CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

CARBOXYLIC ACIDS

Level I Exercise I Introduction Nomenclature

1. The general formula of saturated open chain carboxylic acid is

A. $C_2H_{2n+2}O_2$

B. $C_nH_{2n}O_2$

C. $C_nH_{2n-2}O_2$

D. $C_nH_{2n-4}O_2$

Answer: B

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2. The acid obtained from red ants is

A. formatic acid

B. formalin

C. acetic acid

D. formalic acid

Answer: A

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3. Which of the following is known as vinegar

A. 5% aqueous solution of formic acid

B. 5-6% aqueous solution of acetic acid

C. 40% aqueous solution of formic acid

D. 40% aqueous solution of acetic acid

Answer: B

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4. The acid extracted from valerian plants is

A. C_3H_7COOH

B. C_2H_5COOH

C. C_4H_9COOH

D. $HCOOH$

Answer: C

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5. IUPAC name of

is

A. 4-ketopentanoic acid

B. 3-ketobutanoic acid

C. 3-carboxy-2-pentonone

D. 3-carboxy-2-butanone

Answer: B

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6. Which of the following name(s) is/are appropriate for CH_3CH_2COOH

A. Methylethonoic acid

B. Propanoic acid

C. Propionic acid

D. All the above

Answer: D

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7. Which of the following is a pair of functional isomers ?

A. CH_3COCH_3, CH_3CHO

B. C_2H_5COOH, CH_3COOCH_3

C. $C_2H_5COOH, CH_3COOC_2H_5$

D. CH_3COOH, CH_3CHO

Answer: B

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8. Which of the following carboxylic acid is optically active

A. 3-Methylbutanoic acid

B. 4-Methylpentonic acid

C. 2-Methylbutanoic acid

D. All the above

Answer: C

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9. The common name of cis-butenoic acid is

A. Maleic acid

B. Formanic acid

C. Malic acid

D. Malonic acid

Answer: A

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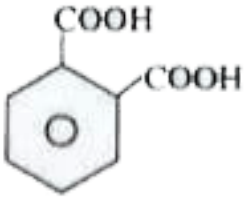
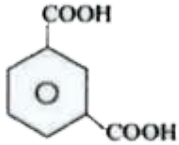
10. Which of the following is known as tere-phthalic acid ?

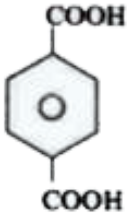
A.



B.



C.



D.

Answer: D

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11. Glacial acetic acid is

A. 75% acetic acid with 25% water

B. 10% acetic acid with 90% water

C. 90% acetic acid with 10% water

D. 100% pure acetic acid

Answer: D

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12. The common name of $CH_2 = CHCOOH$ is

A. Acrylic acid

B. Propenoic acid

C. Propionic acid

D. none of these

Answer: A

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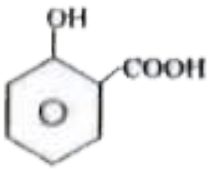
13. Which of the following is known as salicyclic acid ?

A.



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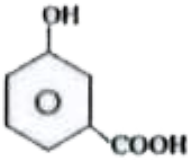

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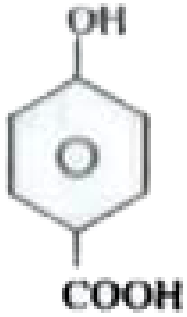
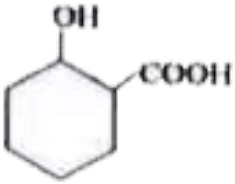


D.



Answer: A

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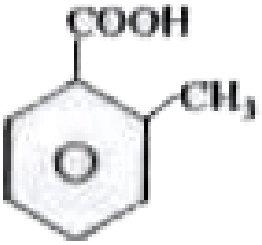
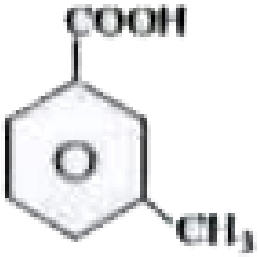
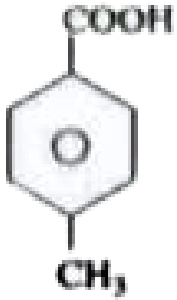
14. Which of the following is likely to possess highest M.P.

A. 

B. 

C. 

D. All possess same M.P. as they are isomers

Answer: C

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15. The minimum number of carbon atoms to be present in a carboxylic acid to exhibit optical activity is

A. 7

B. 5

C. 6

D. 4

Answer: B

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16. Among the following organic acids, the acid present in rancid butter is :

A. Pyruvic acid

B. Lactic acid

C. Butyric acid

D. Acetic acid

Answer: C

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17. In the reaction sequence $C_2H_5Cl + KCN \xrightarrow{C_2H_5OH} x \xrightarrow[\Delta]{H_3O^{\oplus}} Y$. What is the molecular formuls of Y ?

A. $C_3H_6O_2$

B. C_3H_5N

C. $C_2H_4O_2$

D. C_2H_6O

Answer: A

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18. Oxidation of primary Alcohols finally gives

A. Aldehydes

B. Ketones

C. Carboxylic acids

D. Esters

Answer: C

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19. Which one of the following when reacts with CH_3MgBr followed by hydrolysis gives acetic acid ?

A. CO

B. CH_3CHO

C. C_2H_5OH

D. CO_2

Answer: D

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20. Acetonitrite when boiled with alkali gives

A. CH_3COOH only

B. $CH_3COOH + C_2H_5OH$

C. $CH_3COOH + NH_3$

D. $CH_3COOH + H_2$

Answer: C

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21. $CH_3OH + CO \xrightarrow[\Delta \text{pressure}]{X} CH_3COOH$ here X is

A. Cu

B. Co

C. Rb

D. Ni

Answer: B

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22. Which one of the following functional groups undergoes with alkali to yield a carboxylic acid ?

A. $-CN$

B. $-CHCl_2$

C. $-CONH_2$

D. both 1 and 3

Answer: A

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23. Ethyl Benzene $\xrightarrow[(ii)\,H^+/H_2O]{(i)\,KMnO_4/OH^-} X$ Predict X in above reaction

A. $C_6H_5CH_2COOH$

B. $C_6H_5CH_2CHO$

C. Benzoic acid

D. Benzaldehyde

Answer: C

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24. $C_6H_5MgBr \xrightarrow[(2)\,H_3O^+]{(1)\,CO_2} P$ In the above reaction , product P is

A. Phenol

B. Benzoic acid

C. Benzaldehyde

D. Benzophenone

Answer: B

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25. Lower carboxylic acids are soluble in water due to

A. Low molecular weight

B. Hydrogen bonding

C. Dissociation into ions

D. Easy Hydrolysis

Answer: B

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26. Which of the following posses highest boiling point ?

A. C_2H_5Cl

B. CH_3CHO

C. C_2H_5OH

D. CH_3COOH

Answer: D

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27. Which of the following exists as dimer in benzene ?

A. CH_3CHO

B. CH_3COCH_3

C. CH_3CH_2OH

D. CH_3COOH

Answer: D

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28. Acetic acid can be used

A. For curing meat and fish

B. As vinegar in cooking

C. In the preparation of perfumes

D. All

Answer: D

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29. Which of the following is not a fatty acid

A. Propionic acid

B. Oxalic acid

C. Valeric acid

D. Stearic acid

Answer: B

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30. The reagent used for converting ethanoic acid to ethanol is

A. $LiAlH_4$

B. BH_3

C. PCl_3

D. $K_2Cr_2O_7$

Answer: A

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31. Which of the following compound is formed when ethanol reacts with acetic acid in the presence of concentrated H_2SO_4 .

A. $CH_3COOC_2H_5$

B. $C_2H_5OC_2H_5$

C. CH_3OCH_3

D. CH_3CH_2CHO

Answer: A

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32. Which of the following is the strongest acid

A. CF_3COOH

B. CBr_3COOH

C. CH_3COOH

D. CCl_3COOH

Answer: A

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33. Which of the following is the weakest acid ?

A. Phenol

B. CH_3COOH

C. $HCOOH$

D. Benzoic acid

Answer: A

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34. Among ethanol (I) , Acetic acid (II), Phenol (III) and Benzoic acid (IV) , the corret order of increasing acid strength is

A. $I < II < III < IV$

B. $I < III < II < IV$

C. $I < III < IV < II$

D. $III < IV < I < II$

Answer: B

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35. Among α-Nitroacetic acid (1) α-Fluoro Acetic Acid (2) , α-Fluoro Acetic Acid (2) , α- Bromoacetic acid (3) , α-Cyanoacetic acid (4) the correct order of increasing acid strength is

A. $3 < 1 < 4 < 1$

B. $1 < 2 < 3 < 4$

C. $2 < 4 < 3 < 1$

D. $4 < 2 < 3 < 1$

Answer: A

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Level I Exercise Ii Preparation And Properties

1. $C_2H_5OH \xrightarrow{K_2Cr_2O_7 / H^+} (X) \xrightarrow{O} (Y)$, What is 'Y' ?

A. CH_3CHO

B. CH_3COOH

C. $CH_3COOC_2H_5$

D. CH_3COCH_3

Answer: B

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2. The catalyst used in the manufacture of acetic acid from acetaldehyde by the atmosphere oxygen is

A. $(CH_3COO)_2Mn$

B. $(CH_3COO)_2Zn$

C. CH_3COOK

D. CH_3COONa

Answer: A

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3. The reagent used for the detection of a carboxyl group in a organic compound is

A. PCl_5

B. $SOCl_2$

C. Na

D. $NaHCO_3$

Answer: D

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4. Which of the following does not participate in HVZ reaction.

A. CH_3COOH

B. CH_3CH_2COOH

C. $CH_3CHClCOOH$

D. $(CH_3)_3CCOOH$

Answer: D

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5. The gases liberated at anode during electrolysis of an aqueous solution of potasssium acetate is

A. C_2H_6, CO_2

B. C_2H_6, H_2

C. CH_4, CO_2

D. C_2H_6, CH_4

Answer: A

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6. Carbondioxide present along with ethane is removed by passing the mixture through

A. Conc. H_2SO_4

B. dil. HCl

C. Solid KOH

D. dil. H_2SO_4

Answer: C

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7. $C_2H_5OH + CH_3COOH \overset{H_2SO_4}{\Longleftrightarrow} CH_3COOC_2H_5 + H_2O$. Here H_2SO_4 acts is

A. oxidising agent

B. Reducing agent

C. Dehydrating agent

D. negative catalyst

Answer: C

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8. The intermediate compound formed during the hydrolysis of CH_3CN is

A. CH_3COOH

B. CH_3COONH_4

C. CH_3CONH_2

D. $CH_3CH_2NH_2$

Answer: C

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9. Hydrolysis of an ester gives a carboxylic acid which on Kolbe's electrolysis yields ethane ester is

A. methyl ethanoate

B. methylmethanoate

C. ethyl methanoate

D. methyl propanoate

Answer: A

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10. The gas liberated by the electrolysis of Dipotassium succinate solution is

A. Ethane

B. Ethyne

C. Ethene

D. Propene

Answer: C

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11. Compound A reacts with PCI_5 to give B which on treatment with KCN followed by hydrolysis gave propionic acid. What are A & B respectively?

A. $C_3H_8 \& C_3H_7Cl$

B. $C_2H_6 \& C_2H_5Cl$

C. $C_2H_5OH \& C_2H_4Cl_2$

D. $C_2H_5Oh \& C_2H_5Cl$

Answer: D

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12. An organic compound reacts with metallic sodium to liberate hydrogen and with Na_2CO_3 solution to liberate CO_2. The compound is

A. Alcohol

B. Carboxylic acid

C. Ether

D. An ester

Answer: B

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13. An organic compound reacts with metallic sodium to liberate hydrogen and with Na_2CO_3 solution to liberate CO_2. The compound is

A. C_2H_6

B. CH_4

C. CH_5COONa

D. CH_3CONH_2

Answer: B

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14. What is the reagent used in the preparation of chloro-acetic acid from acetic acid

A. PCl_5

B. $Cl_2 / \text{Red} P$

C. PCl_3

D. $SOCl_2$

Answer: B

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15. In the following reaction X and Y respectively are respectively are X

$$\xrightarrow{Aq.NaOH} CH_3COOH \xrightarrow{Y} (CH_3CO)_2O$$

A. $CH_3.Cho, PCl_5$

B. CH_3CN, P_2O_5

C. $CH_3CH_2OH, NaOAC$

D. CH_3COCH_3, H_2SO_4

Answer: B

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16. In the following reaction X and Y respectively

$$CH_3COOH + NH_3 \rightarrow X \underset{\Delta}{\longrightarrow} Y + H_2O$$

A. CH_3CONH_2, CH_4

B. CH_3COONH_4, CH_3CONH_2

C. CH_3CONH_2, CH_3COOH

D. CH_3NH_2, CH_3CONH_2

Answer: B

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17. In the following reaction X and Y respectively are

$$C_2H_5OH \xrightarrow{KMnO_4/H^{\oplus}} X \xrightarrow[H_2SO_4]{Y} CH_3COOC_2H_5$$

A. CH_3OH, C_2H_5OH

B. CH_3CHO, CH_3OH

C. $CH_2 = CH_2, CH_3COOH$

D. CH_3COOH, C_2H_5OH

Answer: D

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18. Aqueous 10% $NaHCO_3$ solution is used as a reagent for identifying X'. Which one of the following compounds yields 'X' on hydrolysis?

A. $CH_3CO_2C_2H_5$

B. $C_2H_5 - O - C_2H_5$

C. CH_3CHO

D. $CH_3 - CH_2\_OH$

Answer: A

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19. Acid hydrolysis of X yields two different organic compounds. Which one of the following is X ?

A. CH_3CN

B. CH_3CONH_2

C. $CH_3COOC_2H_5$

D. $(CH_3CO)_2O$

Answer: C

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20. When compound X is oxidised by acidified potassium dichromate, compound Y is formed. Compound Y on reduction with $LiAlH_4$gives X.X and Y respectively are

A. C_2H_5OH, CH_3COOH

B. CH_3COCH_3, CH_3COOH

C. C_2H_5OH, CH_3COCH_3

D. CH_3CHO, CH_3COOH_3

Answer: A

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21. $CH_3COOH \xrightarrow{LiAlH_4} A$

$A + CH_3COOH \xrightarrow{H_3O^+} B + H_2O$

In the above reactions 'A' and 'B' respectively, are

A. $CH_3COOC_2H_5, C_2H_5OH$

B. CH_3CHO, C_2H_5OH

C. C_2H_5OH, CH_3CHO

D. $C_2H_5OH, CH_3COOC_2H_5$

Answer: D

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22. Identify X and Y in the following sequence of reaction .

$CH_3CHO \xrightarrow{HNO_3} X \xrightarrow[\Delta]{P_4O_{10}} Y$

	X	Y
1)	C_2H_5OH,	C_2H_4
2)	CH_3CO_2H,	$(CH_3CO)_2O$
3)	CH_3CO_2H,	$CH_3CO_2CH_3$
4)	C_2H_5OH,	CH_3CO_2H

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23. In which of the following reactions hydrogen is not liberated?

A. $CH_3COOH + Na$

B. $CH_3COOH + NaHCO_3$

C. $CH_3COOH + NaOH$

D. $CH_3COOH + H_2O$

Answer: A

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24. $CH_3CH_2COOH \xrightarrow[\text{Red P}]{Br_2} X \xrightarrow[\text{alcohol}]{NH_3} Y$ Y in the reaction is

A. Lactic acid

B. Ethylamine

C. Propylamine

D. Amino acid

Answer: D

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25. $CH_3COOH \xrightarrow{1\text{ mole}Cl_2 / \text{Red}P} A \xrightarrow{KCN} B \xrightarrow{H^+ / H_2O} C$. Hence 'C' is

A. Oxalic acid

B. Maleic acid

C. Fumaric acid

D. Malonic acid

Answer: D

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26. $CH_3CH_2COOH \xrightarrow{Cl_2 / \text{Red}P} A \xrightarrow{\text{aq. KOH}} B$. Here 'B' is

A. Succinic acid

B. Lactic acid

C. Picric acid

D. Malonic acid

Answer: B

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27. Benzoic acid gives benzene on being heated with X and Phenol gives benzene on being heated with Y therefore X and Y are respectively

A. Sodalime and copper

B. Zincdust and sodium hydroxide

C. Zinc dust and Sodalime

D. Sodalime and Zinc dust

Answer: D

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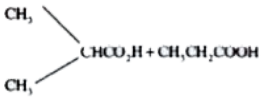
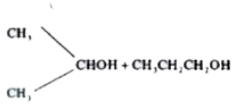
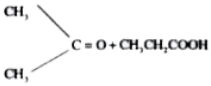
28. On vigorous oxidation by permanganate solution $(CH_3)_2C = CH - CH_2CH_3$ gives

A. $CH_3 - \overset{OH}{\underset{CH_3}{\overset{|}{\underset{|}{C}}}} - \overset{OH}{\overset{|}{CH}} - CH_2CH_3$

B. 

C. 

D. 

Answer: D

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29. Identify C in the following reaction :

$$C_2H_2 \xrightarrow{\text{Chromic acid}} A \xrightarrow{NH_3} B \xrightarrow[-H_2O]{\Delta} C$$

A. $CH_3CH_2NH_2$

B. CH_3CN

C. $CH_3CH_2NHCH_3$

D. $CH_3 - \overset{\overset{O}{||}}{C} - NH_2$

Answer: D

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30. $CH_3CN + H_2O \xrightarrow{H^+} A \xrightarrow[\text{Red } P]{\text{Excess} Cl_2} B$. In the above reaction A and B are respectively

A. CH_3COOH, CCl_3COOH

B. CH_3CH_2OH, CH_3CH_2Cl

C. CH_3CHO, CCl_3CHO

D. CH_3COCH_3, CCl_3COCH_3

Answer: A

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31. Identify A and B in the following reaction , $CH_3CH_3 \xleftarrow{B} CH_3COOH \xrightarrow{\Delta} CH_3CH_2OH$

A	B
1) HI + Red P	$LiAlH_4$
2) Ni/ Δ	$LiAlH_4$
3) $LiAlH_4$	HI + Red P
4) Pd-$BaSO_4$	Zn + HCl

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Level I Exercise Ii Acidic Nature

1. In the $HCOO^-$ the two carbon-oxygen bonds are found to be of equal length. What is the reason for it ?

A. The anion $HCOO^-$ has two equivalent resonating structures

B. The anion is obtained by removal of a proton from the acid molecule

C. Electronic orbitals of carbon atom are hybridised

D. The C=O bond is weaker than the C-O bond

Answer: A

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2. Among the following acids which has the lowest pK_a value

A. CH_3COOH

B. $HCOOH$

C. $(CH_2)_2CH - COOH$

D. CH_3CH_2COOH

Answer: B

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3. Which of the following has highest tendency to ionise in aqueous solution.

A. HCOOH

B. CH_3COOH

C. FCH_2COOH

D. $BrCH_2COOH$

Answer: C

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4. Which acid has lowest value of pK_a ?

A. p-Methoxybenzoic acid

B. p-Chlorobenzoic acid

C. p-Aminobenzoic acid

D. p-Toluic acid

Answer: B

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5. Which of the following anion is a strongest base ?

A. $C_6H_5COO^-$

B. $HCOO^-$

C. CH_3COO^-

D. $(CH_3)_2CHCOO^-$

Answer: D

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6. Which of the followign statements are correct ?

A. the two carbon-oxygen bond lengths in molecular formic acid are different

B. the two carbon -oxygen bond length in sodium formate are equal

C. very partial resonance is there in formic acid

D. all of the above

Answer: B

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7. Among acetic acid , phenol and n-hexanol, which of the compounds will react with $NaHCO_3$ solution to give sodium salt and CO_2

A. acetic acid

B. phenol

C. n-hexanol

D. acetic acid and phenol

Answer: A

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8. CH_3COOH is less acidic than HCOOH. It is due to which effect

A. $+I$ of Methyl group

B. $+M$ of Methyl group

C. $-I$ of Methyl group

D. None

Answer: A

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9. What is the main reason for the fact that carboxylic acids can undergo ionisation.

A. Absence of α - hydrogen

B. Resonance stabilisation of the carboxylate ion

C. High reactivity of α - Hydrogen

D. Hydrogen bonding

Answer: B

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10. The reagent that can be used to distinguish between phenol and ethanoic acid is

A. Ammoniacal silver nitrate solution

B. Fehling solution

C. Sodium carbonate solution

D. Phenolphthalein

Answer: C

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11. A liquid was mixed with ethanol and a drop of concentrated H_2SO_4 was added. A compound with a fruity smell was formed. The liquid was:

A. HCHO

B. CH_3COCH_3

C. CH_3COOH

D. CH_3OH

Answer: C

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12. Which of the following is not useful to convert CH_3COOH into CH_3COCI

A. PCl_5

B. PCl_3

C. $SOCl_2$

D. SO_2Cl_2

Answer: D

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13. Which of the following compounds liberate CO_2 on reaction with acetic acid

A. Na_2CO_3

B. $KHCO_3$

C. $CaCO_3$

D. All the above

Answer: D

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14. Acetic acid is converted into acetic anhydride by heating with

A. P_2O_5

B. $NaOH$

C. NH_4OH

D. any of the above

Answer: A

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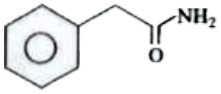
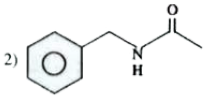
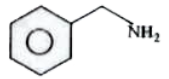
15. 

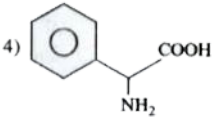
. Which sequence of reaction is 'X' .

A. 

B. 

3) 

C.

4) 

D.

Answer: C

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16. Which of the following is the correct order of acetic strength of Benzoic acid (I), 4-nitrobenzoic acid (II), 3,4-dinitrobenzoic acid (III), 4-methoxy-benzoic acid (IV)

A. $I > II > III > IV$

B. $III > IV > I > II$

C. $III > II > I > IV$

D. $III > II > IV > I$

Answer: C

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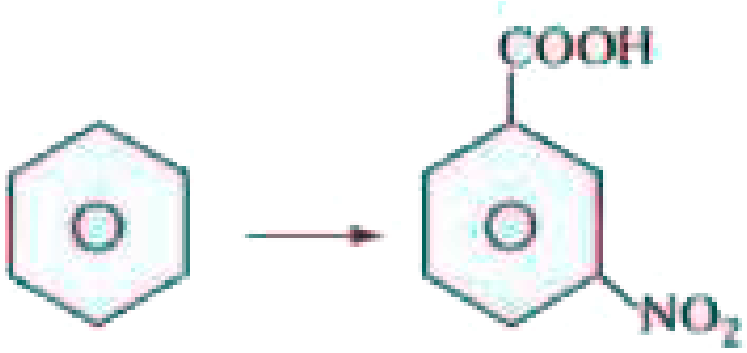

17.

Which sequence of reactions will be useful for above conversion.

A. CH_3Cl, $AlCl_3$, Conc $HNO_3 \& H_2SO_4$, $KMnO_4$

B. Conc $HNO_3 \& H_2SO_4$, $CH_3Cl \& AlCl_3$, $KMnO_4$

C. CH_3Cl, $AlCl_3$, $KMnO_4$, Conc $HNO_3 \& H_2SO_4$

D. Conc $HNO_3 \& H_2SO_4$, $KMnO_4$, CH_3Cl, $AlCl_3$

Answer: C

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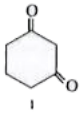
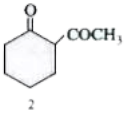
18. Which of the following compounds will undergo decarboxylation on heating ?



1



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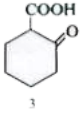

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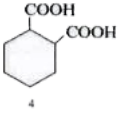

4

A. 2& 3

B. 3 &4

C. 3 only

D. 1 & 4

Answer: C

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Level Ii Lexture Sheet Exericse I Single Or More Than One Option Questions

1. The increasing order of acidity :

A. $CH_3COOH < ClCH_2COOH < HCOOH$

B. $ClCH_2COOH < CH_3COOH < HCOOH$

C. $ClCH_2COH < HCOOH < CH_3COOH$

D. $CH_3COOH < HCOOH < ClCH_2COOH$

Answer: D

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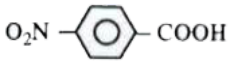
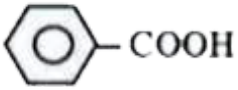
2. Which of the following is the weakest acid ?

A. $HCOOH$

B. CH_3COOH

C. 

D. 

Answer: B

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3. Formic acid is obtained when

A. CH_3CHO is oxidised with $K_2Cr_2O_7$ and H_2SO_4

B. Glycerol is heated with oxalic acid

C. $(CH_3COO)_2$ Ca is heated with conc. H_2SO_4

D. $(HCOO)_2$ Ca is heated with $(CH_3COO)_2Ca$

Answer: B

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4. Acetic acid can be prepared by:

A. oxidizing CH_3CHO with $K_2Cr_2O_7$ and H_2SO_4

B. heating glycerol with concentrated H_2SO_4

C. oxidizing CH_3OH with $KMnO_4$

D. distilling a mixture of calcium acetate and calcium formate

Answer: A

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5. When acetamide is hydrolysed by boiling with water the product obtained is :

A. ethyl alcohol

B. ethyl amine

C. acetaldehyde

D. acetic acid

Answer: D

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6. The compound formed by the acid hydrolysis of ethyl acetate is :

A. formic acid and propanol

B. acetic acid and ethyl alcohol

C. ethanol and ethyl alcohol

D. ethyl alcohol and acetone

Answer: B

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7. $R-CH_2-CH_2OH$ can be converted into RCH_2CH_2COOH. The correct sequence of reagents is :

A. PBr_3, KCN, H^+

B. HCN, PBr_3, H^+

C. KCN, H^+

D. PBr_3, KCN, H_2

Answer: A

Watch Video Solution

8. Optical activity is expected for :

A. 2-chloropropanoic acid

B. 2-methyl propanoic acid

C. methyl-2-chloropropanoate

D. methyl-2-methyl propanoate

Answer: A::C

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9. Formic acid gives the test of :

A. Aldehydic group

B. Ketonic group

C. Carboxylic group

D. Alcoholic group

Answer: A::C

Watch Video Solution

10. Which of the following reagents is useful to distinguish between HCOOH and CH_2COOH

A. Fehling's solution

B. Potassium permanganate solution

C. Tollen's reagent

D. Iodoform reaction

Answer: A::B::C

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11. $CH_3CH_2COOH + Br_2 \xrightarrow{\text{Red phosphrous}}$

A. The product formed is $CH_3\underset{\underset{Br}{|}}{C}H - COOH$

B. The name of this reaction is Hell-Vohlard Zelinsky reaction

C. The first compound formed is CH_3CH_2COBr

D. There is exchange of OH and Br between $CH_3CH(Br)COBr$ and CH_3CH_2COOH

Answer: A::B::C::D

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12. Which of the following functional group(s) when attached to the para position of benzoic acid will increase the acidic strength ?

A. $-OCH_3$

B. $-Cl$

C. $-NO_2$

D. $-OH$

Answer: B::C

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13. In which of the following compounds carbon oxygen bond length is shorter than others

A. $RCOOH$

B. ROH

C. $RCOCH_3$

D. All carbon-oxygen bond lengths are equal

Answer: C

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14. Which of the following acids is the strongest

A. CH_3CH_2COOH

B. $CH_2 = CHCOOH$

C. $CH \equiv CCOOH$

D. CH_3COOH

Answer: C

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15. Which of the following is/are correct regarding acidic strength.

A. $CH_3COOH > CH_3COOOH$

B. $ClCH_2COOH > BrCH_2COOH$

C. $O_2N - CH_2COOH > NC - CH_2COOH$

D. $HCOOH > CH_3COOH$

Answer: A::B::C::D

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16. Which of the following statements is correct regarding the hydrolysis of an ester

A. Base catalysed - IInd order

B. Acid catalysed - Ist order

C. Acid catalysed - reversible

D. Base catalysed - Irreversible

Answer: A::B::C::D

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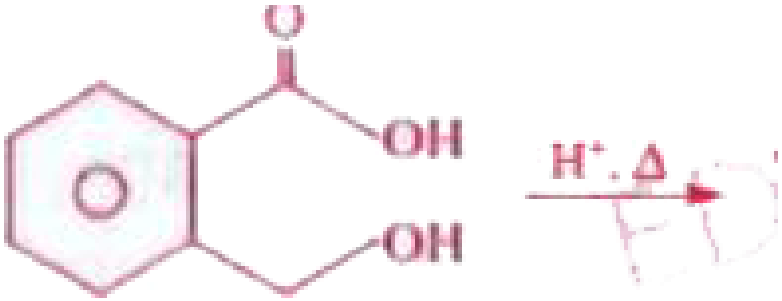
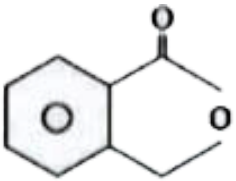
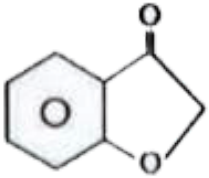
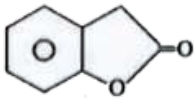
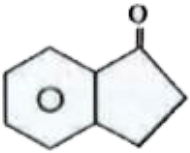
17. 

The Product is

A. 

B. 

C. 

D. 

Answer: A

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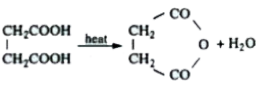
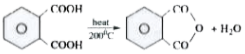
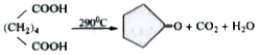
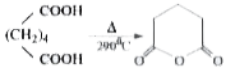
18. Which of the following reactions is correct.

A. 

B. 

C. 

D. 

Answer: A::B::C

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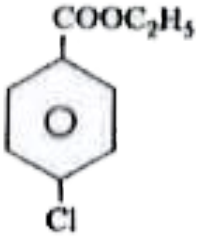
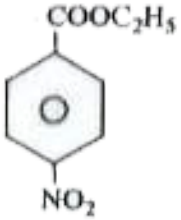
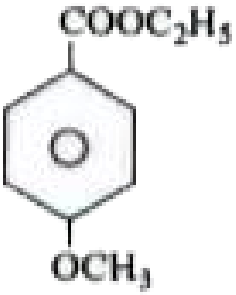
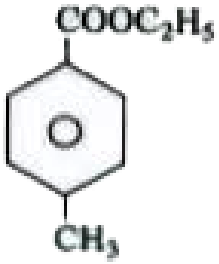
19. Which of the following esters is hydrolysed at a fastest rate than other

(Base catalysed)

A. 

B. 

C. 

D. 

Answer: B

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20. Which of the following esters undergo alkaline hydrolysis at a fastest rate

A. CH_3COOCH_3

B. $CH_3COOC_2H_5$

C. $CH_3COOCH(CH_3)_2$

D. $CH_3COOC(CH_3)_3$

Answer: A

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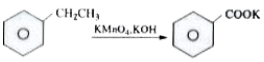
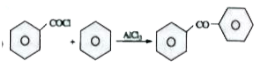
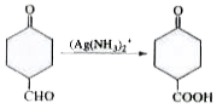
21. Which of the following reactions is/are correctly represented

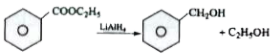
A. 

B. 

C.



D.



Answer: A::B::C::D

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Level Ii Lexture Sheet Exericse Ii Linked Comprehension Type Questions

1. An organic compound $A(C_4H_7C_{13})$ yields(B) when treated with aq. KOH. (B) upon treatment with C_2H_5OH in presence of acid gave (C) which upon reducing with $LiAIH_4$ gave (D) and (E). (B) upon treatment with NH_3 followed by heating with P_4O_{10} and subsequent hydrolysis gives back(B). Sodium salt of (B) on Kolbe's electrolysis gave 2, 3-dimethylbutane at anode.

Compound (B) can also be obtained by

A. catalysed $(HgSO_4)$ hydration of 1-butone

B. reduction of $CH_3 - \overset{OH}{\overset{|}{C}}H - \overset{O}{\overset{||}{C}}OC_2H_5$ with $LiAIH_4$

C. oxidative cleavage of 4-methyl-2-pentene

D. All the above

Answer: C

Watch Video Solution

2. An organic compound $A(C_4H_7C_{13})$ yields(B) when treated with aq. KOH. (B) upon treatment with C_2H_5OH in presence of acid gave (C) which upon reducing with $LiAIH_4$ gave (D) and (E). (B) upon treatment with NH_3 followed by heating with P_4O_{10} and subsequent hydrolysis gives back(B). Sodium salt of (B) on Kolbe's electrolysis gave 2, 3-dimethylbutane at anode.

Structural formula of compound (C) is

A. $CH_3 - \overset{CH_3}{\overset{|}{C}}HCOOC_2H_5$

B. $CH_3 - CH_2 - CH_2COOC_2H_5$

C. $CH_3 - CH_2 - \overset{C_2H_5}{\underset{|}{C}}\ H - COOH$

D. $CH_3 - \overset{CH_2}{\underset{|}{C}}\ H - COO\ \overset{CH_3}{\underset{|}{C}}\ H - CH_3$

Answer: A

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3. An organic compound $A(C_4H_7C_{13})$ yields(B) when treated with aq. KOH. (B) upon treatment with C_2H_5OH in presence of acid gave (C) which upon reducing with $LiAIH_4$ gave (D) and (E). (B) upon treatment with NH_3 followed by heating with P_4O_{10} and subsequent hydrolysis gives back(B). Sodium salt of (B) on Kolbe's electrolysis gave 2, 3-dimethylbutane at anode.

Compound (D) and (E) respectively are

A. $CH_3CH_2CH_2OH, C_2H_5OH$

B. $CH_3 - \underset{CH_3}{\overset{|}{C}}\ HCH_2OH, C_2H_5OH$

C. $CH_3CH_2CH_2CH_2OH, C_2H_5OH$

D. $CH_3 - \underset{\underset{CH_3}{|}}{C}\ HCH_{2_\circ} - OCH_3, CH_3OH$

Answer: B

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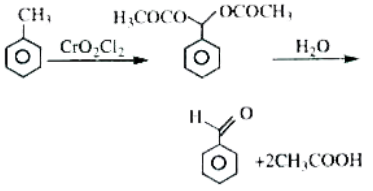
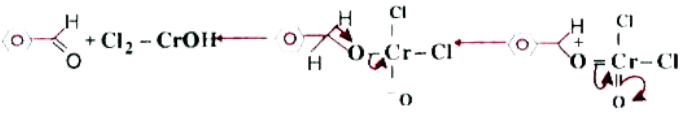
4. The oxidation of aryl methyl or cyclo alkyl methyl by the treatment with chromyl chloride to an aldehyde via the formation of esters is known as Etard reaction. The oxidation stops at aldehyde stage because the product of the reaction is acylal, $R - CH(OCOCH_3)_2$ which is resistance to oxidation with this reagent. The acylal on hydrolysis gives aldehyde.



The mechanism of this reaction is given as



What is the product obtained when ethyl benzene is subjected to Etard reaction ?

A. Methyl phenyl ketone

B. 2 - Phenyl ethanal

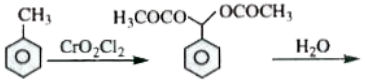
C. Benzoic acid

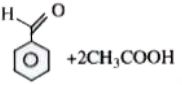
D. 2-Phenyl ethanoic acid

Answer: B

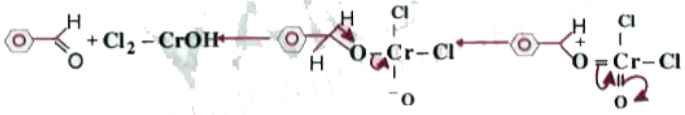
Watch Video Solution

5. The oxidation of aryl methyl or cyclo alkyl methyl by the treatment with chromyl chloride to an aldehyde via the formation of esters is known as Etard reaction. The oxidation stops at aldehyde stage because the product of the reaction is acylal, $R-CH(OCOCH_3)_2$ which is resistance to oxidation with this reagent. The acylal on hydrolysis gives aldehyde.

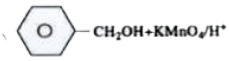


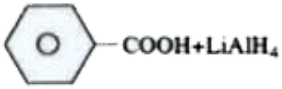


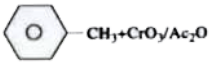
The mechanism of this reaction is given as

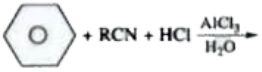


Which of the other reactions will produce benzaldehyde ?

A. 

B. 

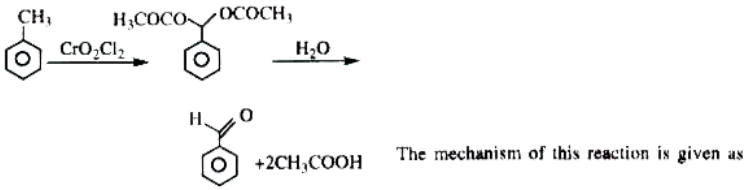
C. 

D. 

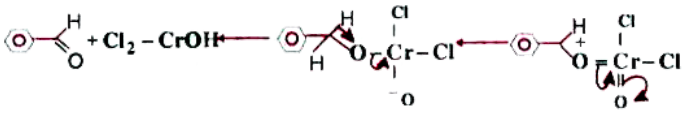
Answer: C

Watch Video Solution

6. The oxidation of aryl methyl or cyclo alkyl methyl by the treatment with chromyl chloride to an aldehyde via the formation of esters is known as Etard reaction. The oxidation stops at aldehyde stage because the product of the reaction is acylal, $R-CH(OCOCH_3)_2$ which is resistance to oxidation with this reagent. The acylal on hydrolysis gives aldehyde.

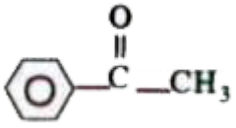


The mechanism of this reaction is given as

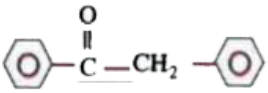


Which of the following compounds give benzo-phenone upon treating with CrO_2Cl_2 ?

A.



B.



C. 

D. none of these

Answer: C

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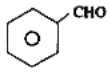
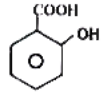
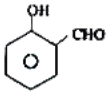
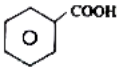
Level Ii Lexture Sheet Exericse Iii Match The Following Questions

1. Match the following question

COLUMN-I	COLUMN-II
A) 	p) Undergo electrophilic substitution
B) 	q) Undergo Cannizzaro reaction
C) 	r) liberate H_2 with sodium metal
D) 	s) liberate CO_2 with $NaHCO_3$
	t) gives violet colour with neutral $FeCl_3$ solution

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2. Match the following question

COLUMN -I	COLUMN -II
A) $R\text{-}CONH_2$	p) most reactive towards acyl substitution
B) R - COOR'	q) reduces $HgCl_2$
C) HCOOH	r) high boiling point
D) RCOCl	s) fruit flavour

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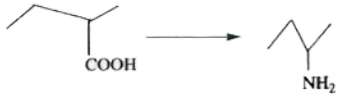
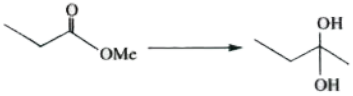
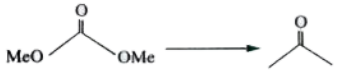
3. Match the following question

COLUMN -I (Reaction)	COLUMN -II (Reagent required)
A) 	p) CH_3MgBr (2 moles)/$H_3O^{(+)}$
B) 	q) $EtMgBr/H_3O^{(+)}$
C) 	r) NH_3/Δ then KOBr
D) 	s) N_3H/H_3O^+
	t) MeMgBr (2 moles)

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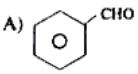
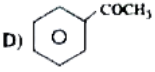
4. Match the following question

COLUMN-I	COLUMN-II
A) 	p) Gives reaction with Tollen's reagent
B) CH_3CHO	q) Gives iodoform reaction
C) HCHO	r) Undergo Cannizzaro reaction
D) 	s) Oxidation gives carboxylic acid
	t) Under electrophilic substitute

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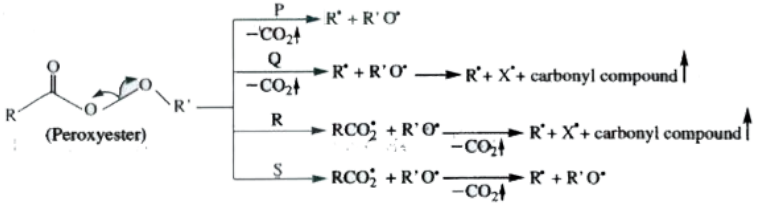
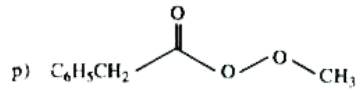
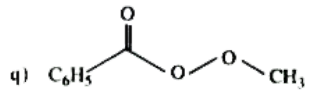
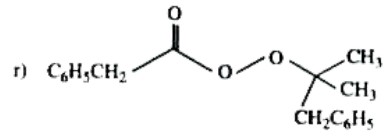
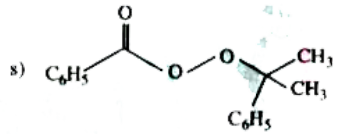
5. Different possible thermal decomposition pathwasy for peroxyesters are shown below. Match each pathway from List-I with an appropriate structure from List-II and select the correct answer using the code given below the lists



COLUMN-I	COLUMN-II
A) Pathway P	p) 
B) Pathway Q	q) 
C) Pathway R	r) 
D) Pathway S	s) 

A. $\begin{matrix} A & B & C & D \\ p & r & s & q \end{matrix}$

B.
A	B	C	D
q	s	r	p

C.
A	B	C	D
s	p	q	r

D.
A	B	C	D
r	q	p	s

Answer: A::B::C::D

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Level Ii Lexture Sheet Exericse Iv Integer Answer Type Questions

1. No of positional isomers possible for benzene dicarboxylic acid

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2. Fructose is oxidised by periodic acid $[HIO_4]$. The number of moles of HCOOH formed from each mole of fructose are

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3. The number of isomeric carboxylic acids possible for the formula $C_4H_8O_2$ are respectively.

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4. The number of hydroxyl groups present in tartaric acid are

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5. During the reaction between formic acid & $KMnO_4$. The equivalent weight of $KMnO_4$ obtained by dividing it's molecular weight by a _____ factor

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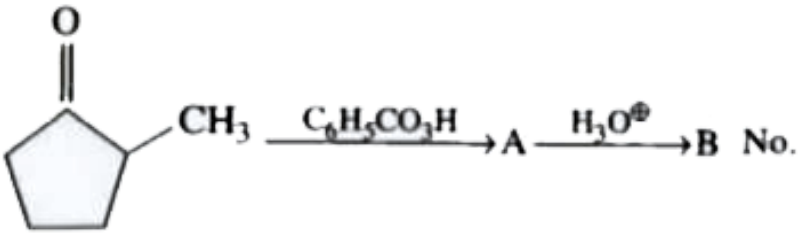
6. 

No. of sp^2 hybridised carbons in compound (B)

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7. Benzoic acid $\xrightarrow[(2)\,KOH+Br_2\,/\,\text{heat}]{(1)\,NH_3\,/\,\text{heat}}$ product Number of sp^2 hybridised atoms in product

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8. Acid chlorides are converted in to 3° alcohols with grignand reagent. During this convertion number of moles of grignand reagent are used

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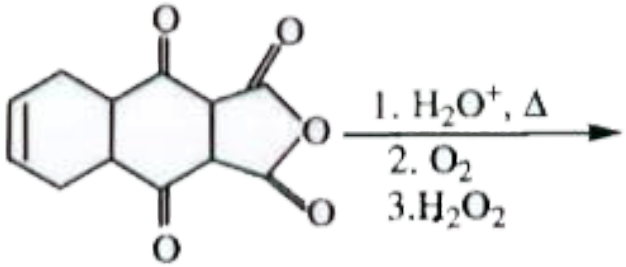
9. The total number of carboxylic acid group in the product P is



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Practice Sheet 1 Single Answer Questions

1. Oxidation of $(CH_3)_2C-CHCH_2CH_3$ with hot alkaline $KMnO_4$ gives

A. $(CH_3)-\underset{\underset{OH}{|}}{C}H-CH_3 \& CH_3CH_2CH_2OH$

B. $(CH_3)_2C=O \& CH_3CH_2COOH$

C. $(CH_3)_2CHCOOH \& CH_3CH_2COOH$

D. $(CH_3)_2C(OH)CH(OH)CH_2CH_3$

Answer: B

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2. The calcium salt of which of the following acids on dry distillation produces 2,4 - dimethyl pentane - 3 - one ?

A. isobutyric acid

B. adipic acid

C. butyric acid

D. propionic acid

Answer: A

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3. Acetaldehyde $\xrightarrow{HCN} X \xrightarrow[H_2O/H^+]{} Y \xrightarrow{\text{Heat}}$ Z : In the above, sequence , the end product Z is

A. but-2-enoic acid

B. prop-2-enoic acid

C. tartaric acid

D. lactic acid

Answer: B

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4. The compound obtained by reaction of CO with NaOH followed by nutralisation with dil. H_2SO_4

A. $HCOONa$

B. $HCOOH$

C. $\begin{array}{l} COOH \\ | \\ COOH \end{array}$

D. CH_3COOH

Answer: B

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5. Which of the following has highest solubility in water

A. acetic acid

B. isobutyric acid

C. n-butyric acid

D. propionic acid

Answer: A

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6. $CH_3OH \xrightarrow{PCl_5} (A) \xrightarrow{KCN} (B) \xrightarrow{H_3O^+} (C)$ the product (C) will be ?

A. CH_3CONH_2

B. $CH_3 - CH_2OH$

C. $HCOOH$

D. CH_3COOH

Answer: D

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7. The end product (C) in the following sequence of reactions,

$CH_3Cl \xrightarrow{KCN} (A) \xrightarrow{H^+ / H_2O} (B) \xrightarrow[\Delta]{P_4O_{10}} (C)$ The compound 'C' is

A. $(CH_3CO)_2O$

B. CH_3COOCH_2

C. CH_3COOH

D. CH_3COCH_3

Answer: A

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8. Which of the following is optically active

A. 2-hydroxypropanoic acid

B. 2-oxypropanoic acid

C. 2-hydroxyethanoic acid

D. Both b & c

Answer: A

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9. In the series of reaction $CH_3COOH \xrightarrow{NH_3} A \xrightarrow{\Delta} B \xrightarrow{P_2O_3} C$ the product C is :

A. ammonium acetate

B. methane

C. acetonitrile

D. methanol

Answer: C

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10. Which of the following anions is not stabilised by resonance

A. $CH_2 = CH - CHO^-$

B. $C_6H_5\overline{O}$

C. $C_6H_5CO\overline{O}$

D. All the above

Answer: A

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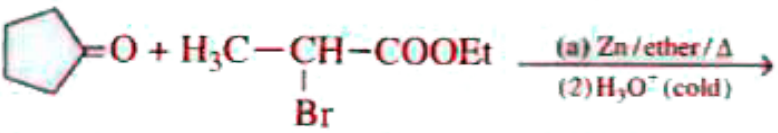
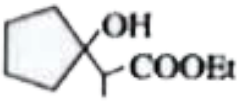
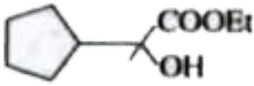
11.



The major product which can be isolated from this reaction is

A. 

B. 

C. 

D. 

Answer: A

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Practice Sheet 1 More Than One Correct Answer Questions

1. Which of the following compounds undergo nucleophilic substitution reaction

A. CH_3COCl

B. $CH_3COOC_2H_5$

C. CH_3COCH_3

D. $CH_3COCH_2CH_3$

Answer: A::B

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2. Which of the following will be able to produce acetyl chloride by its reaction with acetic acid ?

A. PCl_3

B. PCl_5

C. Cl_2

D. $SOCl_2 / Py$

Answer: A::B::D

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3. Acetyl chloride is reduced to acetaldehyde by

A. $LiAIH_4$

B. $H_2 / Pd - BaSO_4$

C. H_2 / Ni

D. $Na - C_2H_5OH$

Answer: B

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4. Which of the following compounds will give ethyl alochol on reduction with $LiAlH_4$?

A. $(CH_3CO)_2O$

B. CH_3COCl

C. CH_3CONH_2

D. $CH_3COOC_2H_5$

Answer: A::B::D

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5. Benzophenone is oxidised by peroxyacetic acid followed by acid catalysed hydrolysis to give two products (A) and (B) . Identify the products (A) and (B)

A. (A) is benzoic acid

B. (B) is phenol

C. (A) is acetic acid

D. (B) is methanol

Answer: A::B

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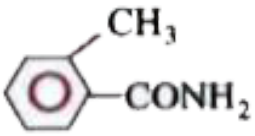
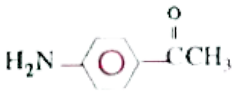
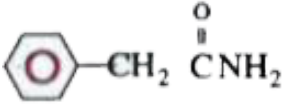
Practice Sheet 1 Linked Comprehension Type Questions

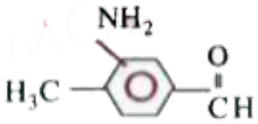
1. An organic compound (A) of molecular weight 135 on boiling with NaOH evolves a gas which gives white dense fumes on bringing a rod dipped in HCl near it. The alkaline solution thus obtained on acidification gives the precipitate of a compound (B) having molecular weight 136. Treatment of (A) with HNO_2 also yeilds (B), whereas its treatment with Br_2/KOH gives (C). compound (C) reacts with cold HNO_2 to give(D), which gives red colour with ceric ammonium nitrate. On the other hand(E) an isomer of (A) on boiling with dil HCl gives an acid (F), having molecular weight 136. On oxidation followed by heating, (F) gives an anhydride (G) which condenses with benzene in presence of $AlCl_3$ to give anthraquinone.

Structrual formula of compound (A) is

A. 

B. 

C. 

D. 

Answer: C

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2. An organic compound (A) of molecular weight 135 on boiling with NaOH evolves a gas which gives white dense fumes on bringing a rod dipped in HCl near it. The alkaline solution thus obtained on acidification gives the precipitate of a compound (B) having molecular weight 136. Treatment of (A) with HNO_2 also yeilds (B), whereas its treatment with Br_2/KOH gives (C). compound (C) reacts with cold HNO_2 to give(D), which gives red colour with ceric ammonium nitrate. On the other hand(E) an isomer of (A) on boiling with dil HCl gives an acid (F), having molecular weight 136. On oxidation followed by heating, (F) gives an anhydride (G) which condenses with benzene in presence of $AlCl_3$ to

give anthraquinone.

IUPAC name of compound (B) is

A. p-methylbenzoic acid

B. 2-phenylethanoic acid

C. methyl benzoate

D. none of these

Answer: B

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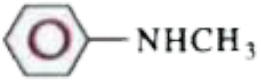
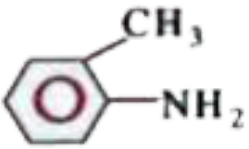
3. An organic compound (A) of molecular weight 135 on boiling with NaOH evolves a gas which gives white dense fumes on bringing a rod dipped in HCl near it. The alkaline solution thus obtained on acidification gives the precipitate of a compound (B) having molecular weight 136. Treatment of (A) with HNO_2 also yeilds (B), whereas its treatment with Br_2/KOH gives (C). compound (C) reacts with cold HNO_2 to give(D), which gives red colour with ceric ammonium nitrate. On the other

hand(E) an isomer of (A) on boiling with dil HCl gives an acid (F), having molecular weight 136. On oxidation followed by heating, (F) gives an anhydride (G) which condenses with benzene in presence of $AlCl_3$ to give anthraquinone.

Structural formula of compound (C) is

A. 

B. 

C. 

D. $C_6H_5CH_2NH_2$

Answer: D

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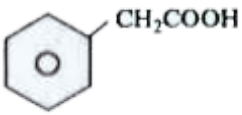
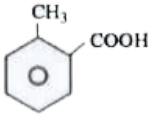
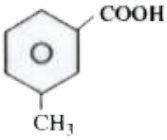
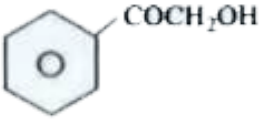
4. Compound $A(C_8H_7OCl)$ on reaction with one equivalent of CH_3MgBr gave $B(C_9H_{10}O)$ B gives codoform reaction and the other product form in this reaction C which on acidification gave $D(C_8H_8O_2)$. Further B on oxidation gave $E(C_7H_6O_2)$. Both D and E liberate CO_2 on reaction with $NaHCO_3$.

The compound 'B' is

A. 

B. 

C. 

D. 

Answer: A

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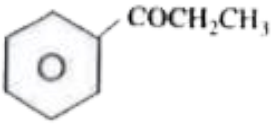
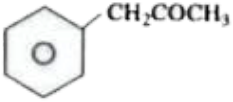
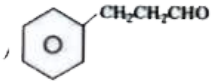
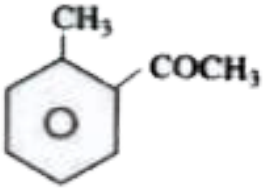
5. Compound $A(C_8H_7OCl)$ on reaction with one equivalent of CH_3MgBr gave $B(C_9H_{10}O)$ B gives codoform reaction and the other product form in this reaction C which on acidification gave $D(C_8H_8O_2)$. Further B on oxidation gave $E(C_7H_6O_2)$. Both D and E liberate CO_2 on reaction with $NaHCO_3$.

The compound 'B' is

A. 

B. 

C. 

D. 

Answer: B

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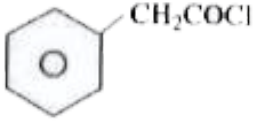
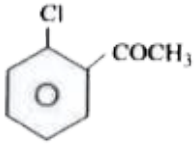
6. Compound $A(C_8H_7OCl)$ on reaction with one equivalent of CH_3MgBr gave $B(C_9H_{10}O)$ B gives codoform reaction and the other product form in this reaction C which on acidification gave $D(C_8H_8O_2)$. Further B on oxidation gave $E(C_7H_6O_2)$. Both D and E liberate CO_2 on reaction with $NaHCO_3$.

The compound 'A' is

A. 

B.



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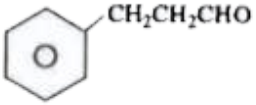
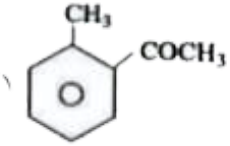


D.



Answer: A

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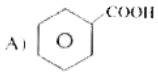
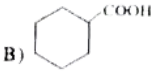
Practice Sheet 1 Matching Type Questions

1. Match type Questions

COLUMN - I	COLUMN - II
A) 	p) Undergoes HVZ reaction
B) 	q) Liberates CO_2 on reaction with $NaHCO_3$
C) CH_3COOH	r) Reduces Tollen's reagent to metallic silver
D) $HCOOH$	s) Dehydration gives anhydride

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2. Match type Questions

COLUMN - I	COLUMN - II
A) CH_3CH_2COCl	p) Hydrolysis gives carboxylic acid
B) $(CH_3CH_2CO)_2O$	q) Reduction with $LiAlH_4$ gives alcohol
C) $CH_3CH_2COOC_2H_5$	r) Reacts with Grignard reagent
D) $CH_3CH_2CONH_2$	s) Undergoes Friedel Crafts reaction with Benzene

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Practice Sheet 1 Interger Type Questions

1. Total number of acids and esters possible for $C_4H_8O_2$ is :

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2. How many of the acids given below are more acidic than CH_3COOH,

$ClCH_2COOH, O_2N - CH_2COOH, CH_3CH_2COOH, CH_3OCH_2COOH,$

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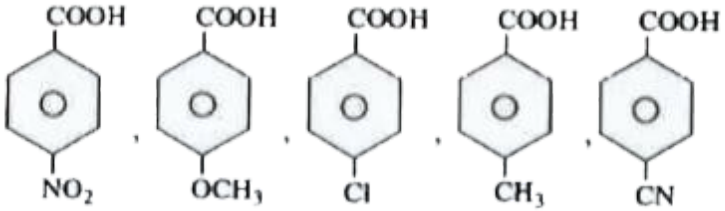
3. How many of the following are more acidic than benzoic acid



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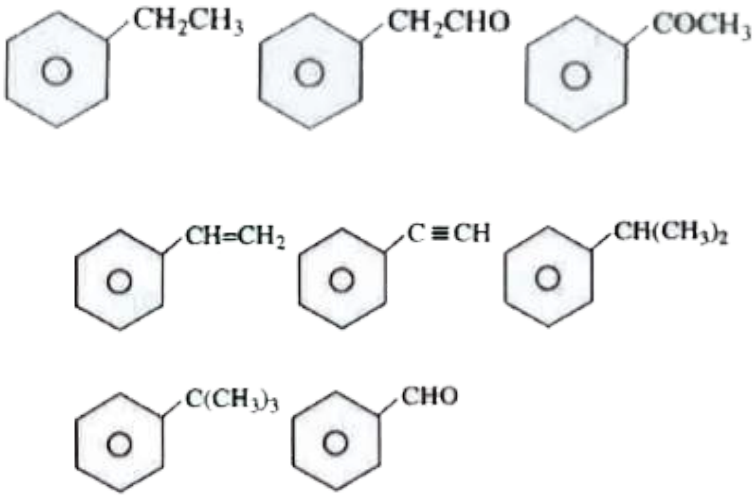
4. How many of the following compounds on oxidation give benzoic acid



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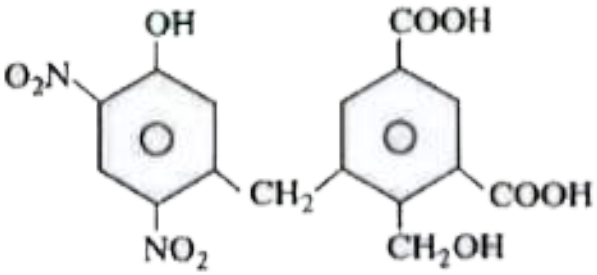

5.

How many moles of $NaHCO_3$ react with compound 'A' to form salt.

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6. How many of the following reagents is useful to distinguish between formic acid and acetic acid $NaHCO_3$, NaOH, Tollen's reagent, Fehlings solution , alk, $KMnO_4$, Metallic sodium , $I_2 / NaOH$

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7. Number of reasonance structure for $HCO\overline{O}$ is

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Practice Sheet 2 Single Answer Questions

1. In the reaction $CH_3CH_2COOH \xrightarrow[Cl_2]{\text{Red}P} A \xrightarrow{NaOH\,(aq)} B$ B is

A. Lactic acid

B. CH_3CH_2COCl

C. hexanoic acid

D. acrylic acid

Answer: A

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2. Which of the following will be higly ionized in water ?

A. CH_3CCl_2COOH

B. $CH_3CH_2CHClCOOH$

C. $CH_2ClCH_2CH_2COOH$

D. $CH_3CHClCH_2COOH$

Answer: A

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3. Hydrolysis of an ester gives acid A and alcohol B. The acid reduces Fehling's solution. Oxidation of alcohol B gives acid, A. The ester is

A. methyl acetate

B. methyl formate

C. ethyl acetate

D. ethyl oxalate

Answer: B

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4. The most suitable reagent to separate a mixture of an aldehyde and carboxylic acid can be

A. $NaHSO_3$

B. $NaHCO_3$

C. NH_3

D. HCl

Answer: B

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5. Which of the following will give while precipitate with mercuric chloride ?

A. CH_3COOH

B. $CH_2 = CHCOOH$

C. Pyruvic acid

D. HCOOH

Answer: D

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6. $CH_3CH_2COOH \xrightarrow[\text{Red P}]{Cl} A \xrightarrow{Alc.KOH} B$ What is B

A. CH_3CH_2CHO

B. $ClCH_2CH_2COOH$

C. $CH_3CH_3CH_2COCl$

D. $CH_2 = CHCOOH$

Answer: D

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7. When acetic acid is heated with P_2O_5 then which compound will be formed ?

A. $(CH_3CO)_2O$

B. CH_3COCH_3

C. CH_3CHO

D. CH_4

Answer: A

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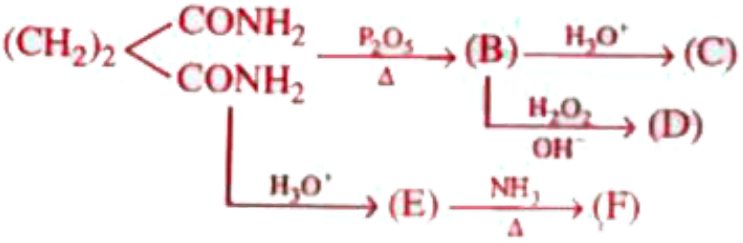

8.

Which statement is not correct ?

A. (F) & (A) are same

B. (C) & (E) are same & can be converted into (A) by NH_3/Heat

C. (D) & (A) are same & can be converted into (C) by H_3O^+

D. all are correct

Answer: C

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9. Which of the following compounds is formed on addition of HBr to

$CH_2 = CH - CH_2 - COOH$

A. $CH_3\underset{\underset{Br}{|}}{CH} - CH_2COOH$

B. $BrCH_2 - CH_2 - CH_2COOH$

C. $CH_3 - CH_2 - \underset{\underset{Br}{|}}{CH} - COOH$

D. $CH_2 = CH - CH_2COBr$

Answer: B

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10. Which of the following reactions does not give a product

A. $CH_3COCl + NH_3$

B. $CH_3COCl + RNH_2$

C. $CH_3COCl + R_2NH$

D. $CH_3COCl + R_3N$

Answer: D

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11. Which of the following carboxylic acids is most reactive with C_2H_5OH to form an ester

A. $HCOOH$

B. CH_3COOH

C. CH_3CH_2COOH

D. CH_2H_5COOH

Answer: A

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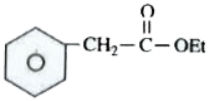
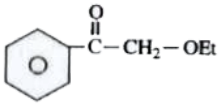
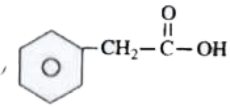
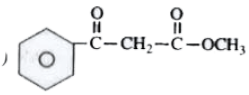
12. 

The major product of the reaction is

A. 

B. 

C. 

D. 

Answer: A

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13. Select the final product (D) from this sequence of reactions .

Acetoacetic ester $\xrightarrow{\text{NaOEt}} A \xrightarrow{CH_3I} B \xrightarrow{NaOEt} C \xrightarrow{H_3C-CH_2-CH_2-Br} D$

A. 0COOC_2H_5),(" |"),(" "CH_2-CH_2-CH_3):}`

B. $H_3C-\underset{\displaystyle CH_2-CH_2-CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2COOC_2H_5$

C. $\begin{matrix} & & CH_3 & \\ & & | & \\ H_3C-CH & - & CH_2COOC_2H_5 & \\ & & | & \\ & & CH_2-CH_2-CH_3 & \end{matrix}$

D. $H_3C-\underset{\displaystyle CH_3}{\overset{\displaystyle O}{\overset{||}{C}}}-\overset{\displaystyle CH_3}{\overset{|}{C}}-CH_2COOC_2H_5$

Answer: A

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Practice Sheet 2 More Than One Correct Answer Questions

1. $R-CO-NH_2 \xrightarrow{Br_2/KOH} RNH_2$ which of the following are formed as species/compounds in the above conversion.

A. $RCONHBr$

B. $RNCO$

C. $RCO\ddot{N}Br$

D. $RCO\ddot{N}Br_2$

Answer: A::B::C

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2. Which of the following statements is/are correct .

A. Acid catalysed hydrolysis of an ester is bimolecular reaction

B. Base catslysed hydrolysis of an ester is a reversible reaction

C. Acid catalysed hydrolysis of an ester is a reversible reaction

D. Base catalysed hydrolysis of an ester is an irreversible reaction

Answer: A::B::C::D

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3. Saponification of an ester (A) followed by acidification gives (B). (B) gives violet color with $FeCl_3$ (A) is

A. Phenyl acetate

B. Methyl benzoate

C. Aspirin

D. Diethyl phthalate

Answer: A::C

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4. Hydroxylamine reacts with

A. CH_3COCl

B. CH_3COCH_3

C. $CH_3COOC_2H_5$

D. CH_3CONH_2

Answer: A::B::C

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5. A chiral compound X with molecular formula $C_4H_8O_3$ liberates CO_2 with aq. $NaHCO_3$. X on reduction with $LiAlH_4$ gives achiral product . The structure of X is

A. $CH_3\overset{OH}{\overset{|}{C}}HCOOH$

B. $H_3C-\overset{H}{\overset{|}{\underset{CH_2OH}{\underset{|}{C}}}}COOH$

C. $H_3C\underset{\underset{OMe}{|}}{C}H-COOH$

D. $CH_3CH_2\underset{\underset{OH}{|}}{C}HCOOH$

Answer: B

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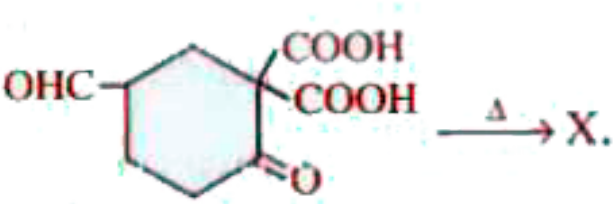
6. Which is not correct about X ?



A. X can show haloform test

B. X can give brisk effervescence with $NaHCO_3$

C. X can not show fehling test

D. X contains one CHO, one keto group & one COOH group

Answer: A::B::C::D

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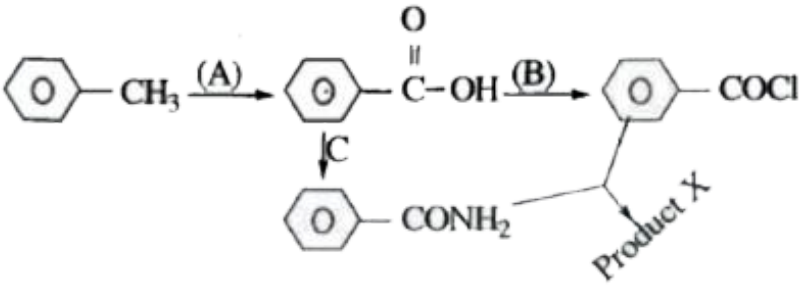
Practice Sheet 2 Linked Compreshension Type Questions



1.

Study sequence of the reactions above and answer the following questions .

The reagent 'B' is

A. PCl_3

B. PCl_5

C. $SOCl_2$

D. any of the above

Answer: D

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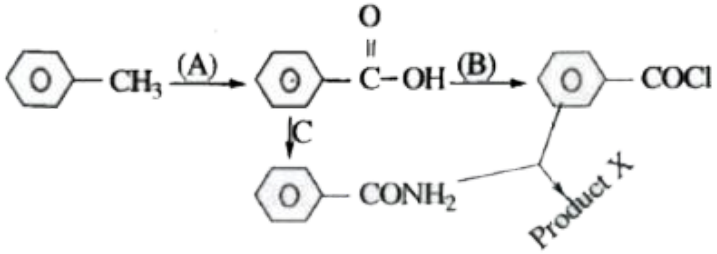

2.

Study sequence of the reactions above and answer the following questions .

The reagent 'A' is

A. PCC

B. CrO_2Cl_2

C. H_2CrO_4

D. PDC

Answer: C

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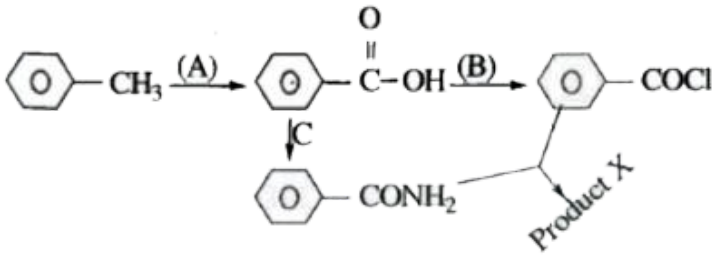

3.

Study sequence of the reactions above and answer the following questions .

The function group present in the product 'X' is

A. Anhydride

B. Amide

C. Ketone

D. Imide

Answer: D

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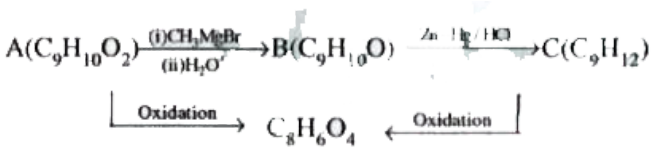
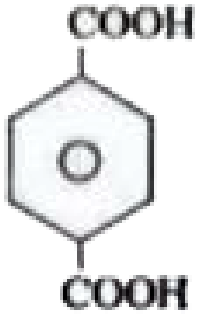


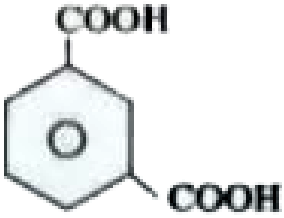
4.

D is a dicarboxylic acid and gives only one monosubstituted product. Study the sequence of reactions above and answer the following questions

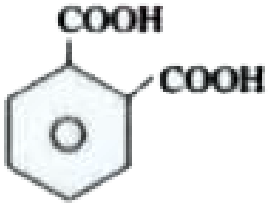
The compound 'D' is likely to be



A.



B.



C.

D. any of the above

Answer: A

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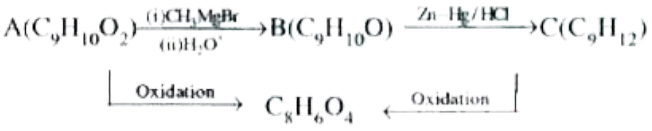
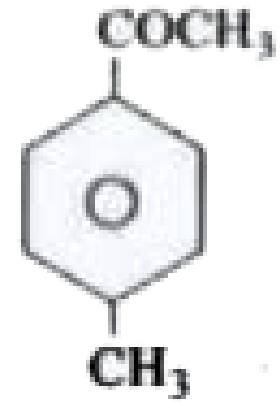


5.

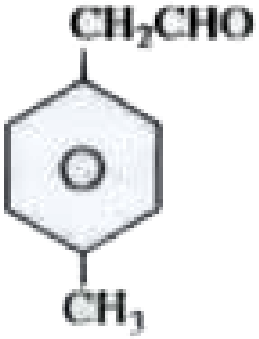
D is a dicarboxylic acid and gives only one monosubstituted product. Study the sequence of reactions above and answer the following questions

The structure of 'B' is

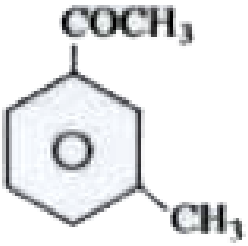
A.



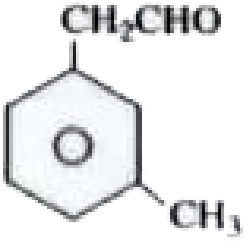
B.



C.



D.



Answer: A

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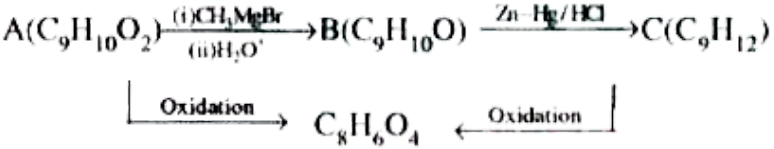
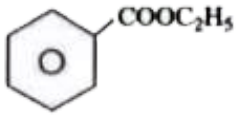
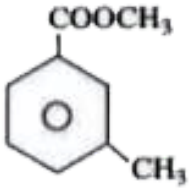


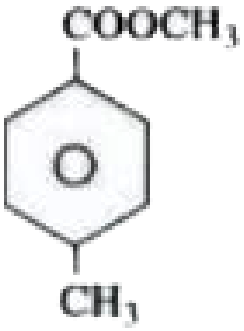
6.

D is a dicarboxylic acid and gives only one monosubstituted product. Study the sequence of reactions above and answer the following questions

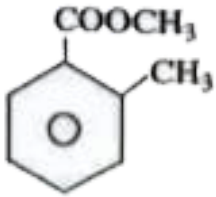
Compound 'A' is

A. 

B. 



C.



D.

Answer: C

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7. Matching Type Questions

COLUMN - I	COLUMN - II
A) Schmidt rearrangement	p) $R-COCl \xrightarrow[\Delta]{NaN_3} R-NH_2$
B) Lossen rearrangement	q) $R-COCl \xrightarrow[\Delta]{NH_2OH/OH^-} R-NH_2$
C) Curtius rearrangement	r) $R-COOH \xrightarrow[H_2SO_4]{N_3H} R-NH_2$
D) Hoffmann rearrangement	s) $R-CONH_2 \xrightarrow{Br_2/OH^-} R-NH_2$

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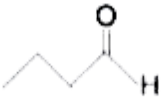
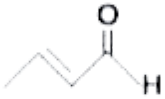
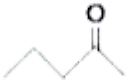
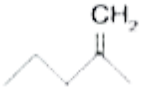
8. Matching Type Questions

COLUMN - I	COLUMN - II (Compound)
A) 	p) 0.4D
B) 	q) 2.9 D
C) 	r) 2.7 D
D) 	s) 3.7

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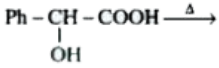
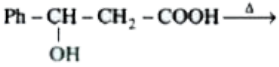
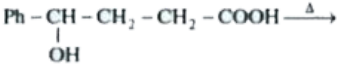
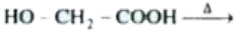
9. Matching Type Questions

COLUMN - I	COLUMN - II
A) 	p) Cyclic compound
B) 	q) Shows geometrical isomers
C) 	r) Can be optically active
D) 	s) Lactone

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Practice Sheet 2 Integer Type Questions

1. The minimum number of carbon atoms to be present to write an ester is

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2. Number of carbon atoms (minimum) be present for an acid to be optically active

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3. Number of isomeric benzoic acids with formula $C_8H_8O_2$ is

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4. Carboxylic acids containing carbocyclic ring, possible for $C_6H_{10}O_2$ is (excluding stereoisomers) - COOH group must be bonded to cyclic ring

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5. Number of isomers possible for $C_4H_8O_2$ (both acids & esters, excluding stereoisomers)

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6. Number of resonance structures for $HCOO^-$ is

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7. Number of resonance structures possible for benzaldehyde

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Practice Sheet 3 Single Answer Questions

1. The reaction product of the compound 'A' with excess of methyl magnesium iodide followed by acidic hydrolysis yields tertiary butanol. The compound could be

A. methanol

B. ethanol

C. propanal

D. Methyl ethanoate

Answer: D

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2. For hydrolysis of the following functional groups, the decreasing order of reactivity

A. $RCOOR > RCOCl > RCONH_2$

B. $RCOCl > RCOOR > RCONH_2$

C. $RCOCl > RCONH_2 > RCOOR$

D. $RCOOR > RCONH_2 > RCOCl$

Answer: B

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3. What is the end product of the following sequence of reactions

Acetamide $\xrightarrow{P_2O_3} A \xrightarrow{4(H)} B.$

A. CH_3NH_2

B. $C_2H_5NH_2$

C. CH_3CN

D. CH_3COONH_4

Answer: B

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4. The reaction between CH_3COCl and KCN followed by hydrolysis yields

A. acetamide

B. acetic acid

C. Pyruvic acid (2-oxopropanoic acid)

D. methyl isocyanate

Answer: C

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5. The end product 'E' in the reaction sequence

$$CH_3CONH_2 \xrightarrow{P_2O_5} B \xrightarrow{4(B)} C \xrightarrow{HNO_2\,.\,\text{Cold}} D \xrightarrow{Cu300^\circ} E$$

A. CH_3CHO

B. $CH_3COOC_2H_5$

C. CH_3COCH_3

D. $(CH_3CO)_2O$

Answer: A

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6. The preparation of ethyl acetoacetate involves

A. Witting reaction

B. Claisen condensation

C. Cannizaro's reaction

D. Reformatsky reaction

Answer: B

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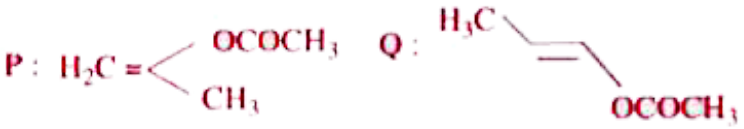
7. The products of acid hydrolysis of P and Q can be distinguished by



A. Lucas reagent

B. 2,4-DNP

C. Fehling's solution

D. $NaHSO_3$

Answer: C

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8. Acetic anhydride is used

A. as an acetylating agent

B. for the detection and estimation of -OH & -NH_2 groups

C. In the manufacture of aspirin

D. all of the above

Answer: D

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9. Fruity smell is given by

A. esters

B. alcohols

C. chloroform

D. acid anhydrides

Answer: A

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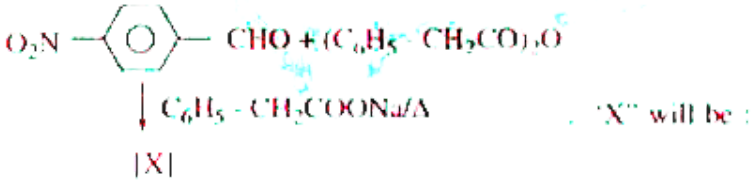
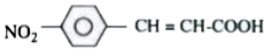
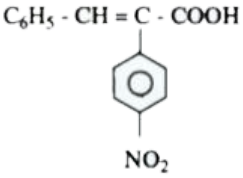
10. The product of the reaction :

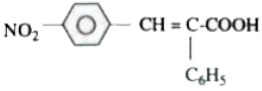


'X' will be :

A. $C_6H_5 - CH = C - COOH$

B. 

C. 

D. 

Answer: D

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11. In the given reaction

$$C_6H_5CHO + X \xrightarrow[(ii)\, HOH/NH_4Cl]{(i)\, Zn} C_6H_5 - \overset{OH}{\underset{|}{C}}H - CH_2 - COOC_2H_5. [X]$$

will be

A. $CH_3 - COOC_2H_5$

B. $CH_3 - CH_2 - COOC_2H_5$

C. $Br - CH_2COOC_2H_5$

D. 

Answer: C

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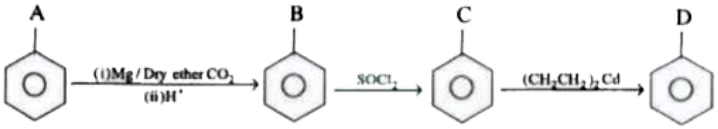
12. Consider the following sequence of reactions



Identify the A,B ,C and D

A. $-F,\ -COOH,\ -COCH_3,\ -OCH_2CH_2CH_3$

B. $-CHO,\ -COOH,\ -COCl,\ -COCH_2CH_3$

C. $-Br, COOH,\ -COCl,\ -COCH_2CH_3$

D. $-Br,\ -COOH,\ -COCl,\ -CHO$

Answer: C

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13. The reaction , $CH_3COOC_2H_5 \xrightarrow[4[H]]{Na+C_2H_5OH} C_2H_5OH + CH_3CH_2OH$, is called

A. Claisen reduction

B. Claisen condensation

C. Bouveault-Blanc reduction

D. Tischenko reduction

Answer: C

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14. $C_6H_5COOCH_3 + {}^{18}OH \rightarrow A + B$

In the above reaction , products A and B respectively are

A. $C_3H_5\overset{\overset{O}{||}}{C} - O^- + CH_3O^{18}H$

B. $C_2H_5 - \overset{\overset{O^{18}}{||}}{C} - O^{-18} + CH_3OH$

C. $C_2H_5 - \overset{O}{\overset{||}{C}} - O^{-18} + CH_3OH$

D. $C_2H_5 - \overset{O^{18}}{\overset{||}{C}} - \overline{O}^{+} CH_3OH$

Answer: C

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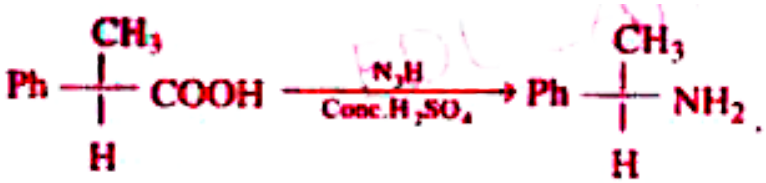

15. . The above reaction is known as

A. Schmidt reaction

B. Curtius reaction

C. Hofmann rearrangement

D. Lossen rearrangement

Answer: A

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Practice Sheet 3 More Than One Correct Answer Questions

1. Which of the following acids are dicarboxylic acids?

A. Succinic acid

B. Glutaric acid

C. Lactic acid

D. Cinnamic acid

Answer: A::B

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2. Which of the following can convert $CH_3 - CH = CH - CHO \rightarrow CH_3 - CH = CH - COOH$?

A. Tollen's reagent

B. Fehling's solution

C. $KMnO_2$/KOH(cold)

D. $KMnO_4$/KOH(hot)

Answer: A::B::C

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3. Acetoacetic ester is used for the synthesis of :

A. α, β-unsaturated acids

B. γ-keto acids

C. monocarboxylic acids

D. diacarboxylic acids

Answer: A::B::C::D

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4. Reaction of R-COOH with N_3H gives RNH_2 as the main product. The intermediates involved in this reaction are :

A. $RNHNH_2$

B. $RCON_3$

C. $RNCO$

D. $RCONH_2$

Answer: B::C

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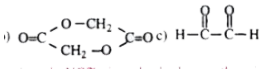
Practice Sheet 3 Linked Comprehension Type Questions

1. Hydroxy ethanoic acid is a white solid, readly soluble in water. It is prepared by the hydrolysis of chloroethanoic acid with sodium hydroxide followed by acidification. It exhibits the properties of both a

monocarboxylic acid and a primary alchol. In addition, it undergoes reactions which neither a carboxylic acid nor a primary alcohol can undergo.

Which of the following products is formed when hydroxyethanoic acid is being heated?

A. $HO - CH_3$

B. 

C. $H - \overset{O}{\overset{||}{C}} - \overset{O}{\overset{||}{C}} - H$

D. $HO - \overset{O}{\overset{||}{C}} - \overset{O}{\overset{||}{C}} - H$

Answer: B

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2. Hydroxy ethanoic acid is a white solid, readly soluble in water. It is prepared by the hydrolysis of chloroethanoic acid with sodium hydroxide followed by acidification. It exhibits the properties of both a

monocarboxylic acid and a primary alchol. In addition, it undergoes reactions which neither a carboxylic acid nor a primary alcohol can undergo.

Which of the following ractions is NOT given by hydroxy ethanoic acid ?

A. $HOCH_2 - COOH + CH_3OH \overset{H^+}{\Longleftrightarrow} CH_3O - CH_2COOH_3$

B. $HOCH_2 - COOH \xrightarrow[H_2SO_4]{Na_2Cr_2O_7} CO_2 + H_2O$

C. $HOCH_2 - COOH \xrightarrow[H_2SO_4]{\text{Conc.}H_2SO_2} HCHO + CO + H_2O$

D. $HOCH_2 - COOH \xrightarrow{Cu, 573K} H - \overset{O}{\overset{|}{C}} - COOH$

Answer: A

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3. Hydroxy ethanoic acid is a white solid, readly soluble in water. It is prepared by the hydrolysis of chloroethanoic acid with sodium hydroxide followed by acidification. It exhibits the properties of both a monocarboxylic acid and a primary alchol. In addition, it undergoes

reactions which neither a carboxylic acid nor a primary alcohol can undergo.

Which of the following reagent can convert 2-hydroxy propanoic acid to 2-oxo propanoic acid?

A. Ag_2O

B. $Na_2Cr_2O_7 / H_2SO_4$

C. Conc. H_2SO_4

D. Br_2 / CCl_4

Answer: A

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4. Hydroxy ethanoic acid is a white solid, readly soluble in water. It is prepared by the hydrolysis of chloroethanoic acid with sodium hydroxide followed by acidification. It exhibits the properties of both a monocarboxylic acid and a primary alchol. In addition, it undergoes reactions which neither a carboxylic acid nor a primary alcohol can

undergo.

Hydroxyl ethanoic acid can be prepared by

A. $HCHO \xrightarrow[(ii)\, H_3O^+]{(i)\, HCN} HOCH_2CO_2H$

B. $CH_3COOH \xrightarrow[(ii)\, KOH]{(i)\, Cl_2 \text{red} P} HOCH_2CO_2H$

C. $OHC - CO_2H \xrightarrow[(ii)\, H_2O]{(i)\, LiAlH_4} HOCH_2CO_2H$

D. $CH_3 - CO_2H \xrightarrow{Se} HOCH_2CO_2H$

Answer: B

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5. An acid (A) which is an important constituent of vinegar, on reaction with red P_4 and Br_2 gives a monobromoderivative (B) which on reaction with NH_3 gives a white solid (C). However, ethanal on reaction with a mixture of ammonium chloride and sodium cyanide undergoes strecker synthes is to give a product which on acidic hydrolysis gives another high melting solid (D).

The structure of the compound (D) is

A. $CH_3(OH)CHCOOH$

B. $(+)CH_3CH(NH_2)CHCOOH$

C. $(\pm)CH_3CH(NH_2)COOH$

D. $(\pm)CH_3CH(OH)CONH_2$

Answer: C

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6. An acid (A) which is an important constituent of vinegar, on reaction with red P_4 and Br_2 gives a monobromoderivative (B) which on reaction with NH_3 gives a white solid (C). However, ethanal on reaction with a mixture of ammonium chloride and sodium cyanide undergoes strecker synthes is to give a product which on acidic hydrolysis gives another high melting solid (D).

The total number of optical iosmers of (C) and (D) are

A. 4

B. 2

C. 3

D. zero

Answer: C

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7. An acid (A) which is an important constituent of vinegar, on reaction with red P_4 and Br_2 gives a monobromoderivative (B) which on reaction with NH_3 gives a white solid (C). However, ethanal on reaction with a mixture of ammonium chloride and sodium cyanide undergoes strecker synthes is to give a product which on acidic hydrolysis gives another high melting solid (D).

The dipolar ion is formed by

A. Only D

B. Only B

C. B and C

D. Only C and D

Answer: B

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8. An acid (A) which is an important constituent of vinegar, on reaction with red P_4 and Br_2 gives a monobromoderivative (B) which on reaction with NH_3 gives a white solid (C). However, ethanal on reaction with a mixture of ammonium chloride and sodium cyanide undergoes strecker synthes is to give a product which on acidic hydrolysis gives another high melting solid (D).

The intermediate involves in the conversion of (A) and (B) is

A. $H-\overset{\overset{O}{||}}{C}-Br$

B. $\underset{Br}{\overset{|}{C}}H_2-\overset{\overset{O}{||}}{C}-OH$

C. $\underset{\underset{Br}{|}}{CH_2} - \overset{\overset{Br}{||}}{C} = O$

D. $CH_3 - \overset{\overset{O}{||}}{C} = Br$

Answer: C

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Practice Sheet 3 Matching Type Questions

1. Matching Type questions

COLUMN - I	COLUMN - II
A) Acid amides reacts with acid as well as base	p) Hoffmann - bromamide reaction
B) A carboxylic acid gives a silver mirror	q) Methanoic acid
C) $RCONH_2 \xrightarrow{NaOBr} RNH_2$	r) Amphoteric
D) A carboxylic acid reacts with alkyl magnesium chloride	s) Hydrocarbon p - nitro benzoic acid
E) $RCOOH \xrightarrow[Heat]{P_4O_{10}} (RCO)_2O$	t) Dehydration

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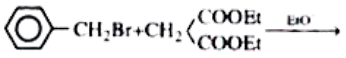
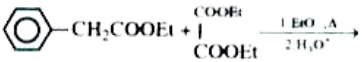
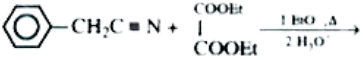
2. Matching Type questions

COLUMN - I

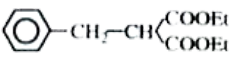
A) 

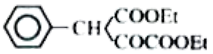
B) 

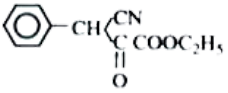
C) 

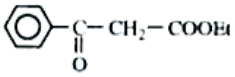
D) 

COLUMN - II

p) 

q) 

r) 

s) 

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Practice Sheet 3 Integer Type Questions

1. How many of the following are stronger than HCOOH (formic acid) ?

$Ph - COOh, Ph, CH - COOH, CH_3 - COOH, I - CH_2 - COOH,$

$Br - CH_2 - COOH, Cl - CH_2 - COOH, F - CH_2 - COOH, NC - C$

$O_2N - CH_2 - COOH, H_2C = CH - COOH$

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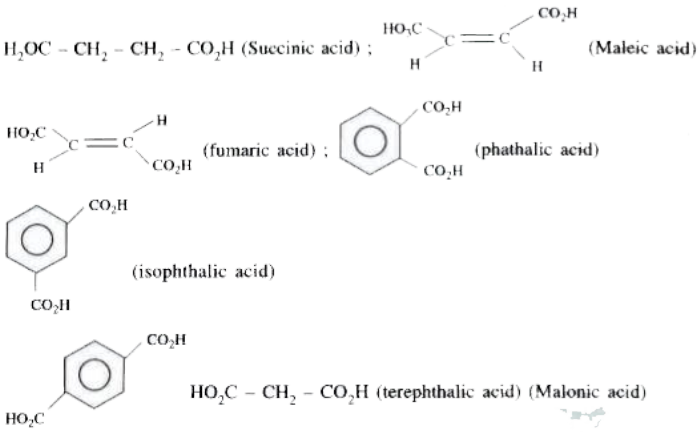
2. How many of the following dicarboxylic acids are forming cyclic anhydride on heating ?



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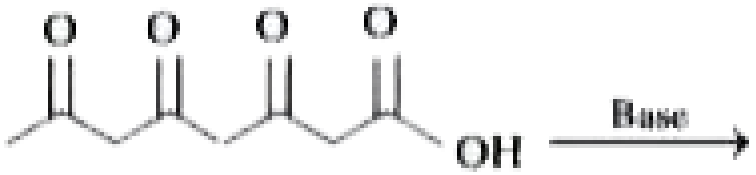
3.



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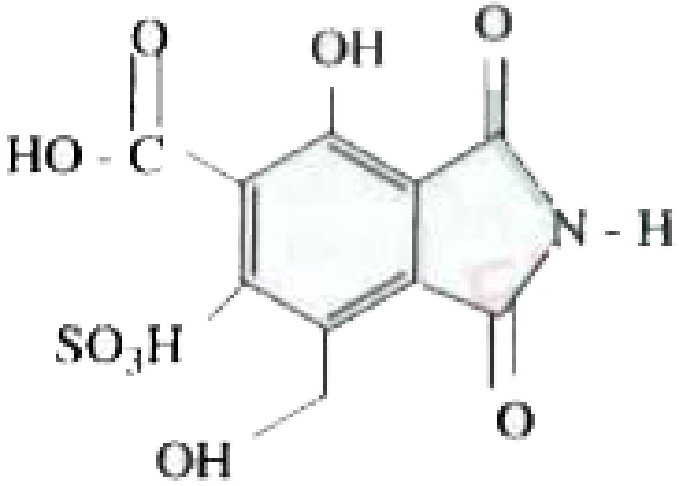
4. How many moles of NaOH would be required for complete Neutralisation of following compounds



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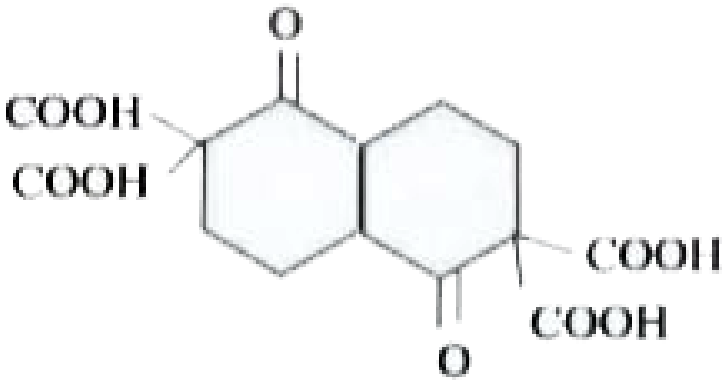
5. How many moles of CO_2 will released when following compound treated with heat



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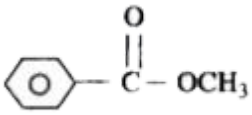
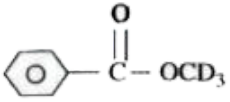
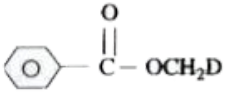
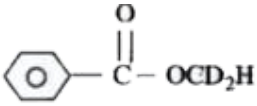
Practice Sheet 4 Single Answer Questions

1. Complete the following reaction

A. 

B. 

C. 

D. 

Answer: C

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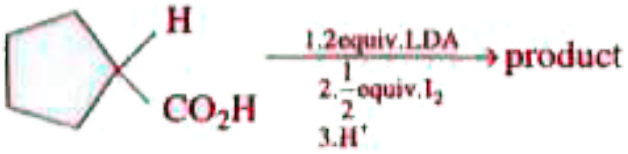
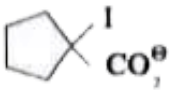
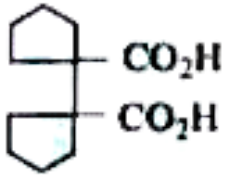
2. Complete the following reaction



A. 

B. 

C. 

D. 

Answer: C

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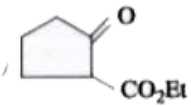
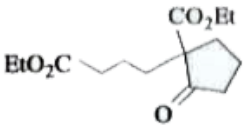
3. Adipic acid $\xrightarrow[H^+]{2EtOH} P \xrightarrow{EtOH} Q \xrightarrow[2Br(CH_2)_3CO_2.Et]{1.EtO} R$, R is

A. $EtO_2C-(CH_2)_4-CO_2Et$

B. 

C. 

D. $EtO_2C-(CH_2)_4-CO_2H$

Answer: C

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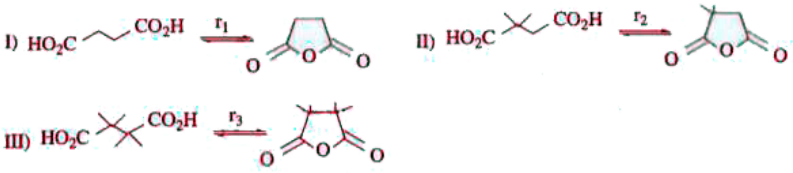
4. 

_ $1, r_2, r_3$ represents rate of cuclisation. Then relation between r_1, r_2 and r_3 is

A. $r_1 > r_2 > r_3$

B. $r_3 > r_2 > r_1$

C. $r_1 > r_3 > r_3$

D. $r_1 = r_2 = r_3$

Answer: B

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5. Which of the following statement is correct ?

P) pyruvic acid gives haloform test

Q) pyruvic acid gives tollen's test

R) pyruvic acid undergoes decarboxylation with warm. dil H_2SO_4 and gives CH_3CHO

S) pyruvic acid undergoes decarbonylation with warm, conc.H_2SO_4, and gives CH_3COOH

A. P,Q,R,S

B. P,Q,R only

C. R,Q only

D. Only P

Answer: A

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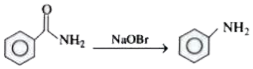
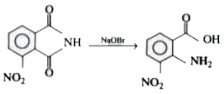
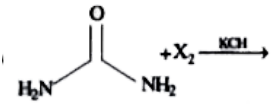
6. Find out the correct reaction

A. 

B. 

C. 

final product in the above reaction number of moles of X_2 consumed is 4

D. $F_3C - CF_2 - CO - NH_2 \xrightarrow{Br_2 / \overline{OH}} F_3C - CF_3 - NH_2$

Answer: A

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Practice Sheet 4 More Than One Correct Answer Questions

1. A carboxylic acid (X) of unknown structure was found to contain only C, H and O. Titration data : 150 mg required 11.9 ML of 0.22 N NaOH to reach equilibrium point. Gentle heating of 'X' led to evolution of CO_2 and formation of a new carboxylic acid, 'Y' with equivalent weight 74. Correct statement is/are

A. X is $HO_2C - \underset{\underset{CH_3}{|}}{C}H - CO_2H$

B. Y is $H_3C - \overset{\overset{O}{||}}{C} - CH_2 - CO_2H$

C. Y is $CH_3 - CH_2 - COOH$

D. X is $H_2OC - CH_2 - \overset{\overset{O}{||}}{C} - CH_2 - CO_2H$

Answer: A::C

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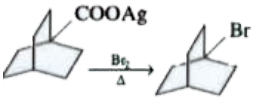
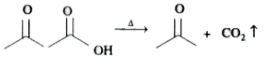
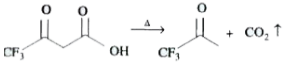
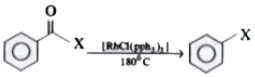
2. Which of the following is given correctly inter pretested .

A. 

B. 

C. 

D. 

Answer: A::B::D

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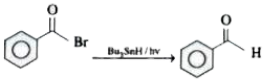
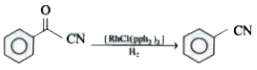
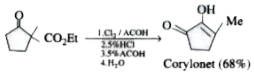
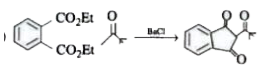
3. Which of the following reactions is/are correctly represented

A. 

B. 

C. 

D. 

Answer: A::B

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4. Acetophenone $\xrightarrow{NaNO_2/HCl} A \xrightarrow[\Delta]{AC_2O} B \xrightarrow{H_3O^+} C$. Incorrect statement(s) about product C is .....

A. Product 'C' on heating liberates CO_2 gas.

B. Product 'C' is more acidic than picric acid

C. Product 'C' can reduce Tollen's reagent

D. product 'C' can give test with neural $FeCl_2$

Answer: A::B::C

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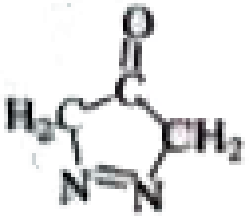
5. $H_2C=C=O+CH_2N_2 \xrightarrow{-78^\circ C}$ Product . Correct statements about the reaction is

A. product 



B. Intermediate is

C. $[\pi_2 + \pi_2]$ cyclo addition reaction

D. All the above

Answer: D

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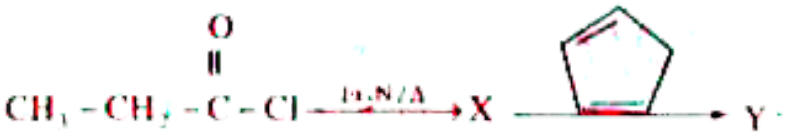
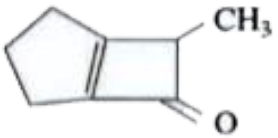


6. Correct option regarding above reaction is



A. X is $CH_3 - CH = C = O$

B. Y is

C. Both a and b

D. [4+2] cyclo addition

Answer: A

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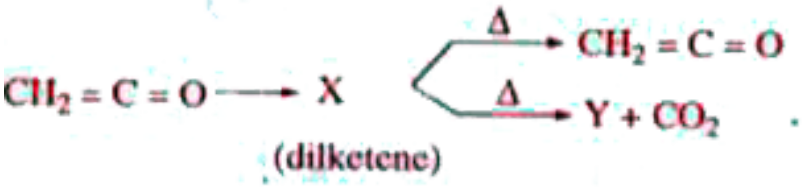
7. $CH_2 = C = O \rightarrow \underset{\text{(dilketene)}}{X}$



Correct statement is

A. In $CH_2 = C = O$, the two π bonds ar perpendicular to each other

B. Y is $H_2C = C = CH_2$

C. Y is optically inactive

D. All the above

Answer: D

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Practice Sheet 4 Linked Comprehension Type Questions

1. An organic compound (A) $\underset{Cl}{\overset{|}{CH_2}} - CH_2 - \underset{Cl}{CH_2}$ on reduction with red P_4 and Hl gives propane (A) on hydrolysis by an alkali followed by oxidation gives $B(C_3H_4O_4)$, which on heating gives (C). Both (B) and (C) gice effervescencence with sodium hydrogen carbonate. (B) on reacting with alcohol gives (D) , $C_7H_{12}O_8$ a well known synthetic reagent. Now answer the following questions.

(D) +benzaladehyde $\xrightarrow[(ii)\,H^+]{(i)\,\text{pyridine},\,\Delta}$ manor product (E). The product (E) is

A. Crotonic acid

B. Cinnamic acid

C. Benzoic acid

D. Mandelic acid

Answer: B

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2. An organic compound (A) $\underset{Cl}{\overset{|}{CH_2}} - CH_2 - \underset{Cl}{\overset{CH_2}{}}$ on reduction with red P_4 and Hl gives propane (A) on hydrolysis by an alkali followed by oxidation gives $B(C_3H_4O_4)$, which on heating gives (C). Both (B) and (C) gice effervescencence with sodium hydrogen carbonate. (B) on reacting with alcohol gives (D) , $C_7H_{12}O_8$ a well known synthetic reagent. Now answer the following questions.

Compound (C) $\xrightarrow[\Delta]{P_4O_{10}}$ Product (F). Hence , the product (F) may be

A. Malonic anhydride

B. Cinnamic acid

C. Ethanal

D. A cyclic ester called lactone

Answer: B

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3. An organic compound (A) $\underset{Cl}{\overset{|}{CH_2}} - CH_2 - \underset{Cl}{\overset{CH_2}{}}$ on reduction with red P_4 and Hl gives propane (A) on hydrolysis by an alkali followed by oxidation gives $B(C_3H_4O_4)$, which on heating gives (C). Both (B) and (C) gice effervescencence with sodium hydrogen carbonate. (B) on reacting with alcohol gives (D) , $C_7H_{12}O_8$ a well known synthetic reagent. Now answer the following questions.

Compound (A) $\xrightarrow[(ii)\,H^+]{(i)\,KCN\,/\,C_2H_2OH}$ product (G). The product (G) is

A. Malonic acid

B. Adipic acid

C. Glutaric acid

D. Valeric acid

Answer: C

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4. An organic compound $A(C_4H_7C_{13})$ yields (B) when treated with aq. KOH. (B) upon treatment with C_2H_5OH in presence of acid gave (C) which upon reducing with $LiAIH_4$ gave (D) and (E). (B) upon treatment with NH_3 followed by heating with P_4O_{10} and subsequent hydrolysis gives back (B). Sodium salt of (B) on Kolbe's electrolysis gave 2, 3-dimethylbutane at anode.

The IUPAC name of compound (A) is

A. 1,1,2-trichlorobutane

B. 1,2,2-trichlorobutane

C. 1,1,2-trichloro-2-methylpropane

D. 1,1,1-trichloro-2-methylpropane

Answer: D

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5. An organic compound $A(C_4H_7C_{13})$ yields (B) when treated with aq. KOH. (B) upon treatment with C_2H_5OH in presence of acid gave (C) which upon reducing with $LiAIH_4$ gave (D) and (E). (B) upon treatment with NH_3 followed by heating with P_4O_{10} and subsequent hydrolysis gives back (B). Sodium salt of (B) on Kolbe's electrolysis gave 2, 3-dimethylbutane at anode.

Structural formula of compound (C) is

A. $CH_3\overset{CH_3}{\underset{|}{C}}HCOOC_2H_5$

B. $CH_3-CH_2-CH_2-COOC_2H_5$

C. $CH_3-CH_2-\overset{C_2H_5}{\underset{|}{C}}H-COOH$

D. $CH_3-\overset{CH_3}{\underset{|}{C}}H-COO\overset{CH_3}{\underset{|}{C}}H-CH_3$

Answer: A

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6. An organic compound $A(C_4H_7C_{13})$ yields (B) when treated with aq. KOH. (B) upon treatment with C_2H_5OH in presence of acid gave (C) which upon reducing with $LiAIH_4$ gave (D) and (E). (B) upon treatment with NH_3 followed by heating with P_4O_{10} and subsequent hydrolysis gives back (B). Sodium salt of (B) on Kolbe's electrolysis gave 2, 3-dimethylbutane at anode.

Compound (D) and (E) respectively are

A. $CH_3CH_2CH_2OH, C_2H_5OH$

B. $CH_3 - \underset{\underset{CH_3}{|}}{C}\ HCH_2OH, C_2H_5OH$

C. $CH_3CH_2CH_2CH_2OH, C_2H_5OH$

D. $CH_3 - \underset{\underset{CH_3}{|}}{C}\ HCH_2 - OCH_3 - CH_3OH$

Answer: B

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7. An organic compound $A(C_4H_7C_{13})$ yields (B) when treated with aq. KOH. (B) upon treatment with C_2H_5OH in presence of acid gave (C) which upon reducing with $LiAIH_4$ gave (D) and (E). (B) upon treatment with NH_3 followed by heating with P_4O_{10} and subsequent hydrolysis gives back (B). Sodium salt of (B) on Kolbe's electrolysis gave 2, 3-dimethylbutane at anode.

The dehydration of compound (D) gives

A. 2-methyl 1-butane

B. 2-butane

C. 1-butane

D. isobutene

Answer: D

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Practice Sheet 4 Matching Type Questions

1. Matching Type Questions

COLUMN-I	COLUMN-II
A) $RCOOH + N_3H \rightarrow RNH_2$	p) Six membered cylic intermediate
B) $R-\overset{O}{\overset{\|}{C}}-CH_2COOH \xrightarrow{\Delta} RCOCH_3$	q) Carbene
C) $R-CH_2COOH+Br_2 \xrightarrow{P} RCHBrCOOH$	r) Isocyanate
D) $RCOOH+CH_2N_2 \xrightarrow{\Delta} RCOOCH_3$	s) Free radical

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2. Matching Type Questions

COLUMN-I (Ester)	COLUMN-II (Flavour)
A) ethyl butanoate	p) orange
B) octyl ethanoate	q) jasmine
C) n-pentyl ethanoate	r) pineapple
D) benzyl ethanoate	s) bonana

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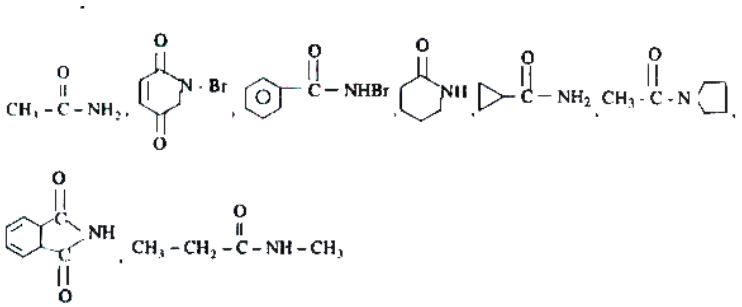
Practice Sheet 4 Integer Type Questions

1. How many of the following compounds will give Hoffman Hypo bromide reaction.



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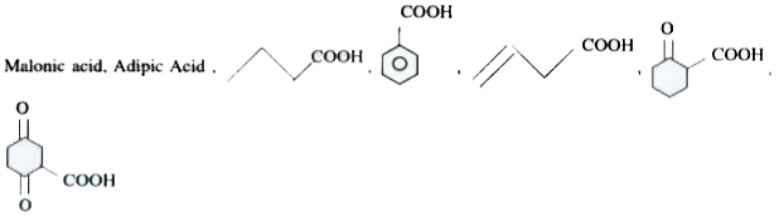
2. How many of the following compound liberate CO_2 on heating

Malonic acid, Adipic Acid,



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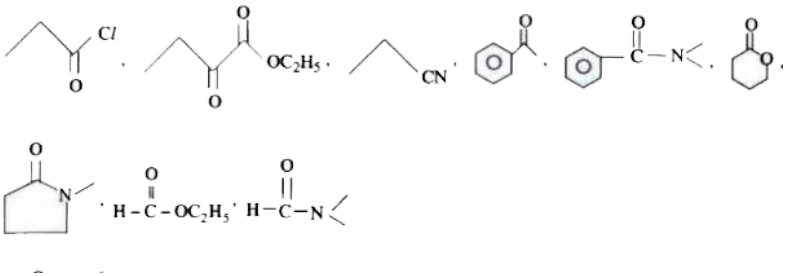
3. How many of the following compounds can give 3°-Alcohols with excess of CH_3MgCl and followed by Hydrolysis



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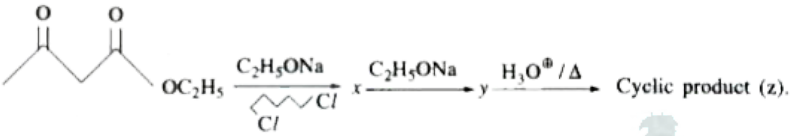
4.



Number of Ring carbons in z is

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5. Pthalic acid $\xrightarrow{\Delta} \underset{x}{\text{product}}$. No of sp^2 carbons in 'x' are

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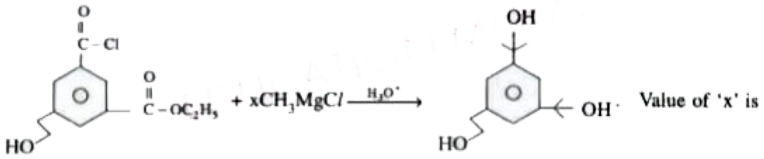
6.  Value of 'x' is

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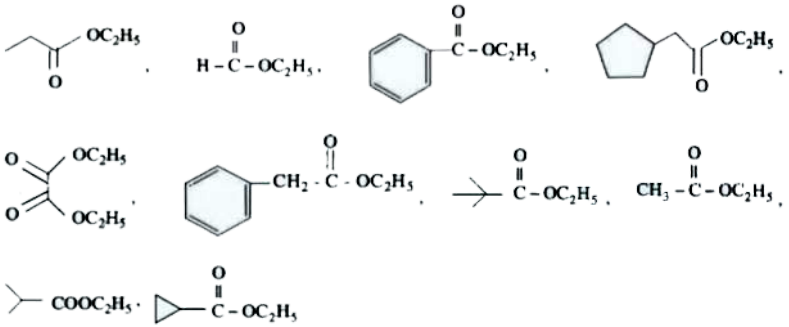
7. Examine the structural formulas of following compounds and find out how many compounds show Self Claisen Condensation reaction



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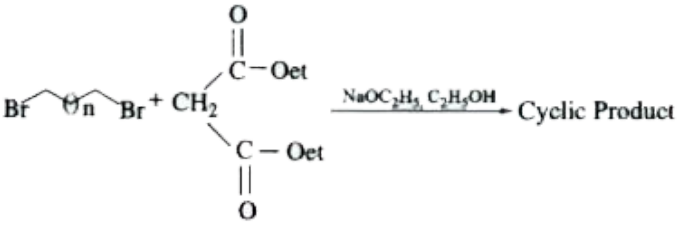
8.



At what value of 'n' the formation of five membered ring take place .

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9. $CH_3 - \overset{O}{\overset{||}{C}} - OC_2H_5 + CH_3 - \overset{O}{\overset{||}{C}} - O - C_2H_5 \xrightarrow{C_2H_5O^{\ominus}\,Na^{\oplus}\,C_2H_5OH}$.

How many different products (including stereo)would beform by above reaction.

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Problem

1. Attachment of vinyl group or phenyl group directly to carboxylic acid group has effect on the acidic character of that carboxylic acid. Explain.

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2. Why oxalic acid is a stronger acid than acetic acid?

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3. Why benzoic acid is a stronger acid than acetic acid?

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4. Explain why carboxylic acids are stronger acids than phenols?

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5. Chloroacetic acid is stronger acid than acetic acid. Explain.

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6. How is formic acid prepared ?

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7. Write sequence of steps for the conversion of formic acid to acetic acid ?

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8. How is acetic acid converted to formic acid ?

Watch Video Solution

9. How is benzoic acid prepared from benzene?

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10. Show how Acetophenone compound can be convered to benzoic acid.

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11. Write chemical reactions to affect the following transformations :

Benzyl alcohol to phenylethanoic acid

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12. What happens when malonic acid is heated ?

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13. Explain the orientation of-COOH group, when present on benzene ring.

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14. How is formic acid distinguished from acetic acid ?

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15. Acetic acid has a molecular mass of 120 when dissolved in benzene. Why?

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16. How is acetic acid converted separately to methylamine and ethyl amine?

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17. Explain the conversion of acetic acid into methane and ethane in separate steps.

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18. Hydrolysis of an ester in presence of NaOH is called saponification. Explain.

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19. Give the order of reactivity of various acid derivatives towards nucleophilic substitution. Solution

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20. How is acetamide converted to methamine?

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21. Write sequence of reactions to convert acetic acid into 2-proponol.

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Exercise 4 1 1

1. Write examples and names of carboxylic acids.

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2. Write on the dissociation equilibrium of carboxylic acids.

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3. Carboxylic acids are weak organic acids. Discuss the relative acidic strength of carboxylic acids hased on K_4 values.

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4. Draw the structures of Hex-2-en-4-ynoic acid and 3-chloro-4-phenylpentanoic acid.

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5. Write IUPAC names of $CH_3COCH_2COCH_3$ and $(CH_3)_3CCH,_2\,COOH.$

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Exercise 4 1 2

1. How is acetic acid prepared? Explain the properties of acetic acid.

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2. How is acetic acid obtained from: (a) ethanol, (b) acetonitrile and (c) Grignard reagent.

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3. Write equations for the reaction of acetic acid with the following reagents :

(a) Na, (b) $NaOH$, (c) $NaHCO_3$, (d) NH_3, and (e) Cl_2 / red P.

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4. How is acetic acid converted to (a) acetone, (b) ethane and (c) ethyl amine.

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5. How the strength of an acid changes with inductive and mesomeric effects exerted by various groups present in it.

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6. What happens when acetic acid is (a) heated with P_2O_5, (b) treated with LiA/H_4 and (c) treated with $SOCl_2$?

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7. Write the equations for the following reactions: (a) Calcium acetate $\xrightarrow[\Delta]{}$ (b) Sodium acetate $\xrightarrow[CaO]{NaOH}$ and (c) Acetic acid $\xrightarrow[ReaP]{HI}$

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8. Write short notes on : (a) HVZ reaction and (b) Esterification.

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9. Explain why the boiling point of acetic acid is higher than that of aldehydes and alcohols having same molar mass.

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10. Write the important uses of acetic acid.

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11. Write the conversions $C_2H_5OH \rightarrow CH_3COOH$ and $CH_3OH \rightarrow CH_3COOH$

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12. Complete the reactions : $(a) CH_3COOH \xrightarrow[\Delta]{P_4O_{10}}$, (b) $CH_3COOH \xrightarrow{LiAlH_4}$

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13. Although phenoxide ion has more number of resonating structures than carboxylate ion, carboxylic acid is a stronger acid than phenol. Why?

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Exercise 4 1 3

1. Explain how ethyl acetate is prepared? Discuss its properties.

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2. How is acetamide prepared? What are its properties?

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3. How is acetyl chloride prepared? Discuss its properties.

Watch Video Solution

4. Discuss the methods of preparation and properties of acetic anhydride.

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5. Write short notes on the Hofmann hypobromite reaction with mechanism.

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Exercise 4 2

1. What is Etard reaction ? Give equation.

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2. Wxplain Gattermann-Koch reaction for the formation of benzaldehyde

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3. Explain why carboxylic acids are stronger acids than phenols?

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4. How is inductive effect useful to explain the relative strength of aliphatic carboxylic acids? Explain with suitable examples.

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5. Acetic acid is stronger acid than peroxyacitic acid? Why?

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6. How is benzoic acid prepared ? What are its properties?

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7. How is lactic acid prepared ? Write two reactions of lactic acid.

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8. Write the mechanism of Claisen condensation.

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9. Discuss the geometrical isomerism exhibited by maleic and fumaric acids. How they differ in properties?

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10. Write the order of acidic strengths of benzoic acid and isomeric chlorobenzoic acids.

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11. Explain how succinic acid is prepared .

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12. Write the mechanism of Hoffmann bromamide reaction.

Watch Video Solution

13. Write the mechanism of acid and alkaline hydrolysis of esters.

Watch Video Solution

14. The boiling points of carboxylic acids are higher than those of alcohols. Explain with suitable examples.

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15. Give equations for the reaction of acetic acid with (i) PCI_3 (ii) PCI_5 (iii) $SOCI_2$.

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16. Give the order of reactivity of various acid derivatives towards nucleophilic substitution. Solution

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17. Nitrobenzene to benzoic acid

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18. Predict the order of acidic nature of (i) p-nitrobenzoic acid (ii) p-methylbenzoic acid (iii) p-chlorobenzoic acid (iv) p-methoxybenzoic acid

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19. The first ionisation constant of oxalic acid is much greater than its second ionisation constant. Justify.

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20. "Salts of acetic acid are useful in the preparation of several organic compounds". Account for the observation with suitable examples.

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21. Explain how acetic acid can be converted to: glycine and lactic acid.

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22. Acid halides undergo esterification at a faster rate than acids. Explain?

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23. $C_6H_5CONH_2 \xrightarrow{dil.NaOH} A \xrightarrow[CaO]{NaOH} B \xrightarrow[AlCl_3]{CH_3Cl} C.$ Name the reaction in the formation of C from B.

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24. $C_6H_6 + Br_2 \xrightarrow{AlCl_3} A \xrightarrow{\text{Mg. ether}} B \xrightarrow{CO_2} C \xrightarrow{H_2O^+} C$.Write the organic products A, B, C and D. Discuss these conversions.

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25.

$CH, COOH - \xrightarrow{Cl_2.P} A \xrightarrow[C_2H_5OH/H^+]{\text{esterification}} B \xrightarrow{alc.KCN} C \xrightarrow[H_2\frac{\emptyset}{H^+}]{hydrolysis} D \xrightarrow{\text{heat150}} -CO$

.Name the functional isomer of compound E in the above sequence.

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Conversions

1. Methanol to acetic acid

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2. Ethanoic acid to propanoic acid

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3. Benzene to methylbenzoate

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4. Propanoic acid to acetic acid

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5. Nitrobenzene to benzoic acid

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6. Benzene to phenylacetic acid .

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7. Benzene to p-nitrobenzoic acid

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8. Benzene to m-nitrobenzoic acid .

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9. Benzene to m-nitroacetophenone .

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10. Ethylbenzene to benzoic acid

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11. Bromobenzene to benzoic acid .

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12. Styrene to benzoic acid

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13. Acetophenone to benzoic acid

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14. Write chemical reactions of affect the 4-Methylacetophenone to benzene -1,4 -dicarboxylic acid transformations.

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15. Butanol-1 to butanoic acid .

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16. Write chemical reactions of affect the Cyclohexene to hexane-1, 6-dioic acid transformations.

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17. Write chemical reactions of affect the Butanal to butanoic acid transformations.

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18. 3-Nitrobromobenzene to 3-nitrobenzoic acid .

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19. Write chemical reactions to affect the following transformations :

Benzyl alcohol to phenylethanoic acid

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