



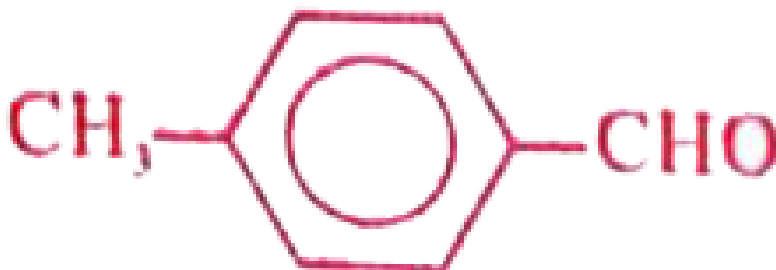
CHEMISTRY

BOOKS - PREMIERS PUBLISHERS

CARBONYL COMPOUNDS AND CARBOXYLIC ACIDS

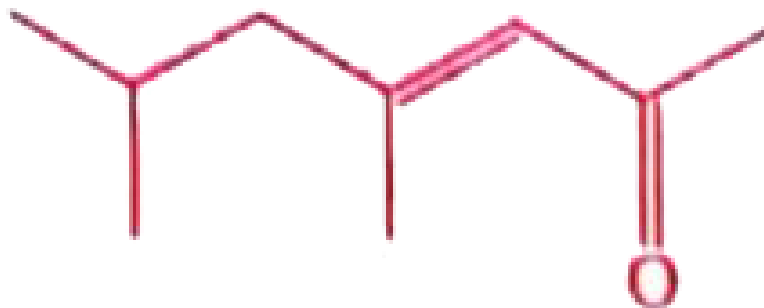
Evaluate Yourself

1. Write the IUPAC name for the following compound



(i)

(ii) $(\text{CH}_3)_2\text{C}=\text{CHCOCH}_3$



(iii)

(iv) $(CH_3)_2C(OH)CH_2CHO$

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2. Write all possible structural isomers and position isomers for the ketone represented by the molecular formula $C_5H_{10}O$.

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3. What happens when the following alkenes are subjected to reductive ozonolysis.

(i) Propene,

(ii) 1-Butene,

(iii) Isobutylene.



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4. What happens when n-propyl benzene is oxidised using $H^+ / KMnO_4$?



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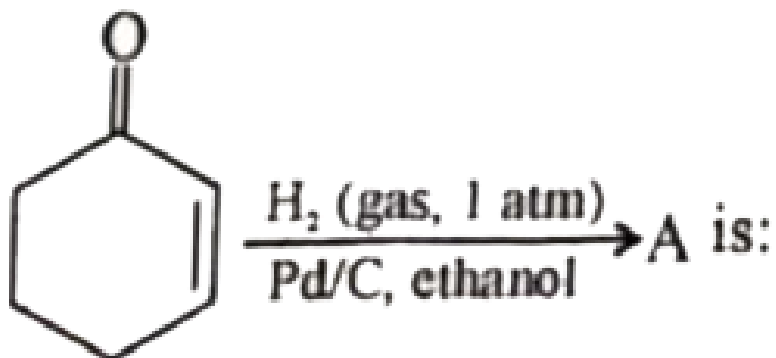
5. How will you prepare benzoic acid using Grignard reagent.



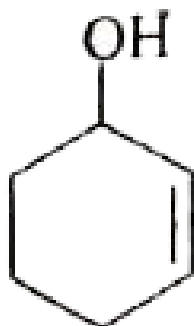
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Evaluation Textbook Questions Answers Choose The Correct Answer

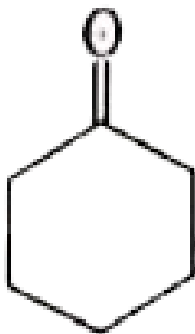
1. The correct structure of the product 'A' formed in the reaction



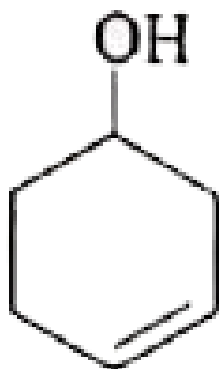
is:



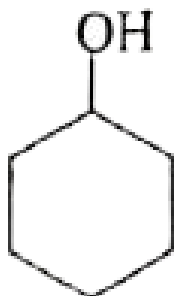
A.



B.



C.



D.

Answer: B

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2. The formation of cyanohydrin from acetone is an example of:

A. Nucleophilic substitution

B. Electrophilic substitution

C. Electrophilic addition

D. Nucleophilic addition

Answer: D

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3. Reaction of acetone with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is:

A. Grignard reagent

B. Sn / HCl

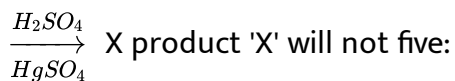
C. hydrazine in presence of slightly acidic solution

D. hydrocyanic acid

Answer: C

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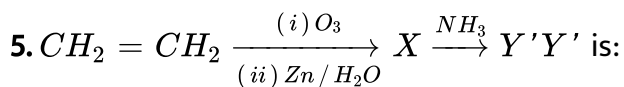
4. In the following reaction,



- A. Tollen's test
- B. Victory meyer test
- C. Iodoform test
- D. Fehling solution test

Answer: B

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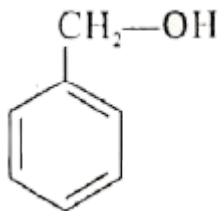
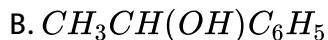
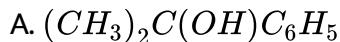
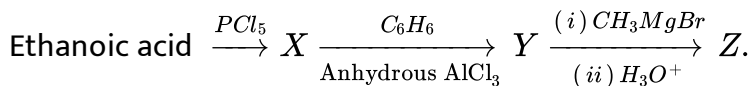


- A. Formaldelyde
- B. diacetoneammonia
- C. hexamethy lenetetraamine
- D. oxime

Answer: C

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6. Predict the product Z in the following series of reactions.



Answer: A

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7. Assertion: 2, 2 - dimethyl propanoic acid does not give HVZ reaction.

Reason: 2, 2 - dimethyl propanoic acid does not have α - hydrogen atom

A. if both assertion and reason are true and reason is the correct explanation of assertion.

B. if both assertion and reason are true but reason is not the correct explanation of assertion.

C. assertion is true but reason is false.

D. both assertion and reason are false.

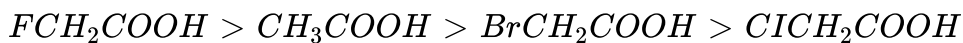
Answer: A



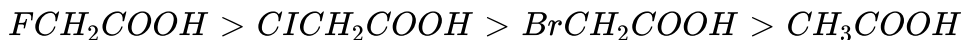
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8. Which of the following represent the correct order of acidity in the given compounds:

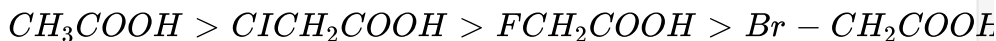
A.



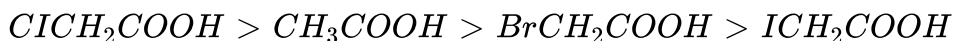
B.



C.



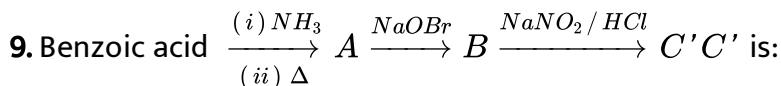
D.



Answer: A



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A. anilinium chloride

B. o-nitro aniline

C. benzene diazonium chloride

D. m-nitro benzoic acid

Answer: C

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10. Ethanoic acid $\xrightarrow{P / Br_2}$ 2-bromothanoic acid.

This reaction is called:

A. Finkelstein reaction

B. Haloform reaction

C. Hell - Volhard - Zelinsky reaction

D. none of these

Answer: C

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11. $CH_3Br \xrightarrow{KCN} (A) \xrightarrow{H_2O^+} (B) \xrightarrow{PCl_5} (C)$ Product (C) is:

- A. acetylchloride
- B. chloro acetic acid
- C. α - chlorocyano ethanoic acid
- D. none of these

Answer: A



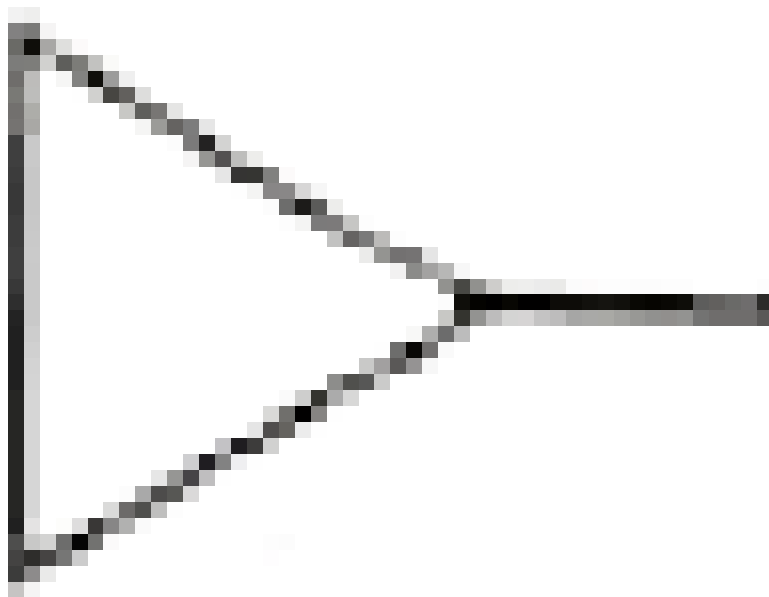
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12. Which one of the following reduces Tollens reagent:

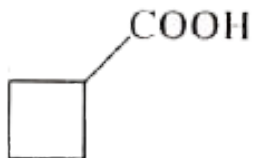
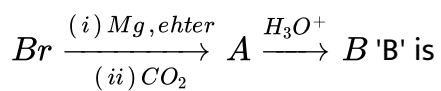
- A. Formic acid
- B. acetic acid
- C. benzophenone
- D. none of these

Answer: A

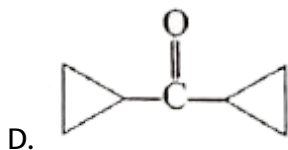
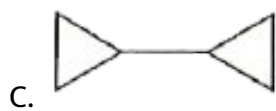
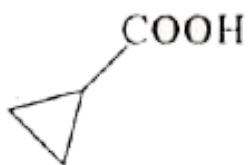
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13.



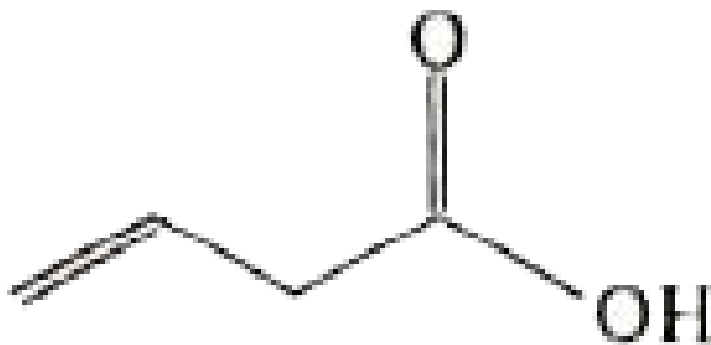
A.



Answer: B

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14. The IUPAC name of



A. but-3-enoic acid

B. but-1-ene-4-oic acid

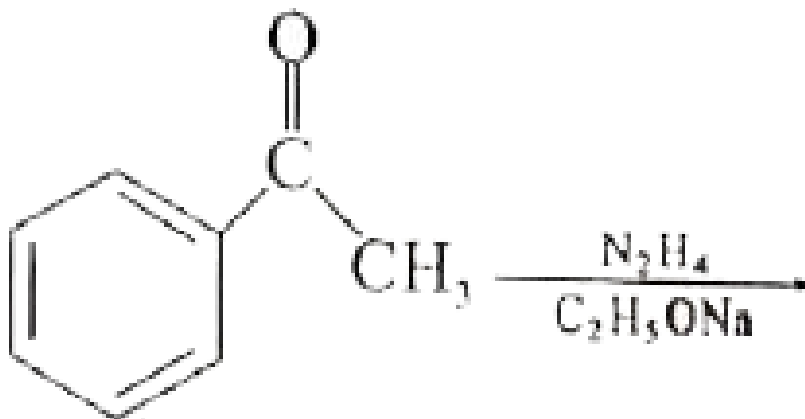
C. but-2-ene-1-oic acid

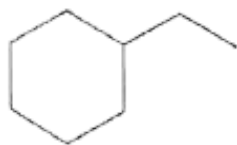
D. but-3-ene-1-oic acid

Answer: A

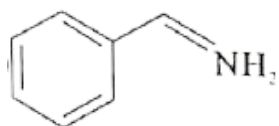
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15. Identify the product formed in the reaction

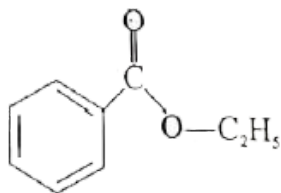




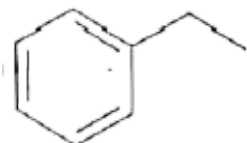
A.



B.



C.



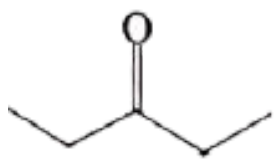
D.

Answer: D

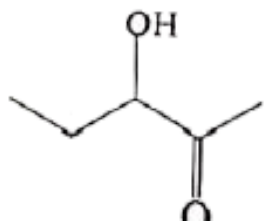


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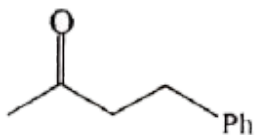
16. In which case chiral carbon is not generated by reaction with HCN:



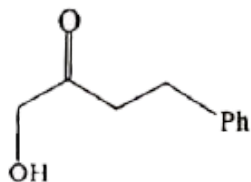
A.



B.



C.



D.

Answer: A



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17. Assertion: p-N, N-dimethyl aminobenzaldehyde undergoes benzoin condensation.

Reason: The aldehydic (-CHO) group is meta directing.

- A. if both assertion and reason are true and reason is the correct explanation of assertion.
- B. if both assertion and reason are true but reason is not the correct explanation of assertion.
- C. assertion is true but reason is false.
- D. both assertion and reason are false.

Answer: B

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18. Which one of the following reaction is an example of disproportionation reaction:

- A. Aldol condensation
- B. cannizaro reaction

C. Benzoin condensation

D. none of these

Answer: B

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19. Which one of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid:

A. Phenylmethanal

B. ethanal

C. ethanol

D. methanol

Answer: A

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20. The reagent used to distinguish between acetabdehyde and benzaldehyde is:

- A. Tollens reagent
- B. Fehling 's solution
- C. 2,4-dinitrophenyl hydrazine
- D. semicarbazide

Answer: B



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21. Phenyl methanal is reacted with concentrated NaOH to give two products X and Y. X reacts with metallic sodium to liberate hydrogen X and Y are:

- A. sodiumbenzoate and phenol
- B. Sodium benzoate and phenyl methanal

C. phenyl methanol and sodium benzoate

D. none of these

Answer: C

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22. In which of the following reaction new carbon - carbon bond is not formed?

A. Aldol condensation

B. Friedel craft reaction

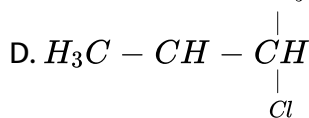
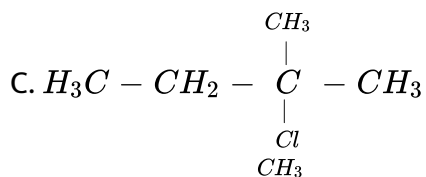
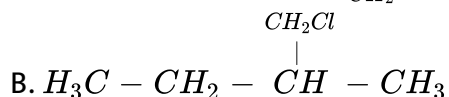
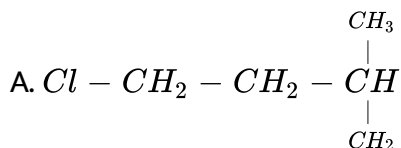
C. Kolbe's reaction

D. Wolf kishner reduction

Answer: D

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23. An alkene "A" on reaction with O_3 and $Zn - H_2O$ gives propanone and ethanol in equimolar ratio. Addition of HCl to alkene "A" gives "B" as the major product. The structure of product "B" is:



Answer: C

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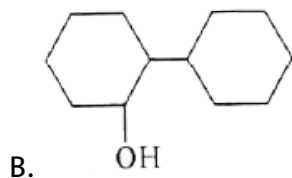
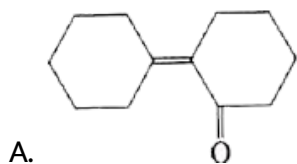
24. Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their:

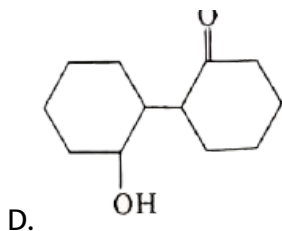
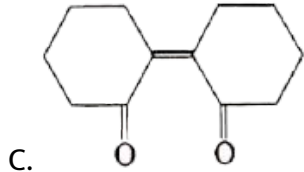
- A. more extensive association of carboxylic acid via van der Waals force of attraction
- B. formation of carboxylate ion
- C. formation of intramolecular H - bonding
- D. formation of intermolecular H - bonding

Answer: D

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25. Of the following, which is the product formed when cyclohexanone undergoes aldol condensation followed by heating?





Answer: A

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Evaluation Textbook Questions Answers Answer The Following Questions

1. How is propanoic acid is prepared stating from

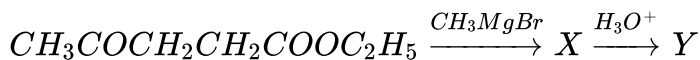
(a) an alcohol, (b) an alkylhalide, (c) an alkene

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2. A Compound (A) with molecular formula C_2H_3N on acid hydrolysis gives (B) which reacts with thionylchloride to give compound (C). Benzene reacts with compounds (C) in presence of anhydrous $AlCl_3$ to give compound (C). Compound (C) on reduction with gives (D). Identify (A), (B), (C) and D. Write the equations.

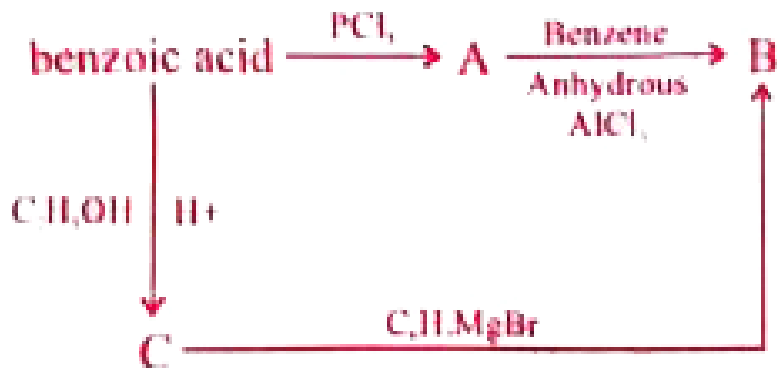
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3. Identify X and Y.



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4. Identify A, B and C.

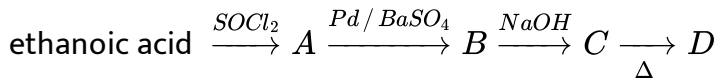


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5. A hydrocarbon A (molecular formula C_8H_{10}) on ozonolysis gives $\text{B}(\text{C}_4\text{H}_6\text{O}_2)$ only. Compound C ($\text{C}_3\text{H}_5\text{Br}$) on treatment with magnesium in dry ether gives (D) which on treatment with CO_2 followed by acidification gives (C). Identify A, B, C and D.

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6. Identify A, B, C and D



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7. An alkene (A) on ozonolysis gives propanone and aldehyde (B). When (B) is oxidised (C) is obtained. (C) is treated with Br_2/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.

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8. How will you convert benzaldehyde into the following compounds?

(i) benzophenone

(ii) benzoic acid

(iii) α - hydroxy phenyl acetic acid.

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9. What is the action of HCN on

(i) propanone

2,4-dichlorobenzaldehyde

(iii) ethanal

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10. A carbonyl compound A having molecular formula $C_5H_{10}O$ forms crystalline precipitate with sodium bisulfate and gives positive iodoform test. A does not reduce Fehling solution. Identify A.

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

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12. How are the following conversions effected

(a) propanal into butanone

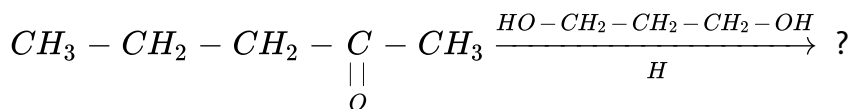
(b) Hex - 3- yne into hexan-3- one

(c) phenylmethanal into benzio acid

(d) phenylmethanal into benzoin

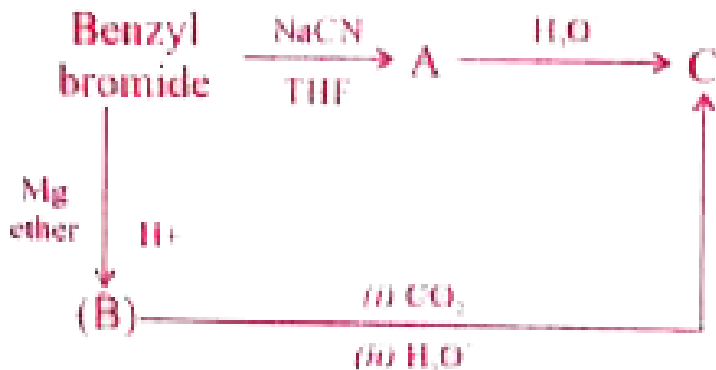
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13. Complete the following reaction.



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14. Identify A, B and C propylene glycol acetal.



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15. Oxidation of ketones involves carbon - carbon bond cleavage. Name the product (s) is / are formed on oxidising 2,5 - dimethylhexan -3-one using strong oxidising agent.

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16. (i) Acetic anhydride from acetic acid

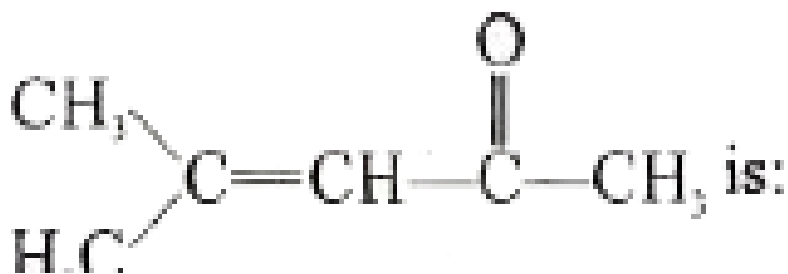
(ii) Ethylacetate from methylacetate

- (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

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Other Important Questions Answers Choose The Correct Answer

1. The IUPAC name of the compound is



A. Mesityl oxide

B. 4 - methyl pent - 3 - en - 2 - one

C. 4 - methyl pent - 2 - en - 4 - one

D. 2 - methyl pent - 4 - one

Answer: B

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2. Ozonolysis of 2 - methyl but -2-ene followed by treatment with

Zn/H_2O gives:

A. ethanal

B. propanone

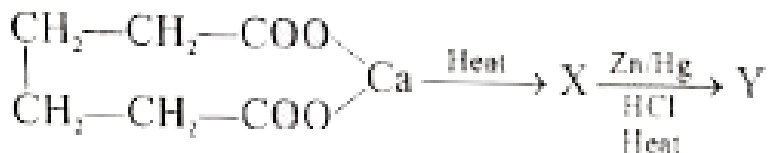
C. propanal and prop - 2 - one

D. ethanal and propan - 2 - one

Answer: D

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3. Identify the product 'Y' in the following reaction sequence .



- A. pentane
- B. cyclobutane
- C. cyclopentane
- D. cyclopentanone

Answer: C

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4. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having molecular mass 44u. The alkene is :

A. 2-butene

B. ethene

C. propene

D. 1-butene

Answer: A



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5. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of :

A. a vinyl group

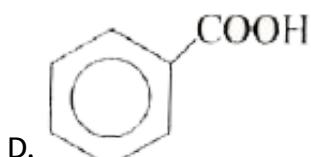
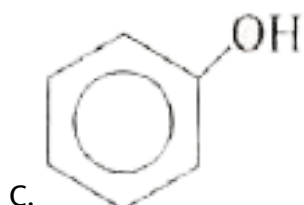
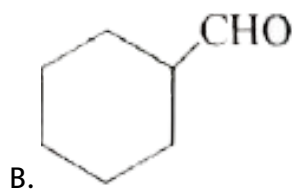
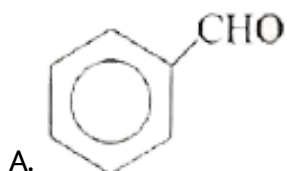
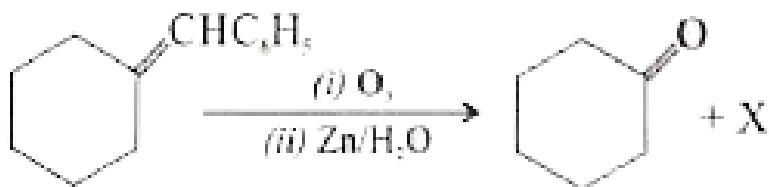
B. an isopropyl group

C. an acetylene triple bond

D. two ethylenic double bonds

Answer: A

6. Identify the compound 'X' in the following reaction :



Answer: A



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7. The order of reactivity of phenyl magnesium bromide (PhMgBr) with the following compounds.

I. CH_3CHO , II. $(\text{CH}_3)_2\text{CO}$ and III. PhCOPh is

A. III gt II gt I

B. II gt I gt III

C. I gt III gt II

D. I gt II gt III

Answer: D



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8. A carbonyl compound reacts with hydrogen cyanide to form a cyanohydrin which on hydrolysis forms a racemic mixture of α - hydroxy acids. The carbonyl compound is :

A. formaldehyde

B. acetaldehyde

C. acetone

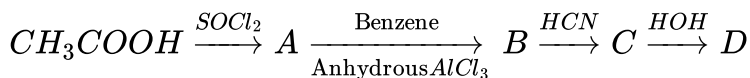
D. diethyl ketone

Answer: B

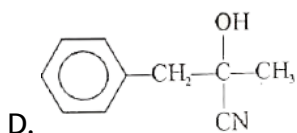
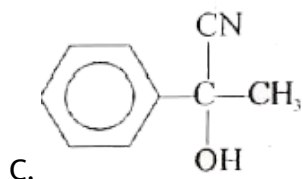
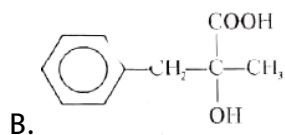
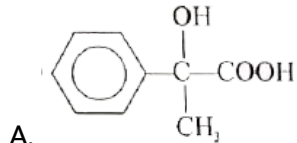


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9. In a set of reactions acetic acid yielded the product D



The structure of 'D' would be :



Answer: A

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10. $(CH_3)_2C = CHCOCH_3$ can be oxidised to $(CH_3)_2C = CHCOOH$

by :

A. Chormic acid

B. NaOI

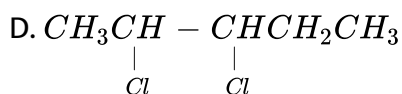
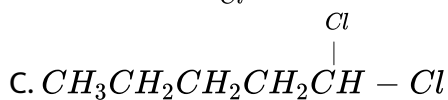
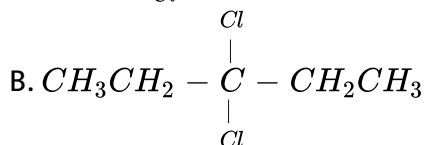
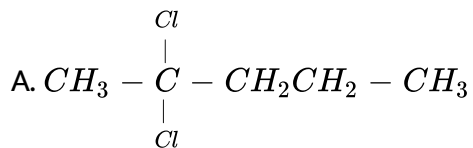
C. Cu at $300^{\circ}C$

D. $KMnO_4$

Answer: B

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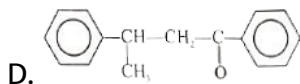
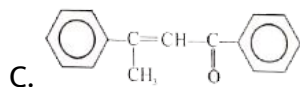
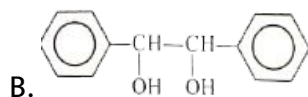
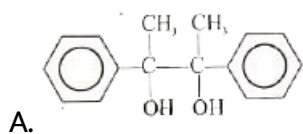
11. A compound 'A' ($C_5H_{10}Cl_2$) on hydrolysis gives $C_5H_{10}O$ which reacts with NH_2OH , forms iodoform but does not give Fehling's test A is :



Answer: A

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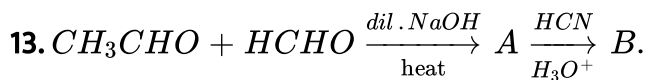
12. A cetophenone, when reacted with a base, C_2H_5ONa , yields a stable compound which has the structure :



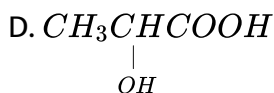
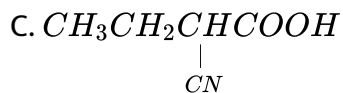
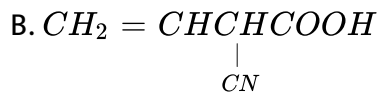
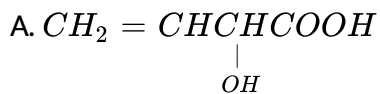
Answer: C



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The structure of 'B' is :



Answer: A

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14. Self condensation of two moles of ethyl acetate in presence of sodium ethoxide yields :

A. ethyl propionate

B. ethyl butyrate

C. acetoacetic ester

D. methyl acetoacetate

Answer: C

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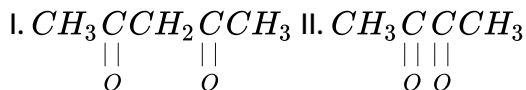
15. *m*-chlorobenzaldehyde on reaction with conc. KOH at room temperature gives :

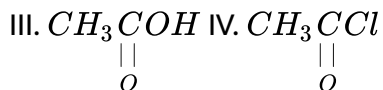
- A. potassium *m*-chloro benzoic acid and *m*-hydroxy benzaldehyde.
- B. *m*-hydroxy benzaldehyde and *m*-chlorobenzyl alcohol.
- C. *m*-chloro benzyl alcohol and *m*-hydroxy benzyl alcohol.
- D. potassium *m*-chloro benzoate and *m*-chloro benzyl alcohol.

Answer: D

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16. Consider the following compounds :





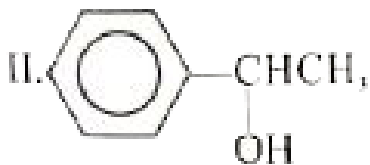
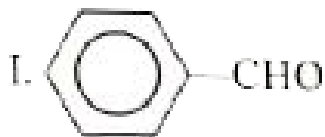
Which will give iodoform test ?

- A. only I
- B. both I and II
- C. only II
- D. all

Answer: C

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17. Fehling solution will oxidise :



IV. HCHO

A. All

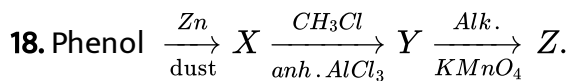
B. only I and IV

C. only II and IV

D. only III and IV

Answer: D

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The product 'Z' is :

A. benzaldehyde

B. benzoic acid

C. benzene

D. toluene

Answer: B

19. Match entriews of column I with appropriate entries of column II.

	Column I		Column II
(A)	$\text{HCHO} + \text{C}_6\text{H}_5\text{CHO} \xrightarrow{\text{OH}^-}$	(p)	$\text{CH}_3\text{COCH}_2\text{CH}_2\text{OH}$
(B)	$\text{CH}_3\text{COCH}_3 + \text{C}_6\text{H}_5\text{CHO} \xrightarrow{\text{OH}^-}$	(q)	$\text{CH}_3\text{COOC}_2\text{H}_5$
(C)	$\text{HCHO} + \text{CH}_3\text{COCH}_3 \xrightarrow{\text{OH}^-}$	(r)	$\text{C}_6\text{H}_5\text{CH}_2\text{OH} + \text{HCO}_2^-$
(D)	$\text{CH}_3\text{CHO} \xrightarrow{\text{Al}(\text{OC}_2\text{H}_5)_3}$	(s)	$\text{C}_6\text{H}_5\text{CH}=\text{CHCOCH}_3$

A. (A) - (p), (B) - (s), (C) - (q), (D) - (r)

B. (A) - (q), (B) - (s), (C) - (p), (D) - (r)

C. (A) - (r), (B) - (s), (C) - (p), (D) - (q)

D. (A) - (r), (B) - (p), (C) - (q), (D) - (s)

Answer: C

20. Assertion : Fehling solution oxidises acetaldehyde to acetic acid but not benzaldehyde to benzoic acid.

Reason : The C - H bond in benzaldehyde is stronger than acetaldehyde.

- A. Both assertion and reason are correct and reason is the correct explanation of assertion.
- B. Both assertion and reason are correct but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is wrong.
- D. Both assertion and reason are wrong.

Answer: A



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21. Assertion : Carboxylic acids contain a carbonyl group but do not give characteristic reactions of the carbonyl group.

Reason : Due to resonance, the electrophilic nature of the carboxyl cation is greatly reduced compared to carbonyl carbon in aldehydes and ketones.

- A. Both assertion and reason are correct and reason is the correct explanation of assertion.
- B. Both assertion and reason are correct but reason is not the correct explanation of assertion.
- C. Assertion is true but reason is wrong.
- D. Both assertion and reason are wrong.

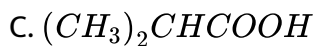
Answer: A



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22. Among the following acids which has the lowest pK_a value ?

A. CH_3COOH

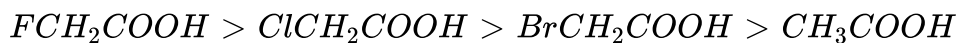


Answer: B

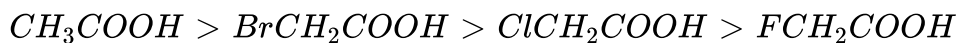
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23. Which of the following presents the correct order of the acidity in the given compounds ?

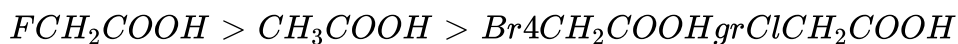
A.



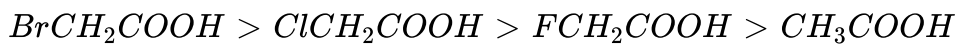
B.



C.



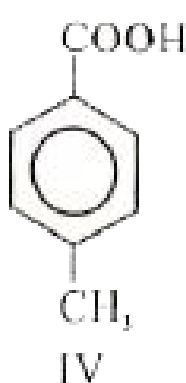
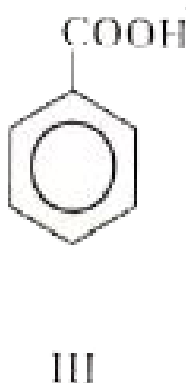
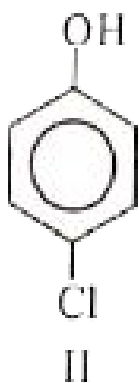
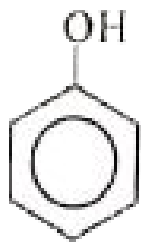
D.



Answer: A

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24. The correct acidity order of the following is



A. III gt IV gt II gt I

B. IV gt III gt I gt II

C. III gt II gt I gt IV

D. II gt III gt IV gt I

Answer: A



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25. Which one the following pairs gives effervescence with aq. NaHCO_3

I. CH_3COCl II. CH_2COCH_3

III. $\text{CH}_3\text{COOCH}_3$ IV. $\text{CH}_3\text{COOCOCH}_3$

A. I and II

B. I and IV

C. II and III

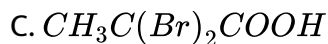
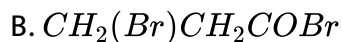
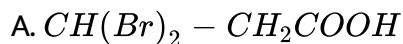
D. I and III

Answer: B



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26. Propionic acid with Br_2/P yields a dibromo product. Its structure would be :



Answer: C



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27. When benzoic acid is treated with $LiAlH_4$, it forms :

A. benzaldehyde

B. benzyl alcohol

C. benzene

D. toluene

Answer: B

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28. Sodium ethoxide reacts with ethanoyl chloride. The compound that is produced in the above reaction is :

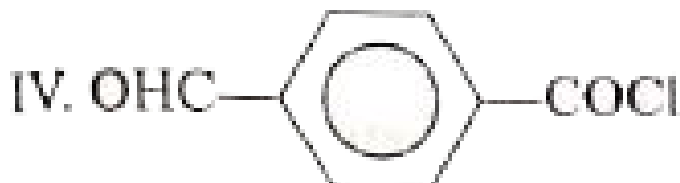
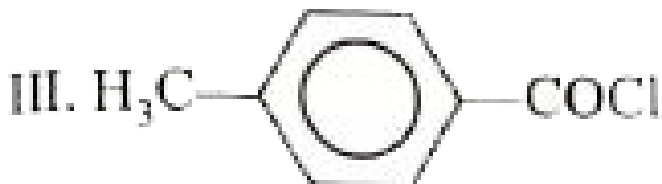
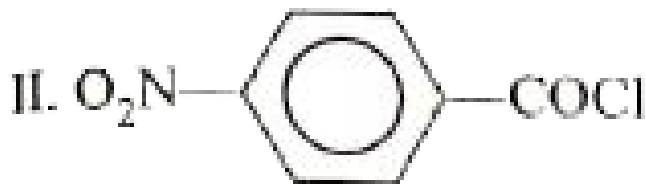
- A. 2- butanone
- B. ethyl chloride
- C. ethyl ethanoate
- D. diethyl ether

Answer: C

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29. Consider the following :

1. C_6H_5COCl



The correct decreasing order of their reactivity towards hydrolysis is :

A. II > IV > I > III

B. II > IV > III > I

C. I > II > III > IV

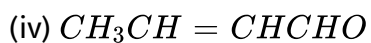
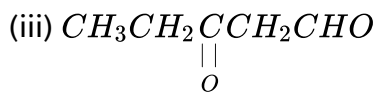
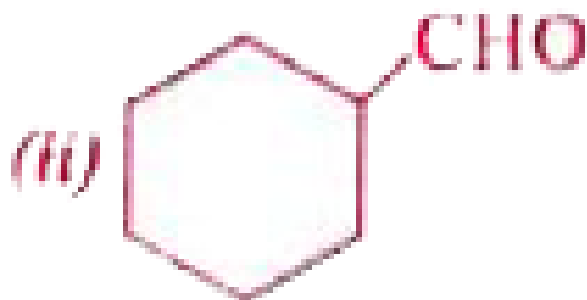
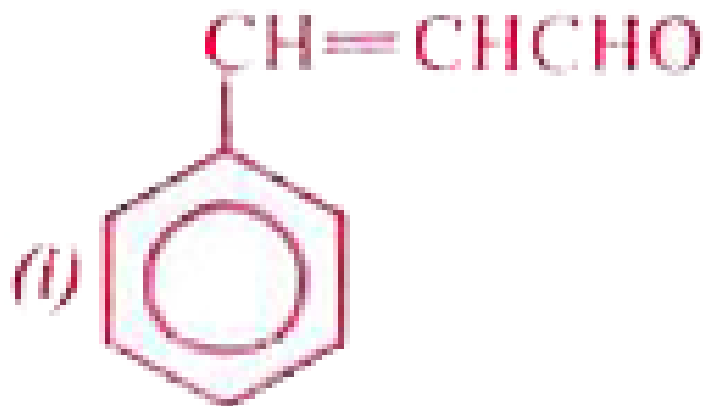
D. IV > II > I > III

Answer: A



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1. Write the IUPAC names of the following :



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2. Give the structure of the following compounds.

(i) 4 - Nitropropiophenone

(ii) 2 - Hydroxycyclopentane carbaldehyde

(iii) phenyl acetaldehyde

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3. Write the IUPAC names of

(i) Diacetone alcohol

(ii) Crotonaldehyde

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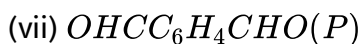
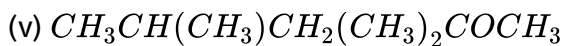
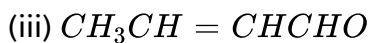
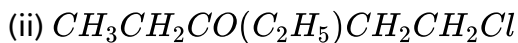
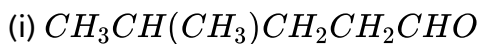
4. Write the structure of

(i) 3- oxopentanal

(ii) 1 - phenylpentan - 1 - one

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5. Name the following compounds according to IUPAC system of nomenclature.



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6. Draw the structures of the following compounds.

(i) 3- methyl butanal

(ii) 4- nitro propiophenone

(iii) p- methyl benzaldehyde

(iv) 4-methylpent - 3-en -2- one

(v) 4 - chloropentan - 2- one

(vi) 3-Bromo-4- phenyl pentanoic acid

(vii) p, p' dihydroxy benzo phenone

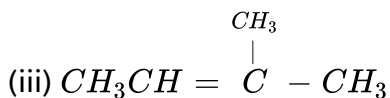
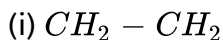
(viii) Hex - 2 - en - 4 yonic acid

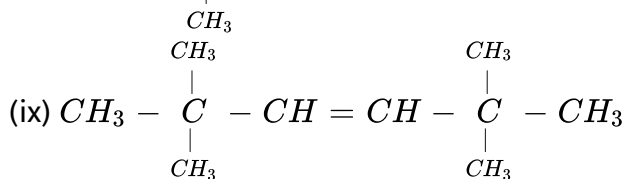
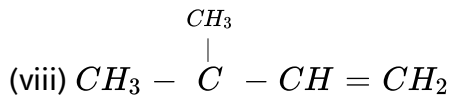
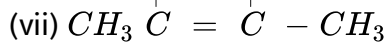
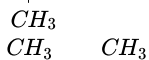
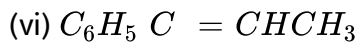
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7. Write IUPAC names of the following aldehydes and ketones. Wherever possible give also common names.

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8. Give the product of oxonolysis of the following alkenes.





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9. Identify the product of hydration of the following :

(i) ethyne

(ii) prop - 1 - yne

(iii) Hex - 1 - yne

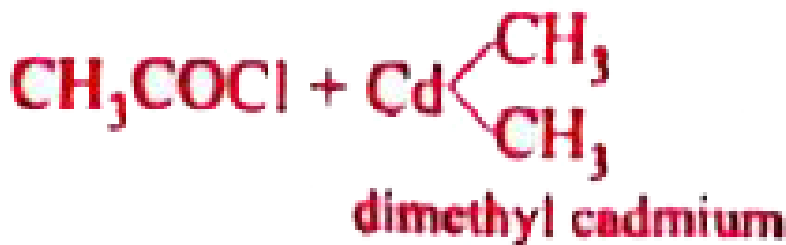
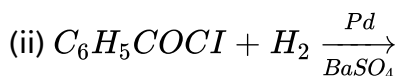
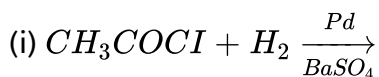
(iv) Diphenyl ecetylene

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10. How are the following compounds formed by distillation of calcium salts of their carboxylic acids ? (i) Formaldehyde, (ii) Acetaldehyde, (iii) Acetone, (iv) Butan -2 - one (v) Cyclopentanone, (vi) Benzaldehyde

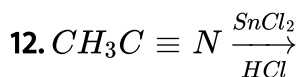
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11. Complete the following equations :



(iii)

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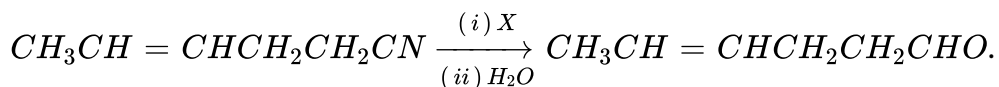
(i) Identify the product

(ii) Name the reaction.

(iii) What is the intermediate formed in the reaction.

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13.



(i) Name the reagent i.e., X used for the above reduction.

(ii) Why other reducing agents like H_2 in the presence of a catalyst are not used.

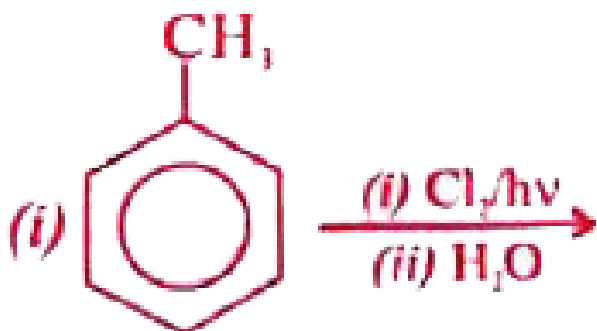
(iii) Write the IUPAC name of the product formed.

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14. How is benzaldehyde prepared from (i) methyl benzene, (ii) benzene, (iii) benzyl alcohol . Give equations.

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15. Identify the product of the following reactions. Write the complete equation.



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16. Give examples for Friedel crafts acetylation reactions.

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17. The boiling points of aldehydes and ketones are high compared to hydrocarbons and ethers of comparable molecular mass. Explain why?

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18. Explain nucleophilic addition reaction with an example.

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19. Explain why the carbonyl group in aldehydes and ketones is polar.

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20. What is meant by the following terms? Give an example in each case.

(i) Cyanohydrin, (ii) Acetal, (iii) Semicarbazone, (iv) Aldol, (v) Hemiacetal, (vi) Oxime, (vii) Ketal, (viii) Imine, (ix) 2,4 DNP derivative, (x) Schiff's base



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21. How does acetaldehyde react with (i) hydroxyl amine, (ii) hydrazine, (iii) phenyl hydrazine, (iv) semicarbazide ? Give equations.



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22. Give equations for the reaction between

(i) acetaldehyde and sodium bisulphite

(ii) acetone and sodium bisulphite



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23. Write the structure of the products formed when acetone reacts with

(i) hdrazine, (ii) phenyl hydrazine, (iii) semicarbazide.



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24. What is urotrophine? How it is formed ? Write its structure.

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25. Mention the used of urotropine.

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26. What is popoff's rule ? How it is used to predict the oxidation products of unsymmetrical ketones.

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27. How will you prepare

(i) diacetone amine from acetone.

(ii) aldimine from acetaldehyde.

(iii) hydrobenzamide from benzaldehyde.

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28. What is a haloform reaction ? Explain with suitable example.

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29. What is iodoforms test ? Explain.

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30. How will you distinguish between by means of a chemical test.

- (i) Propanal and propanone
- (ii) acetaldehyde and benzaldehyde
- (iii) Ethanal and propanal

All these pairs of compounds can be distinguished by iodoform test.

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31. Write a short note on aldol condensation.

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32. Give the mechanism of aldol condensation.

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33. Give the oxidation products obtained when pentan-2-one is oxidised by (conc. HNO_3).

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34. What is crossed aldol condensation? Give an example.

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35. What happens when benzaldehyde reacts with (i) acetone in the presence of dilute NaOH (ii) acetone in the presence of dilute NaOH.

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36. Explain with examples Claisen- Schmidt condensation.

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37. Write a short note on Cannizaro reaction.

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38. Write the mechanism of Cannizaro reaction.

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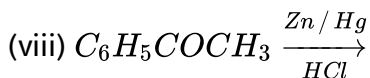
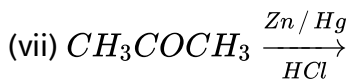
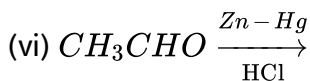
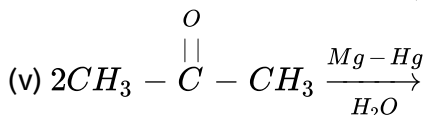
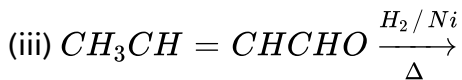
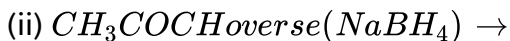
39. Give an example for crossed Cannizaro reaction.

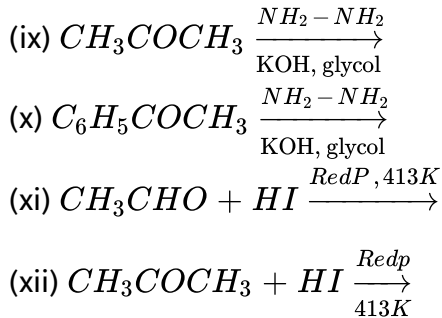
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40. Give an example for benzoin condensation.

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41. Complete the following equation.





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42. How will you convert ethanal into following compounds ? (i) Butane 1, 3 diol (ii) But - 2 - enal (iii) But - 2 - enoic acid.

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43. Give simple chemical tests to distinguish between the following pairs of compounds.

(i) Acetophenone and benzophenone (ii) Phenol and benzoic acid (iii) Pentan - 2 - one and pentan - 3 - one (iv) Benzaldehyde and acetophenone

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44. What happens when benzaldehyde is treated with (i) Br_2 in the presence of $FeBr_3$ (ii) a mixture of conc. H_2SO_4 and conc. HNO_3 (iii) conc. H_2SO_4 (iv) chlorine (v) chlorine in the presence of $FeCl_3$ (vi) methyl bromide in the presence of anhydrous $AlCl_3$.

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45. Mention the uses of (i) formaldehyde (ii) urotropine (iii) acetaldehyde (iv) acetone (v) benzaldehyde (vi) acetophenone and benzophenone.

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46. Give equations for the following reactions.

- (i) Nitration of acetophenone
- (ii) Bromination of benzophenone
- (iii) Friedel-Crafts alkylation of benzophenone

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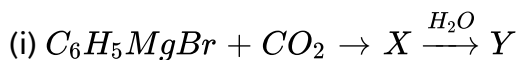
47. Explain the structure of carboxylic acid group.

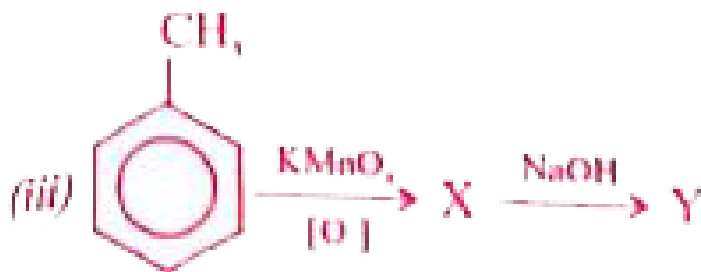
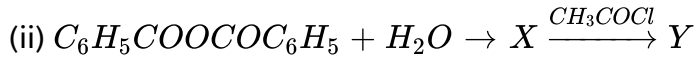
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48. How is acetic acid prepared from (i) ethanol (ii) methyl cyanide (iii) ethyl acetate (iv) methyl magnesium bromide (v) acetyl chloride (vi) acetic anhydride ? Give equation.

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49. Identify X and Y





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50. Explain why ?

(i) Carboxylic acids have higher boiling point than aldehydes, ketones, or even alcohols of comparable molecular mass.

(ii) Lower aliphatic / carboxylic acid are miscible with water while higher carboxylic acids are immiscible with water.

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51. How will you convert

(i) Ethyl benzene to benzoic acid

- (ii) Isopropyl benzene to benzoic acid
- (iii) p - nitro toluene to p-nitrobenzoic acid
- (iv) o-xylene to phthalic acid
- (v) But -2 -ene to ethanoic acid
- (vi) Benzonitrile to benzoic acid
- (vii) Ethyl magnesium iodide to propanoic acid
- (viii) Ethyl benzoate to benzoic acid
- (ix) Benzamide to benzoic acid
- (x) Propane - 2 - one to butanoic acid.



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52. Which of the following compounds will undergo aldol condensation ?

Which the Cannizaro reaction, and which neither ? Write the structure of the expected products of aldol condensation and Cannizaro reaction.

- (i) Methanal
- (ii) 2- methylpentanal
- (iii) Benzaldehyde
- (iv) Benzophenone

(v) Cyclohexanone

(vi) 1 - phenyl propanone

(vii) Phenyl acetaldehyde

(viii) Butan - 1 - ol

(ix) 2, 2-dimethyl butanal



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53. Give equations for reactions of acetic acid with the following reagents.

(i) Na (ii) NaOH (iii) Na_2CO_3 (iv) PCl_5 (v) $SOCl_2$ (vi) C_2H_5OH (vii)

$LiAlH_4$ (viii) Red P and HI (ix) Sodalime (x) NH_3 followed by heating (xi)

Cl_2 //Red P.



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54. Show how each of the following could be converted to benzoic acid :

(i) Ethyl benzene,

(ii) acetophenone,

(iii) benzophenone,

(iv) phenyl ethene.

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55. What is esterification ? Give an example.

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56. Give a brief accounts of decarboxylation reaction.

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57. Suggest a suitable reagent to bring about the following conversions.

Give equations.

(i) Acetic acid to acetyl chloride

(ii) Benzoic acid to ethyl benzoate

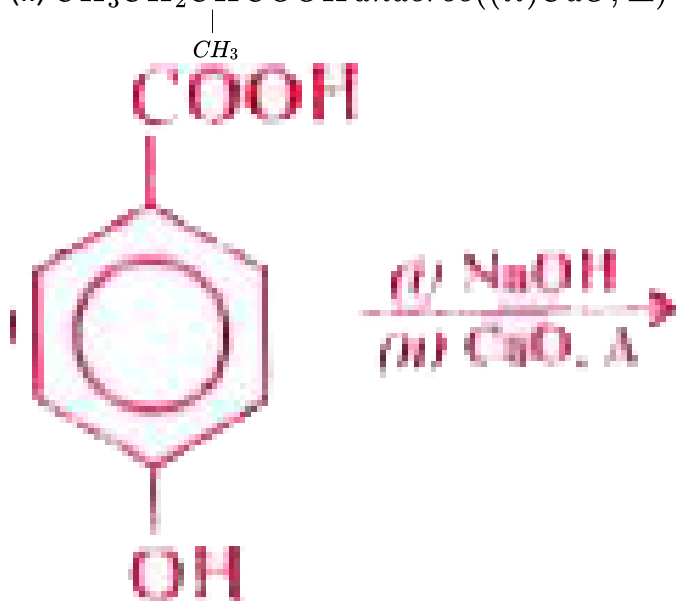
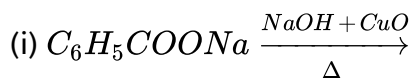
(iii) m - nitro benzoic acid to m - nitro methyl benzoate

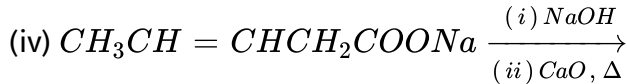
(iv) Ethanoic acid to ethanol

(v) Acetic acid to ethane

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58. Give the products of the following :





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59. What is HVZ reaction? Give an example.

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60. Explain why the 'COOH' group in benzoic acid is meta directing.

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61. How are the following compounds prepared from benzoic acid ?

(i) m - bromo benzoic acid (ii) m - nitro benzoic acid (iii) m - sulpho benzoic acid.



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62. Formic acid is a reducing agent. Substantiate this statement with examples.



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63. Give the tests for carboxylic acid group in an organic compound.



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64. Give a brief account of acidity of carboxylic acids.



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65. Briefly discuss the effect substituents on the acidity of carboxylic acids.

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66. Fluorine is more electroegative than chlorine even their p - fluoro benzoic acid in weaker than p-chloro benzoic acid. Explain.

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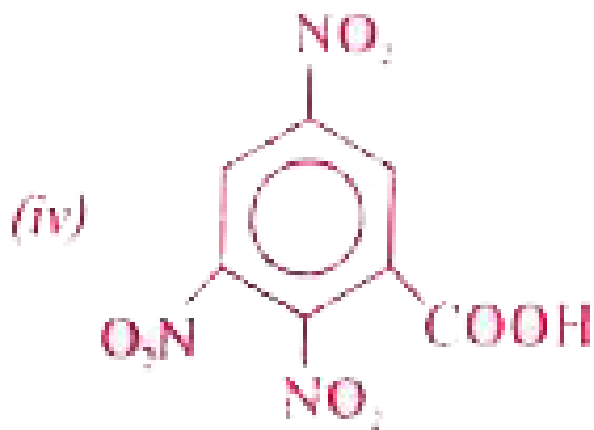
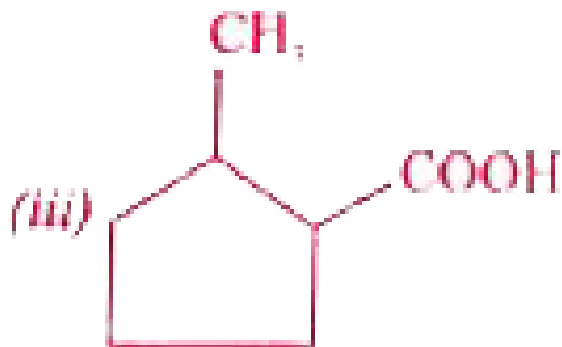
67. Explian why p- nitrobenzoic acid has a higher K_a value than benzoic acid.

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68. Give the IUPAC names of the following compounds. (i)



(ii) $(\text{CH}_3)_2\text{C} = \text{CHCOOH}$



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69. Explain the mechanism for the reaction.

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70. Give the uses of (i) formic acid (ii) acetic acid (iii) benzoic acid (iv) acetyl chloride (v) acetic anhydride (vi) ethyl acetate.

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71. A compound with molecular formula, $C_4H_{10}O_3$ on acetylation with acetic anhydride gives a compound with molecular weight 190. Find out the number of hydroxyl groups present in the compound.

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72. Explain (i) Perkins' reaction (ii) Knoevenagel reaction.

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73. Give names of reagent which bring about the following conversions.

(i) Hexan - 1 -ol to hexanal

- (ii) Cyclohexanal to cyclohexanone
- (iii) p - fluorotoluene to p- fluorobenzaldehyde,
- (iv) Ethanenitrile to ethanal
- (v) allyl alcohol to propenal
- (vi) But - 2- ene to ethanal

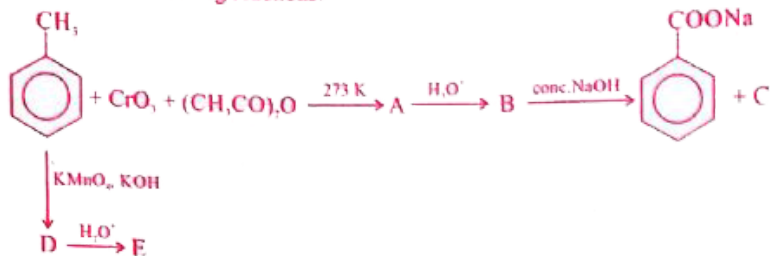
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74. Bring out the following conversions.

- (i) Benzyl alcohol to phenyl ethanoic acid.
- (ii) 3- nitrobromo benzene to 3- nitrobromo benzoic acid
- (iii) Methyl acetophenone to benzene 1, 4, dicarboxylic acid
- (iv) cyclohexene to hexane 1, 6 dicarboxylic acid.

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75. Identify A - E in the following reactions :



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76. Write a short note on electrophilic substitution reaction of benzaldehyde.

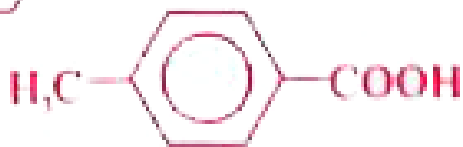
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77. Which acid of each pair shown here would you expect to be stronger ?

(i) CH_3COOH and FCH_2COOH

(ii) FCH_2COOH and CH_2COOH

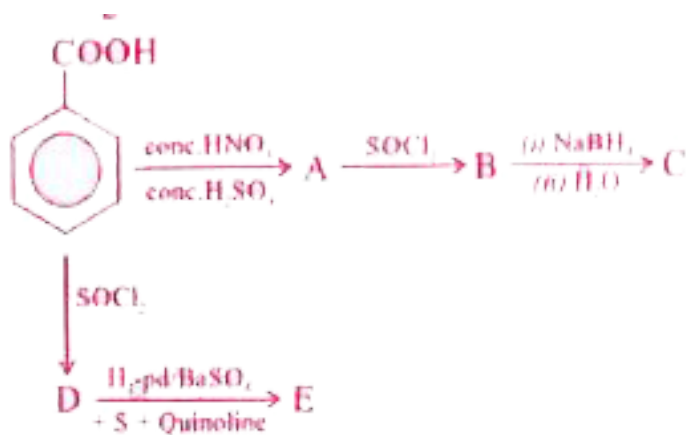
(iii) $FCH_2CH_2CH_2COOH$ and $CH_3\overset{\overset{F}{|}}{CH} - CH_2COOH$



(iv) _____

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78. Identify A to E in the following reactions :



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79. How will you bring about the following conversions in not more than two step?

(i) Propanone to propene (ii) Benzoic acid to benzaldehyde (iii) Ethanol to 3- hydroxy butanal (iv) Benzene to m - nitrobenzene (v) Benzaldehyde to benzophenone (vi) bromo benzene to 1 - phenyl ethanol (vii) Benzaldehyde to 3 phenylpropan - 1 - ol (viii) Benzaldehyde to α -hydroxy phenyl acetic acid (ix) Benzoic acid to m - nitrobenzyl alcohol.

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80. What is trans esterification ? Give an example.

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81. Give an example for Claisen condensation.

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82. How are the following compounds prepared ?

(i) acetyl chloride and ethyl chloride from ethyl acetate

(ii) acetamide from acetyl chloride

(iii) Acetamide from acetic anhydride.

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83. Complete the following equation:

(i) $CH_3COCl + CH_3NH_2 \rightarrow$

(ii) $CH_3COCl + (CH_3)_2NH \rightarrow$

(iii) $(CH_3CO)_2O + PCl_5 \rightarrow$

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84. How are the following compounds prepared from acetamide ?

(i) acetic acid (ii) sodium acetate (iii) methyl cyanide (iv) methyl amine (v)

ethyl amine

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85. Write the structure and IUPAC names of the following acid derivative.

(i) acetyl chloride (ii) propionyl chloride (iii) Benzoyl chloride (iv) acetic anhydride (v) propionic anhydride (vi) benzoic anhydride (vii) methyl acetate (viii) Ethyl acetate (ix) phenyl acetate (x) acetamide (xi) propionamide (xii) Benzamide.

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86. Briefly explain amphoteric nature of acid amide.

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87. An unknown aldehyde (A) on reaction with alkali gives a β -hydroxy aldehyde which loses water to form an unsaturated aldehyde, 2-butanal. Another aldehyde (B) undergoes disproportionation reaction in the presence of conc. Alkali to form products (C) and (D). (C) is an aryl alcohol with formula C_7H_8O . Identify (A) and (B).

(ii) Write the sequence of chemical reaction involved.

(iii) Name the product, when (B) reacts with zinc amalgam and hydrochloric acid.

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88. A compound 'X' (C_2H_4O) on oxidation gives 'Y' ($C_2H_4O_2$). 'X' undergoes haloform reaction. On treatment with HCN, (X) forms (Z) which on hydrolysis gives 2-hydroxy propanoic acid.

(i) Write down the structure of 'X' and 'Z'.

(ii) Name the product when 'X' is treated with dilute NaOH.

(iii) Write down the equation for the reaction involved.

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