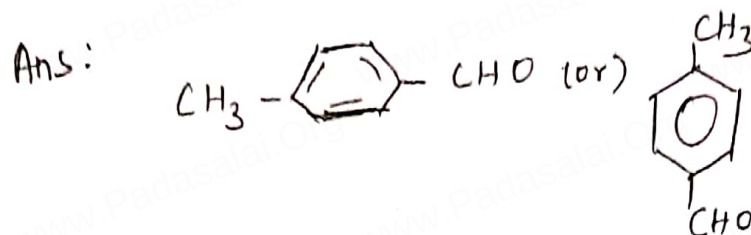
Ans:



Ans:



Q: Write the structure of p-methyl benzaldehyde

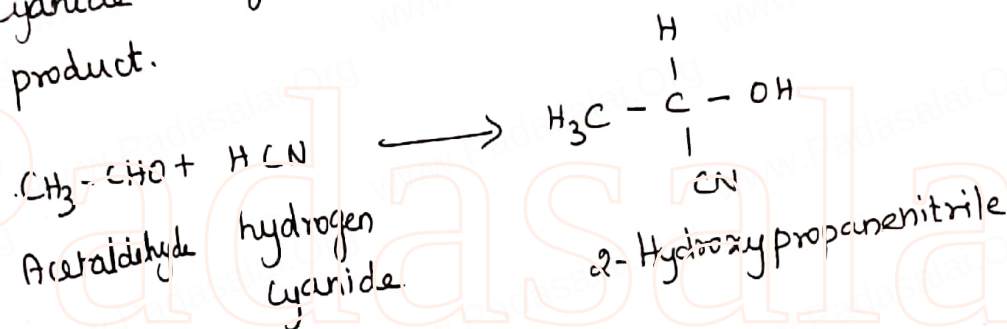


Q: Write the products formed when CH_3CHO reacts with the following reagents:

- (i) HCN (ii) $\text{NH}_2\text{-OH}$ (iii) CH_3CHO in presence of dil. NaOH

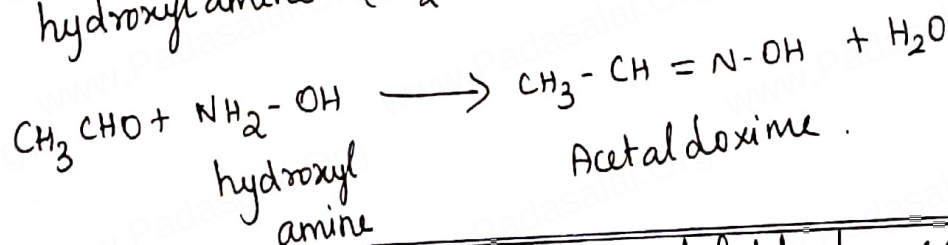
Ans.

(i) On reaction of acetaldehyde with hydrogen cyanide it gives 2-hydroxy propanenitrile as product.



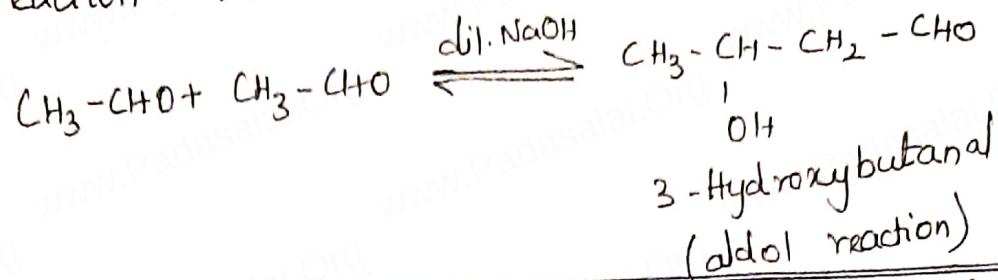
(ii) $\text{NH}_2\text{-OH}$

On reaction of acetaldehyde with hydroxylamine ($\text{NH}_2\text{-OH}$) it gives acetaldoxime.



(iii) When 2 molecules of acetaldehyde reacts with each other in presence of dil. NaOH , 3-hydroxybutanal is obtained. This is a

aldol reaction and further proceeds the reaction when heated.

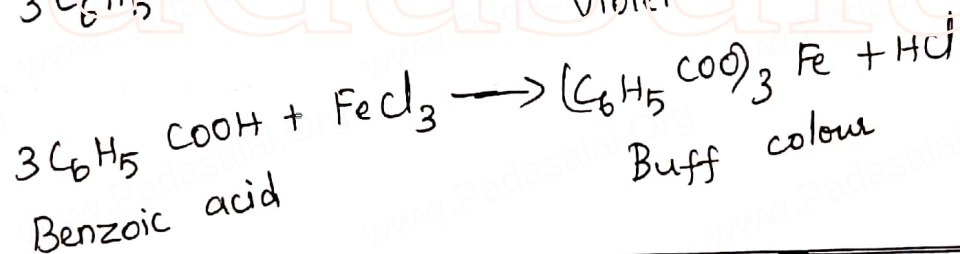
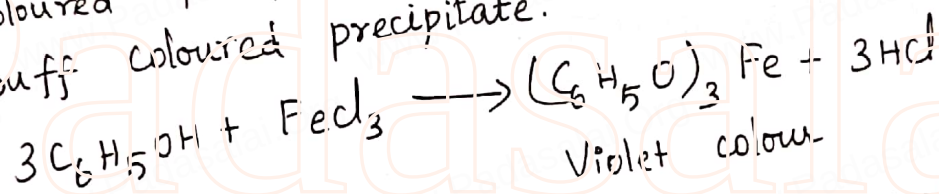


13 Q: Give simple chemical tests to distinguish between the following pairs of compounds.

- (i) Benzoic acid and phenol
- (ii) Propanal and propanone.

Ans:

(i) Phenol reacts with FeCl_3 to give violet coloured precipitate while benzoic acid give buff coloured precipitate.



14 Q: Account for the following:
 $\text{Cl-CH}_2\text{COOH}$ is a stronger acid than CH_3COOH .

Ans:

Because of $-I$ effect of Cl atom in ClCH_2COOH and $+I$ effect of CH_3 group in CH_3COOH the electron density in the O-H bond in $\text{Cl-CH}_2\text{COOH}$ is much lower than CH_3COOH .

Hence ClCH_2COOH acid is stronger acid than CH_3COOH .

(ii) Carboxylic acids do not give reactions of carbonyl group.

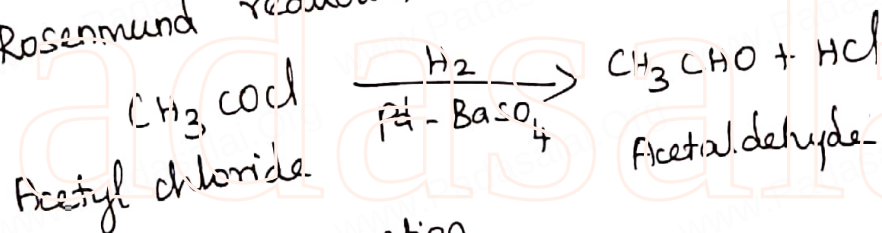
Ans: In carboxylic acids, the carboxyl group is not free as it is involved in resonance.

15 Q: Write the chemical equations to illustrate the following name reactions:

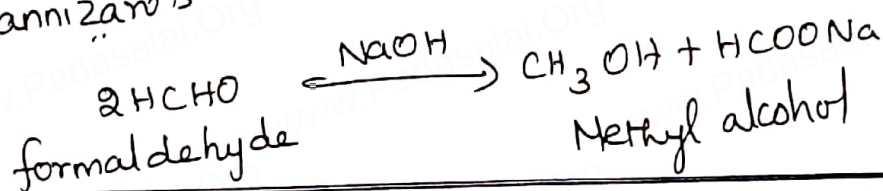
(i) Rosenmund reduction (ii) Cannizzaro's reaction.

Ans:

Rosenmund reduction



Cannizzaro's reaction



16 Q: Out of $\text{CH}_3\text{CH}_2\text{COCH}_3$ and $\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_3$ which gives iodoform test?

Ans:

$\text{CH}_3\text{CH}_2\text{CH}_2\text{COCH}_3$ being a methyl ketone gives iodoform test.

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