Aldehydes, Ketones And Carboxylic

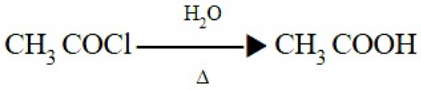
Question1

Select the incorrect reaction among the following:

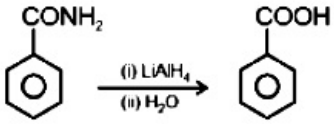
[NEET 2024 Re]

Options:

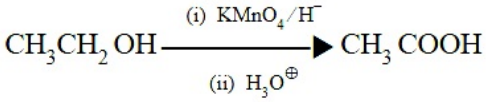
A.



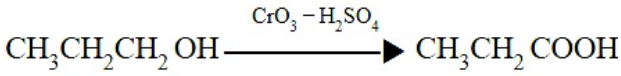
B.



C.

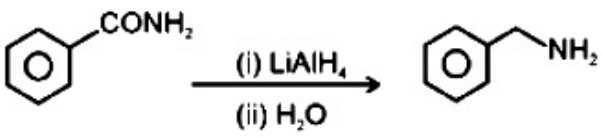


D.



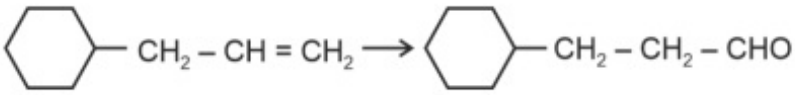
Answer: B

Solution:



Question2

Identify the correct reagents that would bring about the following transformation.



[NEET 2024]

Options:

A.

(i) H_2O/H^+

(ii) CrO_3

B.

(i) BH_3

(ii) $H_2O_2/\overset{\ominus}{O}H$

(iii) PCC

C.

(i) BH_3

(ii) $H_2O_2/\overset{\ominus}{O}H$

(iii) alk. $KMnO_4$

(iv) $H_3O^{\oplus}$

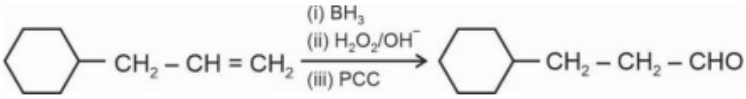
D.

(i) H_2O/H^+

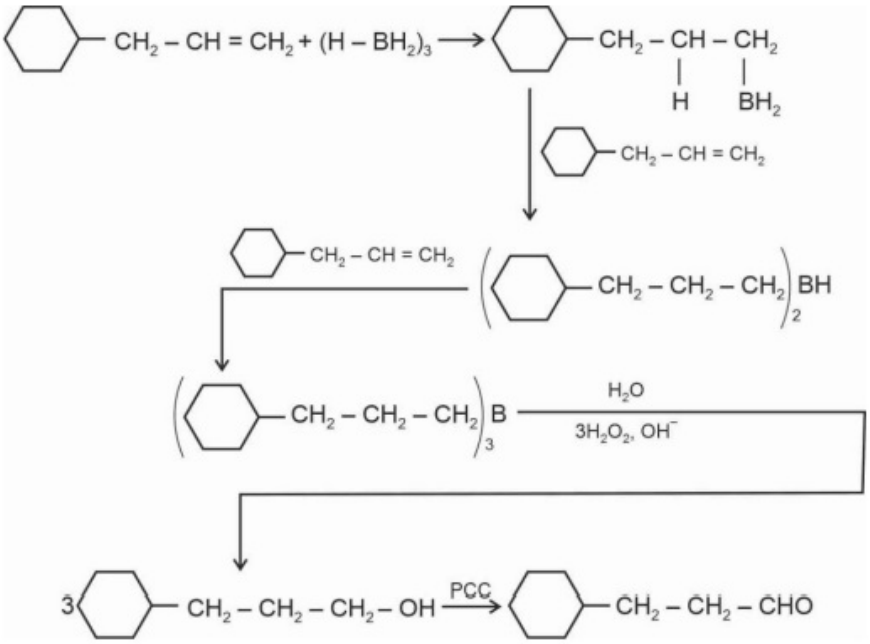
(ii) PCC

Answer: B

Solution:

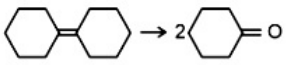
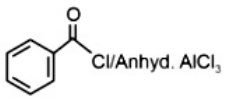
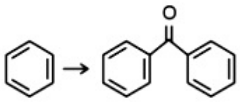
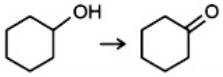
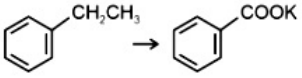


Mechanism :



Question3

Match List I with List II.

	List-I (Reaction)		List-II (Reagents/Condition)
A.		I.	
B.		II.	CrO_3
C.		III.	$KMnO_4/KOH, \Delta$
D.		IV.	(i)O_3 (ii) $Zn - H_2O$

Choose the correct answer from the options given below:

[NEET 2024]

Options:

A.

A-IV, B-I, C-III, D-II

B.

A-III, B-I, C-II, D-IV

C.

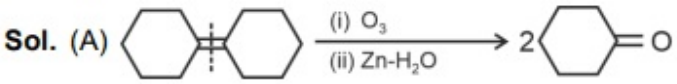
A-IV, B-I, C-II, D-III

D.

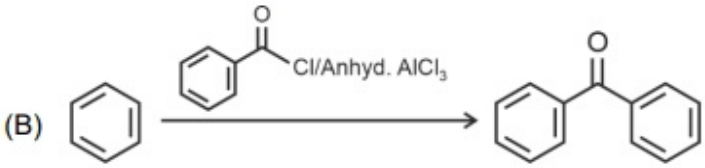
A-I, B-IV, C-II, D-III

Answer: C

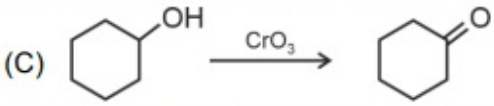
Solution:



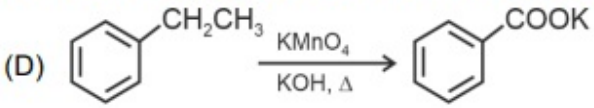
It is reductive ozonolysis



It is Friedel-Crafts acylation reaction.

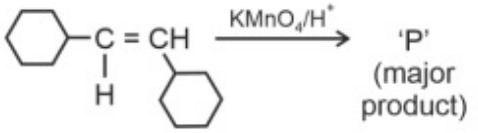


Secondary alcohols are oxidised to ketones by CrO_3



Question4

For the given reaction:

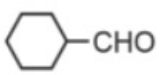


'P' is

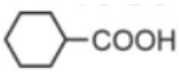
[NEET 2024]

Options:

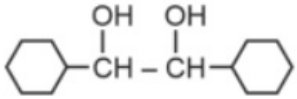
A.



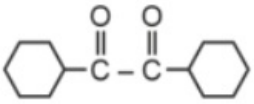
B.



C.

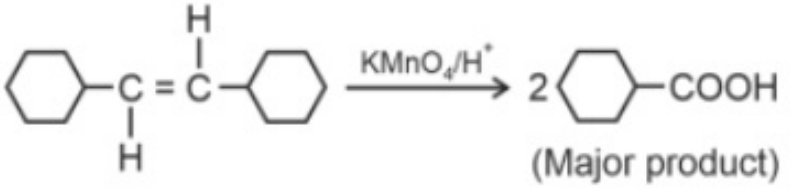


D.



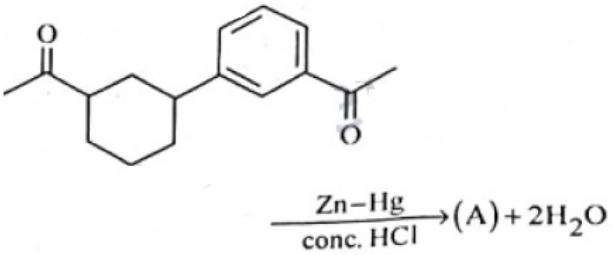
Answer: B

Solution:



Question5

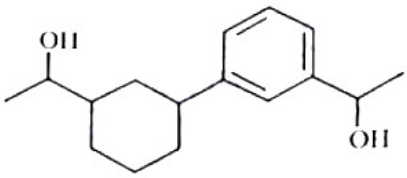
Identify product (A) in the following reaction:



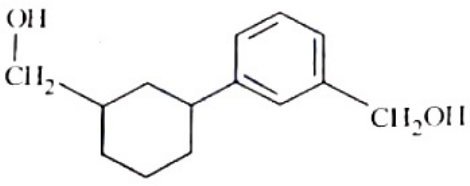
[NEET 2023]

Options:

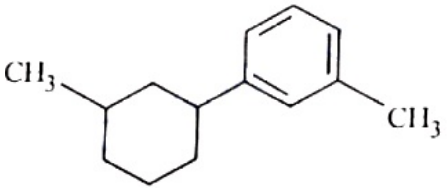
A.



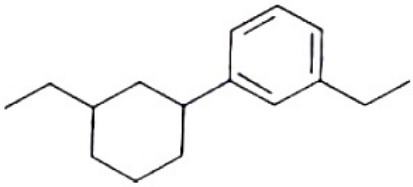
B.



C.



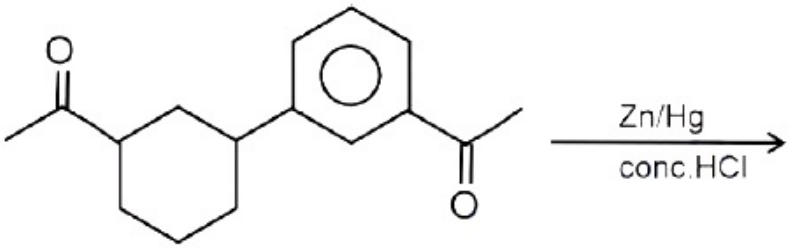
D.

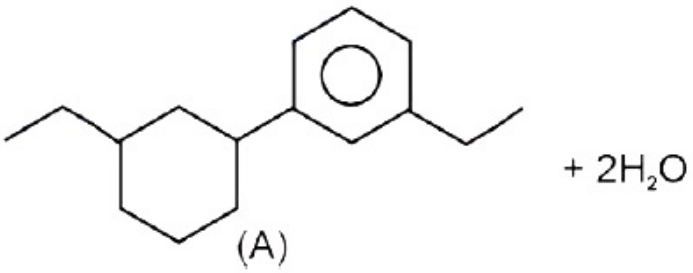


Answer: D

Solution:

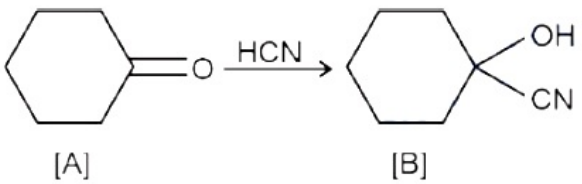
This reaction is Clemmensen reduction

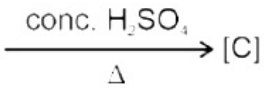




Question6

Complete the following reaction



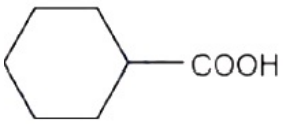


[C] is_____

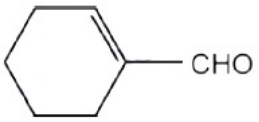
[NEET 2023]

Options:

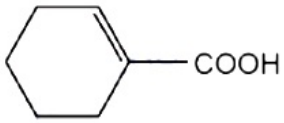
A.



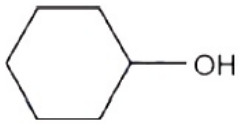
B.



C.

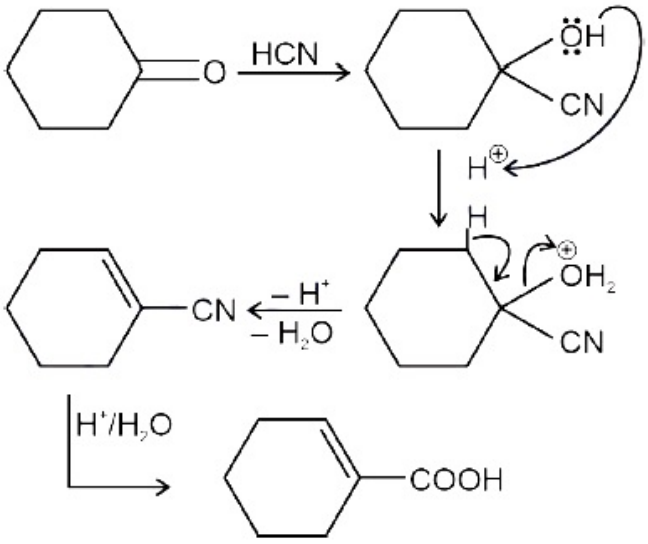


D.



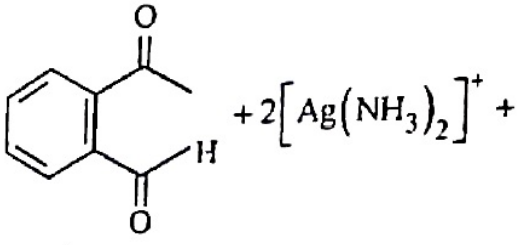
Answer: C

Solution:



Question7

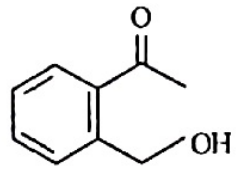
Identify the major product obtained in the following reaction:



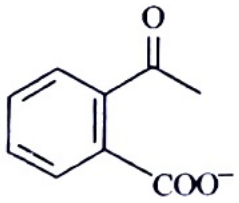
[NEET 2023]

Options:

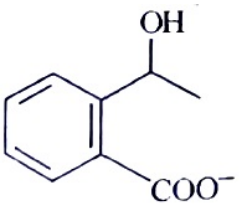
A.



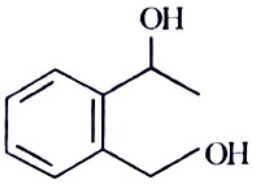
B.



C.



D.

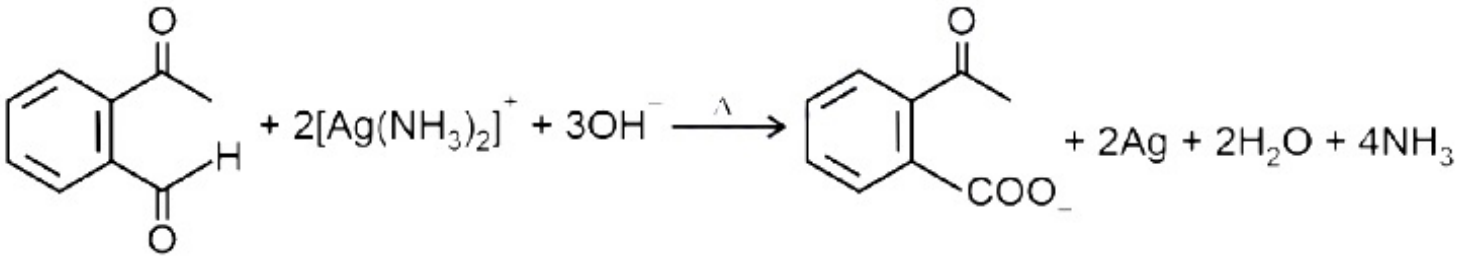


Answer: B

Solution:

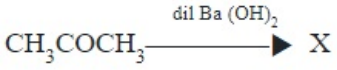
Solution:

Ammoniacal silver nitrate solution is Tollens' reagent. Tollens' reagent can be used to distinguish aldehyde & ketone as aldehyde upon warming with Tollens' reagent produces a silver mirror due to formation of silver metal in alkaline medium. Aldehyde is oxidised to corresponding carboxylate anion.



Question8

Consider the given reaction :



The functional groups present in compound " X " are:

[NEET 2023 mpr]

Options:

A.

ketone and double bond

B.

double bond and aldehyde

C.

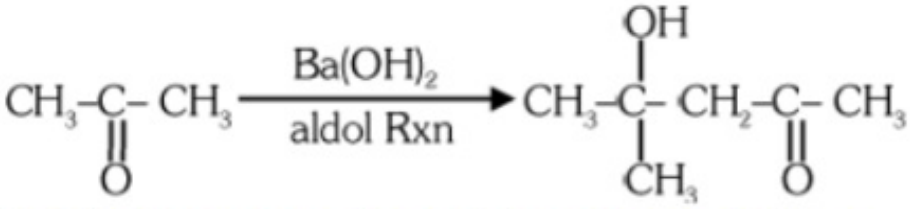
alcohol and aldehyde

D.

alcohol and ketone

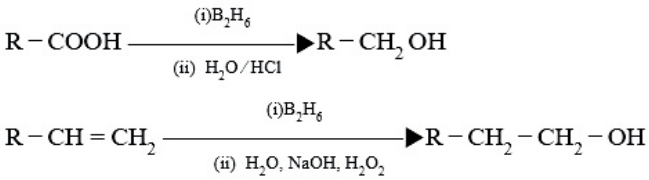
Answer: D

Solution:



Functional groups present in product are alcohol and ketone.

Question9



Identify ' X ' in above reactions

[NEET 2023 mpr]

Options:

A.

B_2H_6

B.

$LiAlH_4$

C.

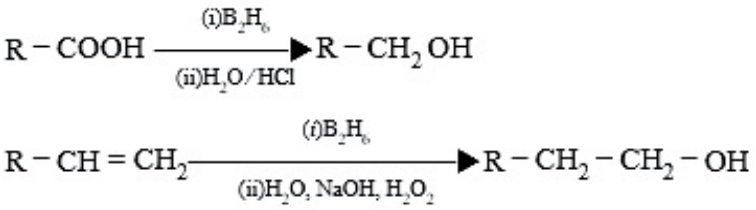
$NaBH_4$

D.

H_2/Pd

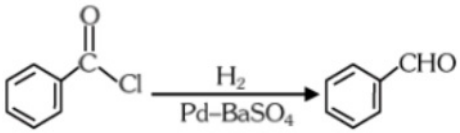
Answer: A

Solution:



Question10

The following conversion is known as :



[NEET 2023 mpr]

Options:

A.

Stephen reaction

B.

Gattermann-Koch reaction

C.

Etard reaction

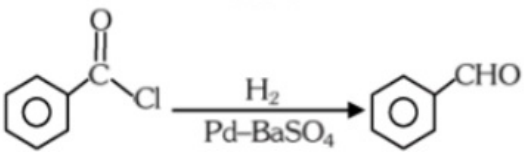
D.

Rosenmund reaction

Answer: D

Solution:

Rosenmund reaction



Question11

Reagents which can be used to convert alcohols to carboxylic acids, are

(A) $CrO_3 - H_2SO_4$

(B) $K_2Cr_2O_7 + H_2SO_4$

(C) $KMnO_4 + KOH/H_3O^+$

(D) Cu, 573K

(E) CrO_3, $(CH_3CO)_2O$

Choose the most appropriate answer from the options given below :

[NEET 2023 mpr]

Options:

A.

(B), (C) and (D) only

B.

(B), (D) and (E) only

C.

(A), (B) and (C) only

D.

(A), (B) and (E) only

Answer: C

Solution:

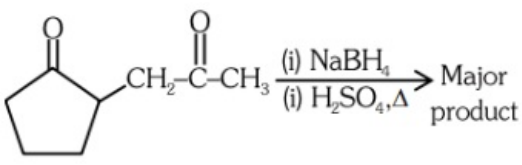
$$R - CH_2 - OH \xrightarrow[K_2Cr_2O_7 - H_2SO_4 \text{ or}]{CrO_3 - H_2SO_4 \text{ or}} R - COOH$$

$KMnO_4 + KOH/H_3O^+$

[Strong oxidising agents]

Question12

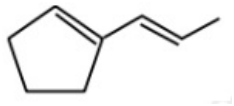
The major product formed in the following conversion is _____.



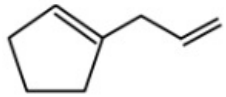
[NEET 2023 mpr]

Options:

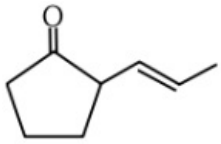
A.



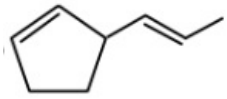
B.



C.

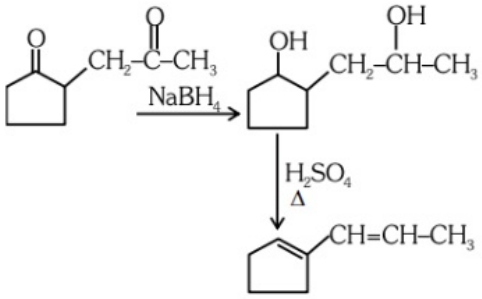


D.



Answer: A

Solution:

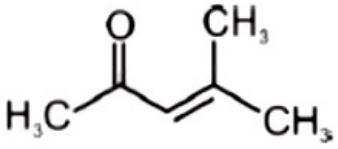


Question13

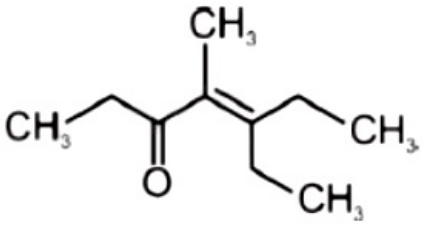
Which one of the following is not formed when acetone reacts with 2-pentanone in the presence of dilute N aOH followed by heating? [NEET-2022]

Options:

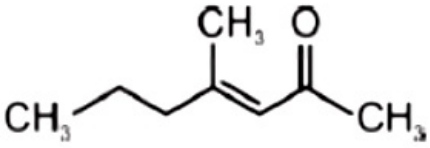
A.



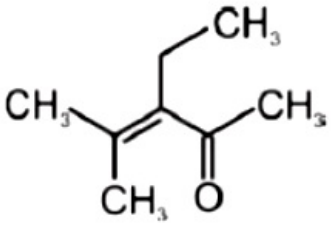
B.



C.



D.



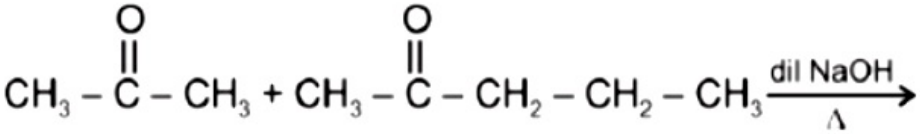
Answer: B

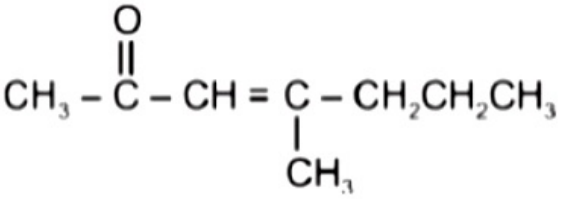
Solution:

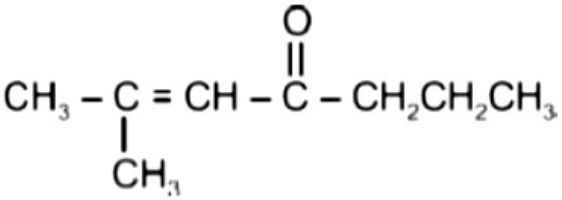
Solution:

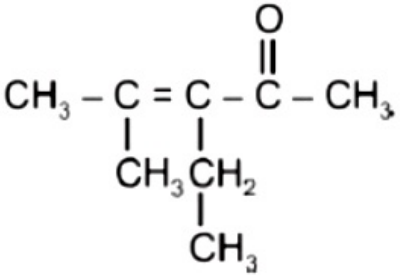
Cross Aldol condensation reaction:

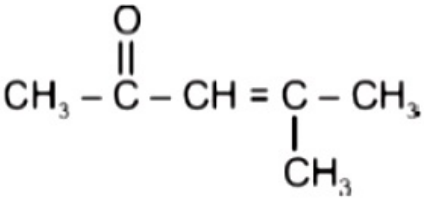
Both reactants contain α-Hydrogens, so multiple products are possible which are as follows:

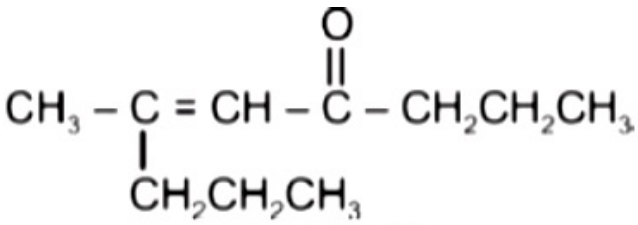


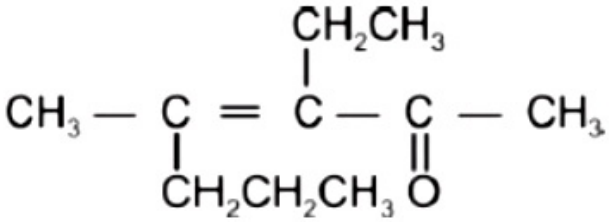
1. 

2. 

3. 

4. 

5. 

6. 

(2) is not possible.

Question14

Match List-I with List-II.

List-I (Products formed)	List-II (Reaction of carbonyl compound with)
(a) Cyanohydrin	(i) NH_2OH
(b) Acetal	(ii) RNH_2
(c) Schiff's base	(iii) alcohol
(d) Oxime	(iv) HCN

[NEET-2022]

Options:

A. (a) - (iii), (b) - (iv), (c) - (ii), (d) - (i)

B. (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

C. (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)

D. (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

Answer: D

Solution:

List-I (Products formed)	List-II (Reaction of carbonyl compound with)
(a) Cyanohydrin	$\rightarrow$ HCN
(b) Acetal	$\rightarrow$ Alcohol
(c) Schiff's base	$\rightarrow RNH_2$
(d) Oxime	$\rightarrow NH_2OH$

(a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

Question15

Given below are two statements:
Statement I : The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses because of weak molecular association in aldehydes and ketones due to dipole - dipole interactions.
Statement II : The boiling points of aldehydes and ketones are lower than the alcohols of similar molecular masses due to the absence of H - bonding.
In the light of the above statements, choose the most appropriate answer from the given below
[NEET-2022]

Options:

A. Both Statement I and Statement II are correct

B. Both Statement I and Statement II are incorrect

C. Statement I is correct but Statement II is incorrect

D. Statement I is incorrect but Statement II is correct

Answer: A

Solution:

Solution:

- The boiling points of aldehydes and ketones are higher than hydrocarbons of comparable molecular masses due to weak molecular association in aldehydes and ketones arising out of the dipole - dipole interaction.

- Alcohols involved intermolecular hydrogen bonding, because of which the boiling point of aldehydes and ketones are lower than the alcohols of similar molecular masses.

Question16

Which of the following reactions is not an example for nucleophilic addition - elimination reaction ?
[NEET Re-2022]

Options:

A.

$CH_3CHO + NH_3 \rightleftharpoons CH_3CH = NH + H_2O$

B.

$CH_3CHO + NaHSO_3 \rightleftharpoons CH_3 - \underset{H}{\overset{OH}{\underset{|}{\overset{|}{C}}}} - OSO_2Na$

C. $CH_3CHO + NH_2OH \rightleftharpoons CH_3CH = N - OH + H_2O$

D. $CH_3CHO + C_6H_5NHNH_2 \rightleftharpoons CH_3CH = N - NHC_6H_5 + H_2O$

Answer: B

Solution:

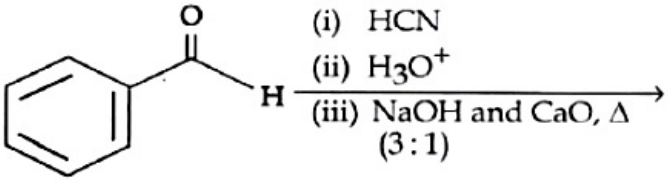
Solution:

In nucleophilic addition-elimination reactions along with the product water molecule is eliminated.

But in reaction of CH_3CHO and $NaHSO_3$ only addition takes place.

Question17

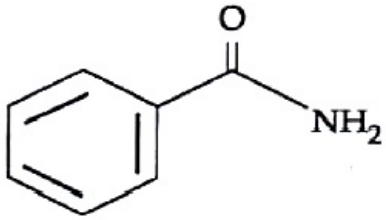
The product formed from the following reaction sequence is :



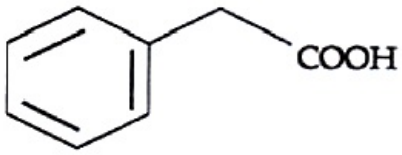
[NEET Re-2022]

Options:

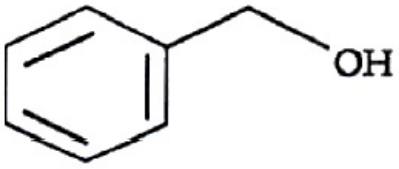
A.



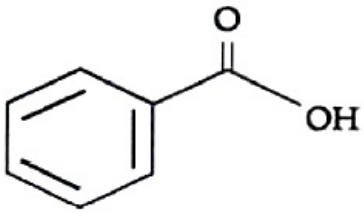
B.



C.

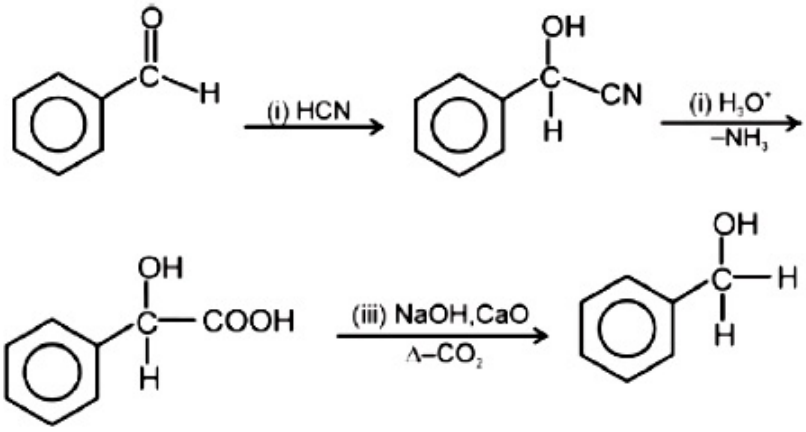


D.



Answer: C

Solution:



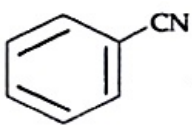
(NaOH + CaO) Sodalime is a decarboxylating reagent.

Question18

The incorrect method to synthesize benzaldehyde is : [NEET Re-2022]

Options:

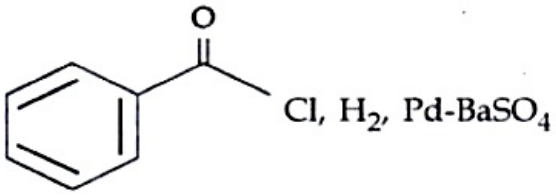
A.



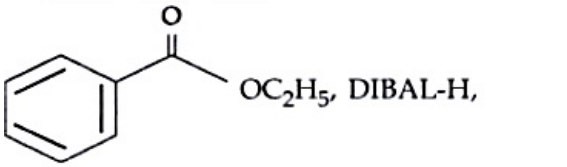
, CH_3MgBr,

followed by H_3O^+

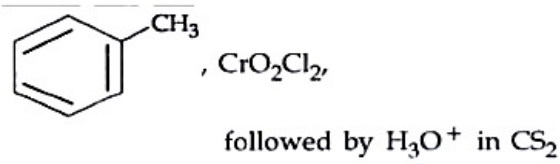
B.



C.

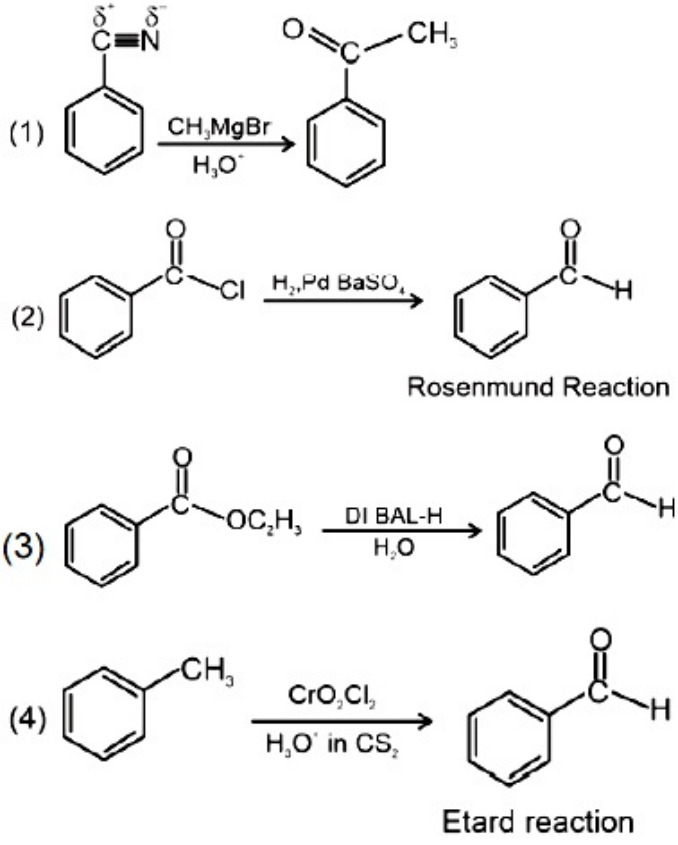


D.



Answer: A

Solution:



Question19

What is the IUPAC name of the organic compound formed in the following chemical reaction?

Acetone $\xrightarrow[(ii)H_2O,\ H^+]{(i)C_2H_5MgBr,\ \text{dry Ether}}$ **Product**

[NEET 2021]

Options:

A. 2-methylpropan-2-ol

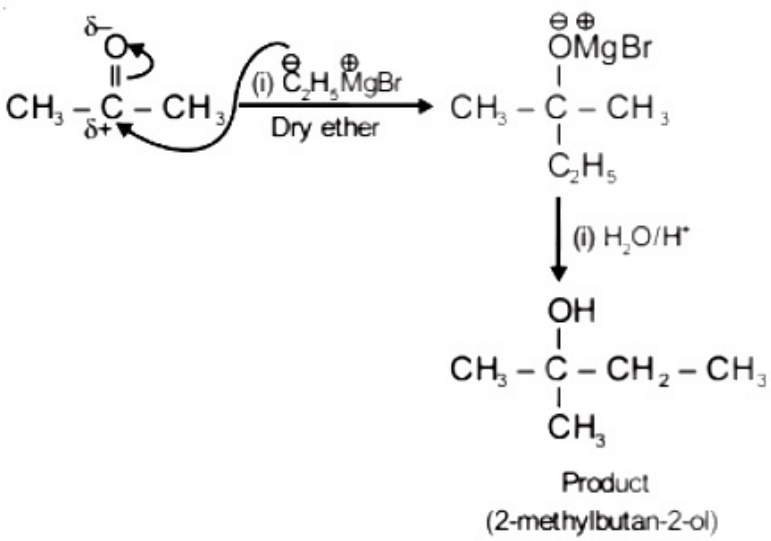
B. pentan-2-ol

C. pentan-3-ol

D. 2-methylbutan-2-ol

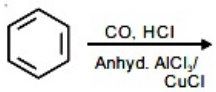
Answer: D

Solution:



Question20

Match List-I with List-II

List-I	List-II
(a) 	(i) Hell-Volhard-Zelinsky reaction
(b) $R-\overset{O}{\overset{\|}{C}}-CH_3+NaOX\rightarrow$	(ii) Gattermann-Koch reaction
(c) $R-CH_2-OH+RCOOH \xrightarrow{Conc.\ H_2SO_4}$	(iii) Haloform reaction
(d) $R-CH_2COOH \xrightarrow[(ii)H_2O]{(i)X_2/Red\ P}$	(iv) Esterification

Choose the correct answer from the options given below. [NEET 2021]

Options:

A. (a) - (iv), (b) - (i), (c) - (ii), (d) - (iii)

B. (a) - (iii), (b) - (ii), (c) - (i), (d) - (iv)

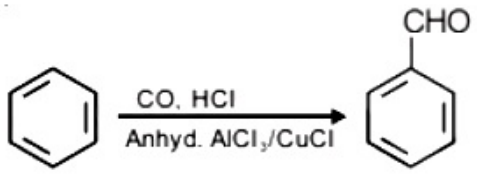
C. (a) - (i), (b) - (iv), (c) - (iii), (d) - (ii)

D. (a) - (ii), (b) - (iii), (c) - (iv), (d) - (i)

Answer: D

Solution:

• Gattermann-Koch reaction:



• Haloform reaction:

$$R-\overset{O}{\overset{\|}{C}}-CH_3+NaOX \rightarrow R-\overset{O}{\overset{\|}{C}}ONa+CHX_3$$

• Esterification:

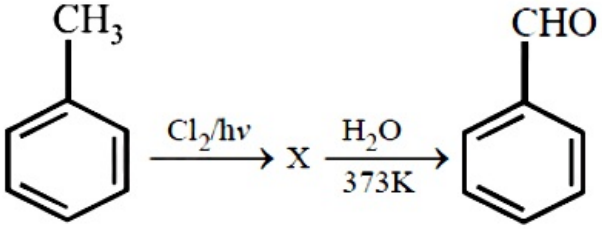
$$R-CH_2-OH+R'-\overset{O}{\overset{\|}{C}}-OH \xrightarrow{\text{Conc. } H_2SO_4} R'-\overset{O}{\overset{\|}{C}}-OCH_2-R$$

• Hell-Volhard-Zelinsky reaction:

$$R-CH_2COOH \xrightarrow[(ii)H_2O]{(i)X_2/\text{Red } P} R-\overset{X}{C}H-COOH$$

Question21

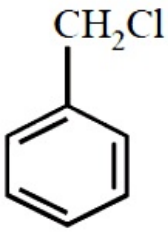
Identify compound X in the following sequence of reactions



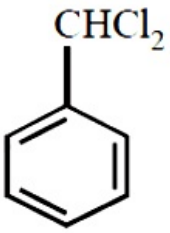
[2020]

Options:

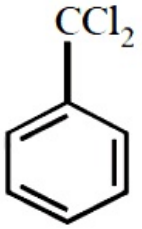
A.



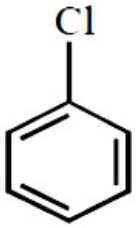
B.



C.



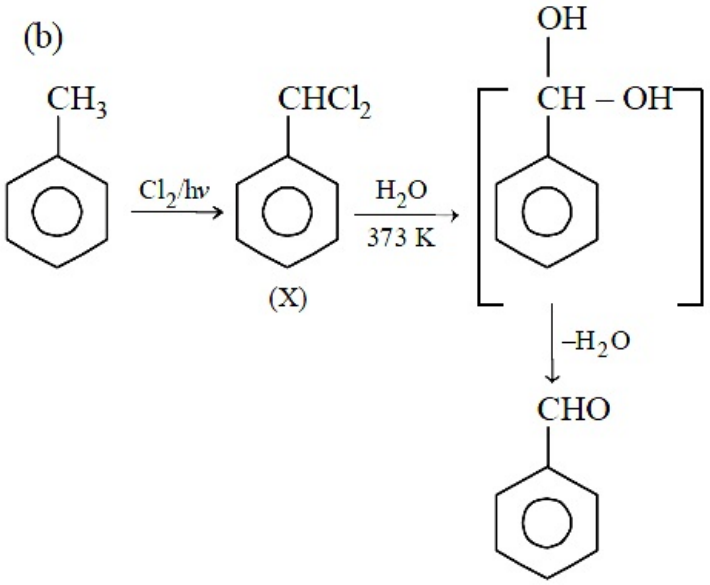
D.



Answer: B

Solution:

Solution:



Question22

Reaction between acetone and methyl-magnesium chloride followed by hydrolysis will give :
[2020]

Options:

A. Sec. butyl alcohol

B. Tert. butyl alcohol

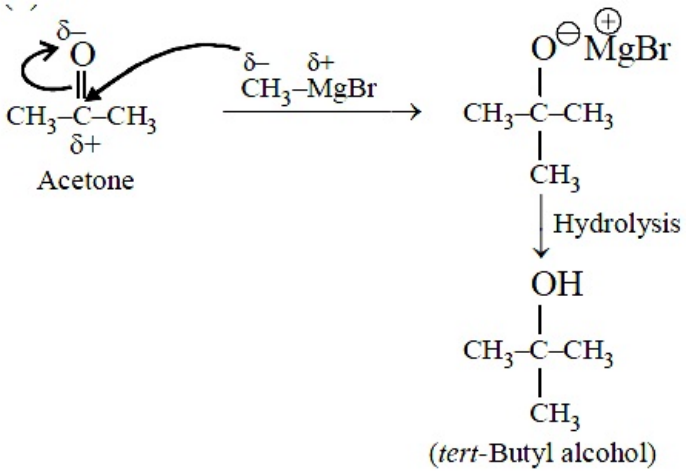
C. Isobutyl alcohol

D. Isopropyl alcohol

Answer: B

Solution:

Solution:



Question23

Reaction between benzaldehyde and acetophenone in presence of dilute NaOH is known as
[2020]

Options:

A. Cannizzaro's reaction

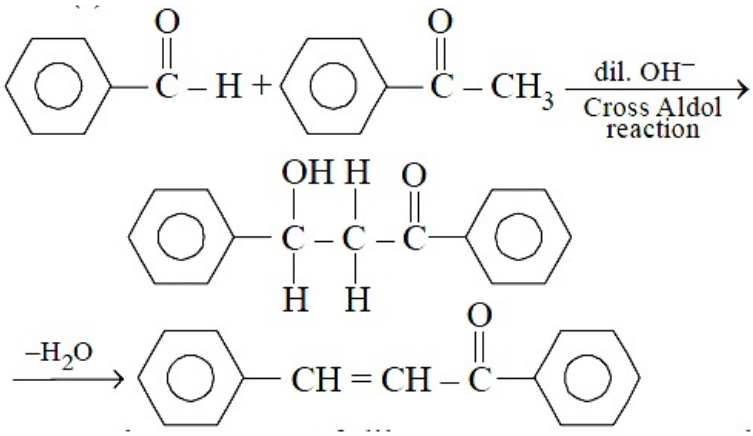
B. Cross Cannizzaro's reaction

C. Cross Aldol condensation

D. Aldol condensation

Answer: C

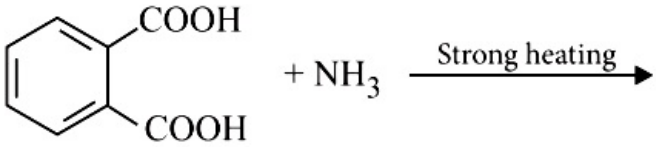
Solution:



In the presence of dil. N aOH , $C_6H_5CH O$ and $C_6H_5COCH_3$ will react to undergo cross-aldol condensation.

Question24

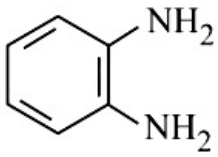
The major product of the following reaction is



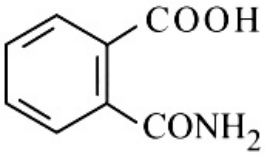
(NEET 2019)

Options:

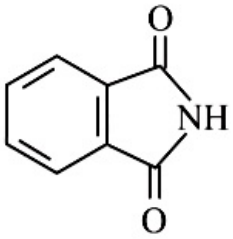
A.



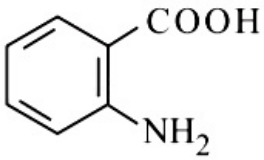
B.



C.

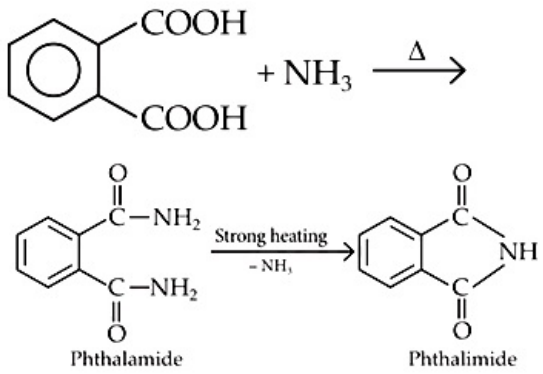


D.



Answer: C

Solution:

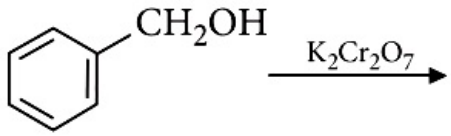


Question25

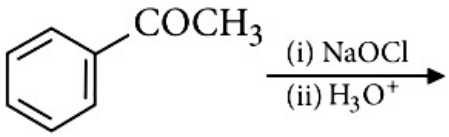
The reaction that does not give benzoic acid as the major product is (Odisha NEET 2019)

Options:

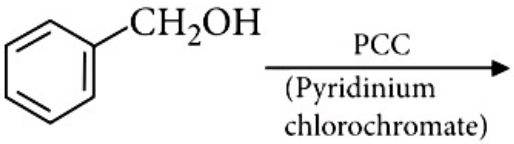
A.



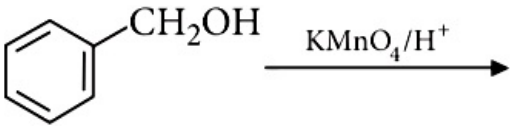
B.



C.



D.



Answer: C

Solution:

PCC (Pyridium chlorochromate) stops oxidation at the aldehyde stage, thereby preventing the further oxidation of aldehydes to carboxylic acids.

Question26

Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their (NEET 2018)

Options:

A. formation of intramolecular H-bonding

B. formation of carboxylate ion

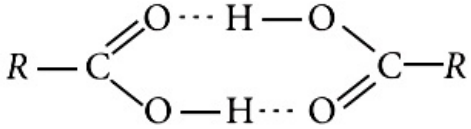
C. more extensive association of carboxylic acid via van der Waals' forces of attraction

D. formation of intermolecular H-bonding.

Answer: D

Solution:

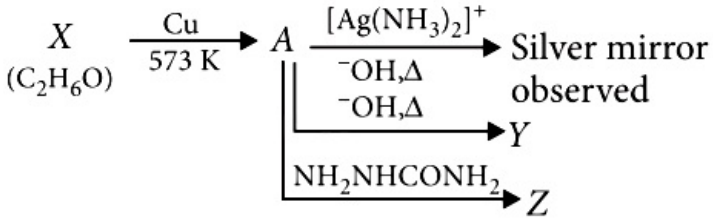
Solution:
Due to the formation of intermolecular H-bonding, association occurs in carboxylic acids.



So, they have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass.

Question27

Consider the reactions,



Identify A, X, Y and Z (NEET 2017)

Options:

A. A -Methoxymethane, X -Ethanol, Y -Ethanoic acid, Z -Semicarbazide.

B. A -Ethanal, X -Ethanol, Y -But- 2 -enal, Z-Semicarbazone.

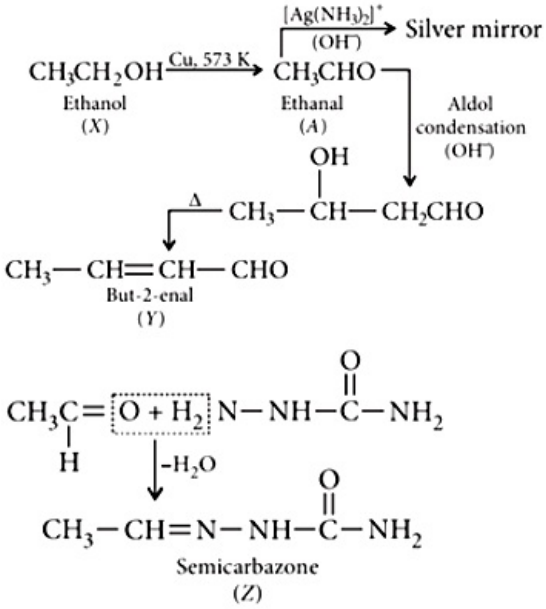
C. A -Ethanol, X -Acetaldehyde, Y -Butanone, Z -Hydrazone.

D. A -Methoxymethane, X -Ethanoic acid, Y -Acetate ion, Z -Hydrazine.

Answer: B

Solution:

Since, A gives silver mirror test, it must be an aldehyde and aldehydes are formed by oxidation of 1° alcohols. Thus, 'X' is a 1° alcohol, i.e., CH_3CH_2OH

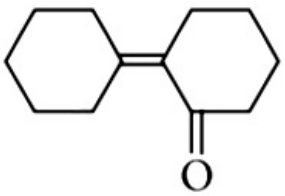


Question28

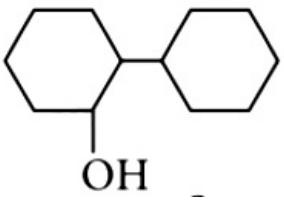
Of the following, which is the product formed when cyclohexanone undergoes aldol condensation followed by heating? (NEET 2017)

Options:

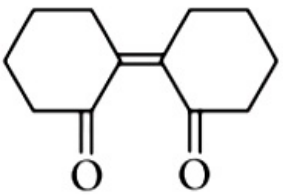
A.



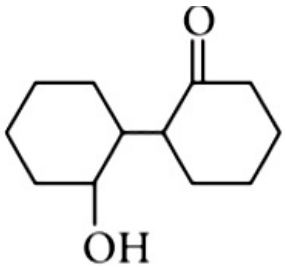
B.



C.

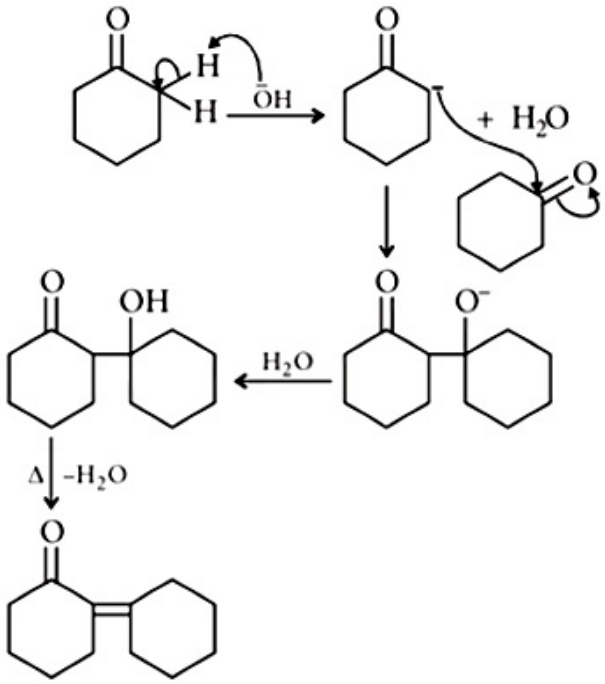


D.



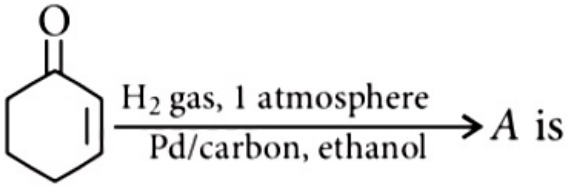
Answer: A

Solution:



Question29

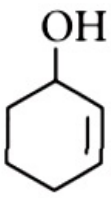
The correct structure of the product ′A′ formed in the reaction



(NEET-II 2016)

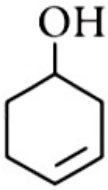
Options:

A.

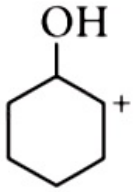


B.

C.



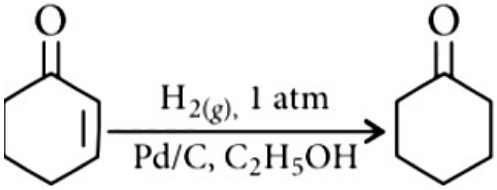
D.



Answer: B

Solution:

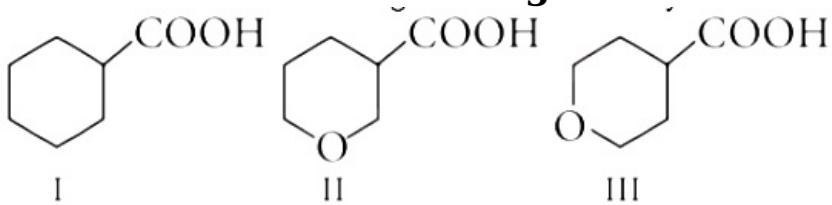
Solution:



C = C bond is reduced faster than C = O bond with H_2(Pd − C).

Question30

The correct order of strengths of the carboxylic acids



is
(NEET-II 2016)

Options:

A. I > II > III

B. II > III > I

C. III > II > I

D. II > I > III

Answer: B

Solution:

Acidic strength $\propto -I$ effect
As oxygen is more electron withdrawing (II) and (III) show greater - I effect than (I). Thus, (I) is least acidic. Out of (II) and (III), (II) is more acidic than (III) as distance of O increases from - COOH group and acidic strength decreases.

Question31

Which of the following reagents would distinguish cis− cyclopenta- 1,2 - diol from the trans-isomer?
(NEET-I 2016)

Options:

A. MnO_2

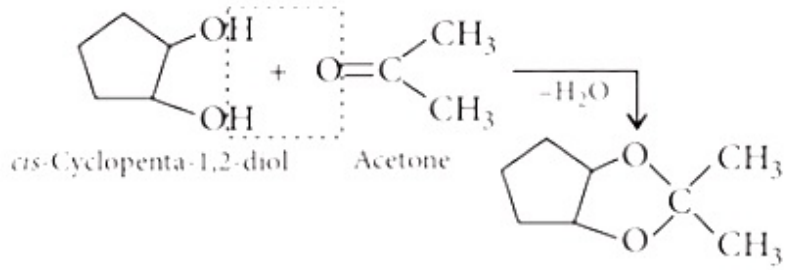
B. Aluminium isopropoxide

C. Acetone

D. Ozone

Answer: C

Solution:



Trans-isomer does not react with acetone.

Question32

The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha-carbon, is
(NEET-I 2016)

Options:

A. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as carbonylation

B. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol tautomerism

C. a carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol

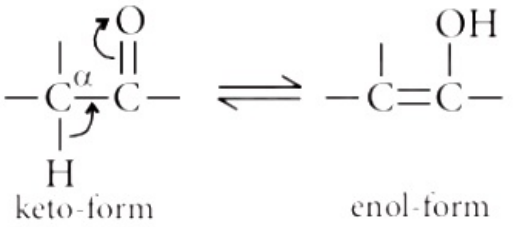
D. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibration.

Answer: B

Solution:

Solution:

Keto-enol tautomerism :



Question33

The product formed by the reaction of an aldehyde with a primary amine is
(NEET-I 2016)

Options:

A. carboxylic acid

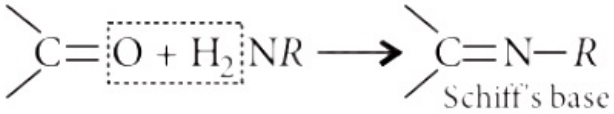
B. aromatic acid

C. Schiff's base

D. ketone.

Answer: C

Solution:



Question34

The oxidation of benzene by V_2O_5 in the presence of air produces (2015)

Options:

A. maleic anhydride

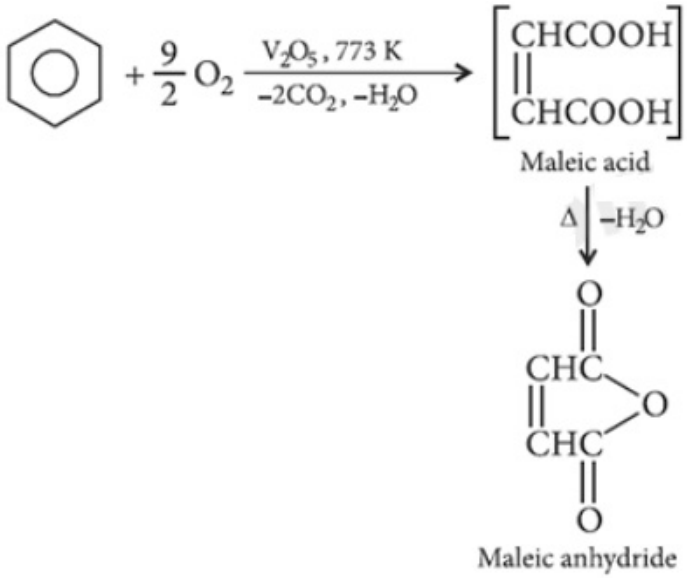
B. benzoic acid

C. benzaldehyde

D. benzoic anhydride.

Answer: A

Solution:



Question35

Reaction of a carbonyl compound with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is (2015)

Options:

A. hydrazine in presence of feebly acidic solution

B. hydrocyanic acid

C. sodium hydrogen sulphite

D. a Grignard reagent.

Answer: A

Solution:

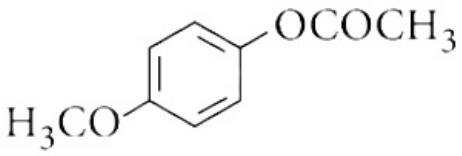
Solution:
Carbonyl compounds react with ammonia derivatives in weakly acidic medium as follows :

Question36

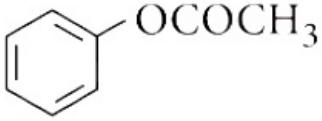
Which one of the following esters gets hydrolysed most easily under alkaline conditions?
(2015)

Options:

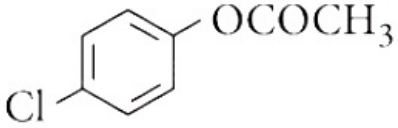
A.



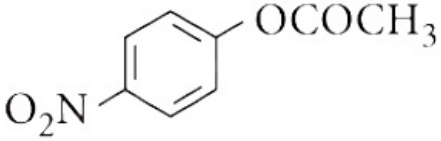
B.



C.



D.



Answer: D

Solution:

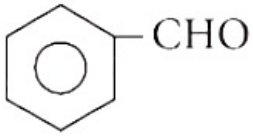
Solution:
Electron withdrawing groups increase the reactivity towards nucleophilic substitution reaction and $-NO_2$ is a strong electron withdrawing group.

Question37

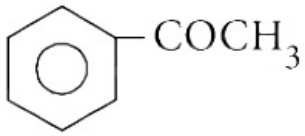
Which one is most reactive towards nucleophilic addition reaction?
(2014)

Options:

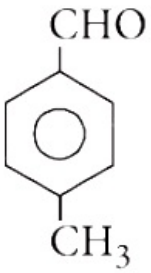
A.



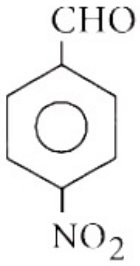
B.



C.



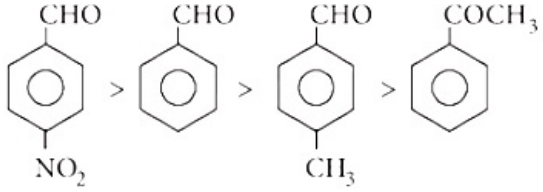
D.



Answer: D

Solution:

Solution:
Aromatic aldehydes are more reactive than alkyl aryl ketones. Electron withdrawing group ($-NO_2$) increases the reactivity towards nucleophilic addition reactions whereas, electron donating group ($-CH_3$) decreases the reactivity towards nucleophilic addition reactions. Therefore, the order is :



Question38

The order of stability of the following tautomeric compounds is

$CH_2 = \underset{}{\overset{OH}{\overset{|}{C}}} - \underset{(I)}{CH_2} - \overset{O}{\overset{||}{C}} - CH_3 \rightleftharpoons$

$CH_3 - \overset{O}{\overset{||}{C}} - \underset{(II)}{CH_2} - \overset{O}{\overset{||}{C}} - CH_3 \rightleftharpoons$

$CH_3 - \overset{OH}{\overset{|}{C}} = \underset{(III)}{CH} - \overset{O}{\overset{||}{C}} - CH_3$

(2013 NEET)

Options:

A. II > I > III

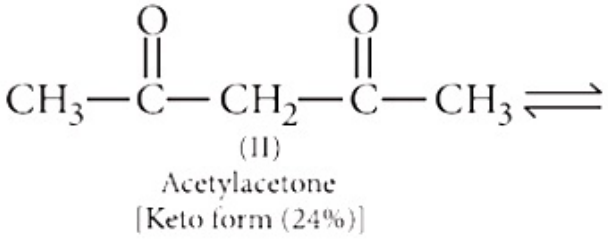
B. II > III > I

C. I > II > III

D. III > II > I

Answer: D

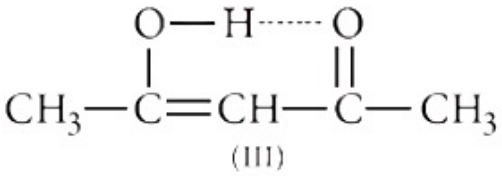
Solution:



(II)

Acetylacetone

[Keto form (24%)]



(III)

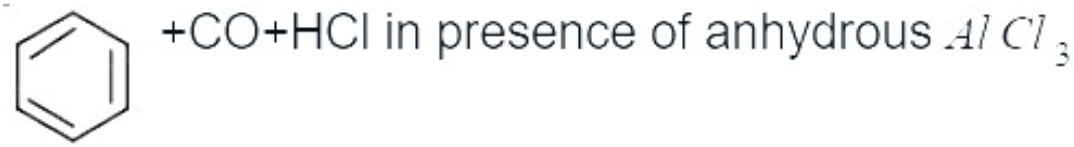
[Enol form (76%) more stable due to intramolecular hydrogen bonding]

Question39

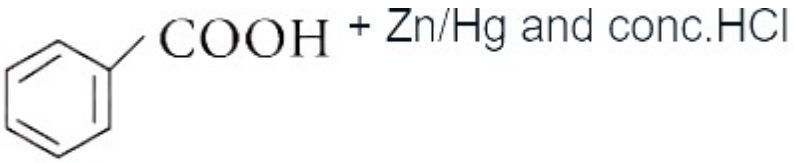
Reaction by which benzaldehyde cannot be prepared (2013 NEET)

Options:

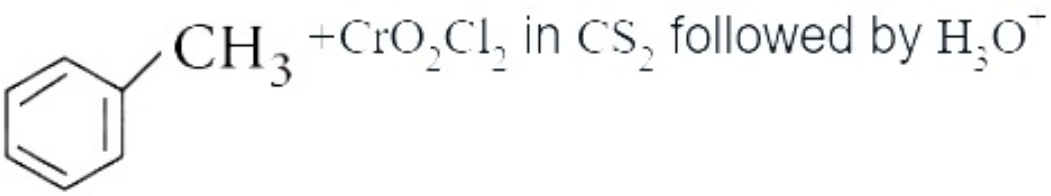
A.



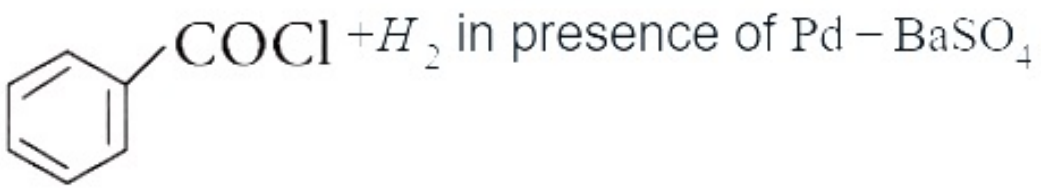
B.



C.



D.



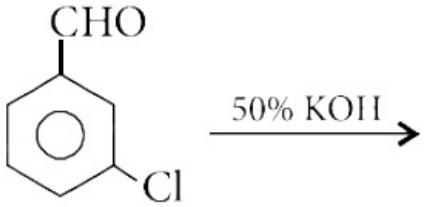
Answer: B

Solution:

Solution:
Reduction in presence of Zn-Hg and cone. HCl is useful for aldehyde and ketone but carboxylic acid group remains unaffected.

Question40

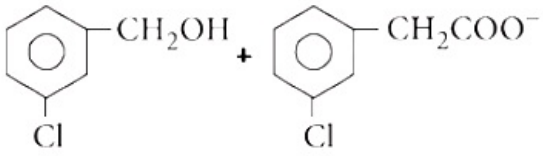
Predict the products in the given reaction.



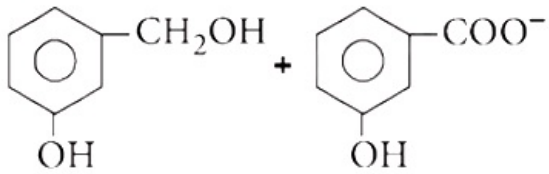
(2012)

Options:

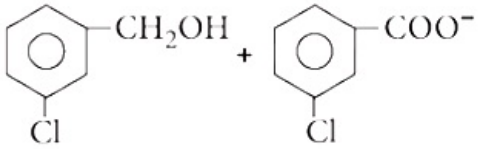
A.



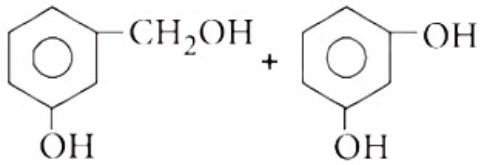
B.



C.



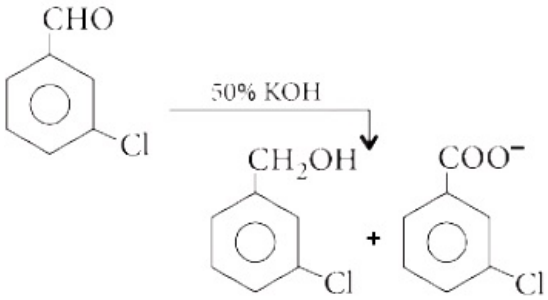
D.



Answer: C

Solution:

Solution:
Aldehyde having no α-hydrogen atoms on heating with concentrated alkali solution (50%) undergo Cannizzaro's reaction.



Question41

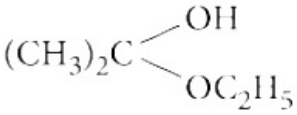
Acetone is treated with excess of ethanol in the presence of hydrochloric acid. The product obtained is
(2012)

Options:

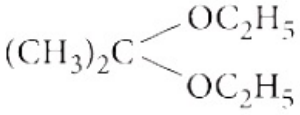
A. $CH_3CH_2CH_2-\overset{O}{\overset{\|}{C}}-CH_3$

B. $CH_3CH_2CH_2-\overset{O}{\overset{\|}{C}}-CH_2CH_2CH_3$

C.

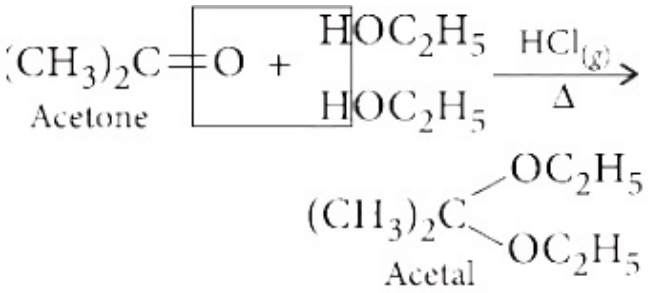


D.



Answer: D

Solution:



Question42

CH_3CHO and $C_6H_5CH_2CHO$ can be distinguished chemically by (2012)

Options:

A. Benedict’s test

B. Iodoform test

C. Tollen’s reagent test

D. Fehling’s solution test

Answer: B

Solution:

Solution:
Acetaldehyde, acetone and methyl ketones having
CH_3CO- group undergo haloform reaction. Thus CH_3CHO will give yellow precipitate with I_2 and NaOH but $C_6H_5CH_2CHO$ will not

Question43

The correct order of decreasing acid strength of trichloroacetic acid (A), trifluoroacetic acid (3), acetic acid (C) and formic acid (D) is (2012)

Options:

A. B > A > D > C

B. B > D > C > A

C. A > B > C > D

D. A > C > B > D

Answer: A

Solution:

Solution:
As $-I$ effect increases $-COOH$ group becomes more electron deficient and tendency to loose H^+ ions increases i.e., acid strength increases.As $+I$ effect increases,acid strength decreases.
Thus correct order of acid strength is
$CF_3COOH > CCl_3COOH > HCOOH > CH_3COOH$
(B) > (A) > (D) > (C)

Question44

Consider the following reaction
The product A is

(2012 Mains)

Options:

A. C_6H_5CHO

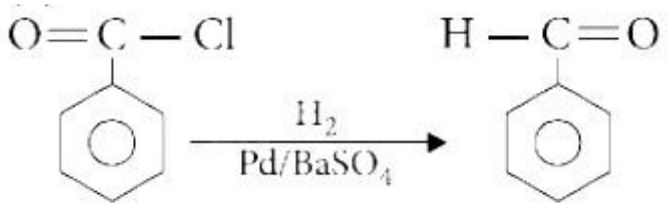
B. C_6H_5OH

C. $C_6H_5COCH_3$

D. C_6H_5Cl

Answer: A

Solution:



It is Rosenmund's reaction.

Question45

Consider the reaction :
$RCHO + NH_2NH_2 \rightarrow RCH = N - NH_2$
What sort of reaction is it?
(2012 Mains)

Options:

A. Electrophilic addition-elimination reaction

B. Free radical addition-elimination reaction

C. Electrophilic substitution-elimination reaction

D. Nucleophilic addition-elimination reaction

Answer: D

Question46

Which of the following compounds w ill give a yellow precipitate with iodine and alkali?
(2012 Mains)

Options:

A. Acetophenone

B. Methyl acetate

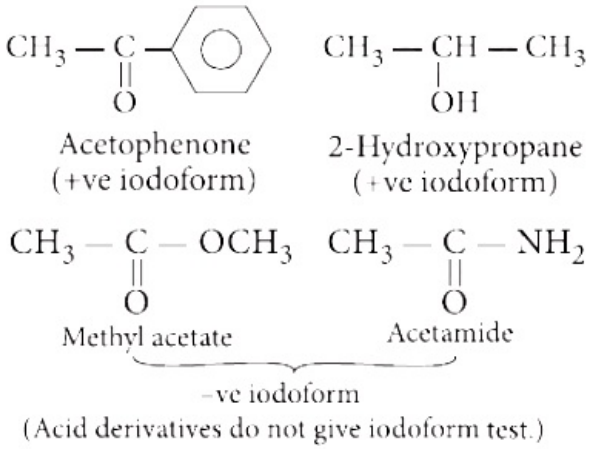
C. Acetamide

D. 2-Hydroxypropane

Answer: D

Solution:

This example shows iodoform reaction.
The compound with $CH_3-\overset{\overset{O}{\|}}{C}-$
group or
$CH_3-\underset{\underset{OH}{|}}{CH}-$
group give yellow precipitate of iodoform (CHI_3) when react with iodine and alkali.



Question47

Clemmensen reduction of a ketone is carried out in the presence of which of the following?
(2011)

Options:

A. Glycol with KOH

B. Zn-Hg with HCl

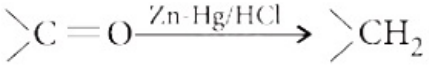
C. $LiAlH_4$

D. H_2 and Pt as catalyst

Answer: B

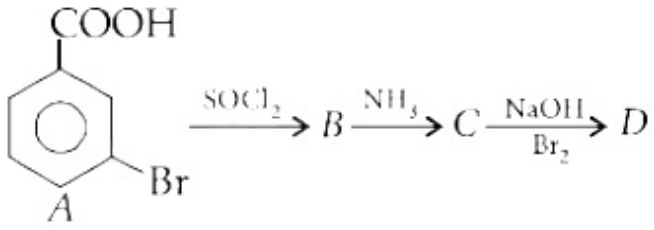
Solution:

Solution:
Carbonyl group is reduced to $-CH_2$ group, when treated with amalgamated zinc and cone. HCl. This process is called Clemmensen's reduction.



Question48

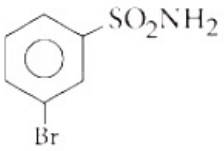
In a set of reactions m-bromobenzoic acid gave a product D. Identify the product D.



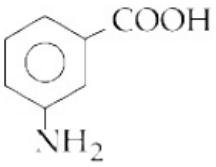
(2011)

Options:

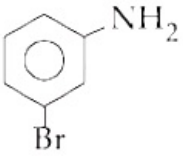
A.



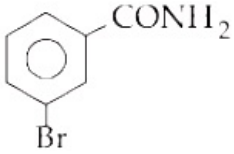
B.



C.



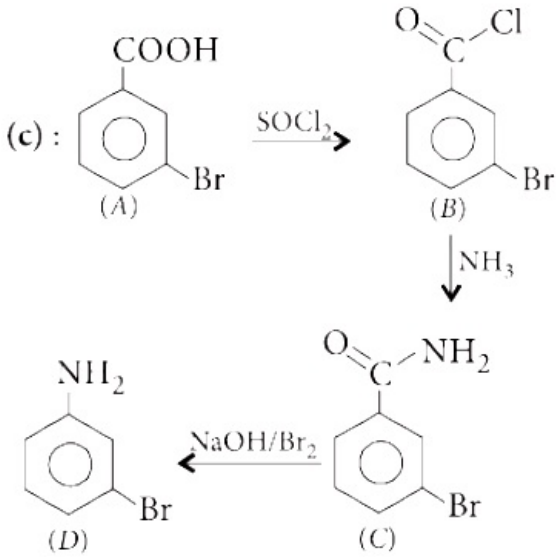
D.



Answer: C

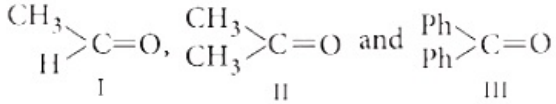
Solution:

Solution:



Question49

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



(2011 Mains)

Options:

A. III > II > I

B. II > I > III

C. I > III > II

D. I > II > III

Answer: D

Solution:

Solution:
Greater the number of alkyl groups attached to the carbonyl groups and hence, lower will be its reactivity.
I > II > III

Question50

Match the compounds given in List-I with List-II and select the suitable option using the code given below.

List - I	List - II
(A) Benzaldehy	(i) Phenolphthalein
(B) Phthalic anhydride	(ii) Benzoin condensation
(C) Phenyl benzoate	(iii) Oil of wintergreen
(D) Methyl Salicylate	(iv) Fries rearrangemet

(2011 Mains)

Options:

A. (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)

B. (A)-(iv), (B)-(ii), (C)-(iii), (D)-(i)

C. (A)-(ii), (B)-(iii), (C)-(iv), (D)-(i)

D. (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)

Answer: D

Solution:

Solution:

(A) Benzaldehy	(ii) Benzoin condensation
(B) Phthalic anhydride	(i) Phenolphthalein
(C) Phenyl benzoate	(iv) Fries rearrangemet
(D) Methyl Salicylate	(iii) Oil of wintergreen

Question51

An organic compound A on treatment with NH_3 gives B, which on heating gives C.C when treated with Br_2 in the presence of KOH produces ethyl amine. Compound A is
(2011 Mains)

Options:

A. CH_3COOH

B. $CH_3CH_2CH_2COOH$

C. $CH_3-\underset{\underset{CH_3}{|}}{C}HCOOH$

D. CH_3CH_2COOH

Answer: D

Solution:

Solution:

The compound will be $CH_3CH_2COOH \xrightarrow{NH_3} CH_3CH_2COONH_4$
(A) (B)
$\downarrow \Delta$
$CH_3 - CH_2 - NH_2 \xleftarrow{Br_2/KOH} CH_3CH_2CONH_2$
Ethyl amine (C)

Question52

Which of the following reactions will not result in the formation of carbon-carbon bonds? (2010)

Options:

A. Reimer-Tiemann reaction

B. Cannizzaro reaction

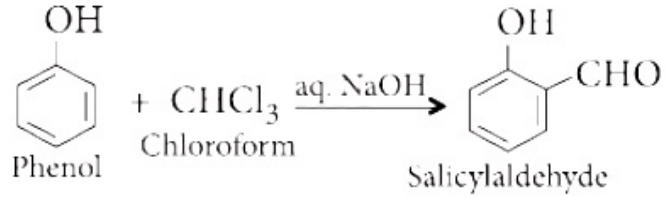
C. Wurtz reaction

D. Friedel-Crafts acylation

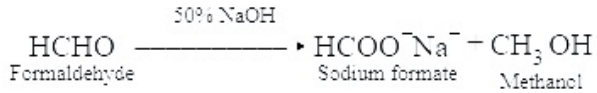
Answer: B

Solution:

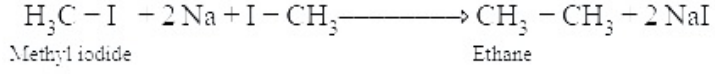
(a) Reimer-Tiemann reaction :



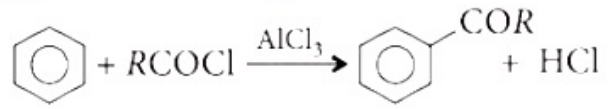
(b) Cannizzaro reaction :



(C) Wurtz reaction:



(d) Friedel-Crafts acylation :



From the above examples it is evident that C— C bond formation does not takes place in Cannizzaro reaction

Question53

Acetamide is treated with the following reagents separately. Which one of these would yield methyl amine?
(2010)

Options:

A. $NaOH - Br_2$

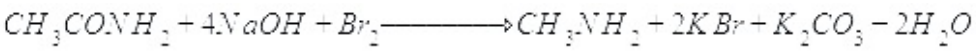
B. Sodalime

C. Hot conc.H_2SO_4

D. PCl_5

Answer: A

Solution:



This reaction is called Hofmann Bromamide reaction.

Question54

Among the given compounds, the most susceptible to nucleophilic attack at the carbonyl group is
(2010)

Options:

A. CH_3COOCH_3

B. CH_3CONH_2

C. $CH_3COOCOCH_3$

D. CH_3COCl

Answer: D

Solution:

CH_3COCl is most susceptible to nucleophilic attack. The susceptibility of a substrate towards nucleophilic attack depends on how good a leaving group is attached to it.Cl^- is a weak base and therefore a good leaving group

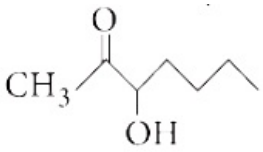
---

Question55

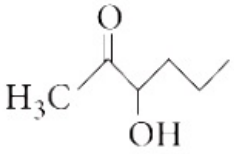
Which one of the following compounds will be most readily dehydrated? (2010 Mains)

Options:

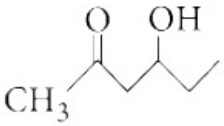
A.



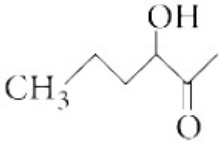
B.



C.



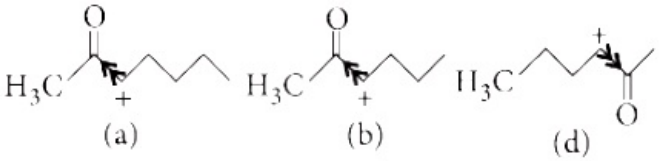
D.



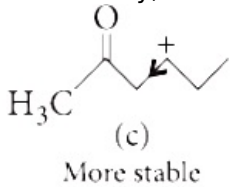
Answer: C

Solution:

The ease of dehydration of the given compounds can be explained on the basis of the stability of the carbocation formed, In case of options (a), (b) and (d), a secondary carbocation is formed but the presence of an electron withdrawing >C = O group adjacent to the positively charged carbon, intensifies the charge and hence destabilises the species.



However, in case of option (c), a secondary carbocation is formed, but the electron withdrawing >C = O group is present farther away, as a result, the effect of this group is diminished and hence the carbocation is relatively more stable.

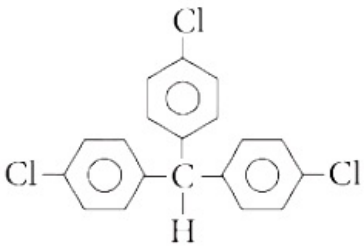


Question56

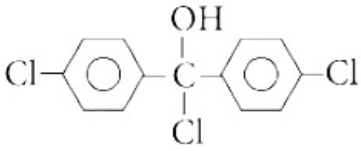
Trichloroacetaldehyde, CCl_3CHO reacts with chloro-benzene in presence of sulphuric acid and produces (2009)

Options:

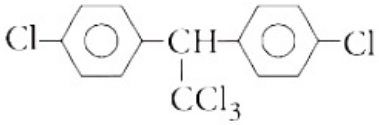
A.



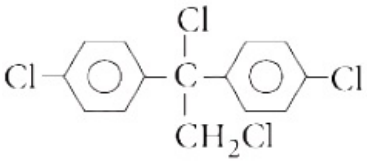
B.



C.



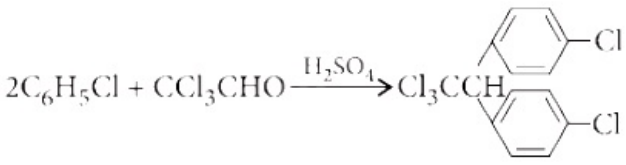
D.



Answer: C

Solution:

It gives D.D.T (p, p'-dichlorodiphenyltrichloro ethane)



Question57

Propionic acid with $\frac{Br_2}{P}$ yields a dibromo. Its structure would be (2009)

Options:

A. $H-\overset{\overset{Br}{|}}{\underset{\underset{Br}{|}}{C}}-CH_2COOH$

B. $CH_2(Br)-CH_2-COBr$

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

D. $CH_2(Br)-CH(Br)-COOH$

Answer: C

Solution:

This is Hell-Volhard Zelinsky reaction. In this reaction, acids containing α-H react with X_2/red P giving product in which the α-hydrogens are substituted by X
∴

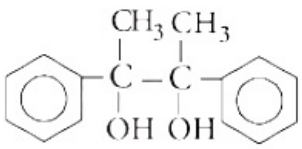
$$CH_3CH_2COOH \xrightarrow[P]{Br_2} CH_3-\overset{\overset{Br}{|}}{\underset{\underset{Br}{|}}{C}}-COOH$$

Question58

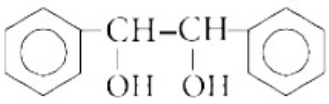
Acetophenone when reacted with a base, C_2H_5ON a, yields a stable compound which has the structure (2008)

Options:

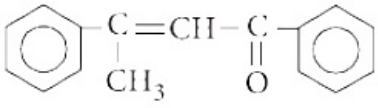
A.



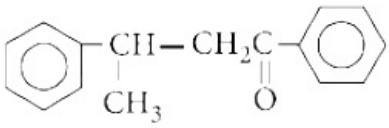
B.



C.



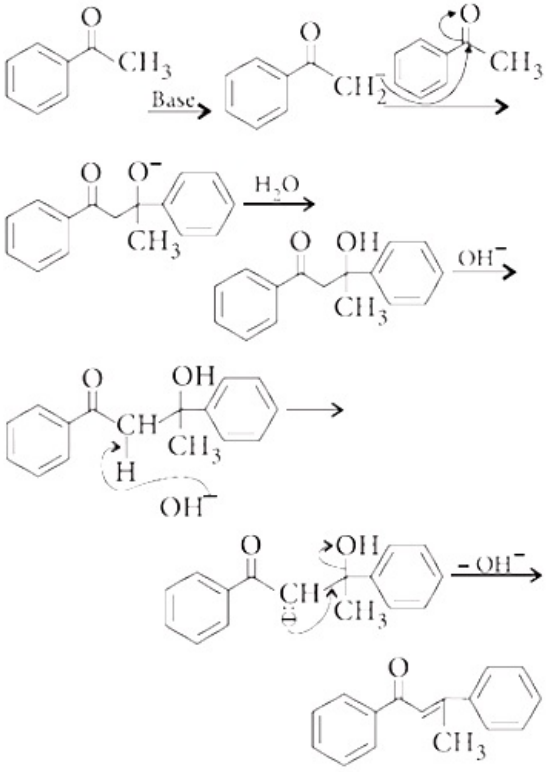
D.



Answer: C

Solution:

Solution:
The first step is a simple condensation reaction. The last step is an example of ElcB mechanism and the leaving group is hydroxide, which is unusual. Still this step manages to take place owing to the stability incorporated therein the product, which is a conjugated carbonyl compound.



Question59

A strong base can abstract an a-hydrogen from (2008)

Options:

A. ketone

B. alkane

C. alkene

D. amine

Answer: A

Solution:

The base (OH^-) ions removes one of the α - hydrogen atom (which is some what acidic) from aldehyde and ketones to form a carbanion or the enolate ion. The acidity of α-hydrogen is due to resonance stabilization of enolate anion.

Question60

The relative re-activities of acyl compounds towards nucleophilic substitution are in the order of (2008)

Options:

A. Acid anhydride > Amide > Ester > Acyl chloride

B. Acyl chloride > Ester > Acid anhydride > Amide

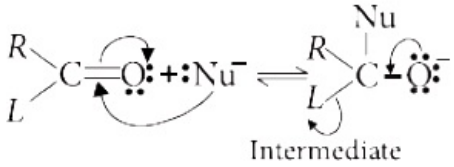
C. Acyl chloride > Acid anhydride > Ester > Amide

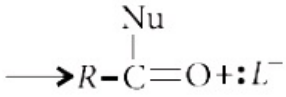
D. Ester > Acyl chloride > Amide > Acid anhydride

Answer: C

Solution:

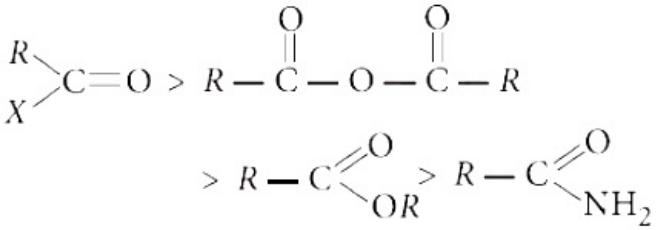
Solution:





$(L = X^-, NH_2^-, O^- - \overset{\circ}{C} - R \text{ or } {}^-OR)$

The relative re-activities of various compounds have been found to be in the following order



Question61

Reduction of aldehydes and ketones into hydrocarbons using zinc amalgam and cone. HCl is called

(2007)

Options:

A. Cope reduction

B. Dow reduction

C. Wolf-Kishner reduction

D. Clemmensen reduction

Answer: D

Solution:

Solution:
Aldehydes and ketones are converted to alkane when treated with zinc amalgam and cone. HCl. This is known as Clemmensen reduction. Here $>C=O$ group is reduced to $>CH_2$ group

$$R-\overset{O}{\overset{||}{C}}-4[H]\xrightarrow[Conc.\ HCl]{Zn-Hg}R-CH_3+H_2O$$

Question62

Which one of the following on treatment with 50% aqueous sodium hydroxide yields the corresponding alcohol and acid (2007)

Options:

A. C_6H_5CHO

B. $CH_3CH_2CH_2CHO$

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

D. $C_6H_5CH_2CHO$

Answer: A

Solution:

Solution:
Aldehydes which do not have α-H atom, in presence of 50% NaOH or 50% KOH undergoes disproportionation reaction to produce alcohol and sodium salt of acid. This reaction is known as Cannizzaro reaction. C_6H_5CHO, containing no α - H atom undergoes Cannizzaro reaction to produce benzyl alcohol and benzoate

$$C_6H_5CHO\xrightarrow{50\%\ NaOH}C_6H_5CH_2OH+C_6H_5COONa$$

Question63

The product formed in Aldol condensation is (2007)

Options:

A. a beta-hydroxy aldehyde or a beta-hydroxy ketone

B. an alpha-hydroxy aldehyde or ketone

C. an alpha, beta unsaturated ester

D. a beta-hydroxy acid

Answer: A

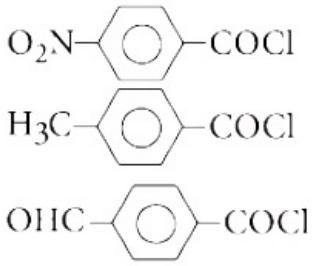
Solution:

Solution:
The aldehydes or ketones containing α-H atom in presence of dilute alkali undergo self condensation reaction to form β-hydroxyaldehyde or β-hydroxy ketone. This reaction is known as Aldol condensation.

Question64

Consider the following compounds

(i) C_6H_5COCl



The correct decreasing order of their reactivity towards hydrolysis is (2007)

Options:

A. (i) > (ii) > (iii) > (iv)

B. (iv) > (ii) > (i) > (iii)

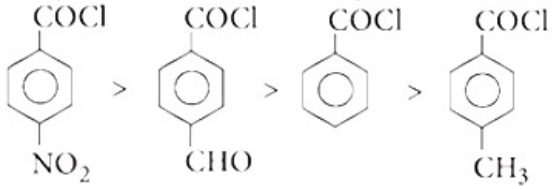
C. (ii) > (iv) > (i) > (iii)

D. (ii) > (iv) > (iii) > (i)

Answer: C

Solution:

The ease of hydrolysis depends upon the magnitude of the +ve charge on the carbonyl group. Electron-withdrawing groups increase the magnitude of positive charge and electron donating groups decrease the magnitude of positive charge. Hence the decreasing order of reactivity towards hydrolysis is



Question65

Which of the following represents the correct order of the acidity in the given compounds?
(2007)

Options:

A.

$FCH_2COOH > CH_3COOH > BrCH_2COOH > ClCH_2COOH$

B.

$BrCH_2COOH > ClCH_2COOH > FCH_2COOH > CH_3COOH$

C.

$FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$

D.

$CH_3COOH > BrCH_2COOH > ClCH_2COOH > FCH_2COOH$

Answer: C

Solution:

Solution:
$FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$

Acidity decreases as the $-I$ effect of the group decreases, F is the most electronegative atom and hence it has highest $-I$ effect among the halogens.

Question66

Nucleophilic addition reaction will be most favoured in
(2006)

Options:

A. CH_3CHO

B. $CH_3-CH_2-CH_2\overset{O}{\overset{\|}{C}}-CH_3$

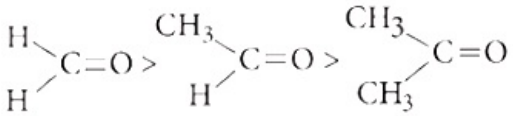
C. $(CH_3)_2CO$

D. CH_3CH_2CHO

Answer: A

Solution:

Solution:
The reactivity of the carbonyl group towards the addition reactions depends upon the magnitude of the positive charge on the carbonyl carbon atom. Hence aryl substituent that increases the positive charge on the carbonyl carbon must increase its reactivity towards addition reactions. The introduction of negative group (-I effect) increases the the reactivity while introduction of alkyl group (+I effect) decreases the reactivity.



+I effect and steric hindrance increase →

Question67

A carbonyl compound reacts with hydrogen cyanide to form cyanohydrin which on hydrolysis forms a racemic mixture of α-hydroxy acid.The carbonyl compound is
(2006)

Options:

A. formaldehyde

B. acetaldehyde

C. acetone

D. diethyl ketone

Answer: B

Solution:

$$CH_3CHO + HCN \rightarrow CH_3-\underset{CN}{\overset{H}{\underset{|}{\overset{|}{C}}}}-OH \xrightarrow{H_2O} CH_3-\underset{COOH}{\overset{H}{\underset{|}{\overset{|}{C}}}}-OH$$

Lactic acis

Question68

In a set of reactions propionic acid yielded a compound D.

$CH_3CH_2COOH \xrightarrow{SOCl_2} B \xrightarrow{NH_3} C \xrightarrow[Br_2]{KOH} D$

The structure of D would be
(2006)

Options:

A. $CH_3CH_2NH_2$

B. $CH_3CH_2CH_2NH_2$

C. $CH_3CH_2CONH_2$

D. $CH_3CH_2NHCH_3$

Answer: A

Solution:

$$CH_3CH_2COOH \xrightarrow{SOCl_2} CH_3CH_2COCl \xrightarrow{NH_3} CH_3CH_2CONH_2 \xrightarrow[Br_2]{KOH} CH_3CH_2NH_2$$

Question69

Self condensation of two moles of ethyl acetate in presence of sodium ethoxide yields
(2006)

Options:

A. ethyl propionate

B. ethyl butyrate

C. acetoacetic ester

D. methyl acetoacetate

Answer: C

Solution:

Ethyl acetate undergoes Claisen condensation in presence of sodium ethoxidc involving α-hydrogen atom in which two

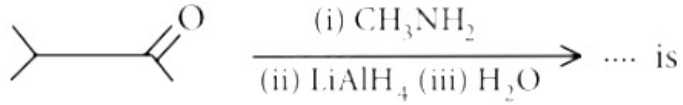
molecules of ethyl acetate combine together to form acetoacetic ester.

$$CH_3COOC_2H_5 + CH_3COOC_2H_5 \xrightarrow{C_2H_5ONa} CH_3COCH_2COOC_2H_5 + C_2H_5OH$$

Acetoacetic ester

Question70

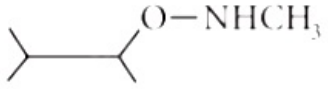
The major organic product formed from the following reaction :



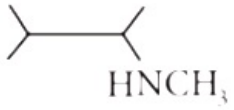
(2005)

Options:

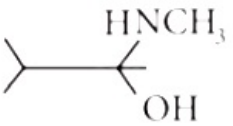
A.



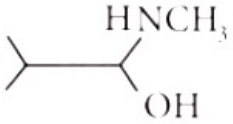
B.



C.

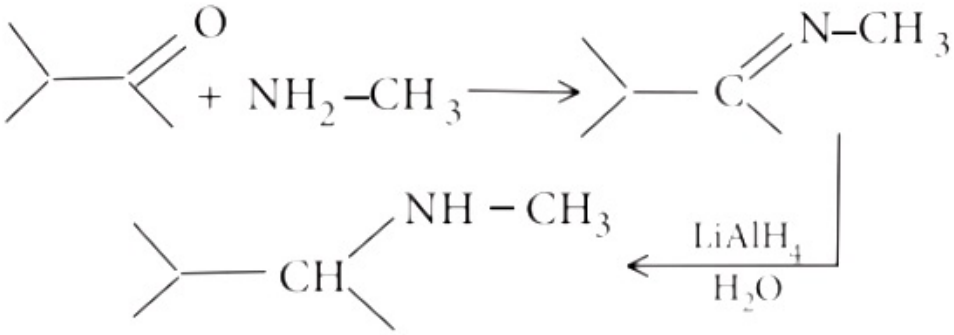


D.



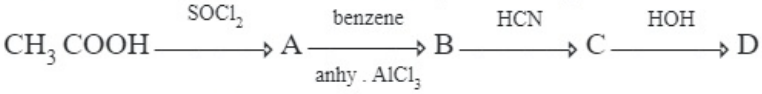
Answer: B

Solution:



Question71

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

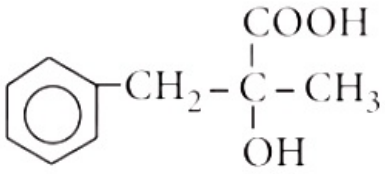


The structure of D would be

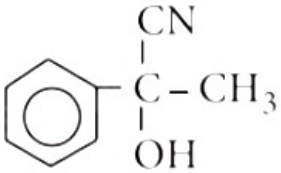
(2005)

Options:

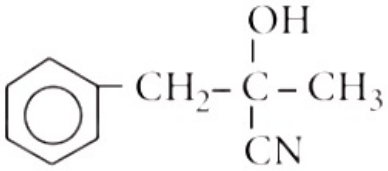
A.



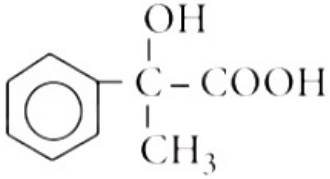
B.



C.



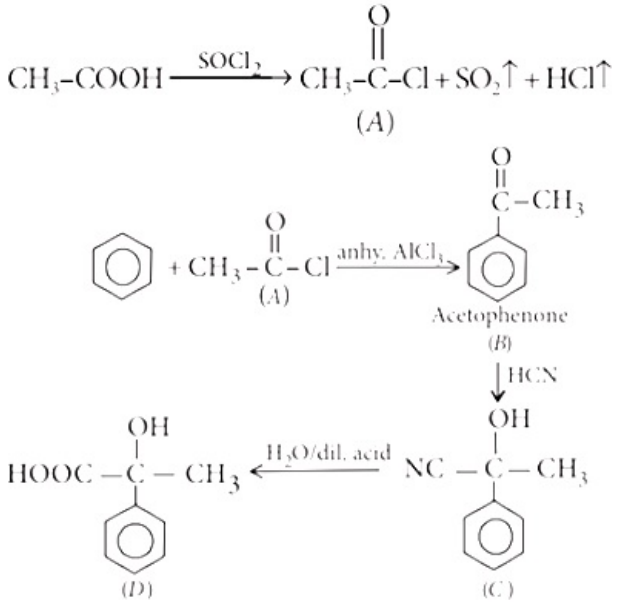
D.



Answer: D

Solution:

Solution:



Question72

Which one of the following can be oxidised to the corresponding carbonyl compound?
(2004)

Options:

A. 2 -Hydroxypropane

B. ortho-Nitrophenol

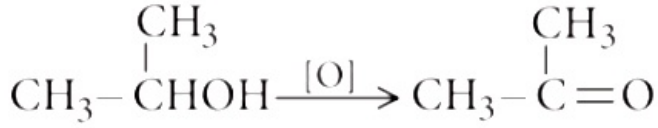
C. Phenol

D. 2-Methyl-2-hydroxypropane

Answer: A

Solution:

Solution:
Secondary alcohol on oxidation gives a ketone containing the same number of carbon atoms.



Question73

In this reaction :
$CH_3CHO + HCN \rightarrow CH_3CH(OH)CN \xrightarrow{HOH} CH_3CH(OH)COOH$
an asymmetric centre is generated. The acid obtained would be
(2003)

Options:

A. D -isomer

B. L -isomer

C. 50% D + 50% L -isomer

D. 20% D + 80% L -isomer.

Answer: C

Solution:

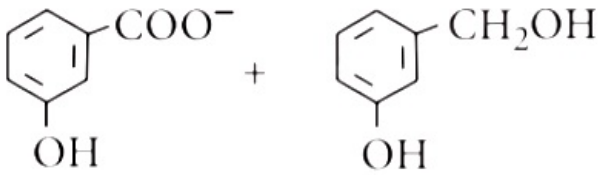
Solution:
Lactic acid ($CH_3CH(OH)COOH$) is an optically active compound due to the presence of asymmetric carbon atom. It exists in D -and L -form, the ratio of which is found to be (1 : 1), i.e., a racemic mixture is obtained.

Question74

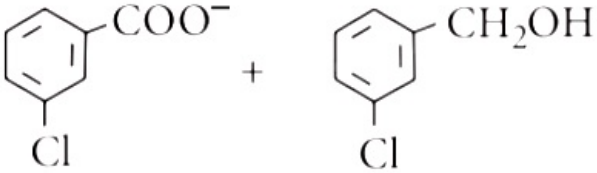
When m -chlorobenzaldehyde is treated with 50% KOH solution, the product(s) obtained is (are)
(2003)

Options:

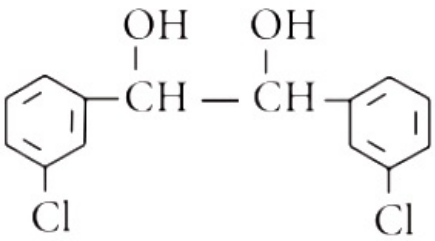
A.



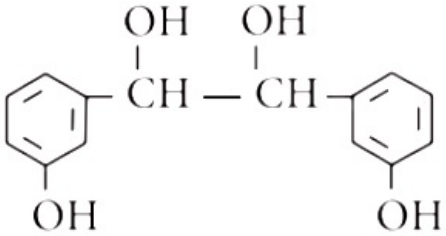
B.



C.

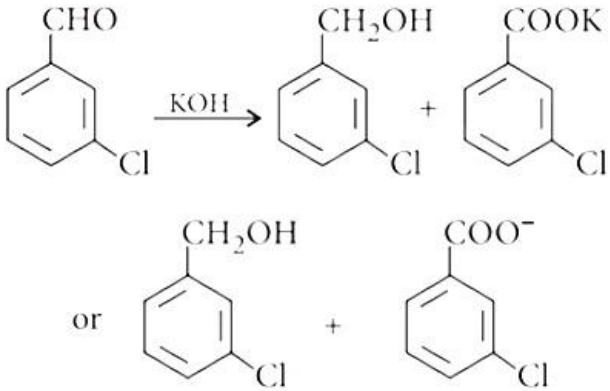


D.



Answer: B

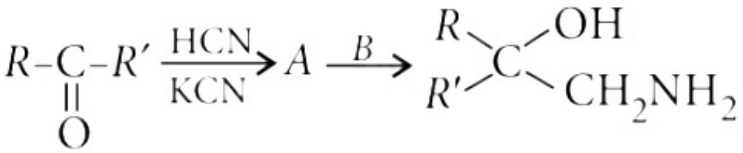
Solution:



The above reaction is known as Cannizzaro's reaction.

Question75

A and B in the following reactions are :



(2003)

Options:

A.

$$A = RR'C\begin{matrix}\diagup\ \mathrm{OH} \\ \diagdown\ \mathrm{COOH}\end{matrix},\quad B = \mathrm{NH_3}$$

B.

$$A = RR'C\begin{matrix}\diagup\ \mathrm{CN} \\ \diagdown\ \mathrm{OH}\end{matrix},\quad B = \mathrm{H_3O^{\oplus}}$$

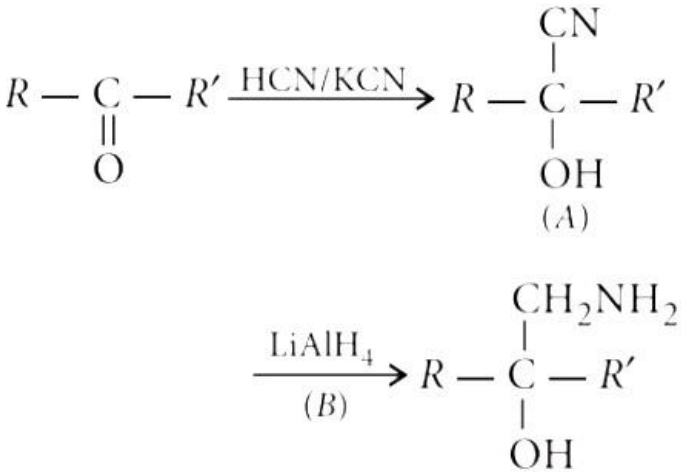
C. A = RR'CHCN, B = NaOH

D.

$$A = RR'C\begin{matrix}\nearrow \text{CN} \\ \searrow \text{OH}\end{matrix},\ B = \text{LiAlH}_4$$

Answer: D

Solution:



Question76

In a set of the given reactions, acetic acid yielded a product C.

$CH_3COOH + PCl_5 \rightarrow A \xrightarrow[\text{Anh. } AlCl_3]{C_6H_5} B \xrightarrow[\text{ether}]{C_2H_5MgBr} C$

Product C would be
(2003)

Options:

A. $CH_3CH(OH)C_2H_5$

B. $CH_3COC_6H_5$

C. $CH_3CH(OH)C_6H_5$

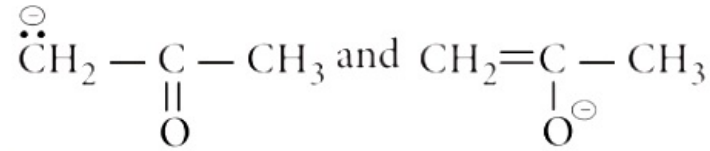
D. $CH_3\overset{C_2H_5}{\underset{|}{C}}(OH)C_6H_5$

Answer: D

Solution:

$$CH_3COOH + PCl_5 \rightarrow \underset{(A)}{CH_3COCl} \xrightarrow[\text{Anh. } AlCl_3]{C_6H_5} \underset{(B)}{C_6H_5COCH_3} \xrightarrow[\text{ether}]{C_2H_5MgBr} CH_3\overset{C_2H_5}{\underset{|}{\underset{(C)}{C}}}(OH)C_6H_5$$

Question77


are

(2002)

Options:

A. resonating structures

B. tautomers

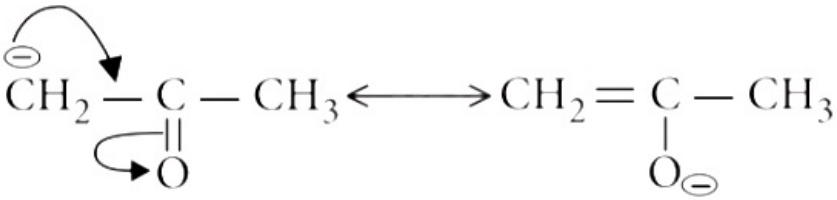
C. geometrical isomers

D. optical isomers.

Answer: A

Solution:

Solution:
They are resonating forms because the position of the atomic nuclei remains the same and only electron redistribution has occurred.



Question78

In the following reaction product P is $R-\underset{\underset{O}{\|}}{C}-Cl \xrightarrow[Pd-BaSO_4]{H_2} P$

(2002)

Options:

A. RCH_2OH

B. RCOOH

C. RCHO

D. RCH_3

Answer: C

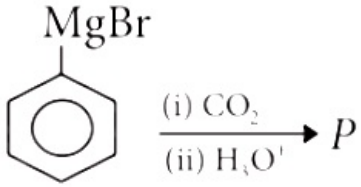
Solution:

This is Rosenmund reaction.

$$R-\underset{\underset{O}{\|}}{C}-Cl \xrightarrow[Pd-BaSO_4]{H_2} \underset{(P)}{RCHO}$$

$BaSO_4$ prevents the aldehyde from being reduced and acts as a poison to the palladium catalyst in this reaction.

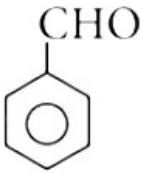
Question79



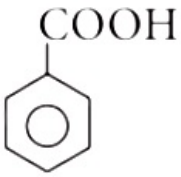
In the above reaction product P is (2002)

Options:

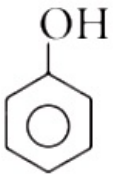
A.



B.



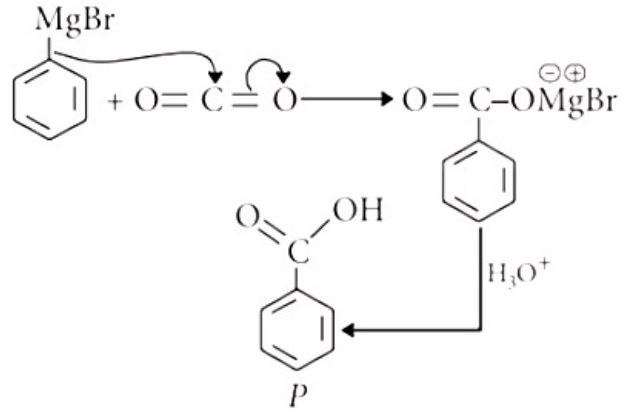
C.



D. $C_6H_5-\overset{\overset{O}{\|}}{C}-C_6H_5$

Answer: B

Solution:



The product is benzoic acid.

Question80

Which alkene on ozonolysis gives CH_3CH_2CHO and CH_3COCH_3? (2001)

Options:

A. $CH_3CH_2CH = C(CH_3)_2$

B. $CH_3CH_2CH = CHCH_2CH_3$

C. $CH_3CH_2CH = CHCH_3$

D. $CH_3 - C(CH_3) = CHCH_3$

Answer: A

Solution:

On passing a steam of ozone through a solution of olefin in an organic solvent, an ozonide is obtained.

$$\begin{matrix} R \\ R \end{matrix}\!\!>\!C = CHR' + O_3 \longrightarrow \underset{\underset{O}{|}}{R_2C} - O - \underset{\underset{O}{|}}{CHR'} \quad (\text{ozonide})$$

The ozonide on reduction with Zn and acid or H_2 / Ni gives aldehydes and/or ketones.

$$\begin{matrix} R \\ R \end{matrix}\!\!>\!\underset{\underset{O}{|}}{C} - O - \underset{\underset{O}{|}}{CHR'} \xrightarrow{H_2/Ni} R_2CO + R'CHO$$

The nature of these products helps in locating the position of the double bond in olefin.

Question81

Which of the following is incorrect?
(2001)

Options:

A. $FeCl_3$ is used in detection of phenol.

B. Fehling solution is used in detection of glucose.

C. Tollens' reagent is used in detection of unsaturation.

D. $NaHSO_3$ is used in detection of carbonyl compound.

Answer: C

Solution:

ammoniacal silver nitrate and used for the detection of -CHO group. Aldehydes reduce Tollens' reagent and itself gets oxidised to convert Ag^+ ions to Ag powder which forms the silver coloured mirror in the test tube. So this test is also known as silver mirror test.
$R-CHO+[Ag(NH_3)_2]^+ \rightarrow R-COO^- + Ag$

Question82

Polarisation in acrolein can be described as
(2000)

Options:

A. $\overset{+\delta}{C}H_2=CH-\overset{+\delta}{C}HO$

B. $\overset{-\delta}{C}H_2=CH-\overset{+\delta}{C}HO$

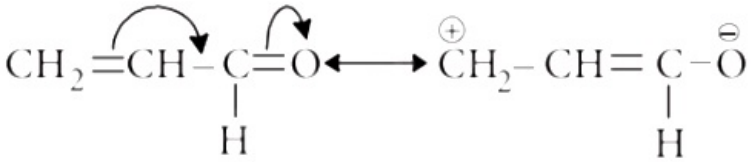
C. $\overset{-\delta}{C}H_2=CH-CH\overset{+\delta}{O}$

D. $\overset{+\delta}{C}H_2=CH-CH\overset{-\delta}{O}$

Answer: D

Solution:

Solution:
O-atom is more electronegative than C-atom, therefore O-atom bears partial -ve charge and C-atom to which it is attached bear partial +ve charge.



Question83

First product of the reaction between RCHO and NH_2NH_2 is (2000)

Options:

A. $RCH = NNH_2$

B. $RCH = NH$

C. RCH_2NH_2

D. $RCON_3$

Answer: A

Solution:

It is a simple condensation reaction which proceeds with elimination of water.

$$R-CH=O+H_2N-NH_2 \xrightarrow[-H_2O]{} RCH=N-NH_2$$

Question84

Ethyl benzoate can be prepared from benzoic acid by using (2000)

Options:

A. ethyl alcohol

B. ethyl alcohol and dry HCl

C. ethyl chloride

D. sodium ethoxide.

Answer: B

Solution:

Ethyl benzoate can be prepared by heating benzoic acid with ethyl alcohol in presence of dry HCl or conc. H_2SO_4. The reaction is called as esterification reaction.

$$C_6H_5-COOH+C_2H_5-OH \xrightarrow[-H_2O]{\text{dry HCl}} \underset{\text{Ethyl benzoate}}{C_6H_5COOC_2H_5}$$

Question85

Reduction by $LiAlH_4$ of hydrolysed product of an ester gives (2000)

Options:

A. two alcohols

B. two aldehydes

C. one acid and one alcohol

D. two acids.

Answer: A

Solution:

Reduction of hydrolysed product of ester by $LiAlH_4$ produces two alcohols.

$$RCOOR' \xrightarrow{H_2O} R-COOH + R'OH \xrightarrow[ether]{LiAlH_4} R-CH_3OH + R'OH$$

Question86

In the reaction, $CH_3CN + 2H \xrightarrow[Ether]{HCl} X \xrightarrow{Boiling\ H_2O} Y$ the term Y is (1999)

Options:

A. acetaldehyde

B. ethanamine

C. acetone

D. dimethylamine.

Answer: A

Solution:

$$CH_3CN + 2H \xrightarrow[Ether]{HCl} \underset{(X)}{CH_3-CH=NH} \xrightarrow{Boiling\ H_2O} \underset{(Y)}{CH_3-CHO} = NH_3$$

Y = acetaldehyde

Question87

Aldol condensation will not take place in (1999, 1996)

Options:

A. CH_3COCH_3

B. CH_3CHO

C. HCHO

D. CH_3CH_2CHO

Answer: C

Solution:

Solution:
The carbonyl compounds having atleast one α -hydrogen atom undergo condensation reaction in presence of dilute NaOH solution. This reaction is called as aldol condensation reaction. As formaldehyde (HCHO) has no α - hydrogen atom attached to carbonyl group, it does not respond to this reaction.

Question88

Which one of the following compounds will react with $NaHCO_3$ solution to give sodium salt and carbon dioxide? (1999)

Options:

A. Acetic acid

B. n -Hexanol

C. Phenol

D. Both (b) and (c)

Answer: A

Solution:

Solution:
$NaHCO_3$ is weakly basic, so it can only react with the acid CH_3COOH. While phenol is weakly acidic and n -hexanol is neutral, they do not react with $NaHCO_3$.$CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + CO_2 + H_2O$

Question89

Which one of the following esters cannot undergo Claisen self-condensation?
(1998)

Options:

A. $C_6H_5CH_2COOC_2H_5$

B. $C_6H_5COOC_2H_5$

C. $CH_3CH_2CH_2CH_2COOC_2H_5$

D. $C_6H_{11}CH_2COOC_2H_5$

Answer: B

Solution:

Solution:
The esters having active methylene group ($-CH_2-$), show Claisen condensation reaction. As $C_6H_5-COOC_2H_5$ has no α -hydrogen atom or active methylene group, so it cannot undergo Claisen condensation reaction.

Question90

An ester (A) with molecular formula, $C_9H_{10}O_2$ was treated with excess of CH_3MgBr and the complex so formed, was treated with H_2SO_4 to give an olefin (B). Ozonolysis of (B) gave a ketonewith molecular formula C_8H_8O which shows +ve iodoform test. The structure of (A) is
(1998)

Options:

A. $H_3CCH_2COC_6H_5$

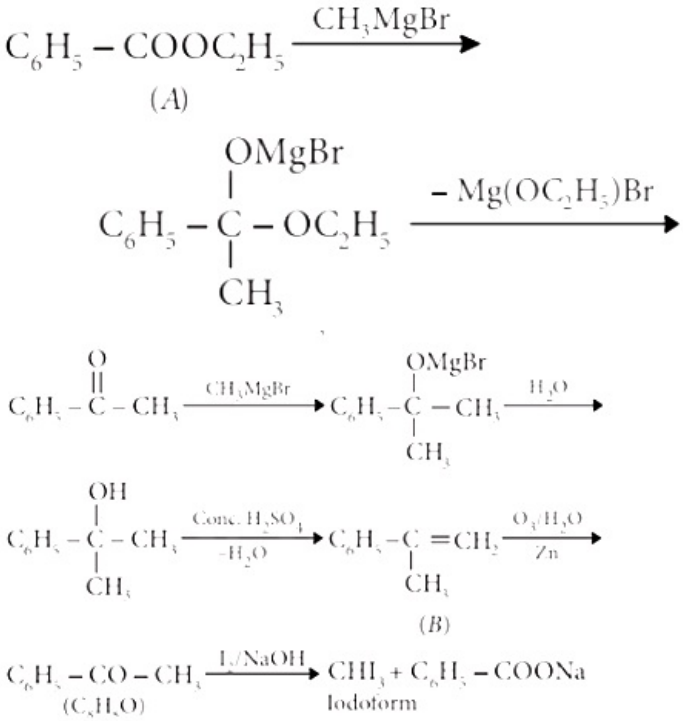
B. $C_2H_5COOC_6H_5$

C. $C_6H_5COOC_2H_5$

D. $p-H_3CO-C_6H_4-COCH_3$

Answer: C

Solution:



Question91

Iodoform test is not given by (1998)

Options:

A. ethanal

B. ethanol

C. 2 -pentanone

D. 3 -pentanone.

Answer: D

Solution:

Solution:
Ethyl alcohol, 2 -alkanols, and carbonyl compounds containing $CH_3-\overset{\overset{O}{\|}}{C}-$ group show iodoform test, i.e., acetaldehyde and 2 -ketones, etc. So iodoform test is not given by 3 -pentanone.

Question92

Ketones [$RCOR_1$] where $R = R_1 =$ alkyl group. It can be obtained in one step by (1997)

Options:

A. oxidation of tertiary alcohol

B. reaction of acid halide with alcohols

C. hydrolysis of esters

D. oxidation of primary alcohol.

Answer: A

Solution:

Solution:
A tertiary alcohol is difficult to oxidise. But when it is treated with an acidic oxidising agent under some conditions, it is oxidised to ketone and then to acids. Both the ketone and acid contain the lesser number of carbon atoms than the starting alcohol.

Question93

Phenylmethanol can be prepared by reducing the benzaldehyde with (1997)

Options:

A. CH_3Br and Na

B. CH_3I and Mg

C. CH_3Br

D. Zn and HCl.

Answer: D

Solution:

$$\underset{\text{Benzaldehyde}}{C_6H_5CHO} + 2[H] \xrightarrow{Zn\ /\ HCl} \underset{\text{Phenylmethanol}}{C_6H_5CH_2OH}$$

Question94

The oxidation of toluene to benzaldehyde by chromyl chloride is called (1996)

Options:

A. Etard reaction

B. Riemer-Tiemann reaction

C. Wurtz reaction

D. Cannizzaro's reaction.

Answer: A

Solution:

The oxidation of toluene ($C_6H_5CH_3$) with chromyl chloride (CrO_2Cl_2) in CCl_4 or CS_2 to give benzaldehyde is called Etard reaction. In this reaction, the chromyl chloride first forms a brown complex, which is separated and then decomposed with H_2O to give benzaldehyde (C_6H_5CHO).

Question95

Which of the following compounds gives benzoic acid on hydrolysis? (1996)

Options:

A. Chlorobenzene

B. Benzoyl chloride

C. Chlorophenol

D. Chlorotoluene

Answer: B

Solution:

$$\underset{\text{Benzoyl Chloride}}{C_6H_5COCl} + H_2O \rightarrow \underset{\text{Benzoic acid}}{C_6H_5COOH} + HCl$$

Question96

The order of reactivity of carbonyl compounds for nucleophilic addition is (1995)

Options:

A. $Ar_2C = O > R_2C = O > ArCHO > RCHO > H_2C = O$

B. $H_2C = O > R_2C = O > Ar_2C = O > RCHO > ArCHO$

C. $H_2C = O > RCHO > ArCHO > R_2C = O > Ar_2C = O$

D. $ArCHO > Ar_2C = O > RCHO > R_2C = O > H_2C = O$

Answer: C

Solution:

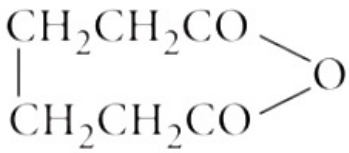
With each substitution of hydrogen atom, reactivity of carbonyl compound decreases.
This is due to inductive effect in case of alkyl groups and resonance in case of aromatic groups.

Question97

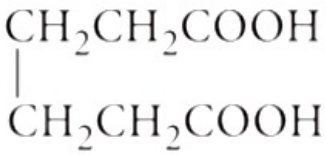
Which one of the following product is formed when adipic acid is heated?
(1995)

Options:

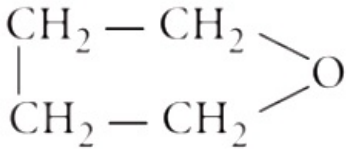
A.



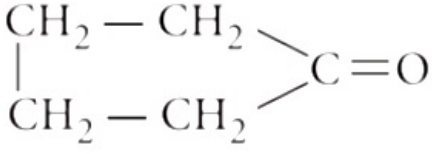
B.



C.

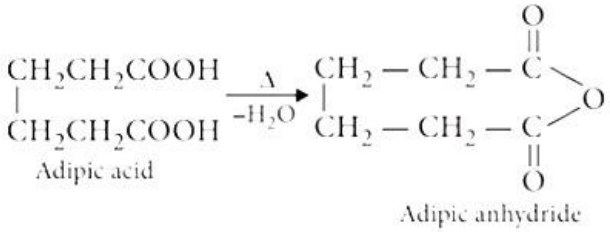


D.



Answer: A

Solution:



Question98

The oxidation of toluene with CrO_3 in the presence of $(CH_3CO)_2O$ gives a product A which on treatment with aqueous NaOH produces (1995)

Options:

A. C_6H_5COONa

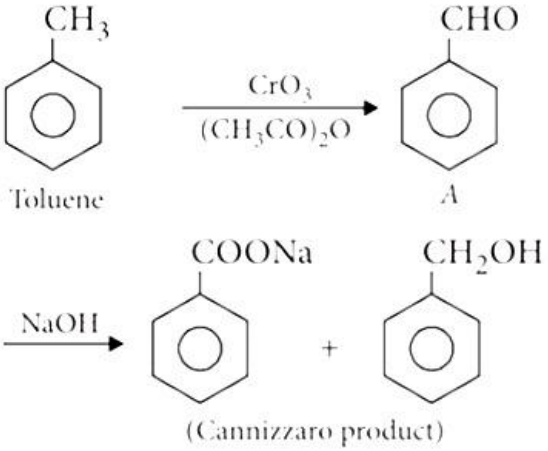
B. 2,4 -diacetyl toluene

C. C_6H_5CHO

D. $(C_6H_5CO)_2O$

Answer: A

Solution:



Question99

When aniline reacts with oil of bitter almonds (C_6H_5CHO) condensation takes place and benzal derivative is formed. This is known as (1995)

Options:

A. Schiff's base

B. Benedict's reagent

C. Millon's base

D. Schiff's reagent.

Answer: A

Solution:

Benzaldehyde reacts with primary aromatic amines to form Schiff's base (Benzylidene aniline).

$$\underset{\text{Benzaldehyde}}{C_6H_5HC=O} + \underset{\text{Aniline}}{C_6H_5NH_2} \rightarrow \underset{\text{Benzylidene aniline}}{C_6H_5HC=NC_6H_5} + H_2O$$

Question100

Compound A has a molecular formula C_2Cl_3OH. It reduces Fehling's solution and on oxidation, it gives a monocarboxylic acid B. If A is obtained by the action of chlorine on ethyl alcohol, then compound A is (1994)

Options:

A. methyl chloride

B. monochloroacetic acid

C. chloral

D. chloroform.

Answer: C

Solution:

$$\underset{\text{(Ethyl alcohol)}}{CH_3CH_2OH} \xrightarrow[-2HCl]{Cl_2} \underset{\text{Acetaldehyde}}{CH_3CHO} \xrightarrow[-3HCl]{3Cl_2} \underset{\text{(Chloral)}}{CCl_3CHO}$$

Thus, the compound A is chloral.

Question101

Which of the following compounds will undergo self aldol condensation in the presence of cold dilute alkali? (1994)

Options:

A. $CH \equiv C - CHO$

B. $CH_2 = CHCHO$

C. C_6H_5CHO

D. CH_3CH_2CHO

Answer: D

Solution:

Solution:
Since CH_3CH_2CHO has α -hydrogen atom, therefore it will undergo aldol condensation in the presence of cold dilute alkali.

Question102

Which of the following compounds will give positive test with Tollens' reagent?
(1994)

Options:

A. Acetic acid

B. Acetone

C. Acetamide

D. Acetaldehyde

Answer: D

Solution:

Acetaldehyde reduces Tollens' reagent to silver mirror.
$CH_3CHO + 2[Ag(NH_3)_2]^+ + 3OH^- \rightarrow CH_3COO^- + 2H_2O + 2Ag + 4NH_3$

Question103

An acyl halide is formed when PCl_5 reacts with an
(1994)

Options:

A. amide

B. ester

C. acid

D. alcohol.

Answer: C

Solution:

$$\underset{\text{Acetic acid}}{CH_3COOH} + PCl_5 \rightarrow \underset{\text{Acetyl chloride}}{CH_3COCl} + POCl_3 + HCl$$

Question104

Sodium formate on heating yields (1993)

Options:

A. oxalic acid and H_2

B. sodium oxalate and H_2

C. CO_2 and NaOH

D. sodium oxalate.

Answer: B

Solution:

Sodium oxalate and H_2

$$2HCOONa \xrightarrow{\Delta} \underset{\text{Sodium oxalate}}{\begin{matrix}COONa\\|\\COONa\end{matrix}} + H_2$$

Question105

$(CH_3)_2C = CHCOCH_3$ can be oxidised to$(CH_3)_2C = CHCOOH$ by (1993)

Options:

A. chromic acid

B. NaOI

C. Cu at 300°C

D. $KMnO_4$

Answer: B

Solution:

$(CH_3)_2C = CHCOCH_3 \xrightarrow{NaOI} (CH_3)_2C = CHCOOH + CHI_3$
$(NaOH + I_2)$ / NaOI is the best suitable reagent for the above reaction.

Question106

In which of the following, the number of carbon atoms does not remain same when carboxylic acid is obtained by oxidation?
(1992)

Options:

A. CH_3COCH_3

B. CCl_3CH_2CHO

C. $CH_3CH_2CH_2OH$

D. CH_3CH_2CHO

Answer: A

Solution:

Solution:
Ketones on oxidation give carboxylic acids with lesser number of carbon atoms i . e,
$CH_3COCH_3 \xrightarrow{[O]} CH_3COOH + CO_2 + H_2O$

Question107

Benzoic acid gives benzene on being heated with X and phenol gives benzene on being heated with Y. Therefore, X and Y are respectively
(1992)

Options:

A. soda-lime and copper

B. Zn dust and NaOH

C. Zn dust and soda-lime

D. soda-lime and zinc dust.

Answer: D

Solution:

$$C_6H_5COOH \xrightarrow[(X)]{\text{Soda - lime}} C_6H_6 + Na_2CO_3$$

$$C_6H_5OH \xrightarrow[(Y)]{\text{Zn dust}} C_6H_6 + ZnO$$

X = soda-lime and Y = Zn dust

Question108

A is a lighter phenol and B is an aromatic carboxylic acid. Separation of a mixture of A and B can be carried out easily by using a solution of (1992)

Options:

A. sodium hydroxide

B. sodium sulphate

C. calcium chloride

D. sodium bicarbonate.

Answer: D

Solution:

Solution:
Carboxylic acids dissolve in $NaHCO_3$ but phenols do not.

Question109

Acetaldehyde reacts with (1991)

Options:

A. electrophiles only

B. nucleophiles only

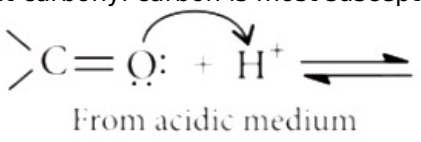
C. free radicals only

D. both electrophiles and nucleophiles.

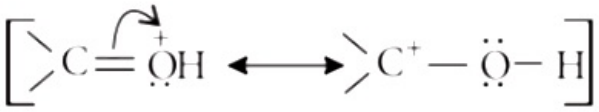
Answer: B

Solution:

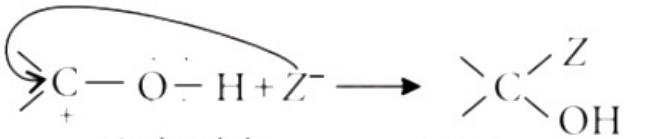
Acetaldehyde reacts only with nucleophiles. since the mobile π -electrons of carbon oxygen double bond are strongly pulled towards oxygen, carbonyl carbon is electron deficient and carbonyl oxygen is electron rich. Thus, the electron deficient carbonyl carbon is most susceptible to attack by electron rich nucleophilic reagent, i.e., by base.



From acidic medium



The nucleophile, then attacks the protonated carbonyl group to form addition product.



Nucleophile Addition product

Question110

The reagent which can be used to distinguish acetophenone from benzophenone is (1990)

Options:

A. 2,4 -dinitrophenylhydrazine

B. aqueous solution of $NaHSO_3$

C. Benedict reagent

D. I_2 and NaOH.

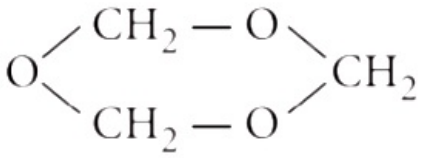
Answer: D

Solution:

Acetophenone reacts with NaOH and I_2 to give yellow ppt. of CHI_3 but benzophenone ($C_6H_5COC_6H_5$) does not. Hence, it can be used to distinguish between them.

$$C_6H_5COCH_3 \xrightarrow{I_2,\ NaOH} \underset{\text{yellow ppt.}}{CHI_3} + C_6H_5COONa$$

Question111



The above shown polymer is obtained when a carbonyl compound is allowed to stand. It is a white solid. The polymer is
(1989)

Options:

A. trioxane

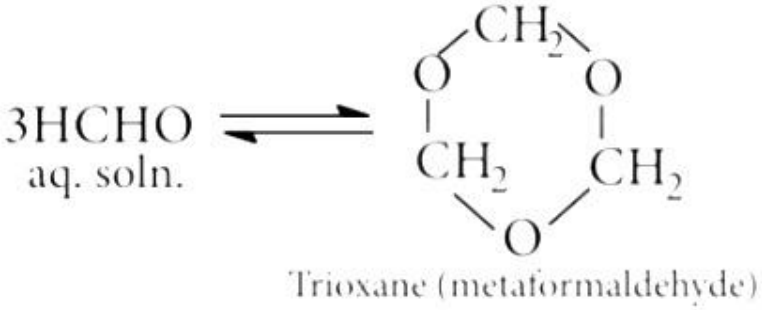
B. formose

C. paraformaldehyde

D. metaldehyde.

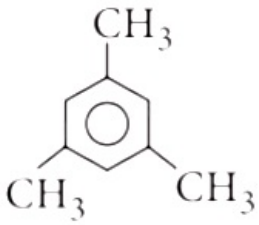
Answer: A

Solution:



Trioxane (metaformaldehyde)

Question112



The given compound describes a condensation polymer which can be obtained in two ways : either treating 3 molecules of acetone (CH_3COCH_3) with conc. H_2SO_4 or passing propyne ($CH_3C \equiv CH$) through a red hot tube. The polymer is
(1989)

Options:

A. phorone

B. mesityl oxide

C. deacetonyl alcohol

D. mesitylene.

Answer: D

Solution:

Acetone forms mesitylene (1, 3, 5-trimethylbenzene) on distillation with conc. H_2SO_4.

Question113

$$\underset{(A)}{3CH_3COCH_3} \xrightarrow[-3H_2O]{HCl} \underset{(B)}{(CH_3)_2C = CH - CO - CH = C(CH_3)_2}$$

This polymer (B) is obtained when acetone is saturated with hydrogen chloride gas, B can be
(1989)

Options:

A. phorone

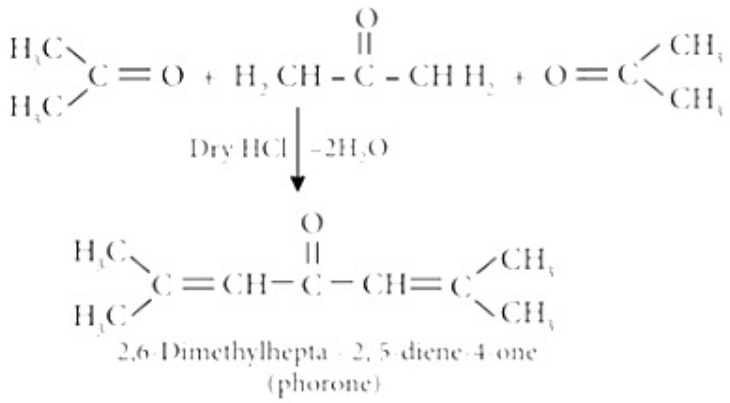
B. formose

C. diacetone alcohol

D. mesityl oxide.

Answer: A

Solution:



Question114

The compound formed when malonic acid is heated with urea is (1989)

Options:

A. cinnamic acid

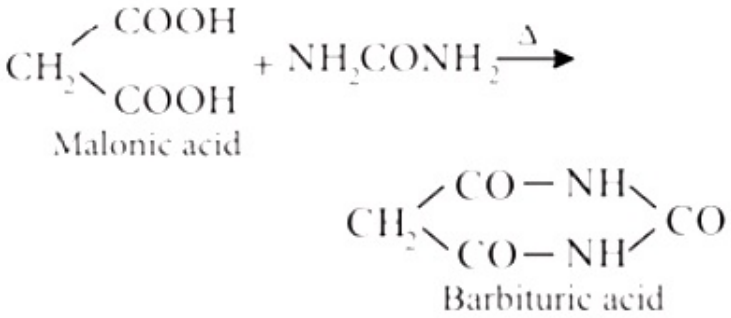
B. butyric acid

C. barbituric acid

D. crotonic acid.

Answer: C

Solution:



Question115

If formaldehyde and KOH are heated, then we get (1988)

Options:

A. methane

B. methyl alcohol

C. ethyl formate

D. acetylene.

Answer: B

Question116

Formalin is an aqueous solution of

(1988)

Options:

A. fluorescein

B. formic acid

C. formaldehyde

D. furfuraldehyde.

Answer: C

Solution:

40%HCHO

Question117

Among the following the strongest acid is (1988)

Options:

A. CH_3COOH

B. CH_2ClCH_2COOH

C. $CH_2ClCOOH$

D. CH_3CH_2COOH.

Answer: C

Solution:

Strongest acid is $CH_2ClCOOH$. $-I$ effect of Cl atom decreases with the increase in distance therefore, $CH_2ClCOOH$ is strongest acid.

Question118

Which of the following is the correct decreasing order of acidic strength of
(i) methanoic acid
(ii) ethanoic acid

(iii) propanoic acid
(iv) butanoic acid
(1988)

Options:

A. (i) > (ii) > (iii) > (iv)

B. (ii) > (iii) > (iv) > (i)

C. (i) > (iv) > (iii) > (ii)

D. (iv) > (i) > (iii) > (ii)

Answer: A

Solution:

+I effect of the alkyl group increases from CH_3 to CH_3CH_2 to $CH_3CH_2CH_2$, resultingthe acid character decreases.
Therefore, the order is (i) > (ii) > (iii) > (iv)
