Nishant Jindal

LIVE

# CARBOXYLIC ACID & Its DERIVATIVES

for JEE-MAIN

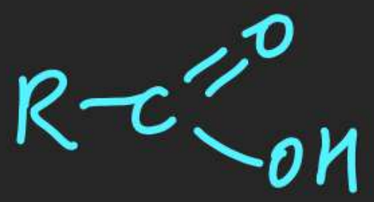
One Shot

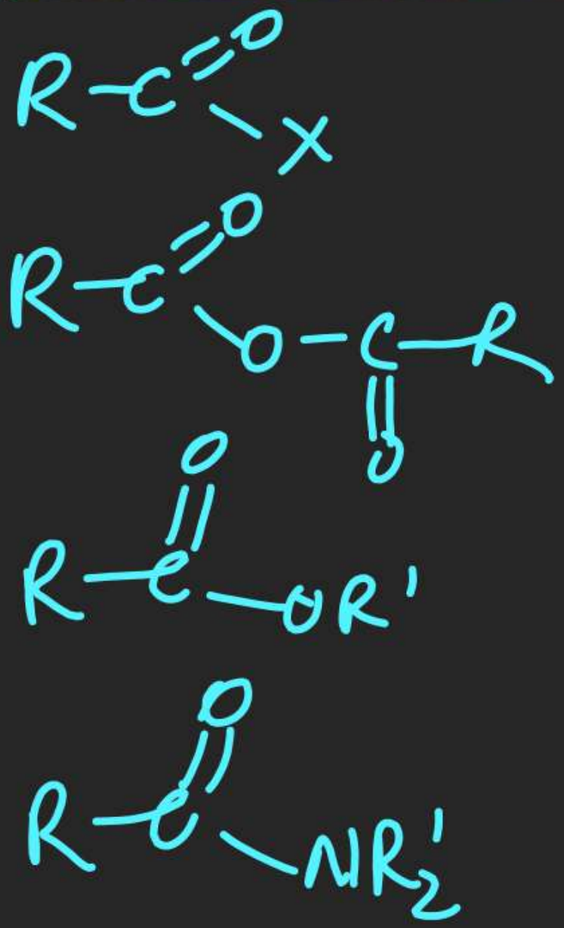

By SKM Sir

4:00 PM Saturday

Nishant Jindal

# : Carboxylic Acid , Derivative & Amines :.





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# (#) Method of Preparation :-

## (1) Hydrolysis :-

(a) $R-C\equiv N \xrightarrow{\text{Partial Hydrolysis}}$ "P" $R-\underset{\underset{O}{\|}}{C}-NH_2$

$R-C\equiv N \xrightarrow{H-OH} R-C(=NH)-OH \rightleftharpoons R-\underset{\underset{O}{\|}}{C}-NH_2$

(b) $R-\bar{C}\equiv\overset{+}{N}: \xrightarrow{\text{Complete Hydrolysis}}$ "Q" $\left(R-\underset{\underset{O}{\|}}{C}-OH\right)$

$R-C\equiv N \xrightarrow{H-OH} R-C(OH)=NH \xrightarrow{-H_2O}$ "Q"

(c) $R-C\equiv N \xrightarrow{H_2O}$ "P" $\xrightarrow{H_2O}$ "Q"

"P": $R-\underset{\underset{O}{\|}}{C}-NH_2$

"Q": $R-\underset{\underset{O}{\|}}{C}-OH$

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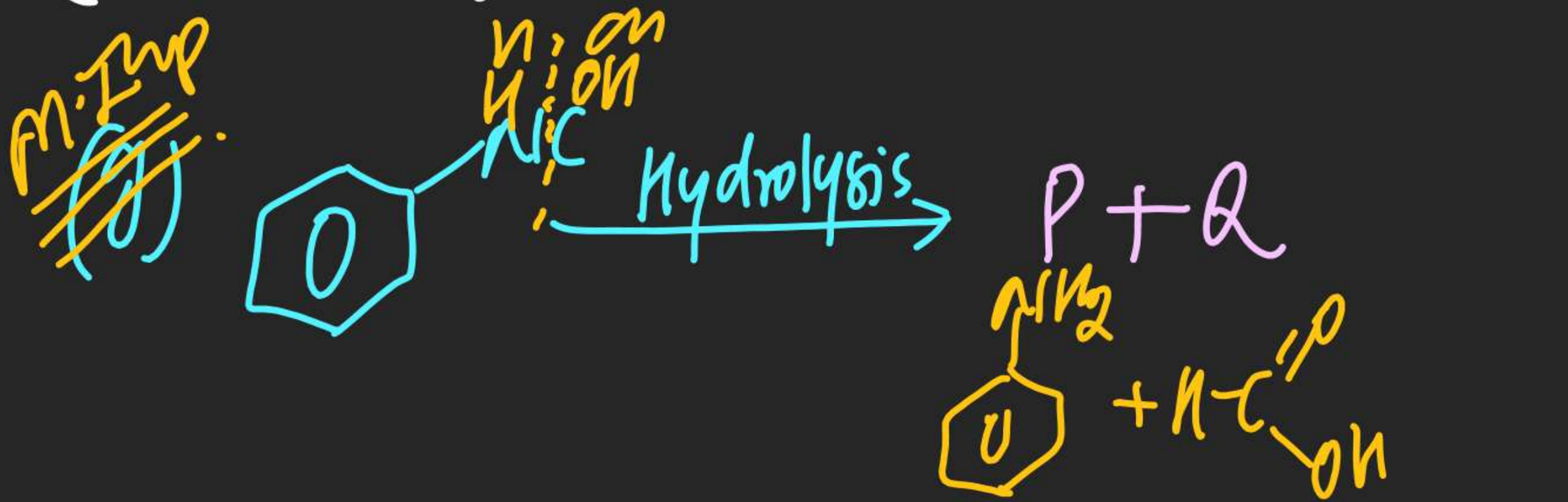
(d) $R-\overset{O}{\overset{\|}{C}}-X \xrightarrow[H_2O]{NaOH} R-\overset{O}{\overset{\|}{C}}-O^-Na^+ \xrightarrow{H^+} R-\overset{O}{\overset{\|}{C}}-OH$

(e) $R-\overset{O}{\overset{\|}{C}}-O-\overset{O}{\overset{\|}{C}}-R' \xrightarrow{''} \quad '' \quad \xrightarrow{''}$

(f) $R-C(=O)-O-R' \xrightarrow{''} \quad '' \quad \xrightarrow{''}$



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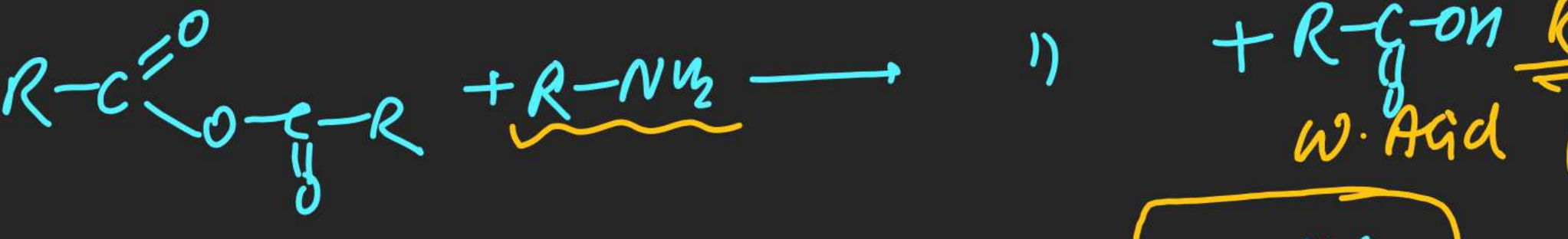
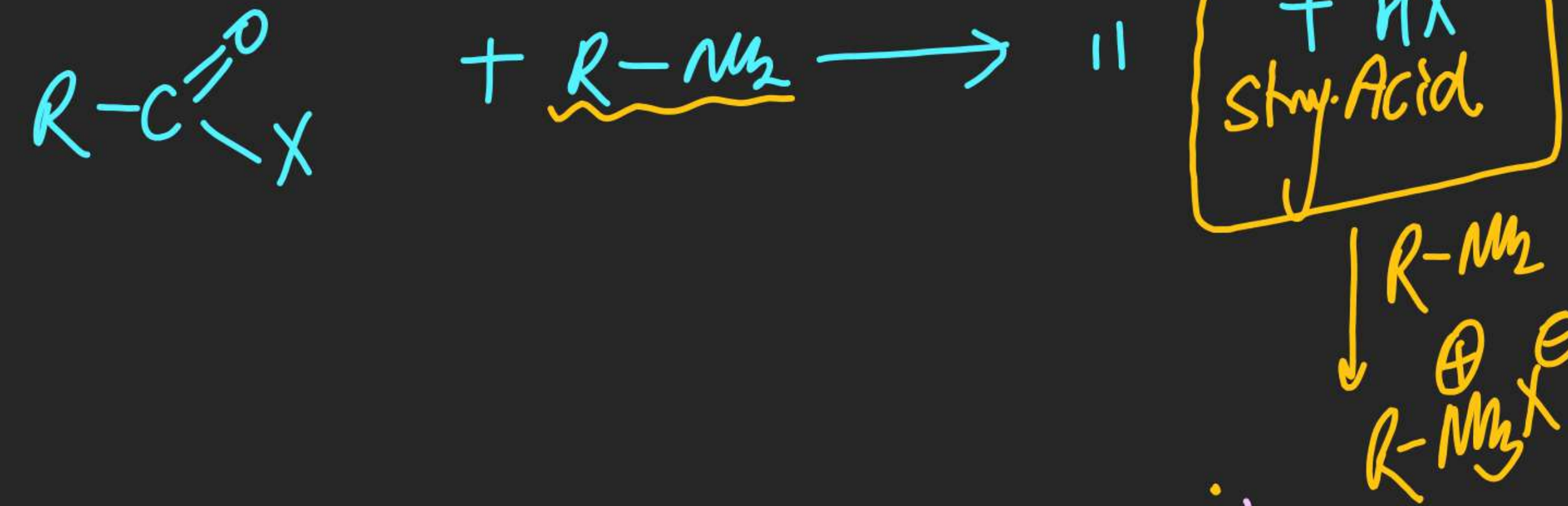
(h) 


(i) 


(j) 

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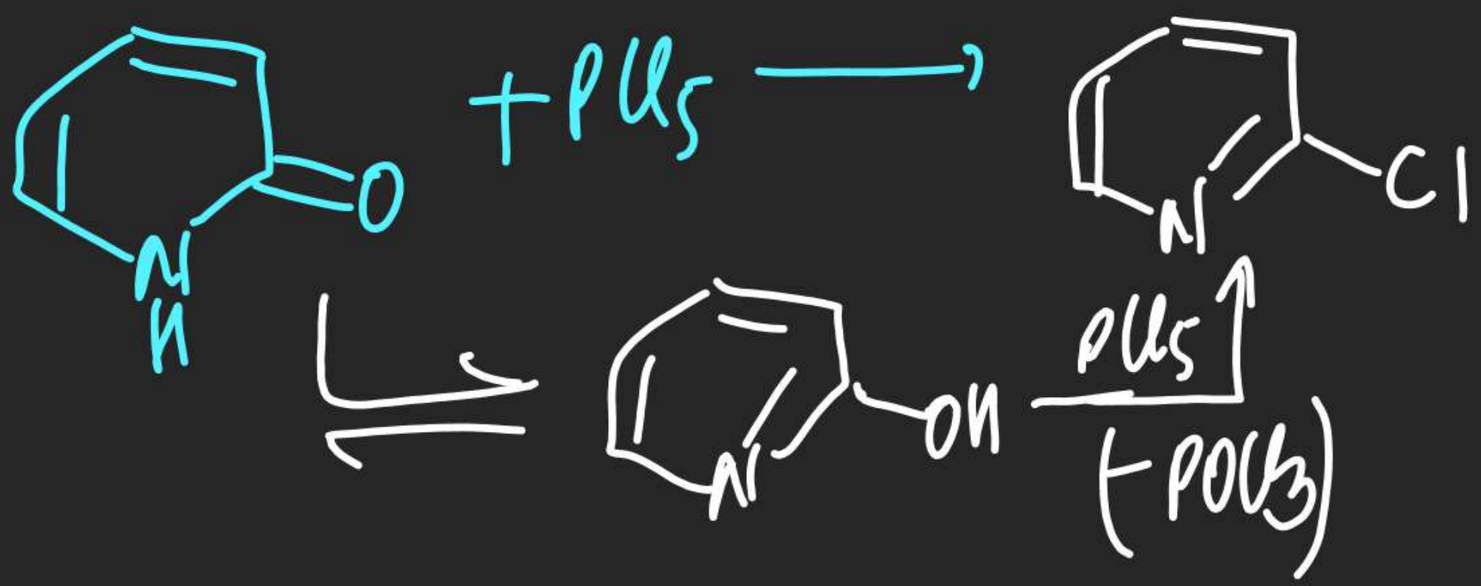
(2) $R-C(=O)-OH + SOCl_2 \longrightarrow R-C(=O)-Cl + SO_2 + HCl$

(3) $R-C(=O)-OH + PCl_5 \longrightarrow R-C(=O)-Cl + POCl_3$

(4)



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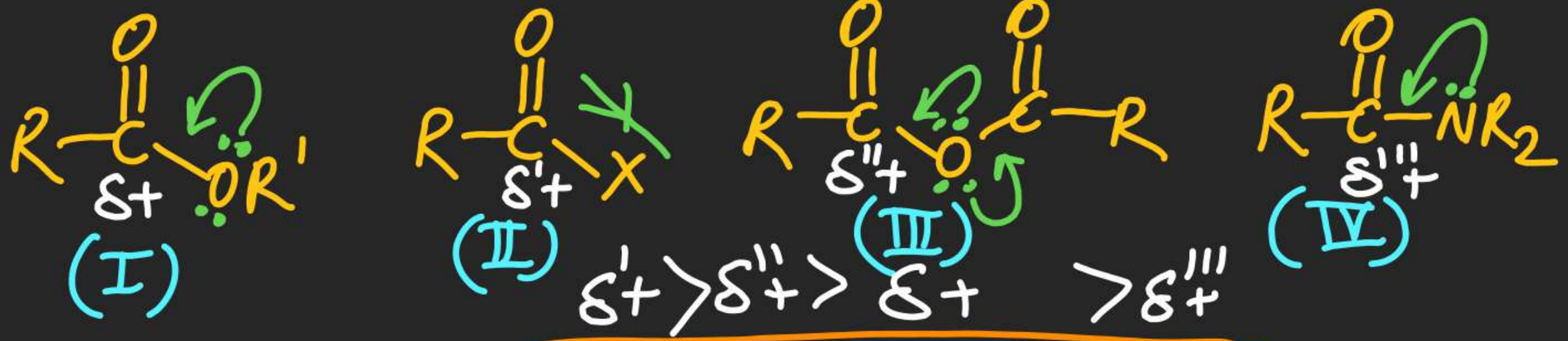
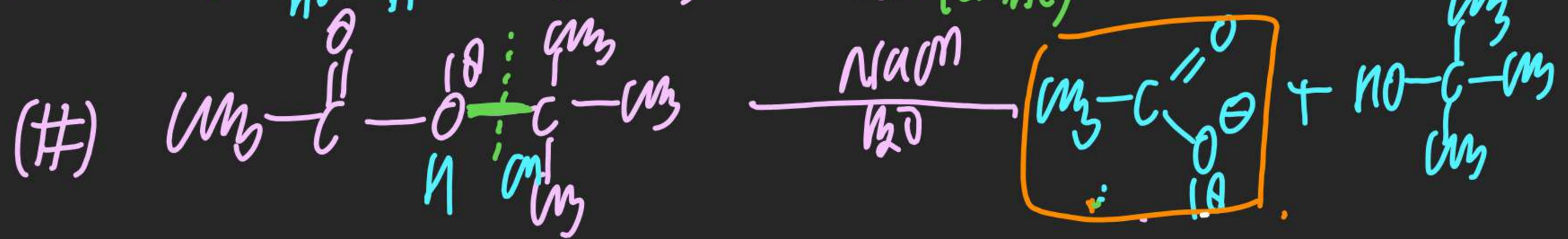
# Order of Rate of Reaction with Nucleophile:




$\delta' > \delta'' > \delta > \delta'''$

**II > III > I > IV**

(#) 


(#) 

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**Q.:** $R-C(=O)-OH + ? \longrightarrow$ fruity smell

$(H-O-R')$

$R-C(=O)-O-R'$

**Q.:** $CH_3-C(=O)-OH \xrightarrow[Br_2]{Red\ P} Br-CH_2-C(=O)-OH$ (HVZ Rxn)

**Q.:** $CH_3-CH_2-COOH \xrightarrow{Cl_2} "P" \xrightarrow[Excess]{NH_3} "Q"$

$"P"$: $CH_3-\underset{Br}{\underset{|}{CH}}-COOH$ $(\pm)$

$"Q"$: $CH_3-\underset{NH_2}{\underset{|}{CH}}-COO^- \overset{+}{N}H_4$

(Alanine)

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(#)

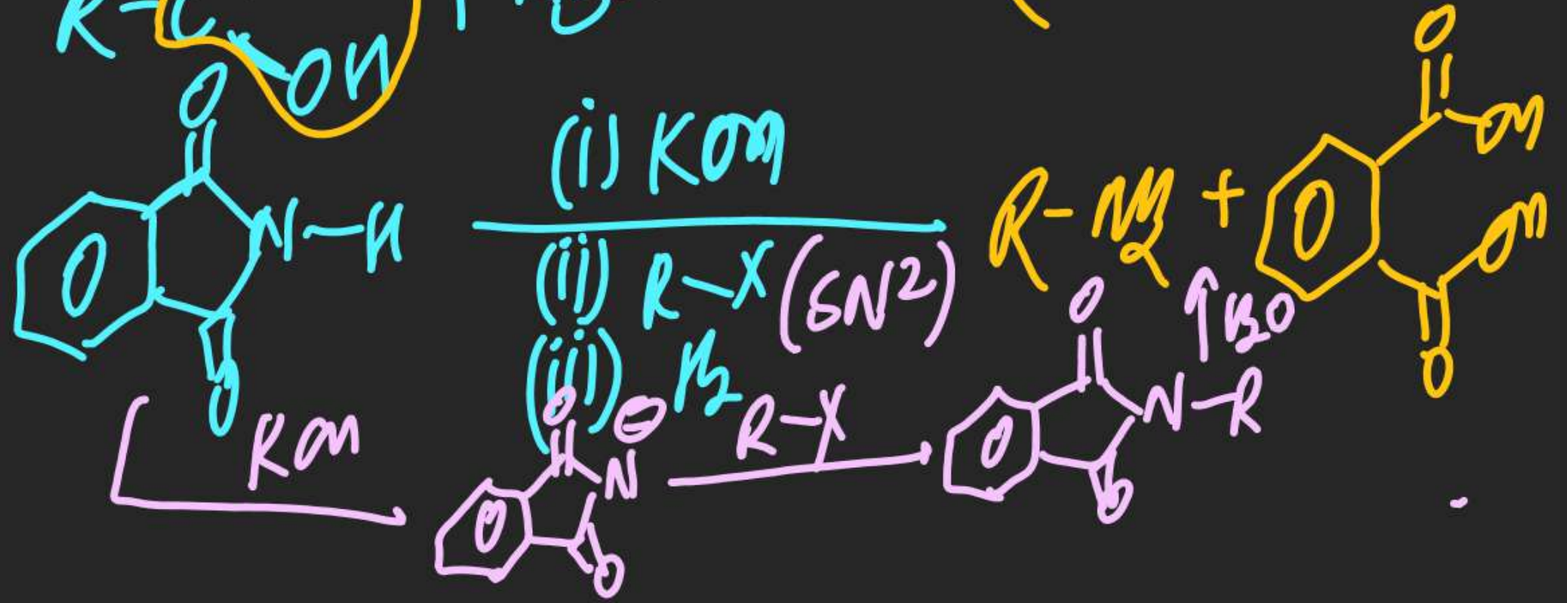
$$R-X \xrightarrow{NH_3} R-NH_2$$

Soln

$$NH_3 + R-X \longrightarrow [H_3N-R]\,X^{\ominus} \xrightarrow{-HX} R-NH_2$$

$R_4N^{\oplus}X^{\ominus}$

(1) $R-C(=O)-OH + N_3H \xrightarrow{H^+} R-NH_2$

(2) 

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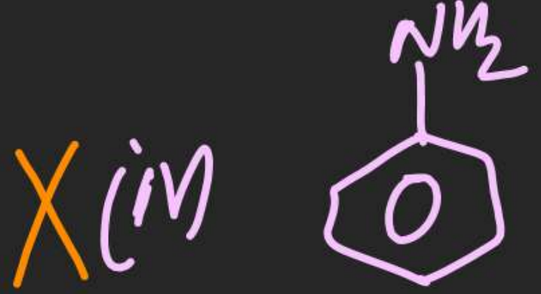
(#) which of the following cannot be obtained By G. Pthalimide amine Synthesis

(i) 

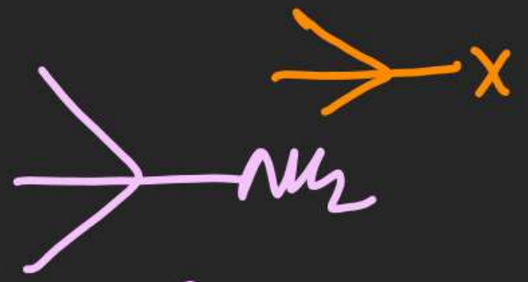
(ii) 

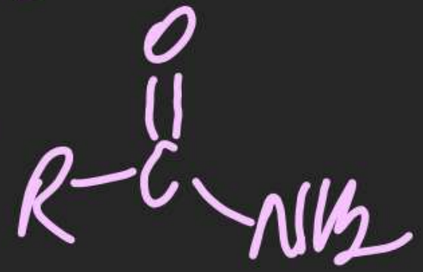
(iii) 

(iv) 

(v) 

(vi) 

(vii) 

(viii) 

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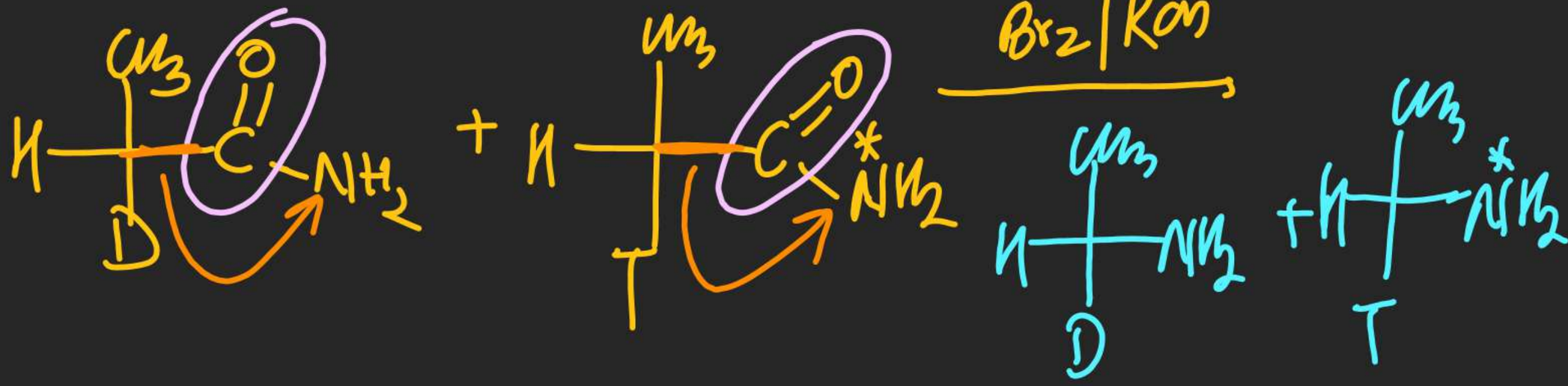
(#) **H. Bromide Rxn**

(a) $R-\underset{\underset{NH_2}{|}}{\overset{\overset{O}{\|}}{C}} + Br_2 + KOH \longrightarrow R-NH_2 + CO_3^{2-}$

**Haloform Rxn**

(b) $R-\underset{\underset{CH_3}{|}}{\overset{\overset{O}{\|}}{C}} + Br_2 + KOH \longrightarrow R-\underset{\underset{O^-}{|}}{\overset{\overset{O}{\|}}{C}} + CHBr_3$

(c) 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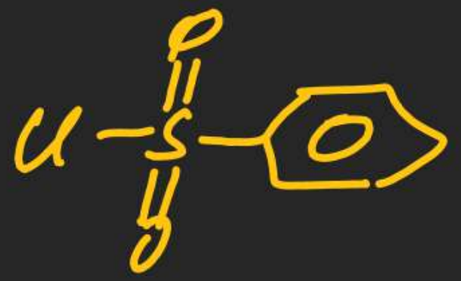
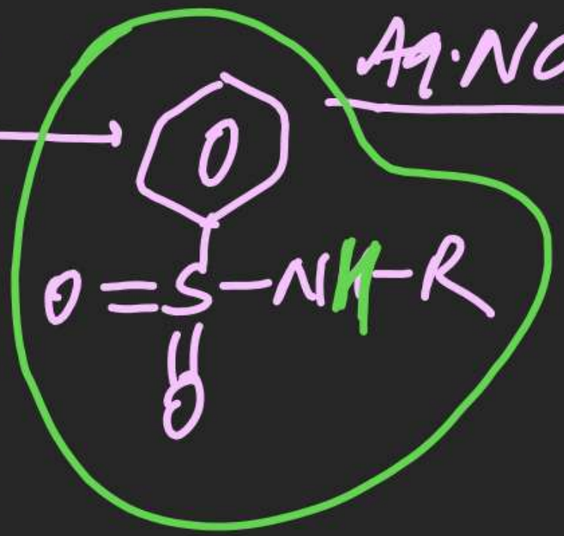
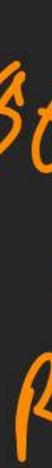
# (#) Hinsberg's Reagent

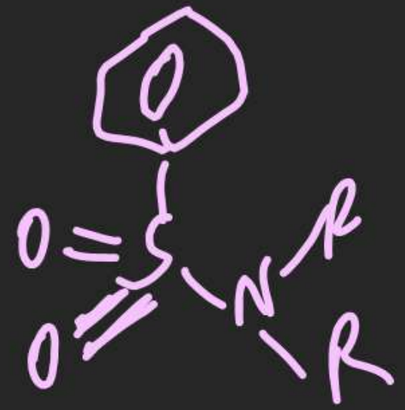


(a) नमूना Sample → Hinsberg's Reagent →  → Aq. NaOH → Soluble in alkali

Primy Amine ($R-NH_2$)

(b) Sec. Amine





Insoluble in alkali

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(#)


$\xrightarrow[NaOH]{CHCl_3}$

Bad smelling compd
or
Offensive smelling comp.
R–NC

Primary Amine
$(R-NH_2)$

(#)

$H_3C-NH_2$ $CH_3-NH_2$



S > P > T > $-NH_2$

# CARBOXYLIC ACIDS AND AMINES

## EXERCISE-I

Alkyl halide (Part-1)
Substitution, Elimination

M.Imp

1. In the given reaction, [X] will be:

[X] + Acetic anhydride ⟶ Aspirin

(A) Benzoic acid
(B) o-methoxybenzoic acid
(C) o-Hydroxybenzoic acid
(D) p-Hydroxybenzoic acid

Ans

(Aspirin)

2-Ethanoyl oxy Benzoic Acid
2-Acetoxy Benzoic Acid.

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# CARBOXYLIC ACIDS AND AMINES

2. In the reaction sequence, (B) will be:

(A) $CH_3 - C \equiv C - CH_3$

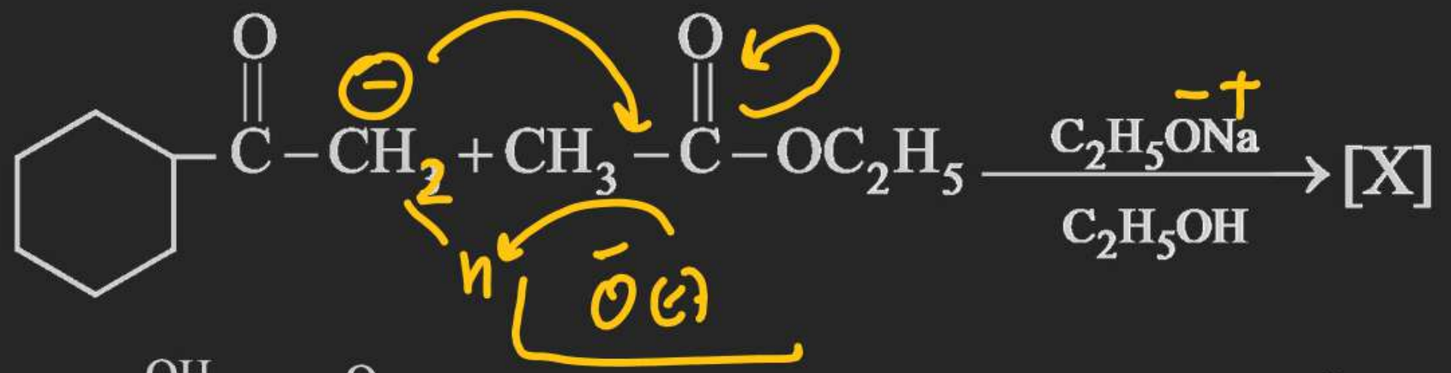
(B) $CH_3 - C \equiv C - MgBr$

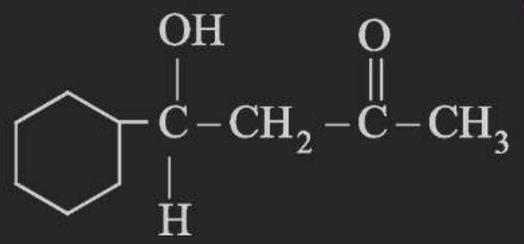
(C) $CH_3 - C \equiv C - COOH$

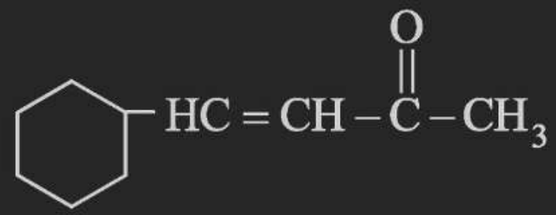
(D) $CH_3 - CH = CH - COOH$

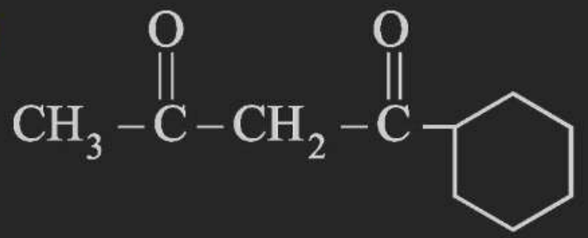
# CARBOXYLIC ACIDS AND AMINES

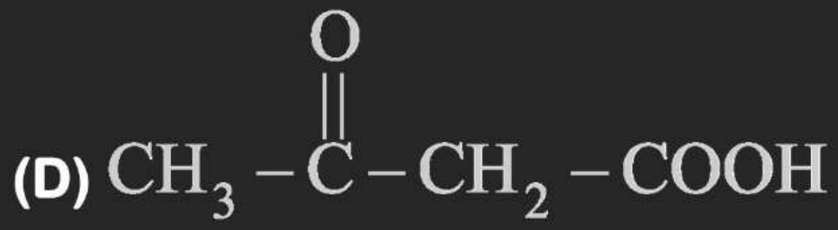
7. In the given reaction, [X] will be:




(A) 


(B) 


(C) 


(D) 

# CARBOXYLIC ACIDS AND AMINES

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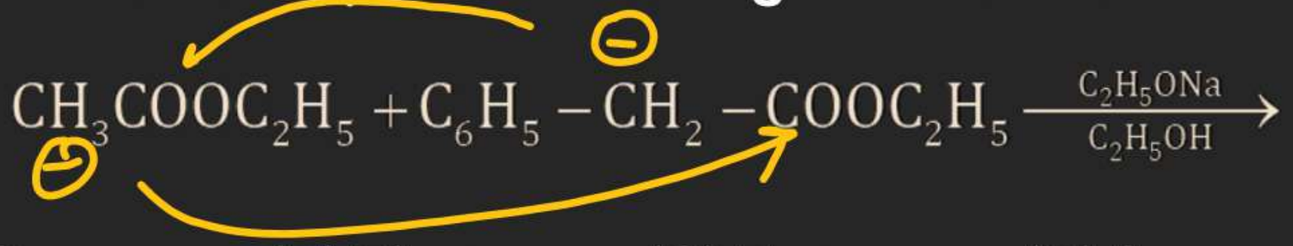
8. Number of cross products in the given reaction:




(A) One (B) Three (C) Two (D) four

# CARBOXYLIC ACIDS AND AMINES

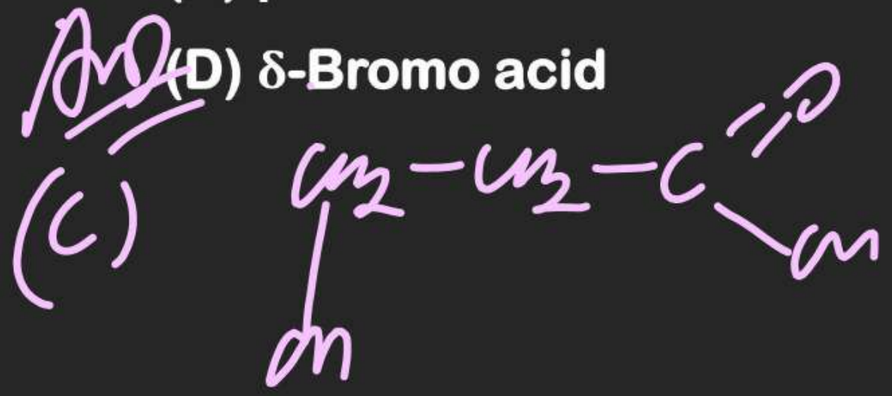
17. Which will form lactone on treatment with NaOH ?

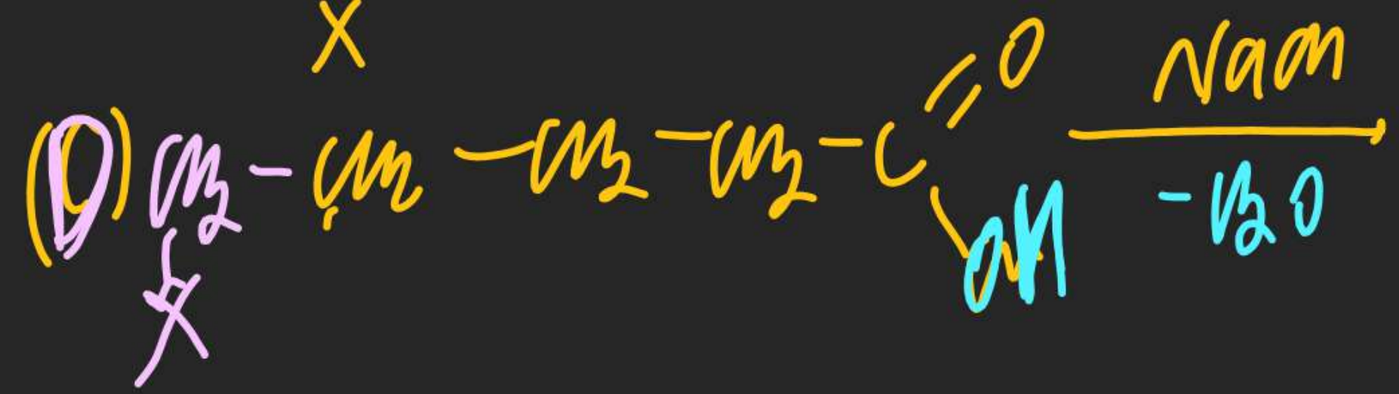
(A) α-Bromo acid

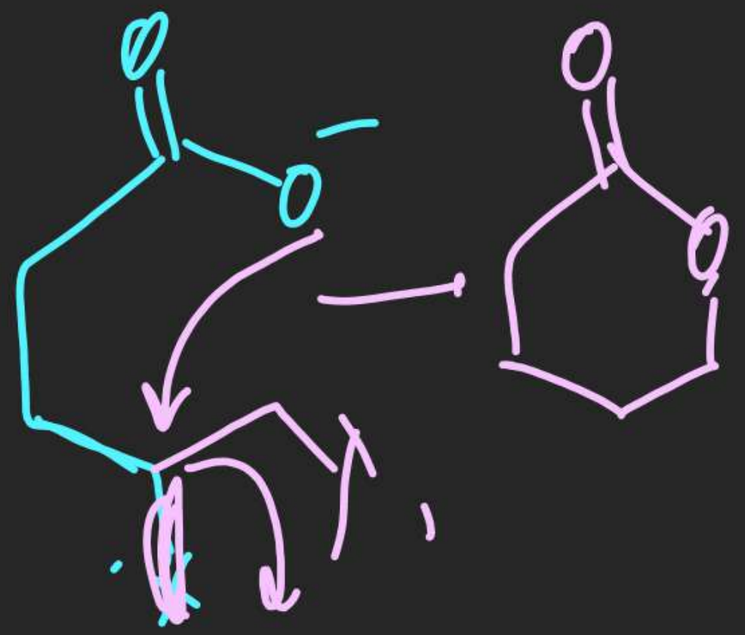
(B) β-Bromo acid

(C) β-Hydroxy acid

(D) δ-Bromo acid







# CARBOXYLIC ACIDS AND AMINES

19. In the given reaction, major product will be:

$$CH_3 - COOH \xrightarrow[(ii)\,NaCN]{(i)\,Br_2/red\,P} \xrightarrow[(iii)\,H_2O/H^{\oplus}]{\Delta}$$

(A) $CH_3COOH$

(B) $COOH - CH_2 - CH_2 - COOH$

(C) Succinic anhydride

(D) Malonic anhydride

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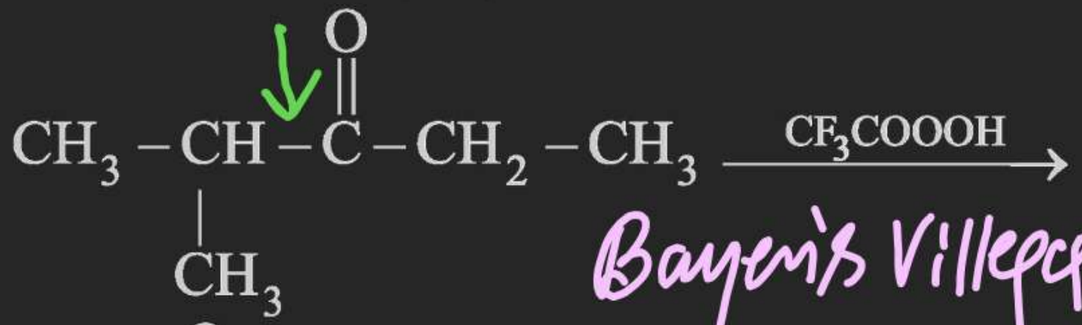
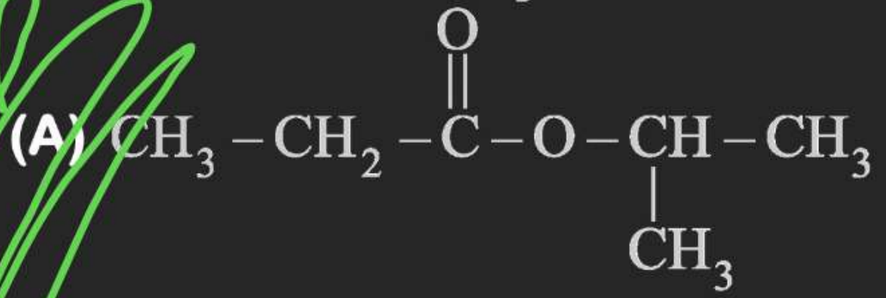
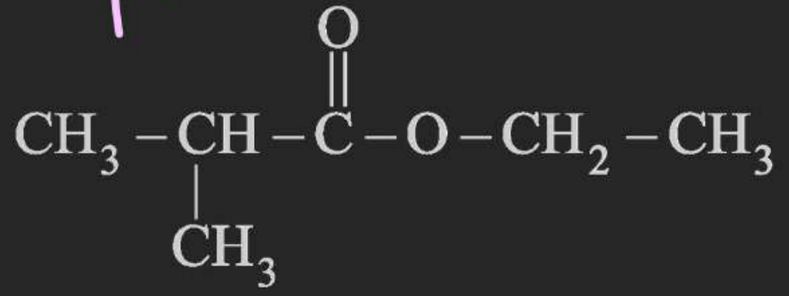
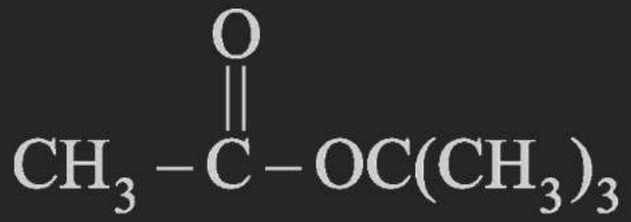
20. In the given reaction, major product will be:




Bayer's Villiger oxidn

(A) 

(B) 

(C) 

(D) $(CH_3)_3COOCH_3$

# CARBOXYLIC ACIDS AND AMINES

21. Which one of the following reactions can be used for the preparation of $\beta$-hydroxy ester:

(A) Perkin reaction

(B) Reformatsky reaction

(C) Aldol condensation

(D) Claisen condensation ($\beta$-keto ester)

$\alpha,\beta$-Unsaturated Carbonyl

(A) Perkin Rxn $\Longrightarrow$ $\alpha,\beta$ unsaturated Acid (Ph-CH=CH-COOH)

(B) Reformatsky Rxn $\Rightarrow$ $\alpha$-halo ester $\xrightarrow[(ii)\ H_3O^+]{(i)\ Zn}$ hydroxy ester

# CARBOXYLIC ACIDS AND AMINES

25. In the given reaction sequence major product B will be:

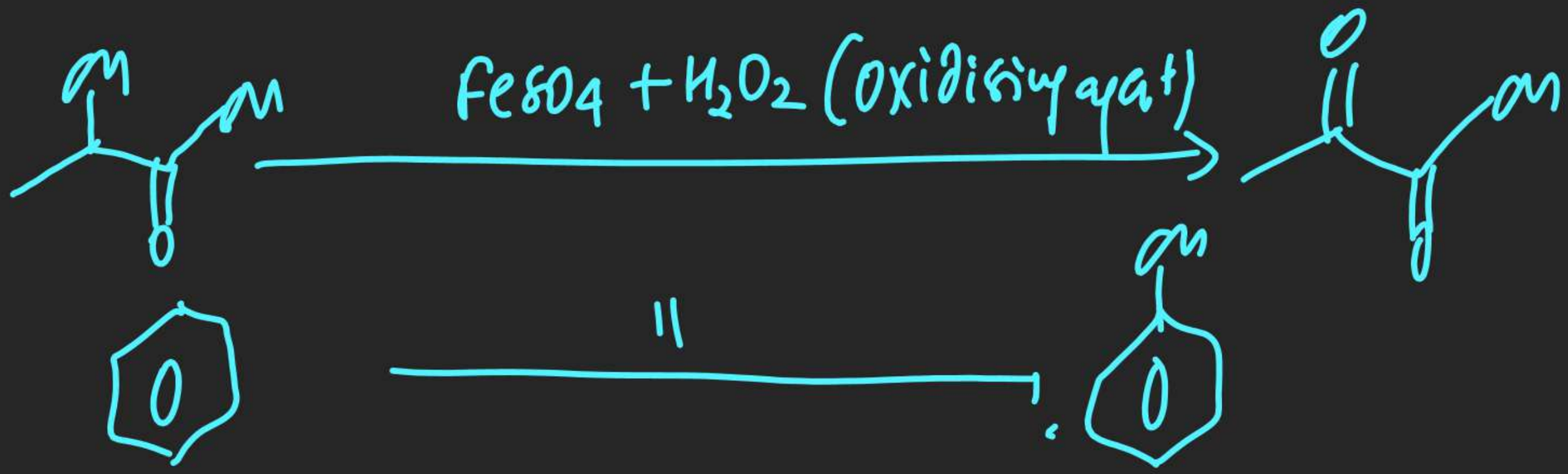
$$CH_3CHO \xrightarrow[(ii)H_2O/H^{\oplus}/\Delta]{(i)NaCN/HCl} (A) \xrightarrow[\text{reagent}]{\text{Fenton}} (B)$$

(A) Acetic acid

(B) Oxalic acid

(C) Pyruvic acid

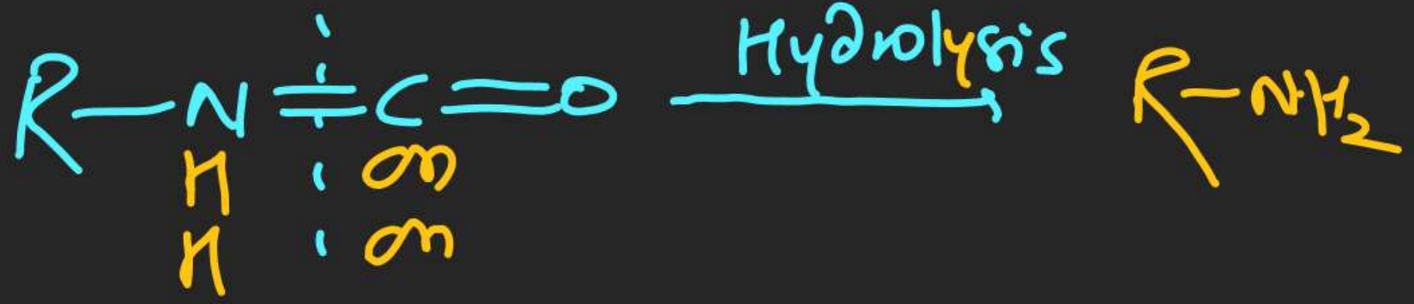
(D) Citric acid



# CARBOXYLIC ACIDS AND AMINES

34. Hydrolysis of alkyl isocyanide yields:

(A) Primary amine (B) Tert. Amine (C)Alcohol (D) Aldehyde



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**38. Major end product of the following sequence of reaction is:**

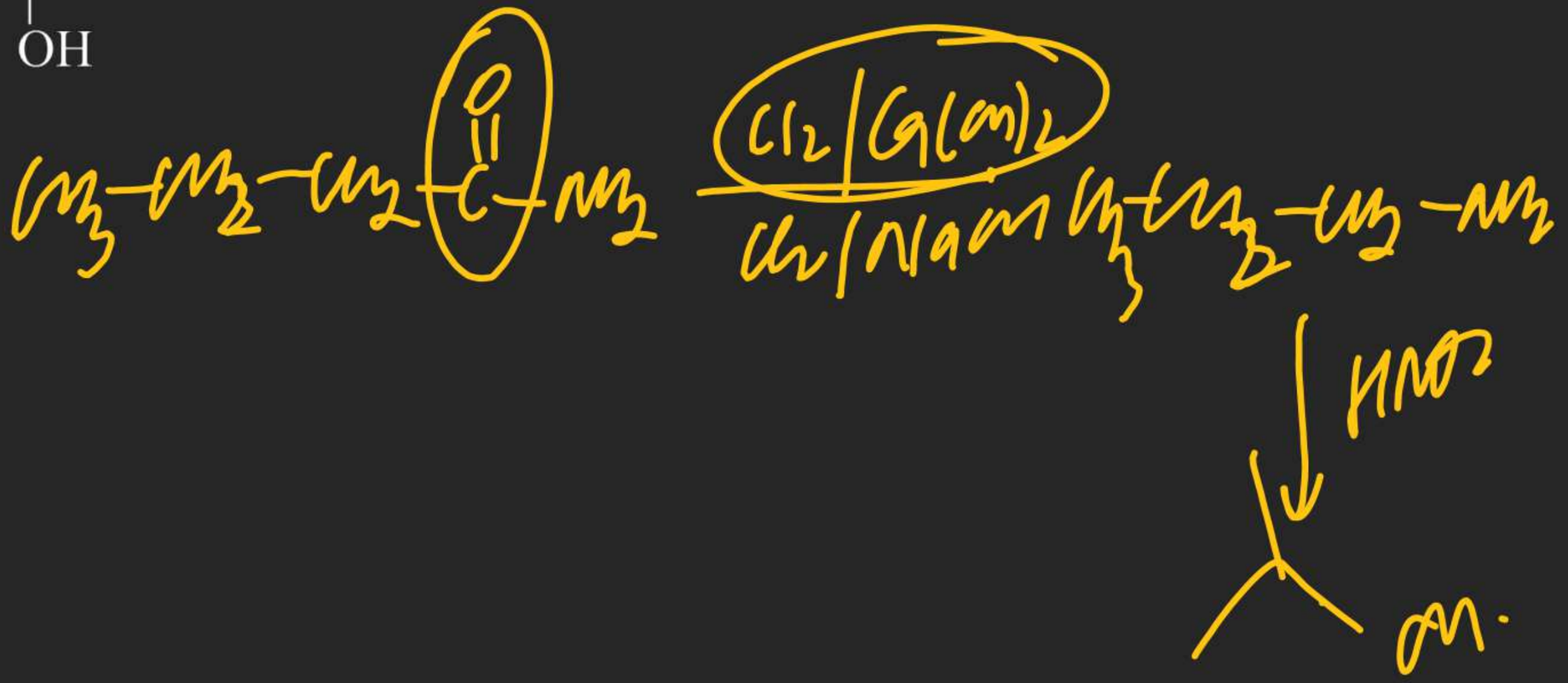
$$CH_3CH_2CH_2CONH_2 \xrightarrow[\Delta]{Ca(OH)_2, Cl_2} X \xrightarrow{HNO_2} Z$$

**(A)** $CH_3CH_2CH_2NH_2$

**(B)** $CH_3CH_2CH_2OH$

**(C)** $CH_3\underset{\displaystyle OH}{\underset{|}{C}}HCH_3$

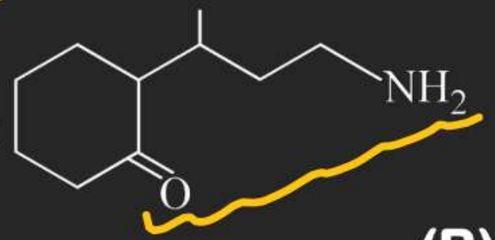
**(D)** $CH_3CH_2COOH$



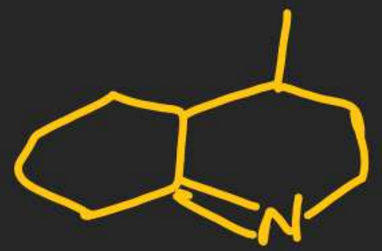
# CARBOXYLIC ACIDS AND AMINES

40. Reductive amination of A forms:

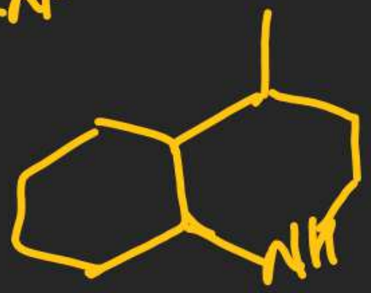
A :



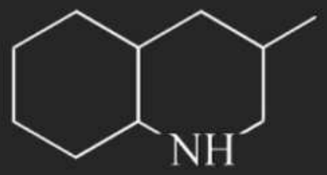

Aminatn



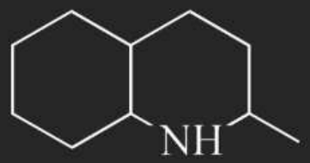

Reductn.



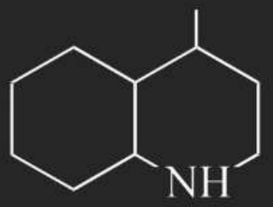

(A)



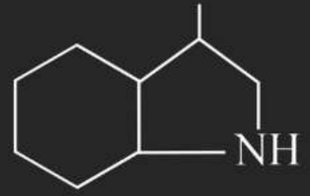

(B)




(C)




(D)



# CARBOXYLIC ACIDS AND AMINES

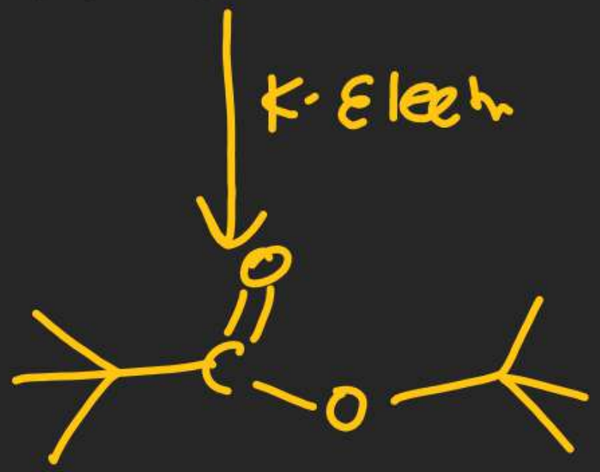
43. Sodium salt of which monobasic acids on electrolysis does not give hydrocarbon:

(A) $C_6H_5COOH$

(B) $HCOOH$

(C) $Me_3C - COOH$

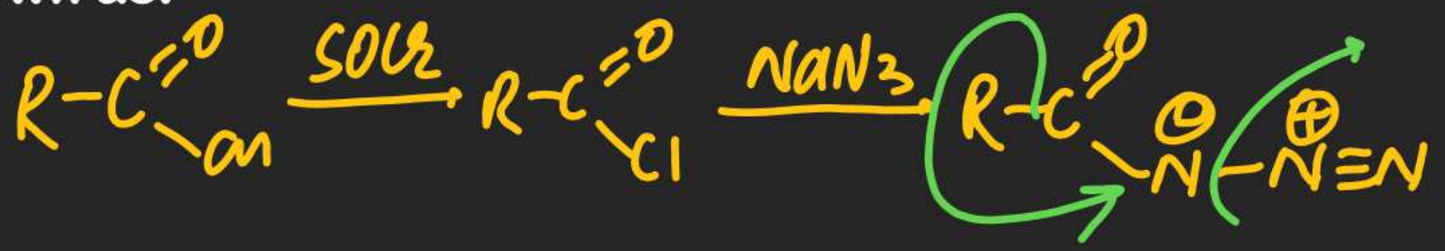
(D) $COOH - CH = CH - COOH$



# CARBOXYLIC ACIDS AND AMINES

45. Following reaction is known as:

$$RCOOH \xrightarrow[(iii)H_2O,\Delta]{(i)SOCl_2 \\ (ii)NaN_3}$$




(A) Hoffman rearrangement

(B) Curtius rearrangement

(C) Lossen rearrangement

(D) Schmidt rearrangement

# CARBOXYLIC ACIDS AND AMINES

## EXERCISE-II

1. Which of the following set of reaction can prepare $R-\overset{\overset{O}{\|}}{C}-OH$ as the final product:

(A) $R-MgX+O=C=O \xrightarrow{\text{dryether}}$

(B) $R-CN \xrightarrow[(ii)\,H_2O/H^+]{(i)\,SnCl_2+HCl}$

(C) 


(D) $CH_3(CH_2)_8CH_2OH \xrightarrow[H_2SO_4]{CrO_3}$

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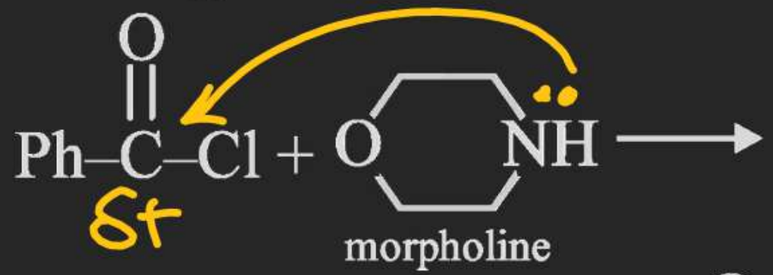
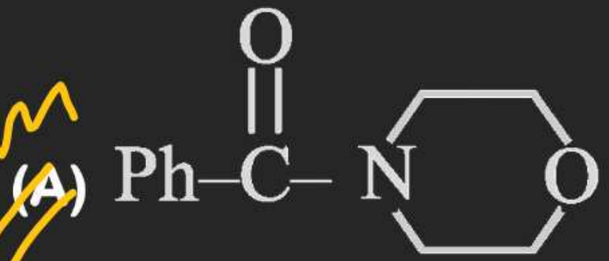
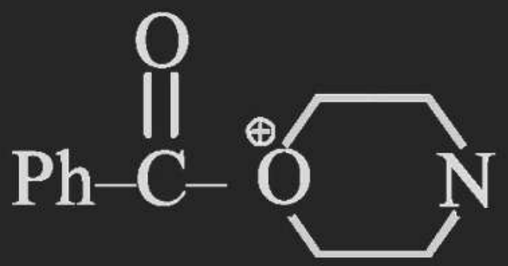
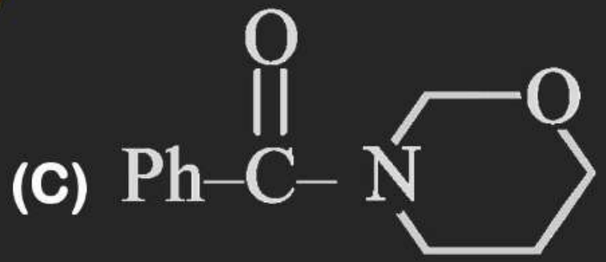
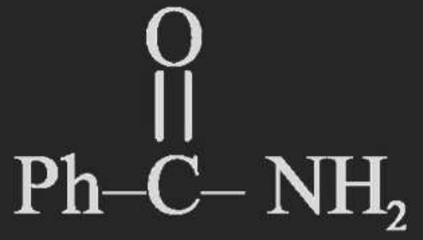
3. Major product of following reaction is:




(A) 

(B) 

(C) 

(D) 

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11. For the following compounds, choose the correct option (s)

$CH_3 - NH_2$ (P) $Ph - NH_2$ (Q)

(A) $(P)$ is more basic than $(Q)$

(B) Both (P) & (Q) will give foul smelling compound with $CHCl_3, KOH$

(C) Both (P) & (Q) will form base soluble sulphonamide with Hinsberg reagent

(D) Both (P) & (Q) can be obtained by gabriel phthalimide synthesis

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25. Which of the following methods would serve to prepare 1-phenylpropan-2-ol.

(A) Addition of benzyl grignard reagent to ethanal.

(B)Addition of phenyllithium to methyloxirane

(C) Addition of methyl grignard reagent to phenyl acetaldehyde.

(D) Addition of phenyl Magnesium bromide with ethanal.

LDA ⇒ Lithium Di Isopropyl Amide