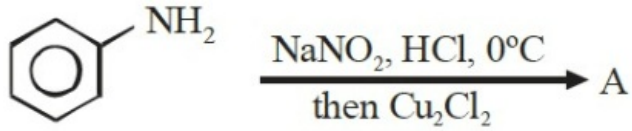
Amines

Question1

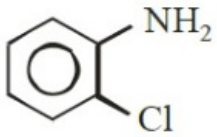
The product A formed in the following reaction is:



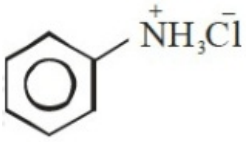
[29-Jan-2024 Shift 2]

Options:

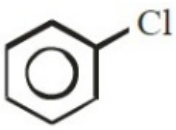
A.



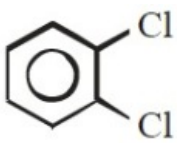
B.



C.

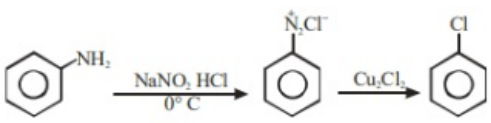


D.



Answer: C

Solution:

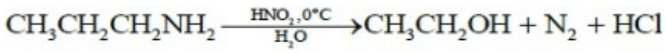


Question2

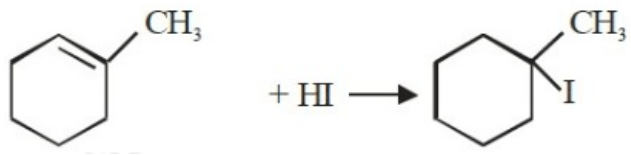
Which of the following reaction is correct?
[29-Jan-2024 Shift 2]

Options:

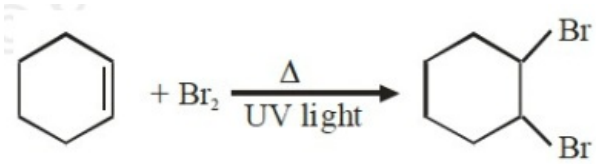
A.



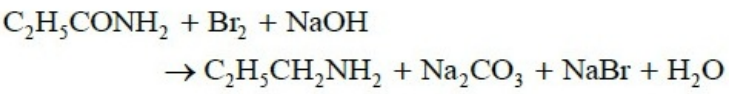
B.



C.

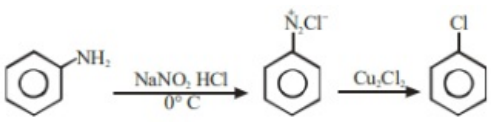


D.



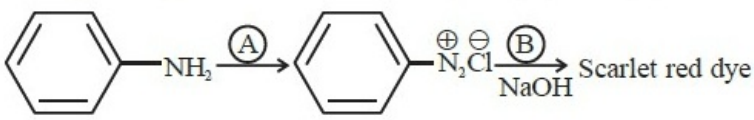
Answer: B

Solution:



Question3

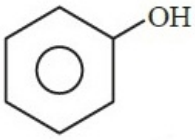
Following is a confirmatory test for aromatic primary amines. Identify reagent (A) and (B)



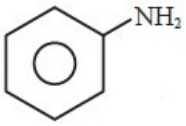
[30-Jan-2024 Shift 1]

Options:

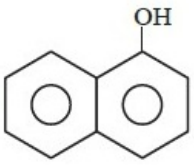
A.

A = HNO_3/H_2SO_4; B = 

B.

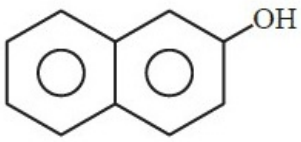
A= $NaNO_2$ + HCl, 0 – 5°C; B = 

C.

A=$NaNO_2$ + HCl, 0 – 5°C; B = 

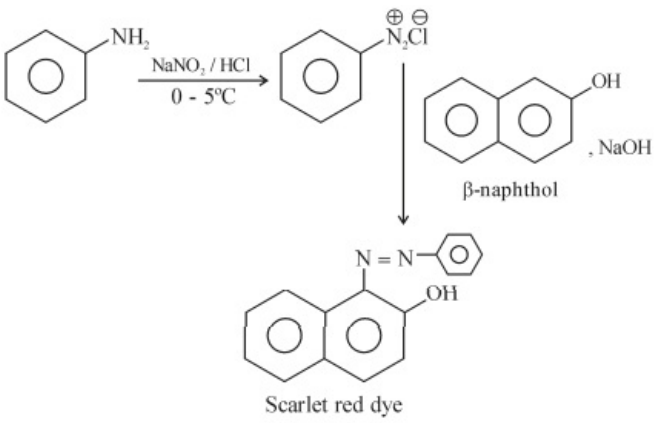
D.

A = $NaNO_2$ + HCl, 0 – 5°C;

B = 

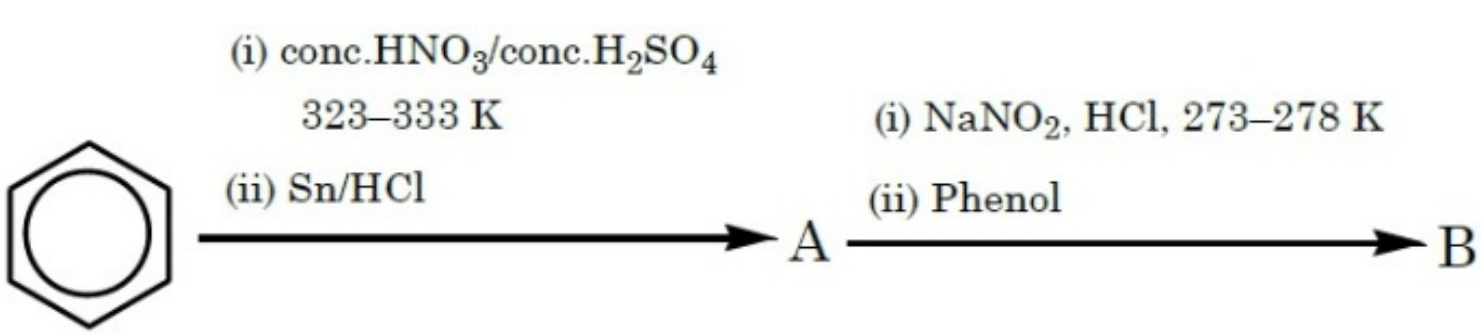
Answer: D

Solution:



Question4

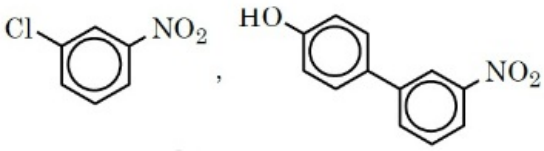
The products A and B formed in the following reaction scheme are respectively



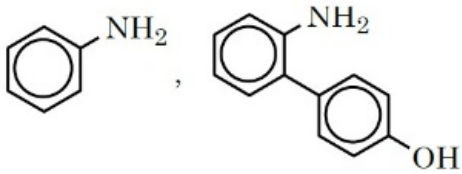
[30-Jan-2024 Shift 2]

Options:

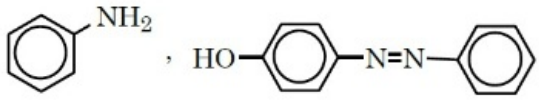
A.



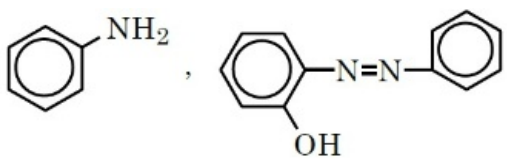
B.



C.



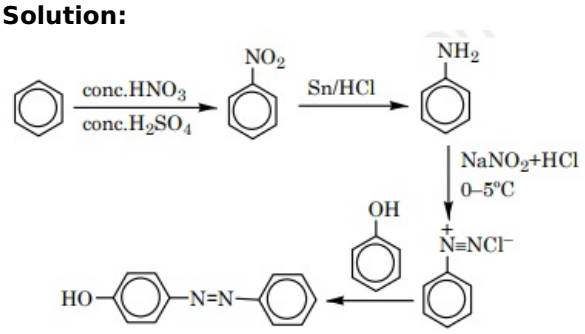
D.



Answer: C

Solution:

Solution:



Question5

Given below are two statements:
Statement I: Aniline reacts with con. H_2SO_4 followed by heating at 453 − 473K gives p aminobenzene sulphonic acid, which gives blood red colour in the 'Lassaigne's test'.
Statement II: In Friedel - Craft's alkylation and acylation reactions, aniline forms salt with the $AlCl_3$ catalyst. Due to this, nitrogen of aniline aquires a positive charge and acts as deactivating group.
In the light of the above statements, choose the correct answer from the options given below :
[31-Jan-2024 Shift 2]

Options:

A. Statement I is false but statement II is true

B. Both statement I and statement II are false

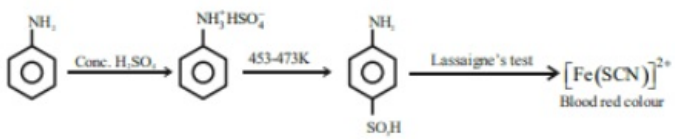
C. Statement I is true but statement II is false

D. Both statement I and statement II are true

Answer: D

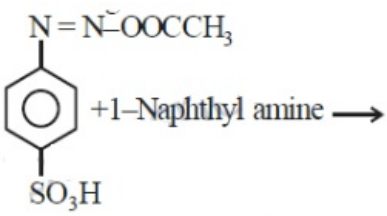
Solution:

Solution:



Question6

Choose the correct colour of the product for the following reaction.



[24-Jan-2023 Shift 2]

Options:

A. Yellow

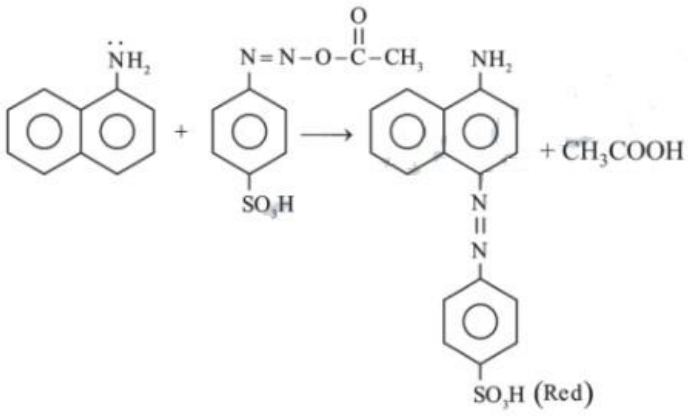
B. White

C. Red

D. Blue

Answer: C

Solution:



Question7

Given below are two statements:
Statement I : Pure Aniline and other arylamines are usually colourless.
Statement II : Arylamines get coloured on storage due to atmospheric reduction.
In the light of the above statements, choose the most appropriate answer from the options given below :
[24-Jan-2023 Shift 2]

Options:

A. Both Statement I and Statement II are incorrect

B. Both Statement I and Statement II are correct

C. Statement I is correct but Statement II is incorrect

D. Statement I is incorrect but Statement II is correct

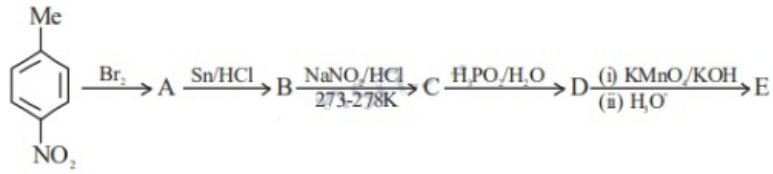
Answer: C

Solution:

Solution:
Statement −1 is (True)
Pure aniline is colourless liquid
Statement - 2 is (False)
Aniline becomes dark brown due to action of air and light [oxidation]

Question8

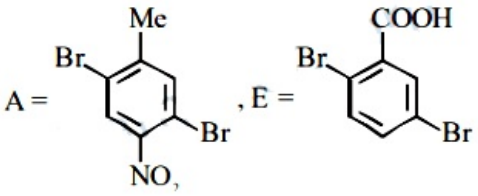
Identify the product formed (A and E)



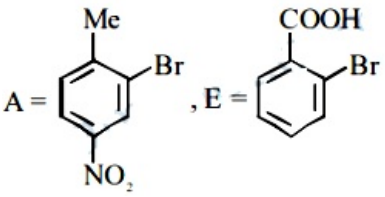
[25-Jan-2023 Shift 1]

Options:

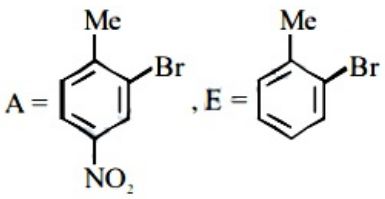
A.



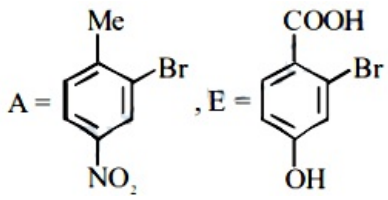
B.



C.

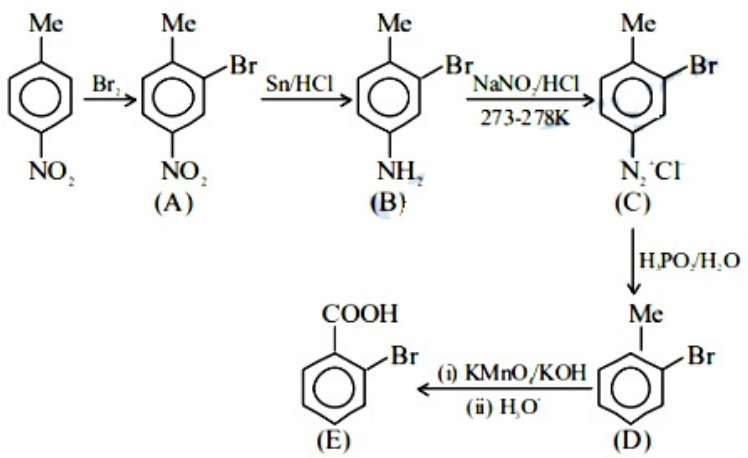


D.



Answer: B

Solution:



Question9

The correct order in aqueous medium of basic strength in case of methyl substituted amines is :
[25-Jan-2023 Shift 1]

Options:

A. $Me_2NH > MeNH_2 > Me_3N > NH_3$

B. $Me_2NH > Me_3N > MeNH_2 > NH_3$

C. $NH_3 > Me_3N > MeNH_2 > Me_2NH$

D. $Me_3N > Me_2NH > MeNH_2 > NH_3$

Answer: A

Solution:

Solution:
In aqueous medium basic strength is dependent on electron density on nitrogen as well as solvation of cation formed after accepting H^+. After considering all these factors overall basic strength order is
$Me_2NH > MeNH_2 > Me_3N > NH_3$

Question10

Reaction of propanamide with Br_2 / KOH (aq) produces:
[29-Jan-2023 Shift 2]

Options:

A. Ethylnitrile

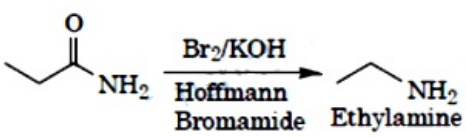
B. Propylamine

C. Propanenitrile

D. Ethylamine

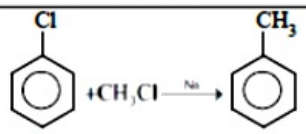
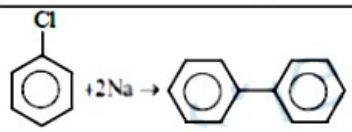
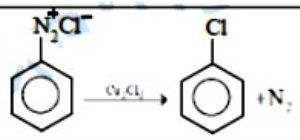
Answer: D

Solution:



Question11

Match List I with List II

List I		List II	
A		I	Fitting reaction
B		II	Wurtz Fitting reaction
C		III	Finkelstein reaction
D	$C_2H_5Cl + NaI \rightarrow C_2H_5I + NaCl$	IV	Sandmeyer reaction

[30-Jan-2023 Shift 1]

Options:

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

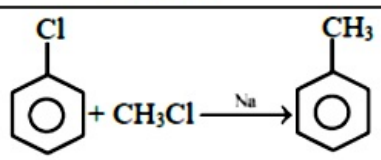
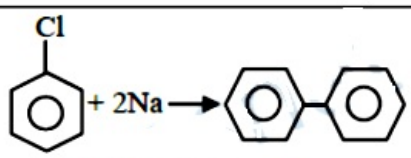
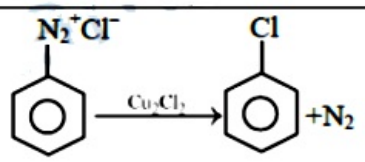
B. A - III, B - II, C - IV, D - I

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

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

Answer: D

Solution:

LIST-I		LIST-II
A.		Wurtz-fitting reaction
B.		Fitting reaction
C.		Sandmeyer reaction
D.	$C_2H_5Cl + NaI \rightarrow C_2H_5I + NaCl$	Finkelstein reaction

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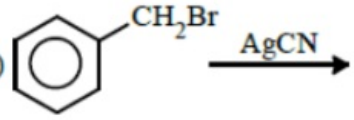
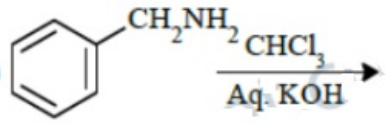
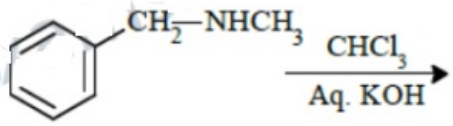
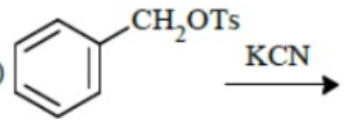
Question12

Benzyl isocyanide can be obtained by :

(A) 

(B) 

(C) 

(D) 

Choose the correct answer from the options given below : [30-Jan-2023 Shift 1]

Options:

A. A and D

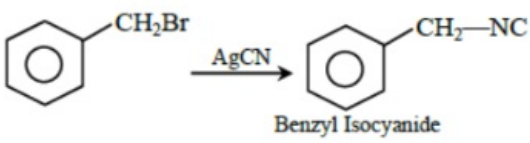
B. Only B

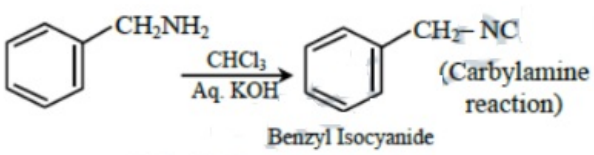
C. A and B

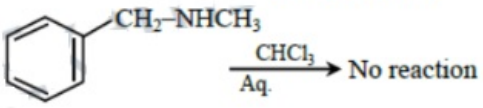
D. B and C

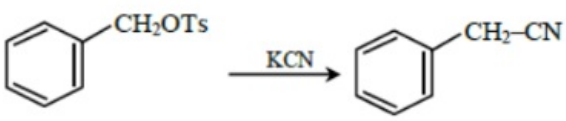
Answer: C

Solution:

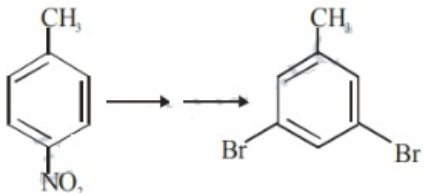








Question13



In the above conversion of compound (X) to product (Y), the sequence of reagents to be used will be:
[30-Jan-2023 Shift 2]

Options:

A. (i) Br_2, Fe (ii) Fe, H^+(iii) $LiAlH_4$

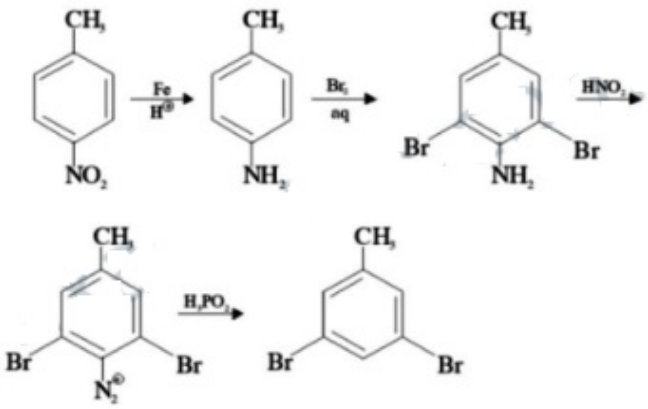
B. (i) Br_2 (aq) (ii) $LiAlH_4$ (iii) H_3O^+

C. (i) Fe, H^+(ii) Br_2 (aq) (iii) HNO_2 (iv) CuBr

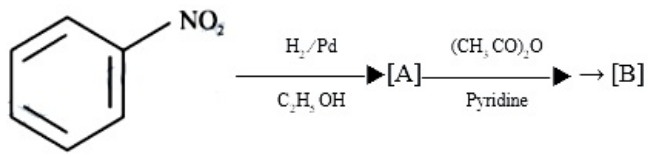
D. (i) Fe, H^+(ii) Br_2 (aq) (iii) HNO_2 (iv) H_3PO_2

Answer: D

Solution:



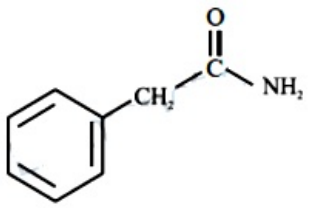
Question14



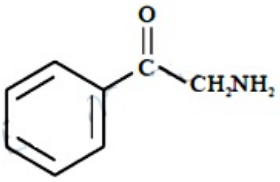
[31-Jan-2023 Shift 1]

Options:

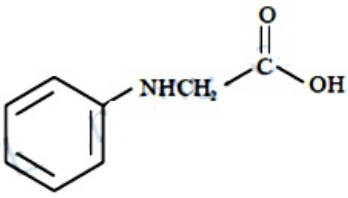
A.



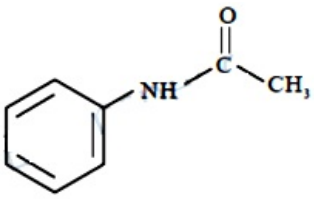
B.



C.



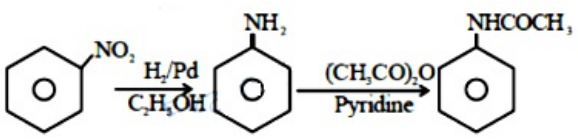
D.



Answer: D

Solution:

Solution:

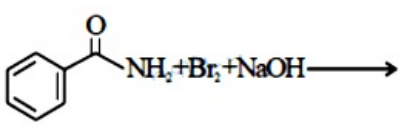


Question15

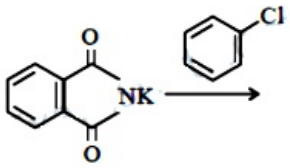
How many of the transformation given below would result in aromatic amines?
[31-Jan-2023 Shift 1]

Options:

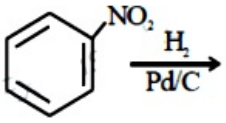
A.



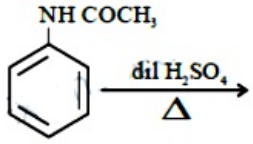
B.



C.



D.

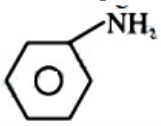


Answer: C

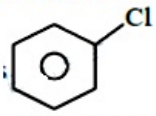
Solution:

Solution:

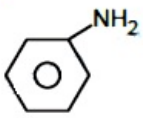
Product in the given reactions are as follow-

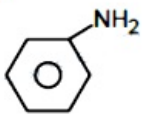
1. 

2. No reactions will be observed as in Gabriel phthalimide synthesis



is poor substrate for SN^2

3. 

4. 

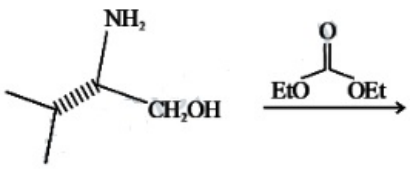
$+CH_3COOH$

Aromatic amines will he formed in 1,3 & 4

Ans: 3

Question16

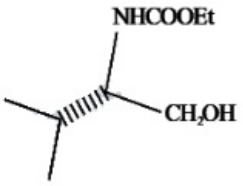
In the following reaction, ' A ' is



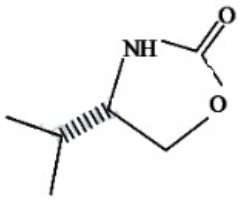
'A' Major product.
[1-Feb-2023 Shift 1]

Options:

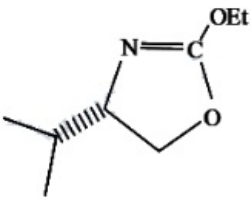
A.



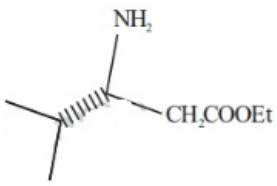
B.



C.



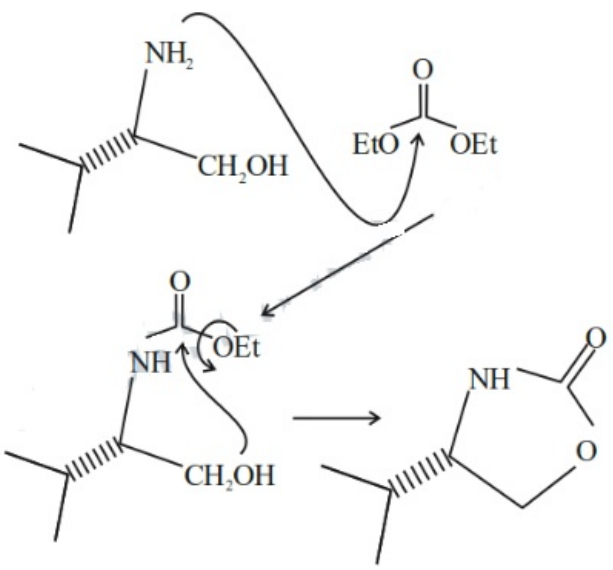
D.



Answer: B

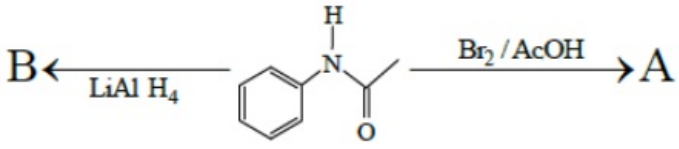
Solution:

Solution:
Initially lone pair electron of $-NH_2$ attack on electrophilic carbon, after then lone pair electron of oxygen attacks leading to formation of cyclic compound.



Question17

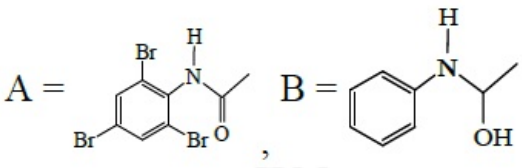
The major products A and B from the following reactions are:



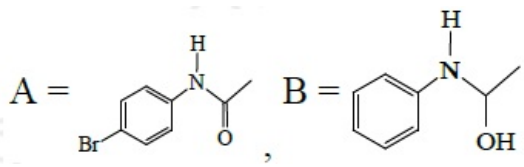
[6-Apr-2023 shift 1]

Options:

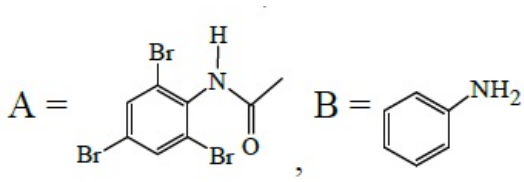
A.



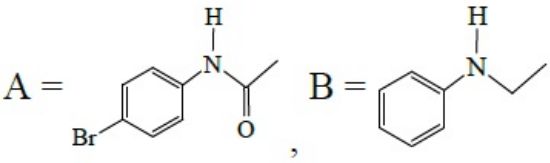
B.



C.

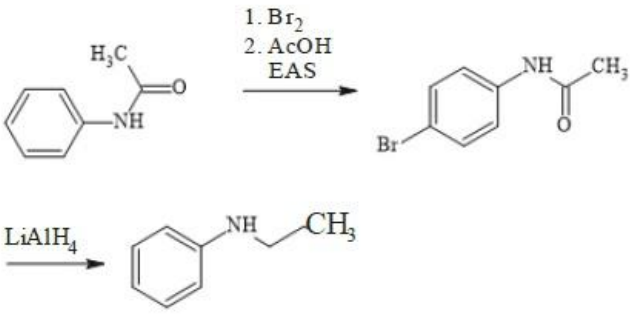


D.



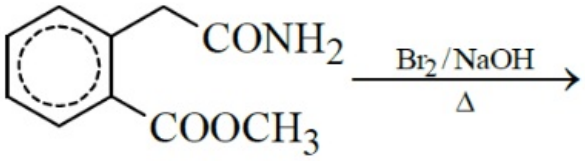
Answer: D

Solution:



Question18

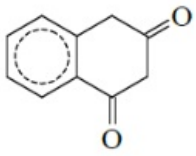
The major product formed in the following reaction is



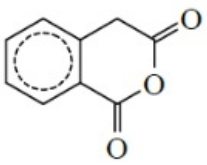
[6-Apr-2023 shift 1]

Options:

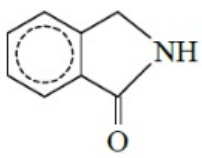
A.



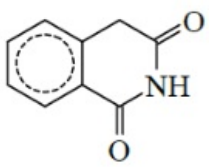
B.



C.



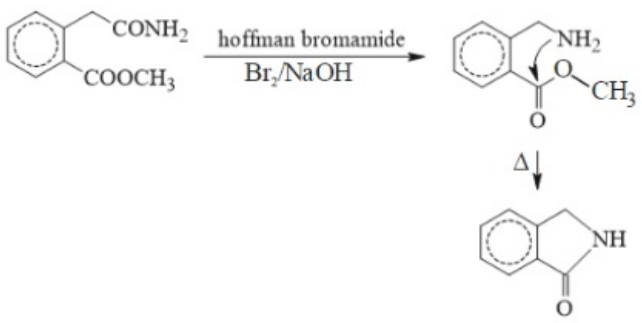
D.



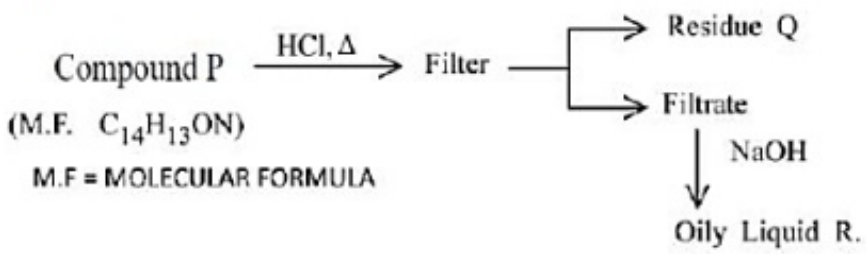
Answer: C

Solution:

Solution:



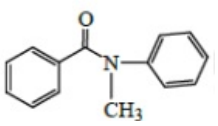
Question19



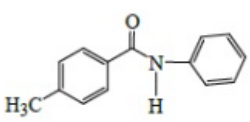
Compound P is neutral. Q gives effervescence with $NaHCO_3$ while R reacts with Hinsbergs reagent to give solid soluble in NaOH. Compound P is
[6-Apr-2023 shift 1]

Options:

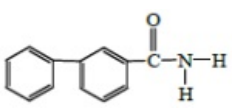
A.



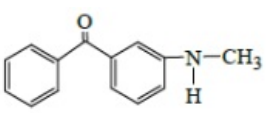
B.



C.

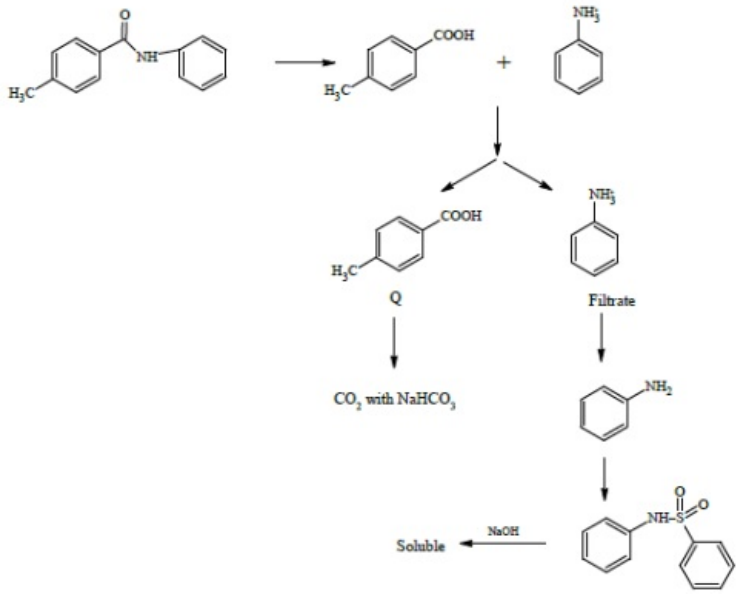


D.



Answer: B

Solution:



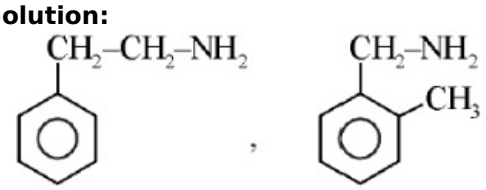
Question20

Number of isomeric aromatic amines with molecular formula $C_8H_{11}N$, which can be synthesized by Gabriel Phthalimide synthesis is___ [6-Apr-2023 shift 2]

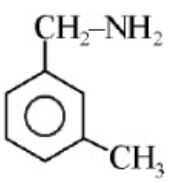
Answer: 6

Solution:

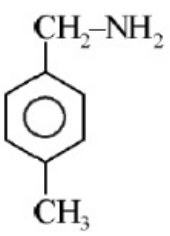
Solution:

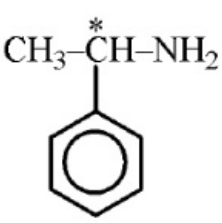


,



,

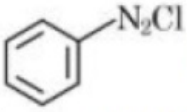




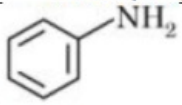
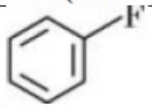
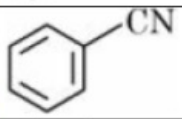
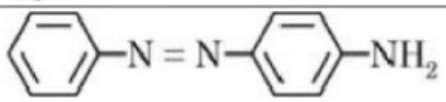
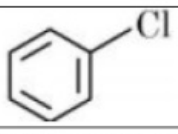
(d + l)

Question21

Match List I with List II:



is reacted with reagents in List I to form products in List II.

List I (Reagent)	List II (Product)
A. 	I. 
B. HBF_4, Δ	II. 
C. Cu, HCl	III. 
D. CuCN/KCN	IV. 

Choose the correct answer from the options given below:

[8-Apr-2023 shift 1]

Options:

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

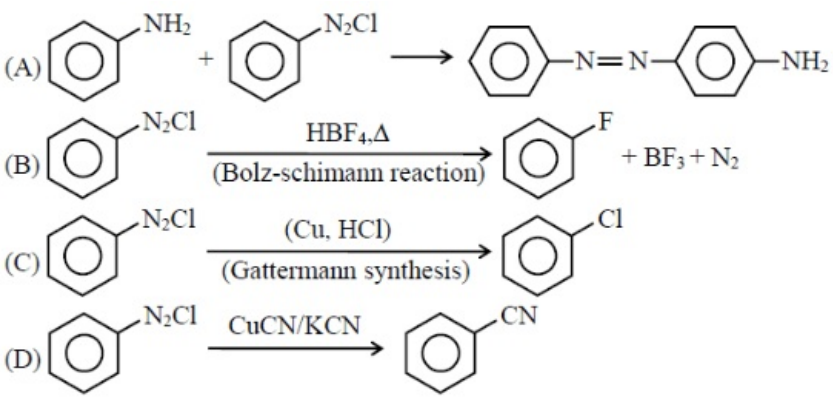
B. A-III, B-I, C-II, D-IV

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

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

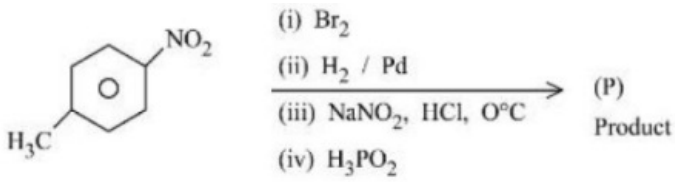
Answer: C

Solution:



Question22

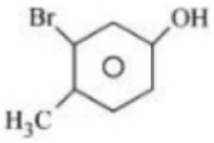
The product (P) formed from the following multistep reaction is :



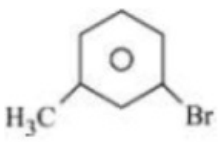
[8-Apr-2023 shift 2]

Options:

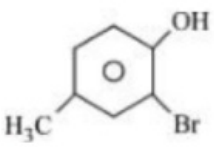
A.



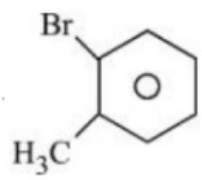
B.



C.

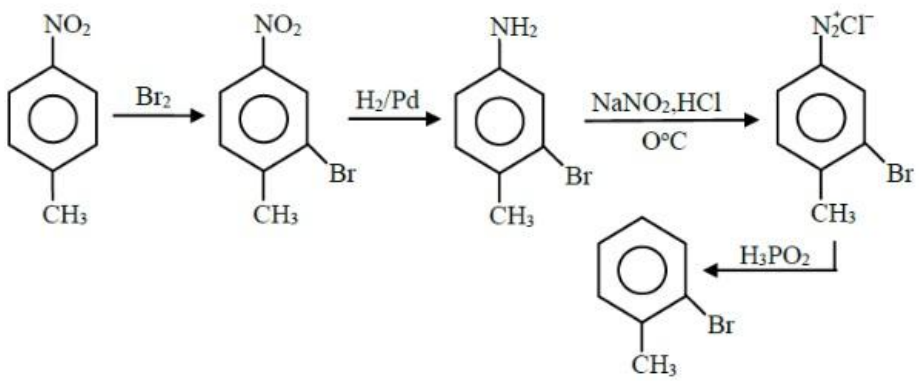


D.



Answer: D

Solution:

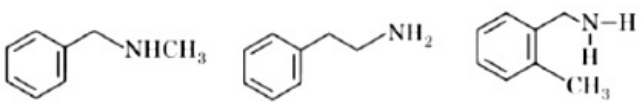


Question23

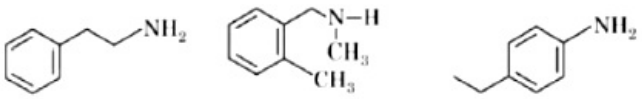
Isomeric amines with molecular formula $C_8H_{11}N$ given the following tests
Isomer (P)⇒ Can be prepared by Gabriel phthalimide synthesis
Isomer (Q)⇒ Reacts with Hinsberg's reagent to give solid insoluble in NaOH
Isomer (R)⇒ Reacts with HONO followed by β-naphthol in NaOH to given red dye.
Isomer (P), (Q) and (R) respectively are
[10-Apr-2023 shift 1]

Options:

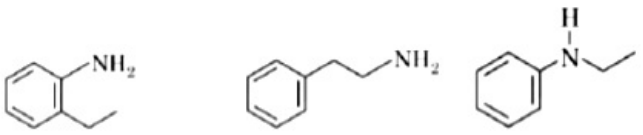
A.



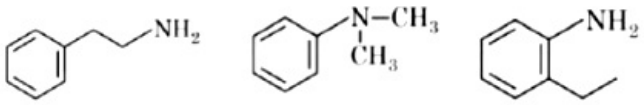
B.



C.



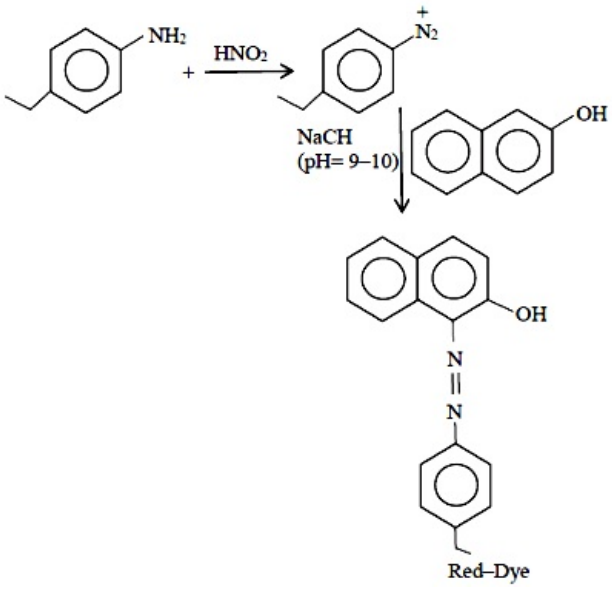
D.



Answer: B

Solution:

Solution:
P = Can be prepased by Gabriel phthalimide synthesis it should be i-amine
Q = React with Hinsberg's reagent and insoluble in NaOH it should be 2°-amine
R = React with HNO_2 followed by B-Napthol in NaOH it give red dye it must be Aromatic Amine

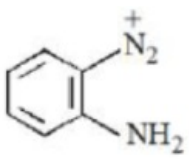


Question24

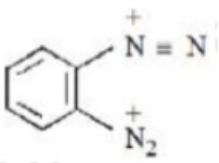
o-Phenylenediamine $\xrightarrow{HNO_2}$ ' X ' Major Product ' X ' is
[11-Apr-2023 shift 1]

Options:

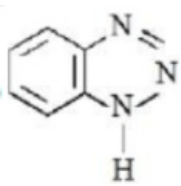
A.



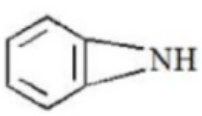
B.



C.



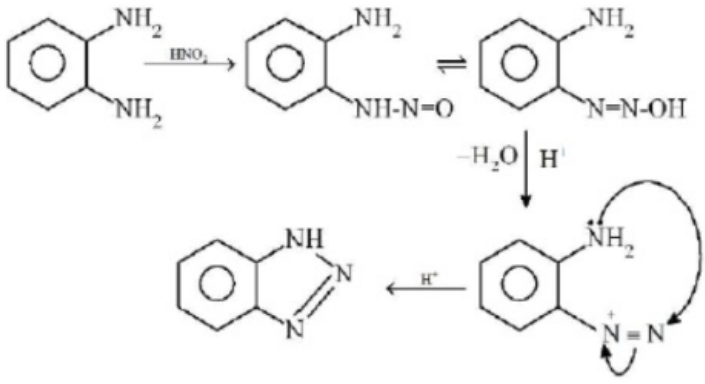
D.



Answer: C

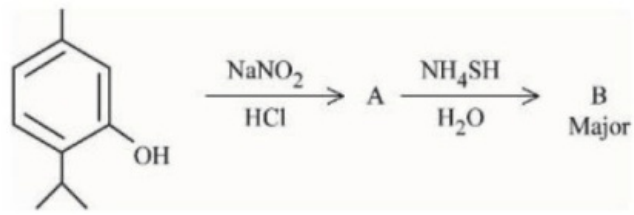
Solution:

o-Phenylenediamine



Question25

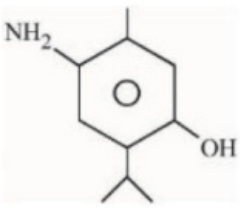
Compound ' B ' is



[11-Apr-2023 shift 2]

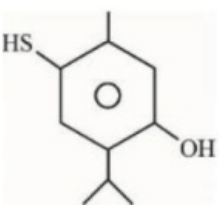
Options:

A.

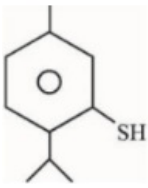


B.

C.

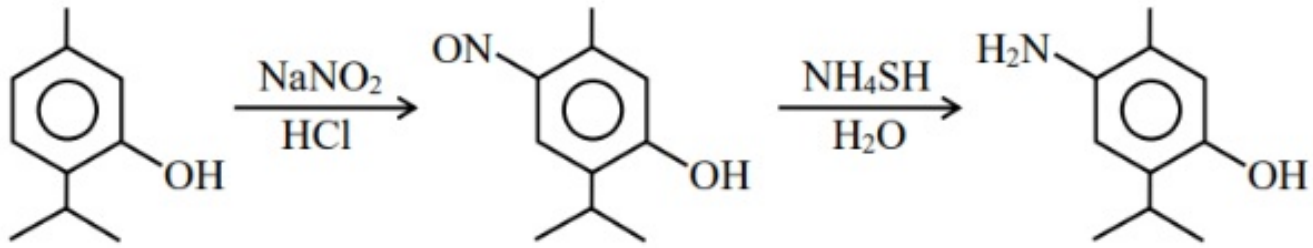


D.



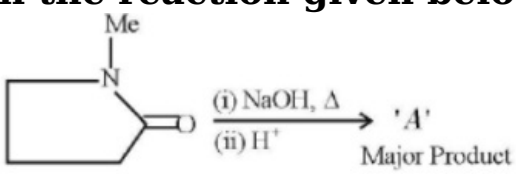
Answer: A

Solution:



Question26

In the reaction given below



'A' is

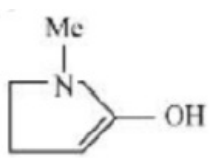
[13-Apr-2023 shift 1]

Options:

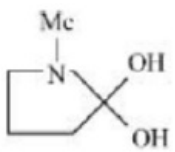
A.

B.

C.

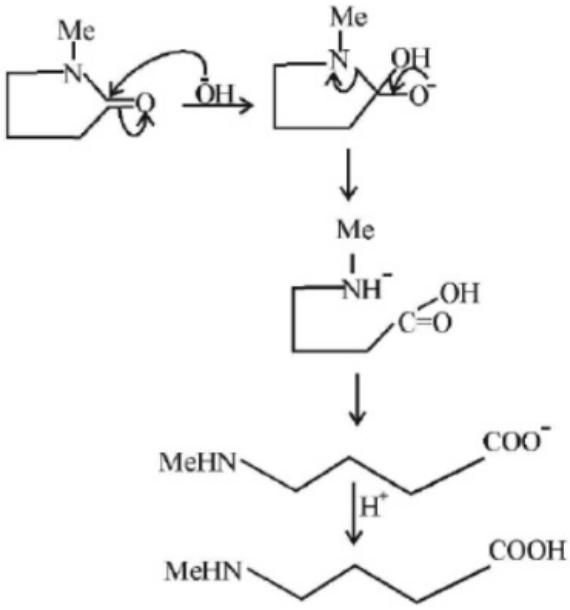


D.



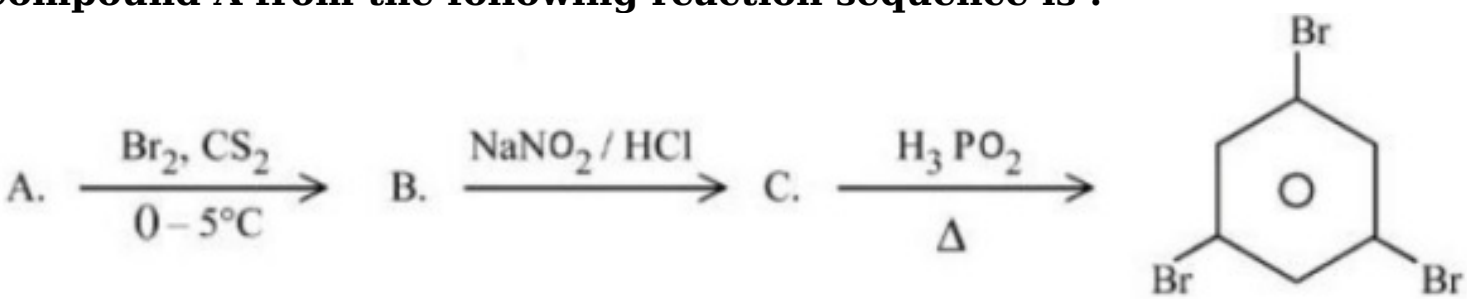
Answer: B

Solution:



Question27

Compound A from the following reaction sequence is :



[13-Apr-2023 shift 2]

Options:

A. Phenol

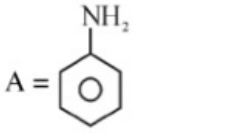
B. Benzoic Acid

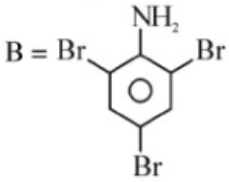
C. Aniline

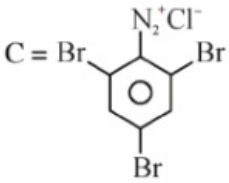
D. Salicylic Acid

Answer: C

Solution:

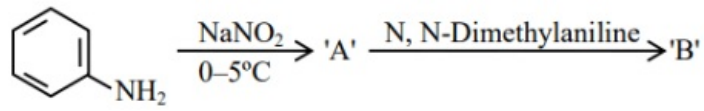






Question28

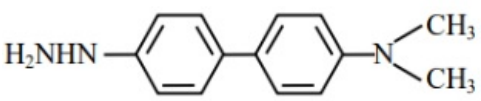
Consider the following sequence of reaction :



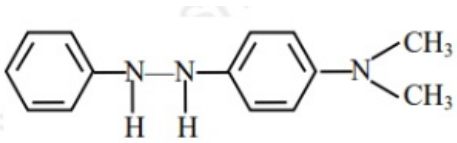
The product ' B ' is :
[15-Apr-2023 shift 1]

Options:

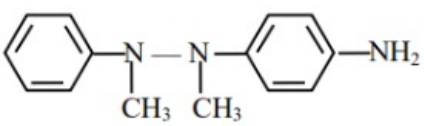
A.



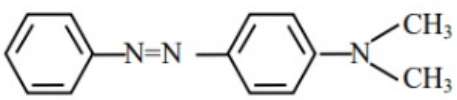
B.



C.

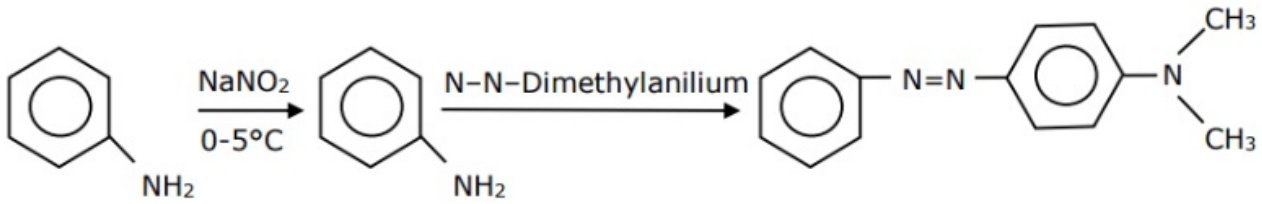


D.

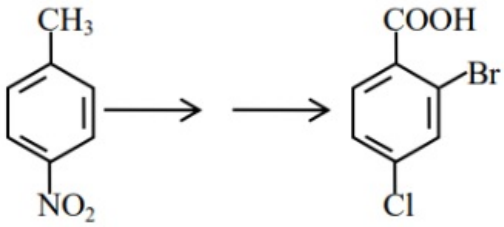


Answer: D

Solution:



Question29



In the above conversion the correct sequence of reagents to be added is :

Options :

[15-Apr-2023 shift 1]

Options:

A. (i) Br_2 / Fe, (ii) Fe / H^+, (iii) $KMnO_4$, (iv) Cl_2

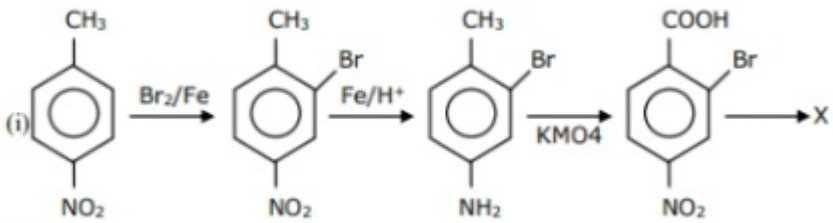
B. (i) Br_2 / Fe, (ii) Fe / H^+, (iii) HONO, (iv) CuCl, (v) $KMnO_4$

C. (i) Fe / H^+, (ii) HONO, (iii) CuCl, (iv) $KMnO_4$, (v) Br_2

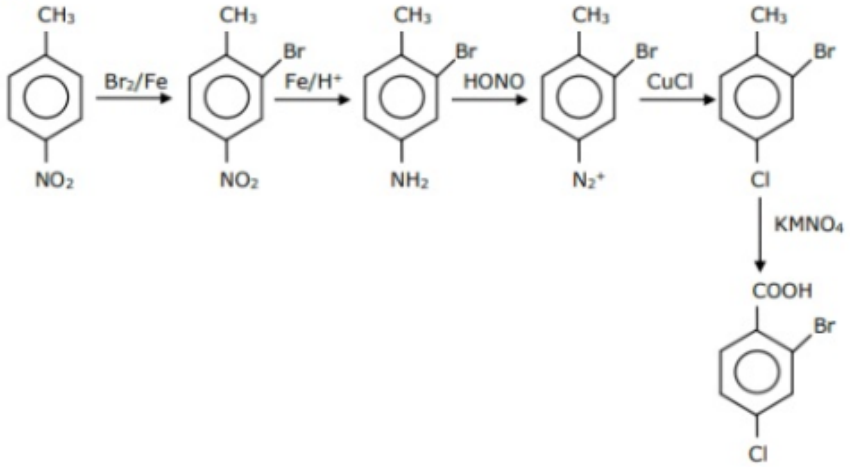
D. (i) $KMnO_4$, (ii) Br_2 / Fe, (iii) Fe / H^+, (iv) Cl_2,

Answer: B

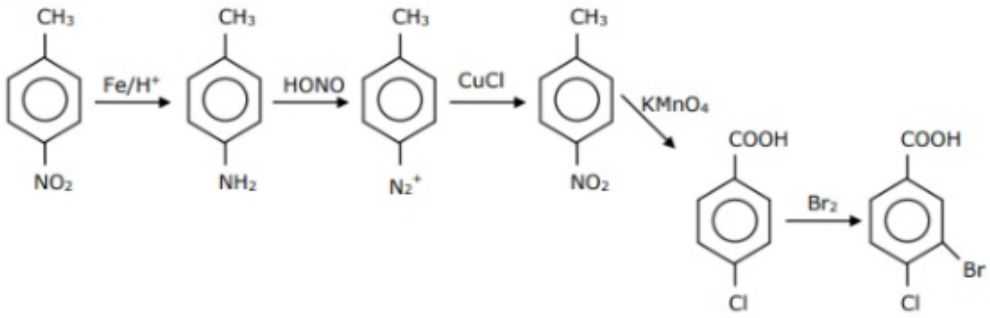
Solution:



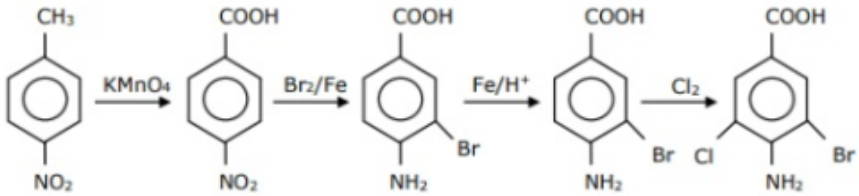
(ii)



(iii)



(iv)



Question30

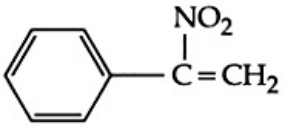
In the given reaction sequence, the major product ′C′ is :

$$C_8H_{10} \xrightarrow[H_2SO_4]{HNO_3} A \xrightarrow[\Delta]{Br_2} B \xrightarrow[KOH]{\text{alcoholic}} C$$

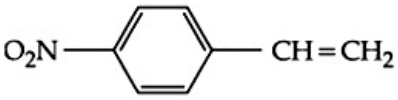
[24-Jun-2022-Shift-1]

Options:

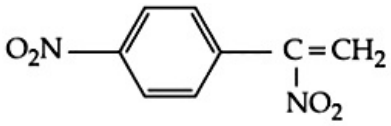
A.



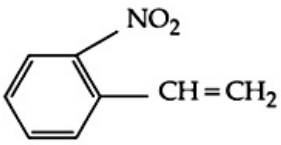
B.



C.



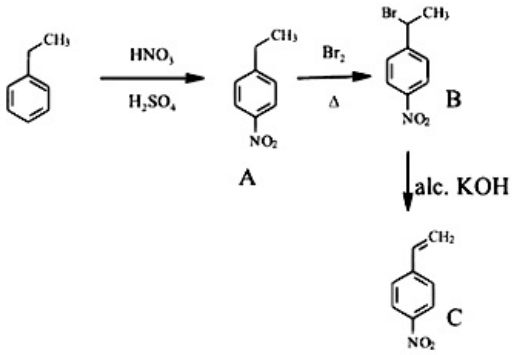
D.



Answer: B

Solution:

Solution:
C_8H_{10} DU = 9 − 5 = 4



Question31

The conversion of propan-1-ol to n-butylamine involves the sequential addition of reagents. The correct sequential order of reagents is [24-Jun-2022-Shift-2]

Options:

A. (i) $SOCl_2$ (ii) KCN (iii) H_2 / Ni, Na(Hg) / C_2H_5OH

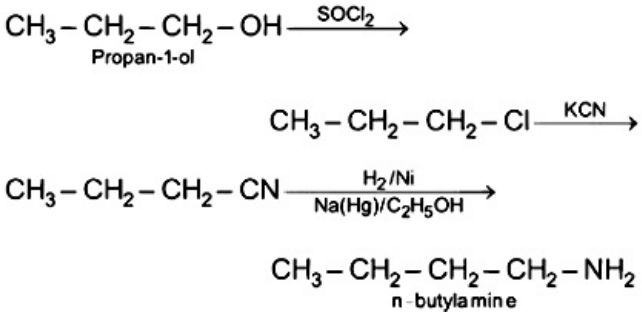
B. (i) HCl (ii) H_2 / Ni, Na(Hg) / C_2H_5OH

C. (i) $SOCl_2$ (ii) KCN (iii) CH_3NH_2

D. (i) HCl (ii) CH_3NH_2

Answer: A

Solution:



Question32

The reaction of
$R - \overset{\overset{O}{\|}}{C} - NH_2$
with bromine and KOH gives RNH_2 as the end product. Which one of the following is the intermediate product formed in this reation?
[25-Jun-2022-Shift-1]

Options:

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

B. $R - NH - Br$

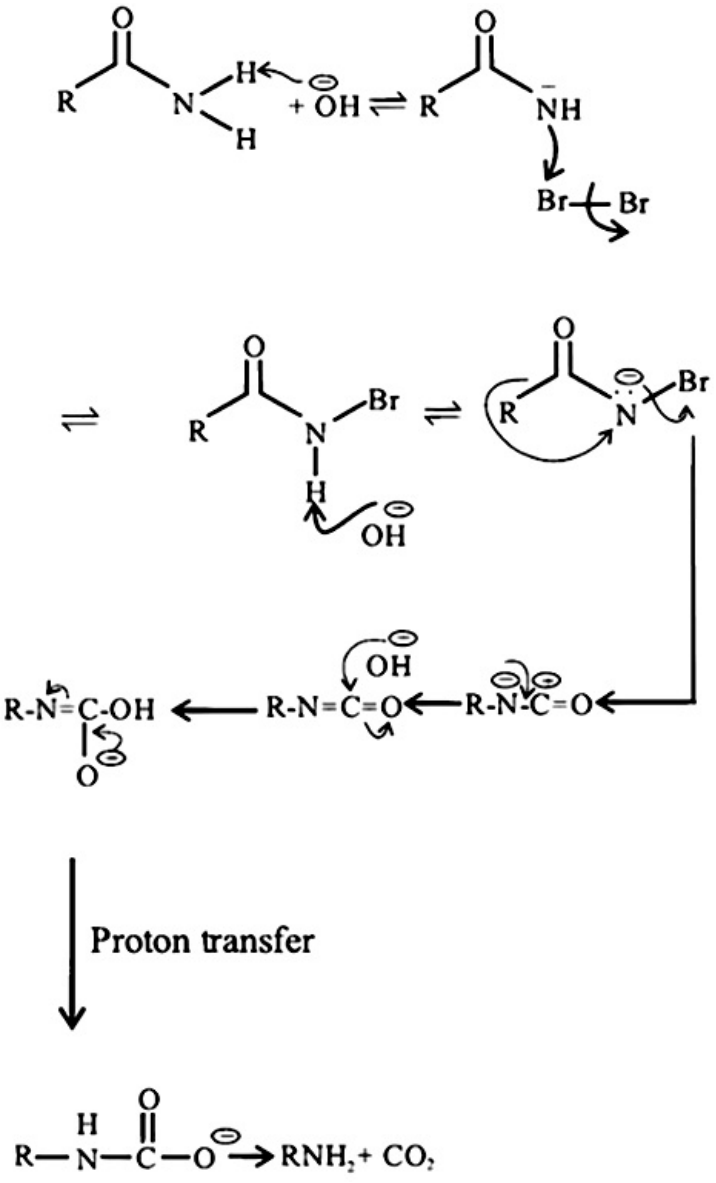
C. $R - N = C = O$

D. $R - \overset{\overset{O}{\|}}{C} - NBr_2$

Answer: C

Solution:

Solution:
The given reaction is Hoffmann-Bromide degradation method.



Question33

During halogen test, sodium fusion extract is boiled with concentrated HNO_3 to

[25-Jun-2022-Shift-2]

Options:

A. remove unreacted sodium

B. decompose cyanide or sulphide of sodium

C. extract halogen from organic compound

D. maintain the pH of extract.

Answer: B

Solution:

During test for halogen, if nitrogen or sulphur is also present in the compound, then sodium fusion extract is first boiled with concentrated nitric acid to decompose cyanide or sulphide of sodium formed during Lassaigne's test.

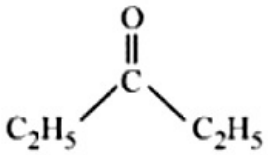
Question34

Which of the following ketone will NOT give enamine on treatment with secondary amines? [where t-Bu is .C(CH$_3$)$_3$]

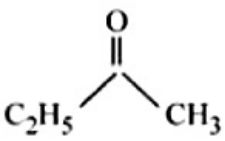
[25-Jun-2022-Shift-2]

Options:

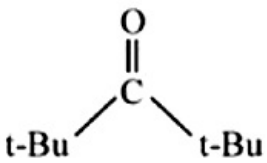
A.



B.



C.

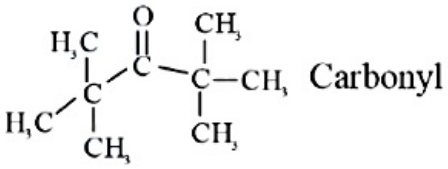


D.

Answer: C

Solution:

Solution:
Enamine formation is an example of nucleophilic addition elimination reaction Since in ketone



Group is highly sterically hindered hence attack of nucleophile will not be possible.

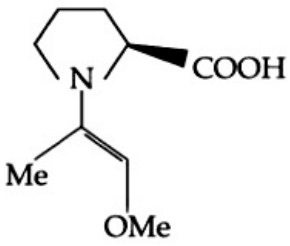
Question35

Among the following structures, which will show the most stable

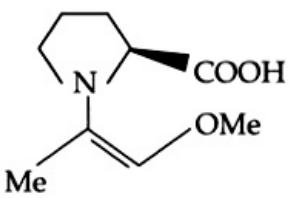
enamine formation? (Where Me is $-CH_3$)
[26-Jun-2022-Shift-1]

Options:

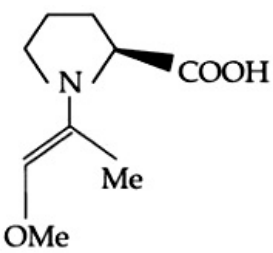
A.



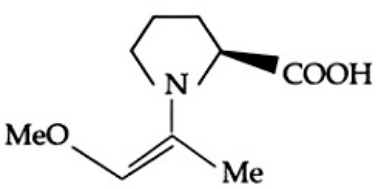
B.



C.



D.



Answer: C

Solution:

Solution:
All these enamines are interconvertible through their resonating structures. So most stable form is ‘C’ due to steric factor.

Question36

Which statement is NOT correct for p-toluene sulphonyl chloride? [26-Jun-2022-Shift-2]

Options:

A. It is known as Hinsberg's reagent.

B. It is used to distinguish primary and secondary amines.

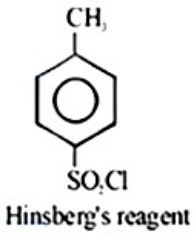
C. On treatment with secondary amine, it leads to a product, that is soluble in alkali.

D. It doesn't react with tertiary amines.

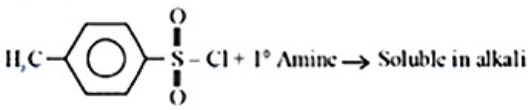
Answer: C

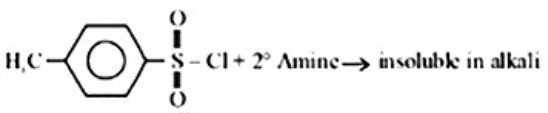
Solution:

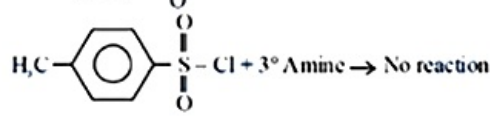
Solution:



Hinsberg's reagent

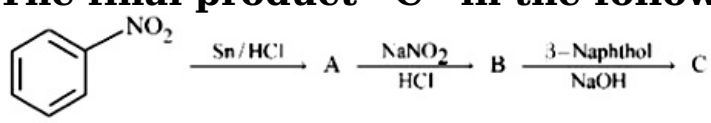






Question37

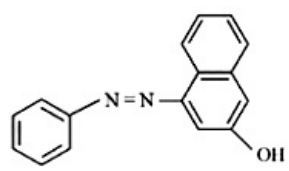
The final product ' C ' in the following series of reactions



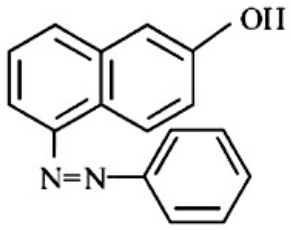
[26-Jun-2022-Shift-2]

Options:

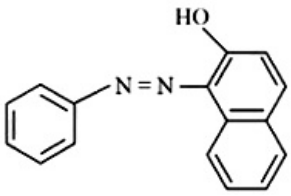
A.



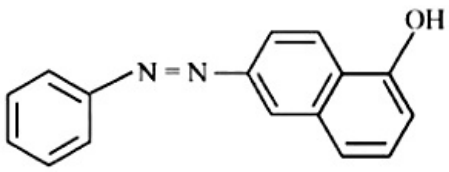
B.



C.

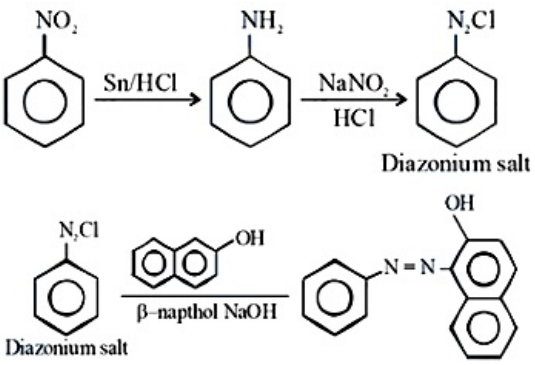


D.



Answer: C

Solution:



Question38

Given below are two statements :
Statement I : In Hofmann degradation reaction, the migration of only an alkyl group takes place from carbonyl carbon of the amide to the nitrogen atom.
Statement II : The group is migrated in Hofmann degradation reaction to electron deficient atom.
In the light of the above statements, choose the most appropriate answer from the options given below:
[27-Jun-2022-Shift-1]

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.

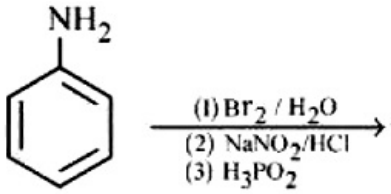
Answer: D

Solution:

Solution:
Hofmann bromamide degradation
In this degradation, the migration of the alkyl/aryl group occurs to the electron-deficient nitrogen (nitrene).
Statement (I) is not absolutely correct as it mentions only the alkyl group, whereas migration of aryl groups may also occur depending on migratory aptitude.
Statement (II) is correct as the migration occurs to the electron-deficient atom.

Question39

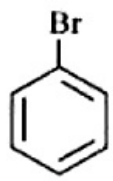
Identify the major product formed in the following sequence of reactions:



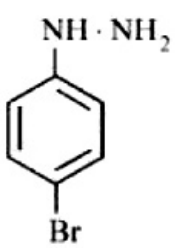
[28-Jun-2022-Shift-1]

Options:

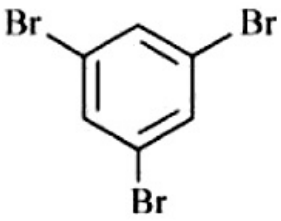
A.



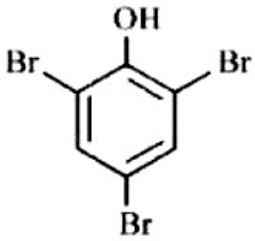
B.



C.



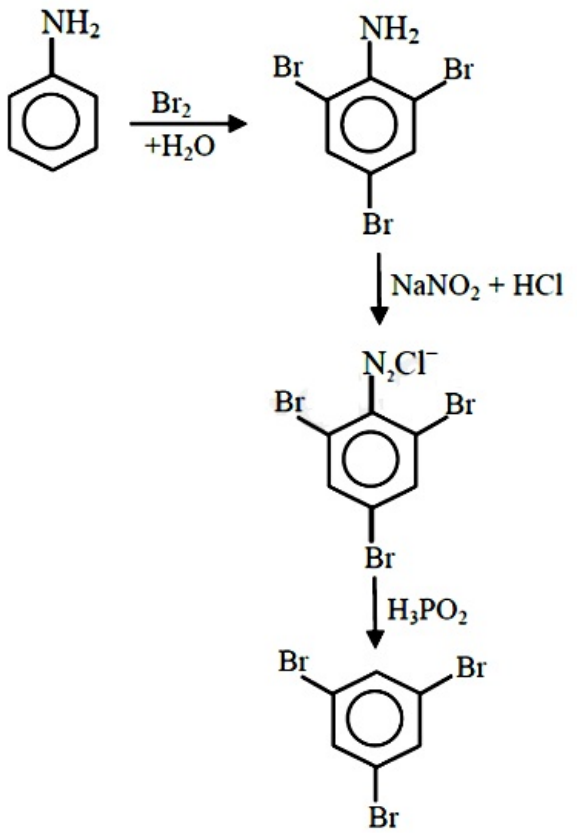
D.



Answer: C

Solution:

Solution:



Question40

A primary aliphatic amine on reaction with nitrous acid in cold (273K) and there after raising temperature of reaction mixture to room temperature (298K), gives a/an
[28-Jun-2022-Shift-1]

Options:

A. nitrile

B. alcohol

C. diazonium salt

D. secondary amine

Answer: B

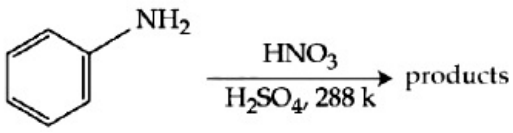
Solution:

Solution:

$$R-NH_2 \xrightarrow[+HCl]{NaNO_2} R-N_2^+ \rightarrow R^+ \xrightarrow[H_2O]{} R-OH$$

Question41

With respect to the following reaction, consider the given statements :



(A) o-Nitroaniline and p-nitroaniline are the predominant products.
(B) p-Nitroaniline and m-nitroaniline are the predominant products.
(C) HNO_3 acts as an acid.
(D) H_2SO_4 acts as an acid.
Choose the correct option.
[28-Jun-2022-Shift-2]

Options:

A. (A) and (C) are correct statements.

B. (A) and (D) are correct statements.

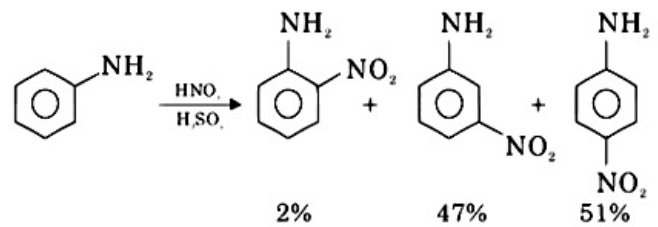
C. (B) and (D) are correct statements.

D. (B) and (C) are correct statements.

Answer: C

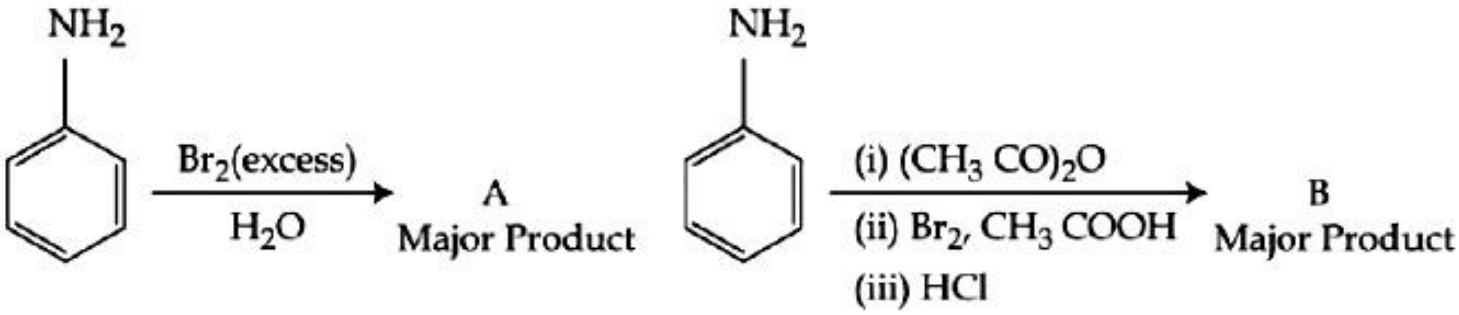
Solution:

Solution:



$$HNO_3 + H_2SO_4 \rightarrow NO_2^+$$
Base Acid

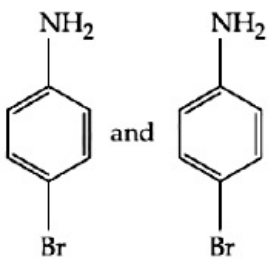
Question42



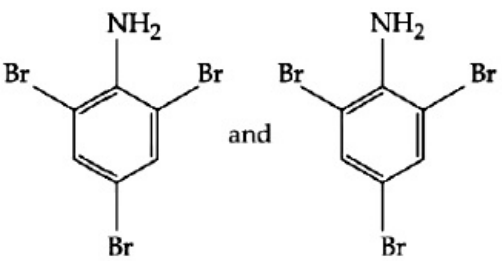
Consider the above reactions, the product A and product B respectively are
[29-Jun-2022-Shift-1]

Options:

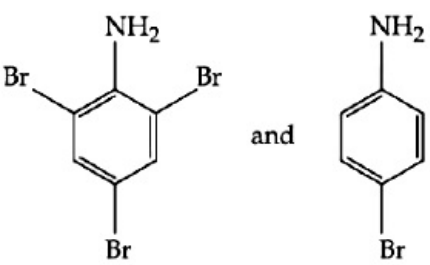
A.



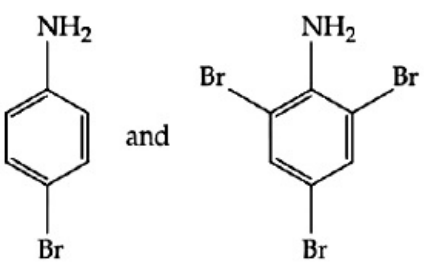
B.



C.



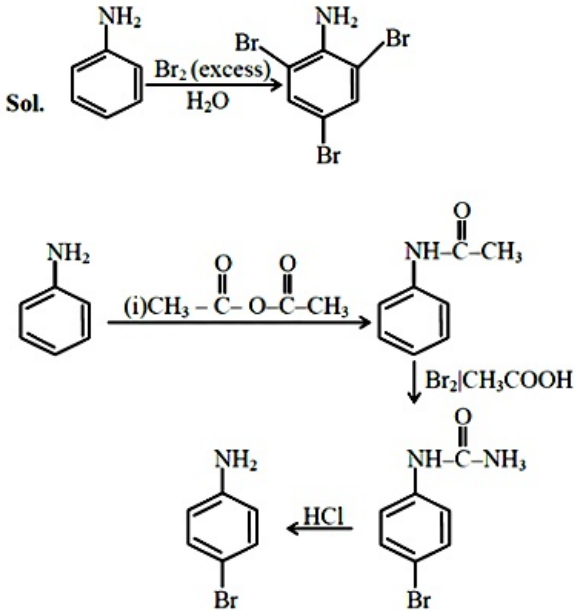
D.



Answer: C

Solution:

Solution:



Question43

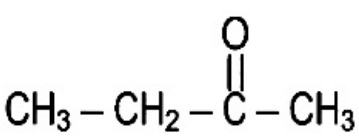
$$CH_3 - CH_2 - CN \xrightarrow[\text{Ether}]{CH_3MgBr} A \xrightarrow{H_3O^+} B \xrightarrow[HCl]{Zn-Hg} C$$

The correct structure of [25-Jul-2022-Shift-2]

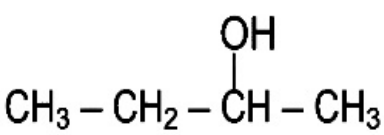
Options:

A. $CH_3 - CH_2 - CH_2 - CH_3$

B.



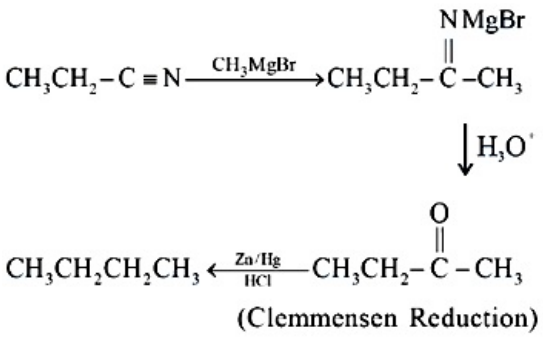
C.



D. $CH_3 - CH_2 - CH = CH_2$

Answer: A

Solution:



Question44

Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A) : Experimental reaction of CH_3Cl with aniline and anhydrous $AlCl_3$ does not give o and p methylaniline.
Reason (R): The $-NH_2$ group of aniline becomes deactivating because of salt formation with anhydrous $AlCl_3$ and hence yields m-methyl aniline as the product.
In the light of the above statements, choose the most appropriate answer from the options given below :
[26-Jul-2022-Shift-1]

Options:

A. Both A and R are true and (R) is the correct explanation of (A).

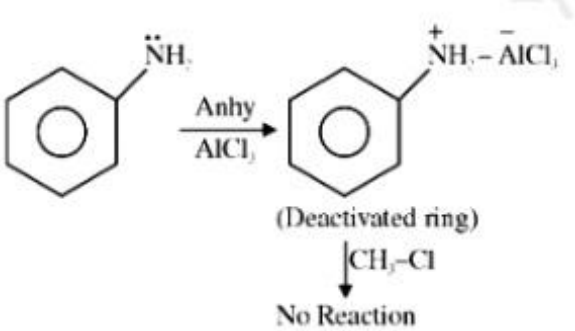
B. Both A and R are true but (R) is not the correct explanation of (A).

C. (A) is true, but (R) is false.

D. (A) is false, but (R) is true.

Answer: C

Solution:



Aniline does not undergo Friedel Craft reaction because the reagent AlCl3 being electron deficient acts as a Lewis acid.

Question45

Hydrolysis of which compound will give carbolic acid?
[26-Jul-2022-Shift-2]

Options:

A. Cumene

B. Benzenediazonium chloride

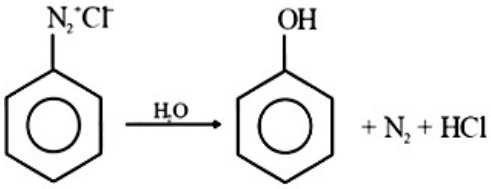
C. Benzal chloride

D. Ethylene glycol ketal

Answer: B

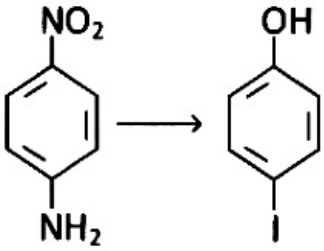
Solution:

Solution:



Question46

The correct sequential order of the reagents for the given reaction is



[26-Jul-2022-Shift-2]

Options:

A. HNO_2, Fe / H^+, HNO_2, KI, H_2O / H^+

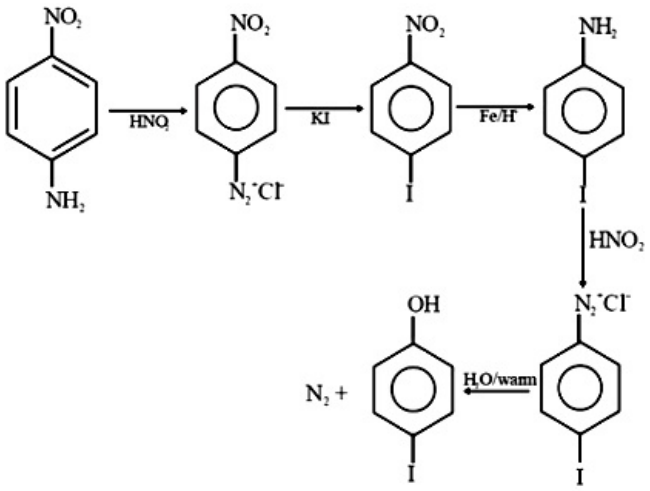
B. HNO_2, KI, Fe / H^+, HNO_2, H_2O/ warm

C. HNO_2, KI, HNO_2, Fe / H^+, H_2O / H^+

D. HNO_2, Fe / H^+, KI, HNO_2, H_2O/ warm

Answer: B

Solution:



Question47

Match List I with List II.

List I	List II
(A) Benzenesulphonyl chloride	(I)Test for primary amines
(B) Hoffmann bromamide reaction	(II) Anti Saytzeff
(C) Carbylamine reaction	(III) Hinsberg reagent
(D) Hoffmann orientation	(IV) Known reaction of Isocyanates.

Choose the correct answer from the options given below: [27-Jul-2022-Shift-1]

Options:

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

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

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

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

Answer: C

Solution:

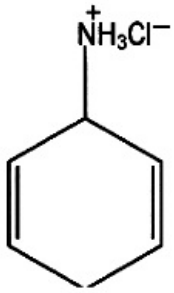
Solution:
(A) Benzene sulphonyl chloride is also known as Hinsberg reagent.
(B) Hoffmann bromamide reaction involves conversion of amide to amine having one C atom less. This reaction involves isocyanate as intermediate.
(C) Carbylamine reaction is a test given by all primary amines.
(D) Hoffmann orientation refers to the addition of molecules to unsymmetrical alkenes according to anti Saytzeff's rule.
Correct match is
A-III, B-IV, C-I, D-II

Question48

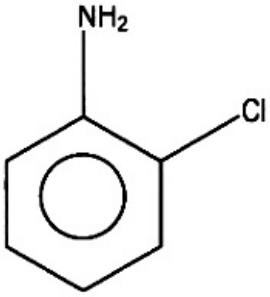
An organic compound ' A ' contains nitrogen and chlorine. It dissolves readily in water to give a solution that turns litmus red. Titration of compound ´A´ with standard base indicates that the molecular weight of ´A´ is 131 ± 2. When a sample of ´A´ is treated with aq. NaOH, a liquid separates which contains N but not Cl. Treatment of the obtained liquid with nitrous acid followed by phenol gives orange precipitate. The compound ' A´ is :
[27-Jul-2022-Shift-2]

Options:

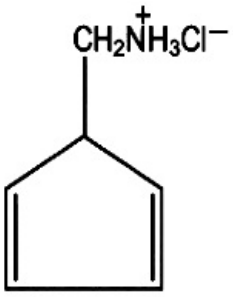
A.



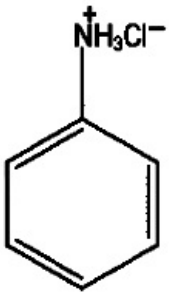
B.



C.

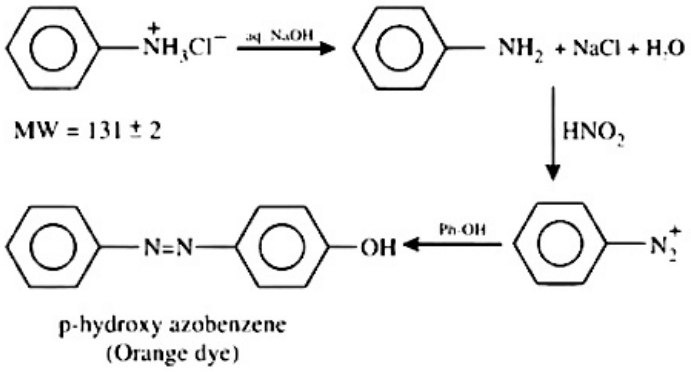


D.



Answer: D

Solution:



Question49

Identify the correct statement for the below given transformation.

$$CH_3-CH_2-CH_2-\underset{\oplus N(CH_3)_3}{CH}-CH_3 \xrightarrow[C_2H_5OH]{C_2H_5ONa} \underset{\text{(Major)}}{A} + \underset{\text{(Minor)}}{B}$$

[28-Jul-2022-Shift-1]

Options:

A. A − $CH_3CH_2CH=CH-CH_3$, B − $CH_3CH_2CH_2CH=CH_2$, Saytzeff products

B. A − $CH_3CH_2CH=CH-CH_3$, B − $CH_3CH_2CH_2CH=CH_2$, Hofmann products

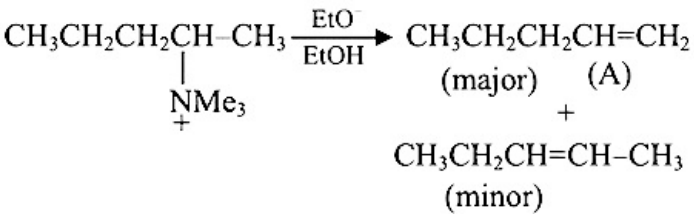
C. A − $CH_3CH_2CH_2CH=CH_2$, B − $CH_3CH_2CH=CHCH_3$, Hofmann products

D. A − $CH_3CH_2CH_2CH=CH_2$, B − $CH_3CH_2CH=CHCH_3$, Saytzeff products

Answer: C

Solution:

Solution:



Question50

Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R
Assertion A : Aniline on nitration yields ortho, meta & para nitro derivatives of aniline.
Reason R : Nitrating mixture is a strong acidic mixture.
In the light of the above statements, choose the correct answer from the

options given below
[28-Jul-2022-Shift-2]

Options:

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is NOT the correct explanation of A

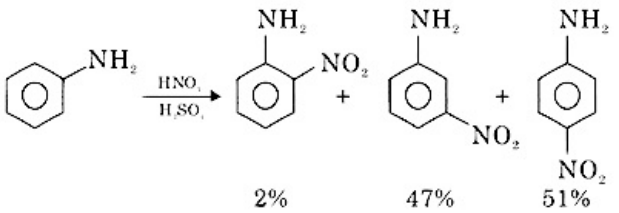
C. A is true but R is false

D. A is false but R is true

Answer: A

Solution:

Solution:



Due to formation of anilinium ion in acidic medium meta product is also obtained in significant amount

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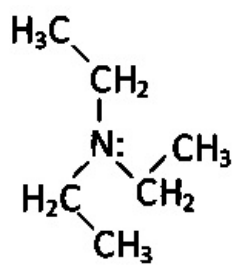
Question51

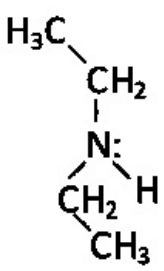
Which among the following is the strongest Bronsted base?
[29-Jul-2022-Shift-1]

Options:

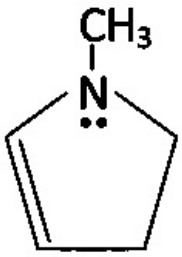
A.



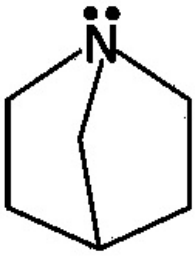
B.



C.



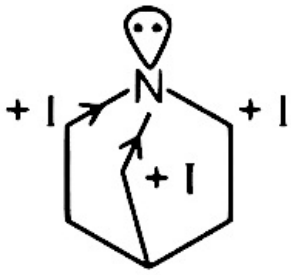
D.



Answer: D

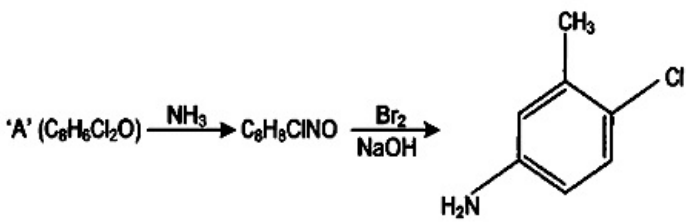
Solution:

Solution:



is the strongest base among the given compounds due to the maximum +1 effect and the lone pair of N is not in dynamic state so it can be donated easily.

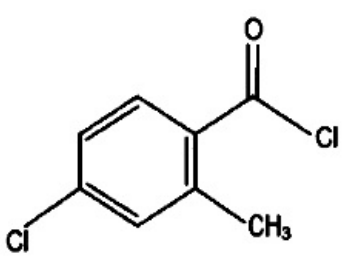
Question52



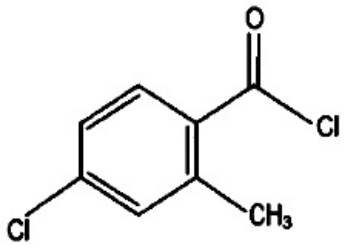
Consider the above reaction, the compound A′ is : [29-Jul-2022-Shift-1]

Options:

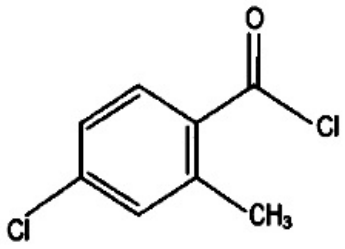
A.



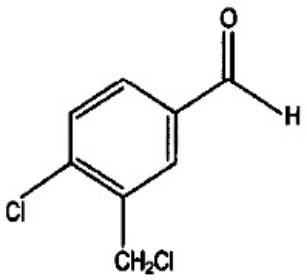
B.



C.



D.

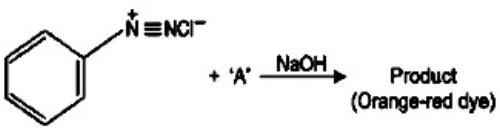


Answer: C

Solution:

Solution:

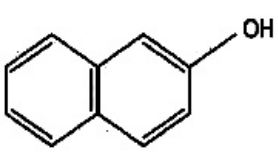
Question53



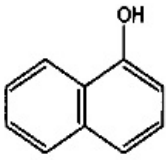
Which among the following represent reagent 'A'? [29-Jul-2022-Shift-1]

Options:

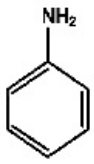
A.



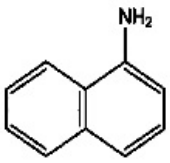
B.



C.

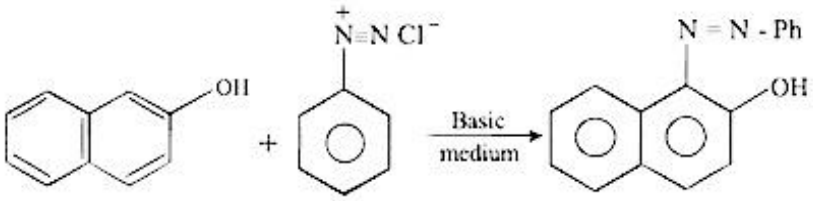


D.



Answer: A

Solution:

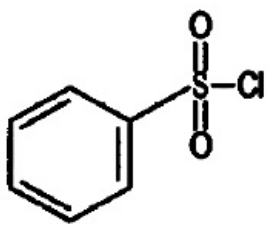


Question54

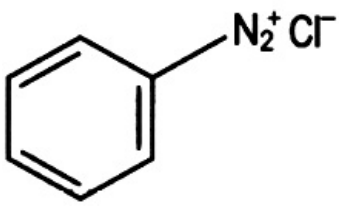
The Hinsberg reagent is
[29-Jul-2022-Shift-2]

Options:

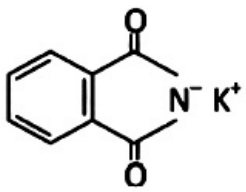
A.



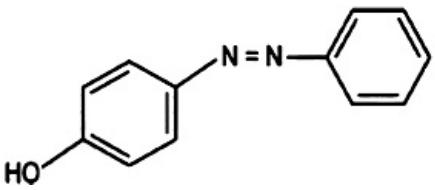
B.



C.



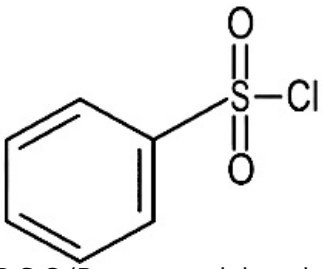
D.



Answer: A

Solution:

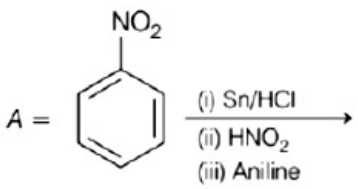
Solution:

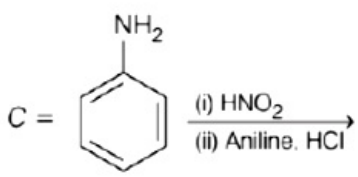


B.S.C (Benzene sulphonyl chloride) is known as Hinsberg Reagent.

Question55

Which of the following reaction(s) will not give p-amino azobenzene?





[25 Feb 2021 Shift 1]

Options:

A. A only

B. C only

C. B only

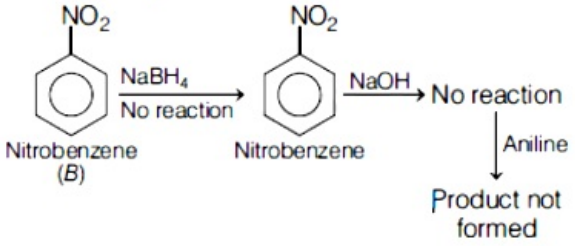
D. A and B

Answer: C

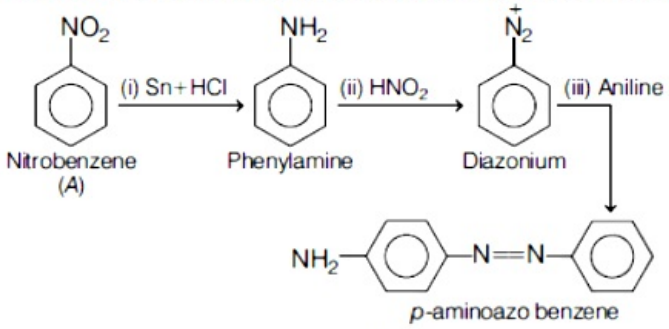
Solution:

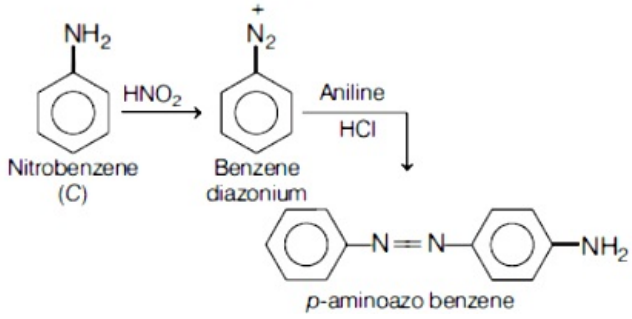
Solution:

Nitrobenzene in presence of $NaBH_4$, $NaOH$ and aniline will not give p-amino azobenzene.



In case of (A) and (C), coupling reaction takes place as the medium is quite acidic follows



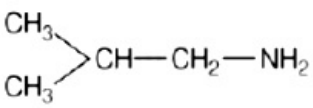


Question56

The total number of amines among the following which can be synthesised by Gabriel synthesis is [24 Feb 2021 Shift 2]

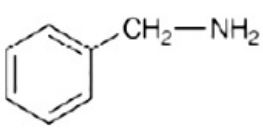
Options:

A.

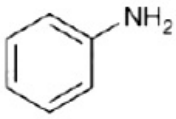


B. $CH_3CH_2NH_2$

C.



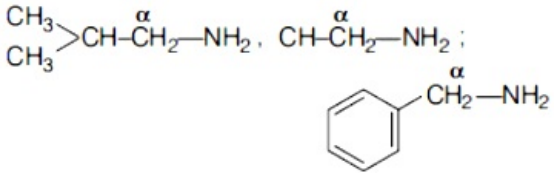
D.



Answer: C

Solution:

Solution:
Gabriel phthalimide synthesis is used to prepare
1° aliphatic or alicyclic amine. Hence, amine which can be synthesised by Gabriel phthalimide synthesis method contains α-carbon.
Aniline ($C_6H_5NH_2$) does not contain $\alpha - C$ cannot be prepared by Gabriel reaction.
Rest amines all contain $\alpha - C$ in its respective position, hence they can easily give Gabriel phthalimide reaction.



∴ Three amins out of given four anions can be prepared by Gabriel synthesis.

Question57

A. phenyl methanamine
B. N,N-dimethylaniline
C. N-methyl aniline
D. Benzenamine
Choose the correct order of basic nature of the above amines.
[26 Feb 2021 Shift 2]

Options:

A. A > C > B > D

B. D > C > B > A

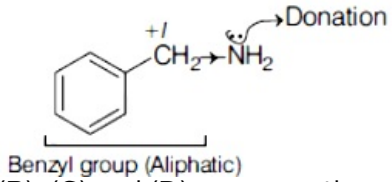
C. D > B > C > A

D. A > B > C > D

Answer: D

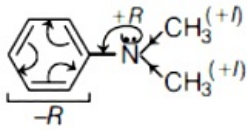
Solution:

Solution:
In phenyl methanamine, the lone pair on nitrogen of $-NH_2$ group is localised and does not undergoes resonance as attached to sp^3-hybridised C-atom.
Phenyl methanamine or benzyl amine

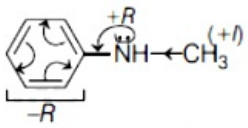


(B), (C) and (D) are aromatic amines in which lone pair of electrons of N-atoms goes in resonance

(+ R effect) with the benzene ring. So, Lewis basicity or donation of lone of electrons of these amines will be decreased in comparison to (A).

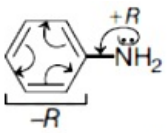
(B) 

$+I$ effects of two $-CH_3$ groups are in compensation with $-R$ effect of the ring.

(C) 

N-methyl aniline (2°-amine)

+ I effect of one $-CH_3$ group is trying to compensate $-R$ effect of the ring.

(D) 

Benzenamine or aniline (1° amine)

It has no + leffect on N -atom to outweigh $-R$-effect of the ring.

So, A is purely aliphatic 1°-amine. B is aromatic 3°-amine with more aliphatic nature (for two $-CH_3$ groups). C is aromatic 2°-amine with less aliphatic nature (for one $-CH_3$ group).

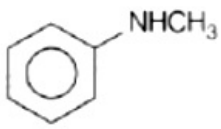
D is purely aromatic 1°-amine. Hence basicity order is A > B > C > D.

Question58

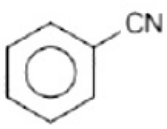
Carbylamines test is used to detect the presence of primary amino group in an organic compound. Which of the following compound is formed when this test is performed with aniline?
[25 Feb 2021 Shift 2]

Options:

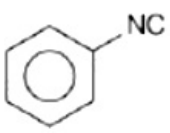
A.



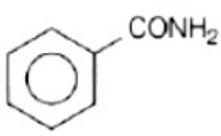
B.



C.



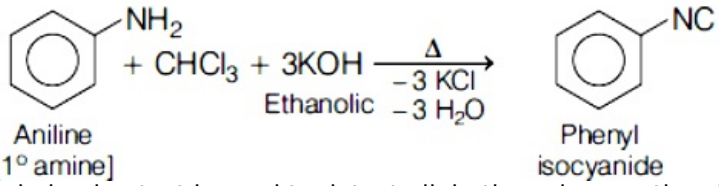
D.



Answer: B

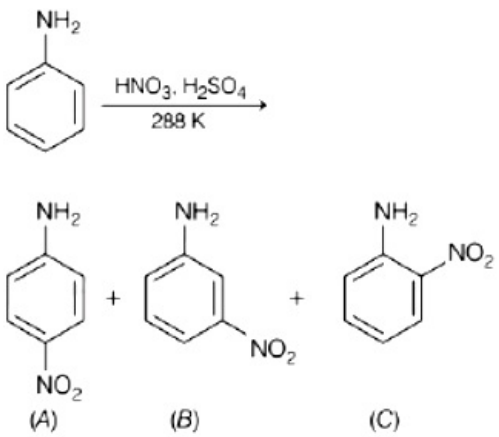
Solution:

Solution:
Aniline on carbylamine reaction produces a foul smelling gas, phenyl isocyanide (C_6H_5NC).



Carbylamine test is used to detect aliphatic and aromatic primary amines.

Question59



Correct statement about the given chemical reaction is [25 Feb 2021 Shift 2]

Options:

A. - $\ddot{N}H_2$ group is ortho and para directing, so product (B) is not possible.

B. reaction is possible and compound (B) will be the major product.

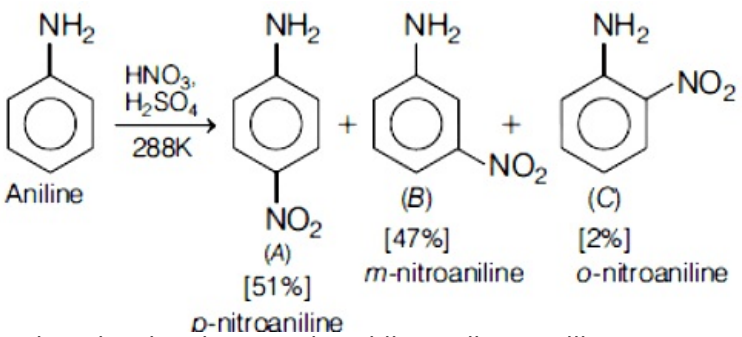
C. the reaction will form sulphonated product instead of nitration.

D. reaction is possible and compound (A) will be major product.

Answer: A

Solution:

Solution:



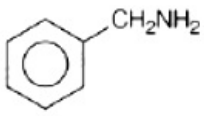
During nitration, in strongly acidic medium, aniline gets protonated to form the anilinium ion i.e, ($C_6H_5 - NH_3$) which is meta-directing as $-NH_3$ is an electron withdrawing ($-I$) group. As a result, we get meta-nitro aniline (B) as the major product.

Question60

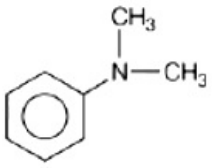
The diazonium salt of which of the following compounds will form a coloured dye on reaction with β-naphthol in NaOH ? [24 Feb 2021 Shift 2]

Options:

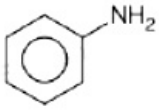
A.



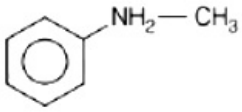
B.



C.



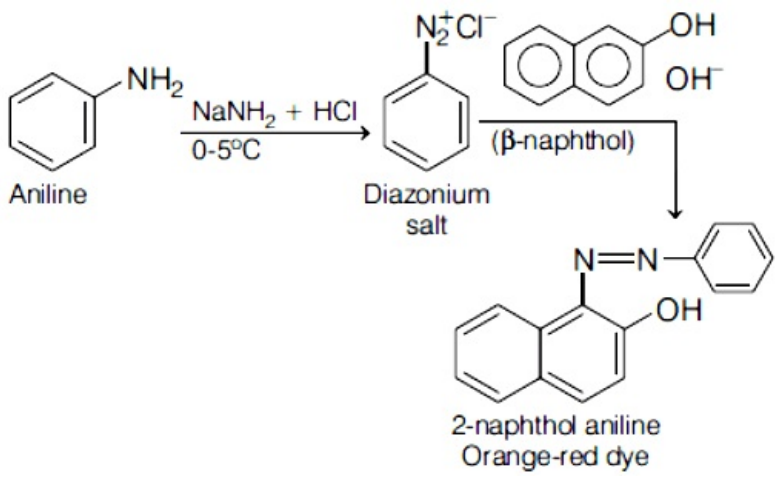
D.



Answer: C

Solution:

Solution:
Initially aniline reacts with diazotisation reagent to form diazonium salt. Then β-naphthol react with salt and orange-red dye is obtained. So, diazonium salt of aniline is used to prepare orange-red dye.



Question61

What is the correct sequence of reagents used for converting nitrobenzene into m-dibromo benzene?

[24 Feb 2021 Shift 2]

Options:

A. $\xrightarrow{NaNO_2}$ / $\xrightarrow{Ha}$ / $\xrightarrow{KBr}$ / $\xrightarrow{H^+}$

B. $\xrightarrow{Br_2/Fe}$ / $\xrightarrow{Sn/HCl}$ / $\xrightarrow{NaNO_2/HCl}$ / $\xrightarrow{CuBrHBr}$

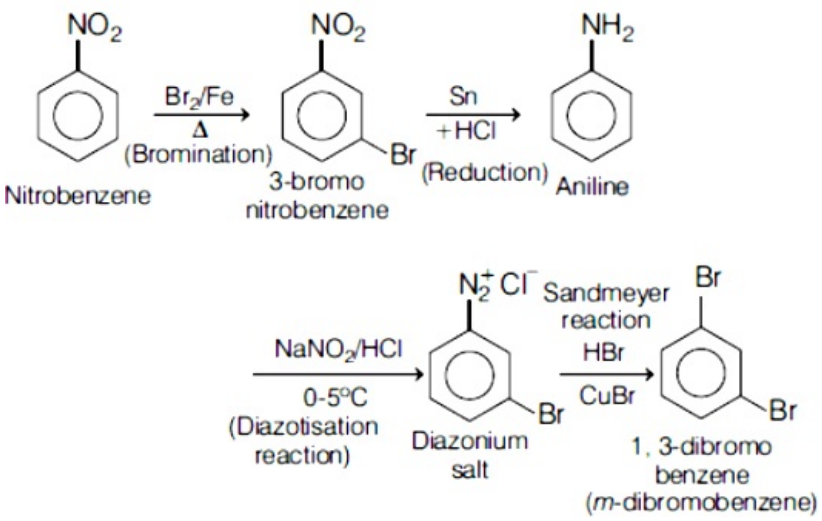
C. $\xrightarrow{Sn/HCl}$ / $\xrightarrow{KBr}$ / $\xrightarrow{Br_2}$ / $\xrightarrow{H^+}$

D. $\xrightarrow{SN/HCl}$ / $\xrightarrow{Br_2}$ / $\xrightarrow{NaNO_2}$ / $\xrightarrow{NaBr}$

Answer: B

Solution:

Solution:
In first step, NO_2 group is electron withdrawing group, it decreases the electron density in meta position and bromination occur in meta position. In second step, Sn/HCl used for reduction to convert $-NO_2$ to $-NH_2$ and form aniline. In next step, diazonium salt is formed and at last bromine replace $N_2^+Cl^-$ group to form 1 , 3-dibromobenzene.
Complete reaction is as follows



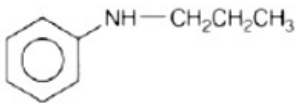
Question62

An amine on reaction with benzene sulphonyl chloride produces a compound insoluble in alkaline solution. This amine can be prepared by ammonolysis of ethyl chloride. The correct structure of amine is

[26 Feb 2021 Shift 1]

Options:

A.



B. $CH_3CH_2NH_2$

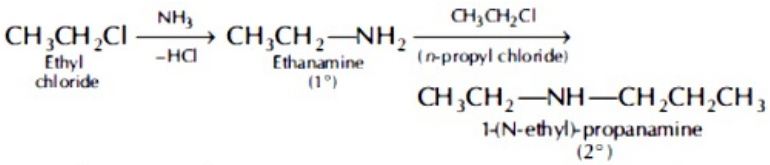
C. $CH_3CH_2CH_2NHCH_3$

D. $CH_3CH_2CH_2\overset{H}{N}-CH_2CH_3$

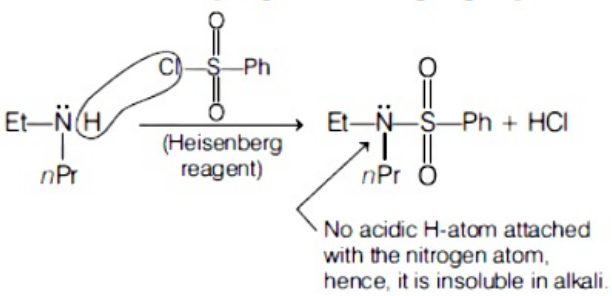
Answer: D

Solution:

Solution:
The amine on reaction with benzene sulphonyl chloride (Heisenberg reagent) produces a compound insoluble in alkali. It indicates the amine is a 2° amine. i.e. all options are possible except option (b) which is a 1° amine ($CH_3CH_2NH_2$).
As this 2° amine can be prepared by ammonolysis of ethyl chloride, the 2°-amine should have at least one ethyl (C_2H_5) group.
(a) $Ph-NH-CH_2CH_2CH_3$ does not have ethyl group.
(c) $CH_3CH_2CH_2-NH-CH_3$ does not have ethyl group.
(d) $CH_3CH_2CH_2-NH-CH_2CH_3$ has one ethyl group.
So, option (d) is the correct answer.
Preparation $CH_3CH_2CH_2-NH-CH_2CH_3$ by ammonolysisof CH_3CH_2Cl

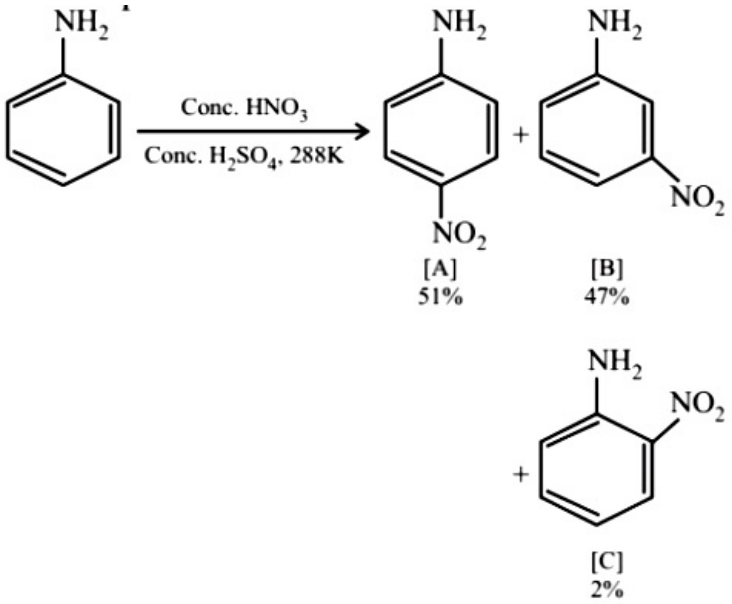


Heisenberg test of $CH_3CH_2-NH-CH_2CH_2CH_3$ or Et—NH—*n*Pr



Question63

In the following reaction the reason why metanitro product also formed is



[24 Feb 2021 Shift 1]

Options:

A. low temperature

B. $-\mathrm{N}\,\mathrm{H}_2$ group is highly meta-directive

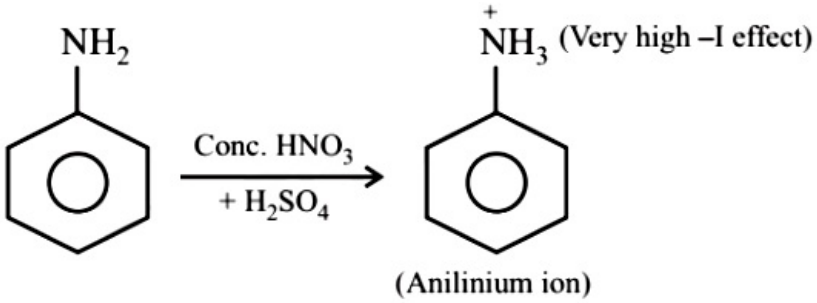
C. Formation of anilinium ion

D. $-\mathrm{N}\,\mathrm{O}_2$ substitution always takes place at meta-position

Answer: C

Solution:

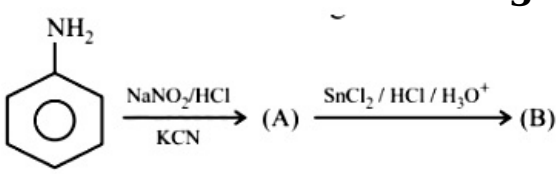
Solution:



The positive anilinium nitrogen deactivates the benzene ring due to $-\mathrm{I}$ effect. It will behaves m-directing group as $-\mathrm{I}$ effect is more on $-\mathrm{o}$ and $-\mathrm{p}$ position and less on m position. Therefore $-\mathrm{m}$ product is also formed along with $-\mathrm{o}$ and $-\mathrm{p}$ product.

Question64

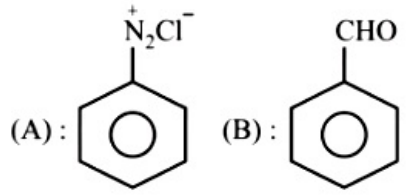
'A' and 'B' in the following reactions are :



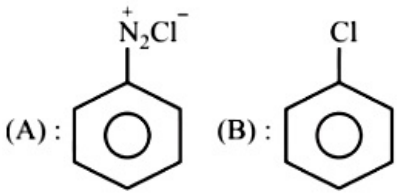
[24 Feb 2021 Shift 1]

Options:

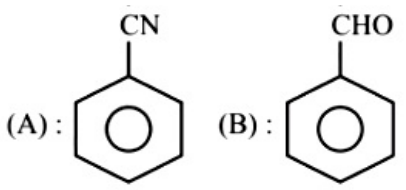
A.



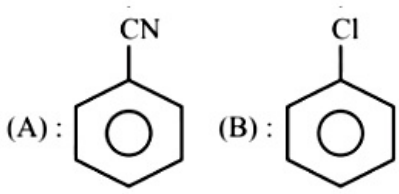
B.



C.



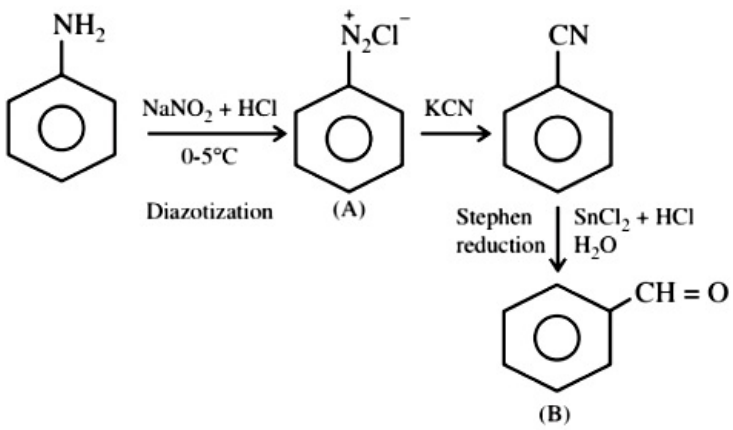
D.



Answer: C

Solution:

Solution:



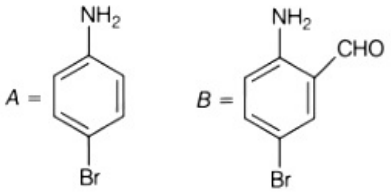
Question65

Hofmann bromamide degradation of benzamide gives product A, which

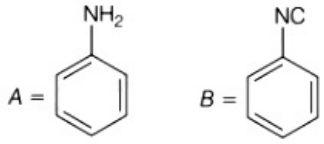
upon heating with $CHCl_3$ and NaOH gives product B. The structures of A and B are
[17 Mar 2021 Shift 1]

Options:

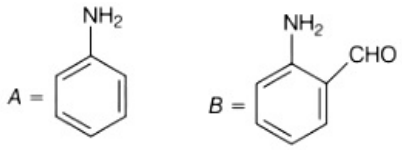
A.



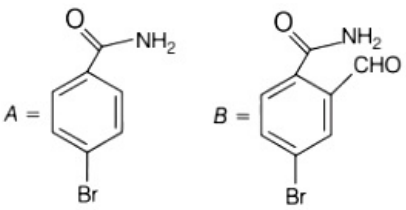
B.



C.



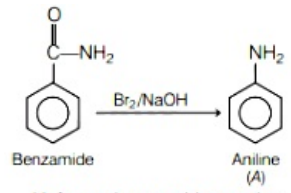
D.



Answer: C

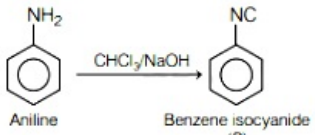
Solution:

Solution:
Hofmann bromamide degradation of benzamide gives product aniline (A), which upon heating with $CHCl_3$ and NaOH gives product benzene isocyanide (B), by carbylamine reaction.
Hofmann bromamide degradation method is for preparation of primary amines by treating an amide with bromine in an aqueous or ethanolic solution of sodium hydroxide. The amine formed contains one carbon less than that present in the amide.



Hofmann bromamide reaction

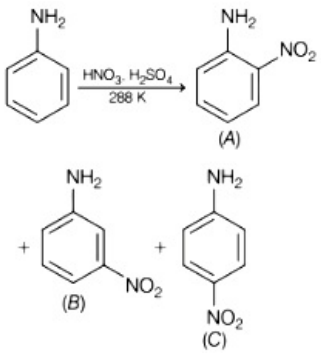
Aliphatic and aromatic primary amines on heating with chloroform and ethanolic potassium hydroxide form isocyanides or carbylamines which are foul smelling substances.



Carbylamine reaction

Note Secondary and tertiary amines do not show this reaction. This reaction is known as carbylamine reaction or isocyanide test and is used as a test for primary amines.

Question66



Consider the given reaction, percentage yield of [18 Mar 2021 Shift 2]

Options:

A. (C) > (A) > (B)

B. (B) > (C) > (A)

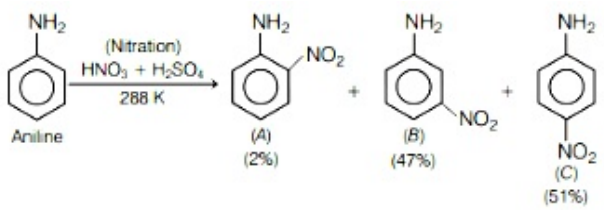
C. (A) > (C) > (B)

D. (C) > (B) > (A)

Answer: C

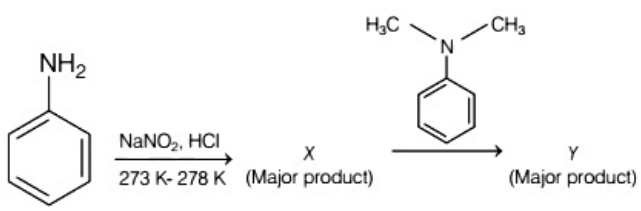
Solution:

Solution:
During nitration of aniline, meta-nitroaniline is also formed as product due to formation of NH_3^+group which is meta directing group under strongly acidic medium. The percentage of p, m and o product is 51%, 47% and 2%, respectively. Reaction is as follows



% yield order is C > B > A.

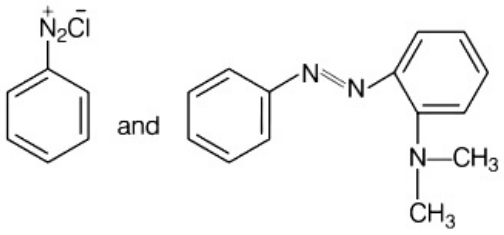
Question67



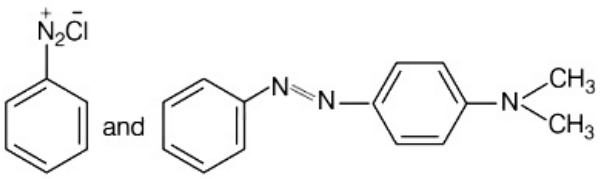
[18 Mar 2021 Shift 1]

Options:

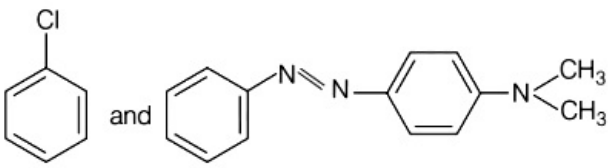
A.



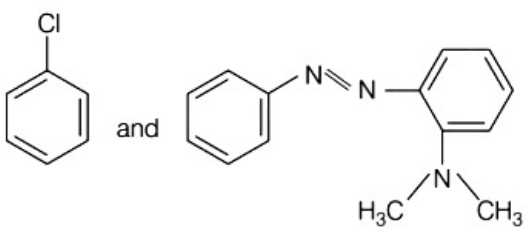
B.



C.



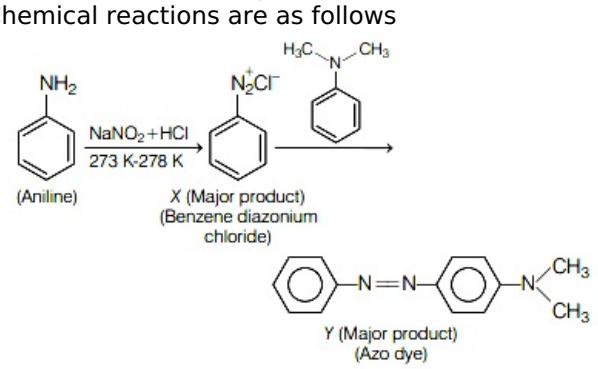
D.



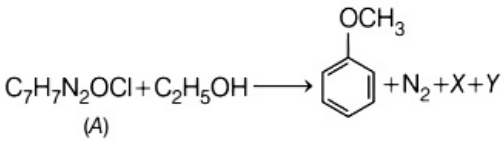
Answer: B

Solution:

Solution:
Aniline reacts with sodium nitrite and HCl in cold condition to form benzene diazonium chloride (X) and on further reaction, it form azo dye (Y).
Chemical reactions are as follows



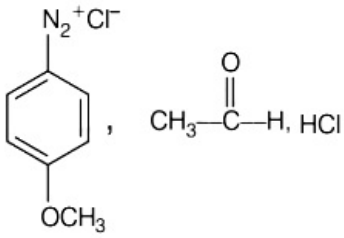
Question68



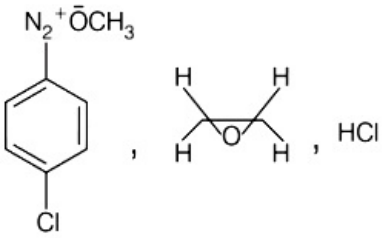
In the above reaction, the structural formula of (A), X and Y respectively are
[17 Mar 2021 Shift 2]

Options:

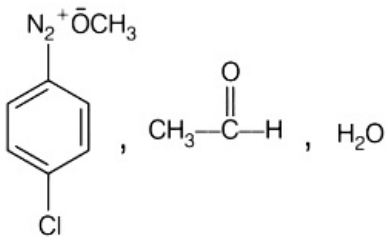
A.



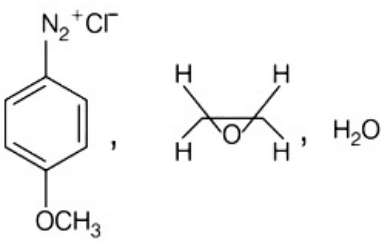
B.



C.



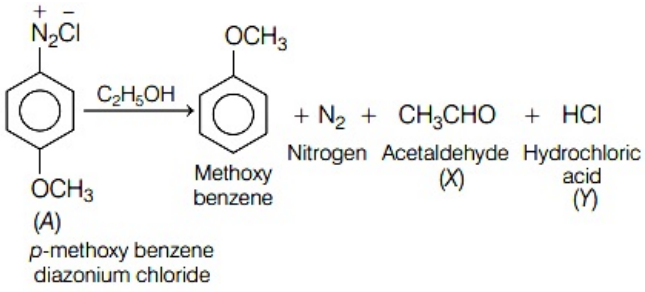
D.



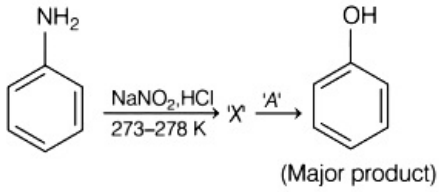
Answer: A

Solution:

Solution:
The structural formula of (A), X and Y are p-methoxy benzene diazonium chloride, acetaldehyde and hydrochloric acid respectively.
Reaction involved are as follows



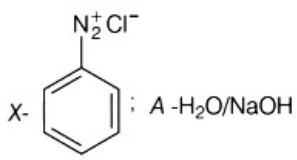
Question69



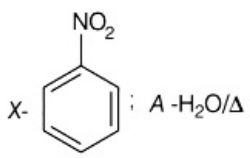
In the above chemical reaction, intermediate X and reagent / condition A are
[16 Mar 2021 Shift 1]

Options:

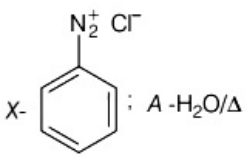
A.



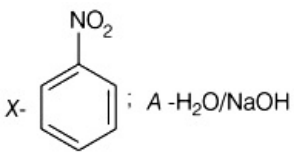
B.



C.



D.

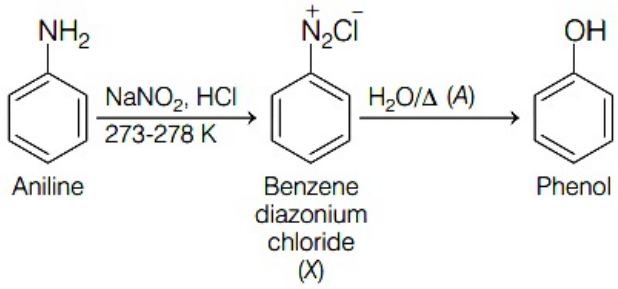


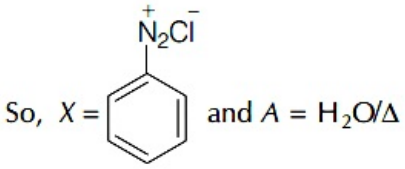
Answer: C

Solution:

Aniline reacts with $\mathrm{NaNO_2}$, HCl at $273-278\ \mathrm{K}$ to give benzene diazonium salt $\left(\mathrm{C_6H_5N_2^+Cl^-} = X\right)$ which on hydrolysis $\left(\mathrm{H_2O}\ \underset{\Delta}{\rightarrow}\right)$ gives phenol.

Complete reaction is as follows





Question70

In the reaction of hypobromite with amide, the carbonyl carbon is lost as
[18 Mar 2021 Shift 2]

Options:

A. $\mathrm{CO_3^{2-}}$

B. $\mathrm{HCO_3^-}$

C. $\mathrm{CO_2}$

D. CO

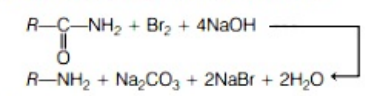
Answer: A

Solution:

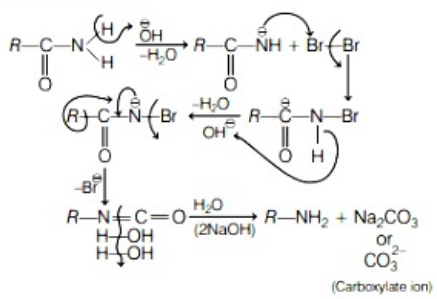
Solution:

Hypobromite transforms the primary amide to carbonic acid which further loses carbonyl carbon as $\mathrm{CO_3^{2-}}$, yielding the amine product.

Chemical reaction is as follows



Mechanism



Thus, the carbonyl carbon is lost as $\mathrm{CO_3^{2-}}$ in the given reaction. The complete reaction in ionic form looks like.

$$\underset{\text{(Amine)}}{R\overset{O}{\overset{\|}{C}}NH_2} + 4BrO^- + 2H^+ \longrightarrow RNH_2 + CO_3^{2-} + 4Br^- + \overline{OH}$$

Question71

An organic compound "A" on treatment with benzene sulphonyl chloride gives compound B . B is soluble in dil. NaOH solution. Compound A is [18 Mar 2021 Shift 2]

Options:

A. $C_6H_5 - N - (CH_3)_2$

B. $C_6H_5 - NHCH_2CH_3$

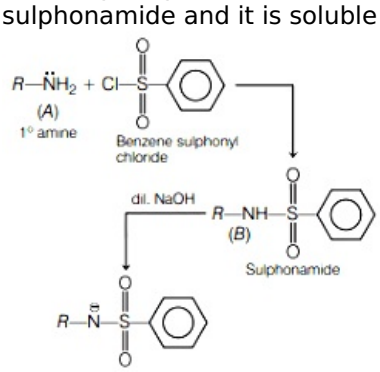
C. $C_6H_5 - CH_2NHCH_3$

D. $C_6H_5 - \underset{\underset{CH_3}{|}}{\overset{}{C}}H - NH_2$

Answer: D

Solution:

Solution:
Hinsberg reagent (benzene sulphonyl chloride) with 1° amine gives sulphonamide product i.e. N-ethylbenzene sulphonamide and it is soluble in dil. NaOH .



Hence, A is 1° amine i.e. $C_6H_5 - \underset{\underset{CH_3}{|}}{\overset{}{C}}H - NH_2$

Question72

Primary, secondary and tertiary amines can be separated using [17 Mar 2021 Shift 2]

Options:

A. para-toluene sulphonyl chloride

B. chloroform and KOH

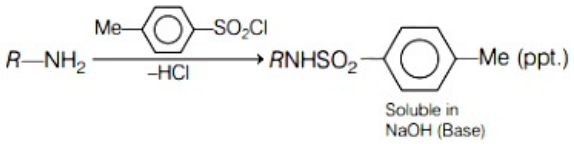
C. benzene sulphonic acid

D. acetyl amide

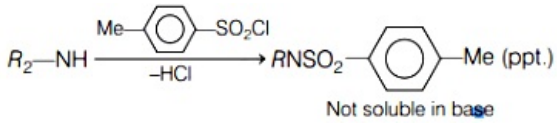
Answer: A

Solution:

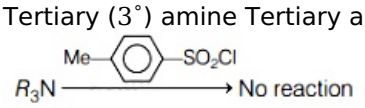
Solution:
Primary, secondary and tertiary amines can be separated using para-toluene sulphonyl chloride. This test is known as Hinsberg test. Reaction involved are as follows:
Primary (1˚) amine Primary amines react with para toluene sulphonyl chloride to form a precipitate that is soluble in N aOH .



Secondary (2˚) amine Secondary amines reacts with para toluene sulphonyl chloride to give a precipitate that is insoluble in N aOH .



Tertiary (3˚) amine Tertiary amines do not react with para toluene.



Question73

Which of the following is least basic? [16 Mar 2021 Shift 2]

Options:

A. $(CH_3CO)\ddot{N}HC_2H_5$

B. $(C_2H_5)_3\ddot{N}$

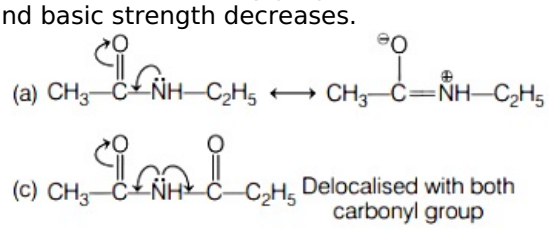
C. $(CH_3CO)_2\ddot{N}H$

D. $(C_2H_5)_2\ddot{N}H$

Answer: C

Solution:

Solution:
Basic nature is directly proportional to electron releasing tendency. If lone pair is delocalised, electron density decreases and basic strength decreases.



So, there is delocalisation of electron in both options (a) and (c).
But it option (c) there is delocalisation of electron with both carbonyl group. Hence, it is weakest base.

There is a subtle interplay of the inductive effect, solvation effect and steric hinderance of the alkyl group, which decides the basic strength of alkyl amines in the aqueous state.
The order of basic strength in case of ethyl substituted amines in aqueous solution is as follows
$(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$

$\therefore (C_2H_5)_2\ddot{N}H$ is strong base.

Question74

Ammonolysis of alkyl halides followed by the treatment with NaOH solution can be used to prepare primary, secondary and tertiary amines. The purpose of NaOH in the reaction is
[16 Mar 2021 Shift 2]

Options:

A. to remove basic impurities

B. to activate NH_3 used in the reaction

C. to remove acidic impurities

D. to increase the reactivity of alkyl halide

Answer: C

Solution:

Solution:
Ammonolysis of alkyl halides

$$R-X \xrightarrow[-HX]{NH_3} R-NH_2 \xrightarrow[-HX]{R-X} R_2NH \xrightarrow[-HX]{R-X} R_3N \xrightarrow{RX} R_4\overset{\oplus}{N}\overset{\ominus}{X}$$

During the reaction HX (acid) is formed. Hence, we use NaOH to remove this acidic impurities.

Question75

Which of the following is least basic?
[16 Mar 2021 Shift 2]

Options:

A. $(CH_3CO)\ddot{N}HC_2H_5$

B. $(C_2H_5)_3\ddot{N}$

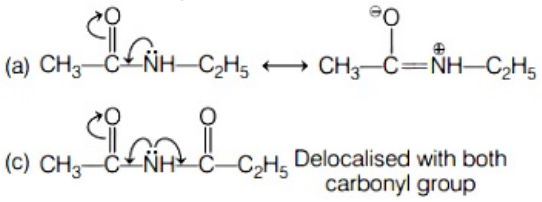
C. $(CH_3CO)_2\ddot{N}H$

D. $(C_2H_5)_2\ddot{N}H$

Answer: C

Solution:

Basic nature is directly proportional to electron releasing tendency. If lone pair is delocalised, electron density decreases and basic strength decreases.



So, there is delocalisation of electron in both options (a) and (c).
But it option (c) there is delocalisation of electron with both carbonyl group. Hence, it is weakest base.
There is a subtle interplay of the inductive effect, solvation effect and steric hinderance of the alkyl group, which decides the basic strength of alkyl amines in the aqueous state.
The order of basic strength in case of ethyl substituted amines in aqueous solution is as follows
$(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$

$\therefore (C_2H_5)_2\ddot{N}H$ is strong base.

Question76

Ammonolysis of alkyl halides followed by the treatment with NaOH solution can be used to prepare primary, secondary and tertiary amines. The purpose of NaOH in the reaction is [16 Mar 2021 Shift 2]

Options:

A. to remove basic impurities

B. to activate NH_3 used in the reaction

C. to remove acidic impurities

D. to increase the reactivity of alkyl halide

Answer: C

Solution:

Ammonolysis of alkyl halides

$$R-X \xrightarrow[-HX]{NH_3} R-NH_2 \xrightarrow[-HX]{R-X} R_2NH \xrightarrow[-HX]{R-X} R_3N \xrightarrow{RX} R_4\overset{\oplus}{N}\overset{\ominus}{X}$$

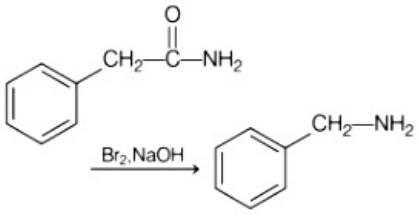
During the reaction HX (acid) is formed. Hence, we use NaOH to remove this acidic impurities.

Question77

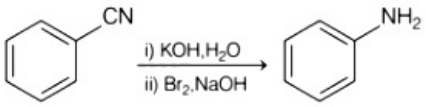
Which of the following reaction does not involve Hoffmann bromamide degradation? [16 Mar 2021 Shift 1]

Options:

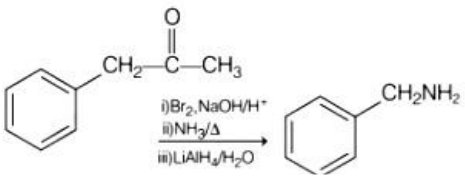
A.



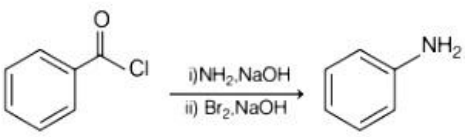
B.



C.



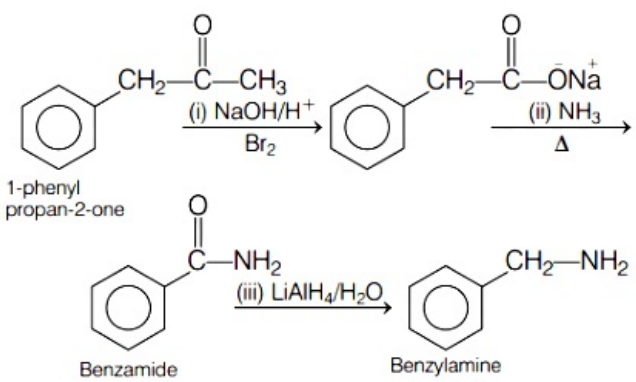
D.



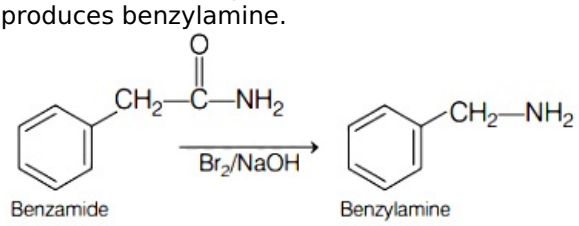
Answer: C

Solution:

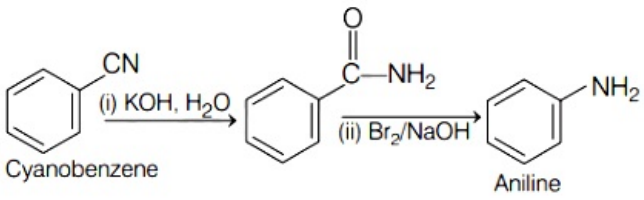
Methyl ketone gives haloform reaction to form carboxylic acid salt which on heating with NH_3 forms amide. Amide is reduced to amine by $LiAlH_4$.



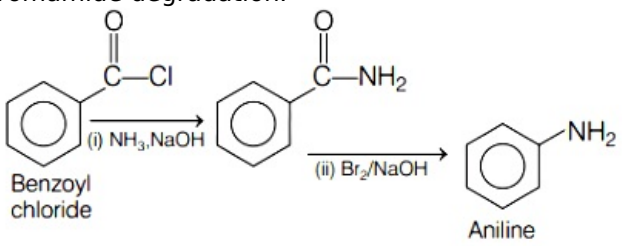
(a) Benzamide undergoes Hofmann bromamide degradation when treated with bromine and aqueous sodium hydroxide, to produces benzylamine.



(b) Benzene nitrile undergoes alkaline hydrolysis to form acidamide which further give Hofmann bromamide degradation.



(d) Acid chloride undergoes nucleophilic substitution with NH_3 to form acid amide. Acid amide undergoes Hoffmann bromamide degradation.

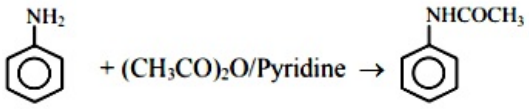


Question78

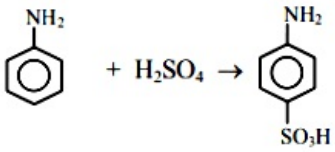
Which one of the following reactions does not occur ? [22 Jul 2021 Shift 2]

Options:

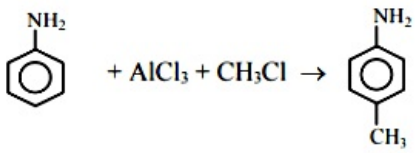
A.



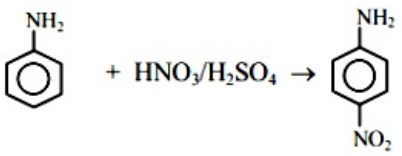
B.



C.

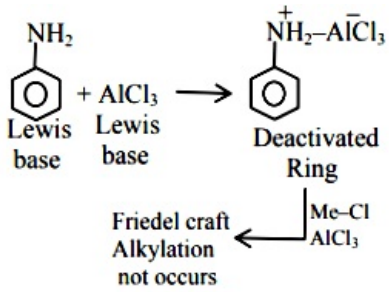


D.



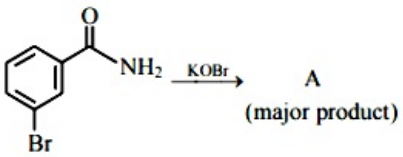
Answer: C

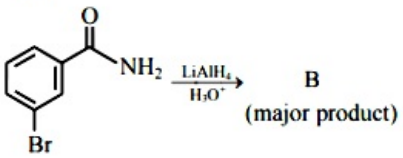
Solution:



(1) Aniline is lewis base give acid base reaction with $Al Cl_3$ and form Anilinium ion
(2) Anilinium ion has strongest deactivated ring so further Friedel craft Alkylation not occurs.

Question79

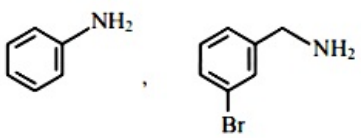




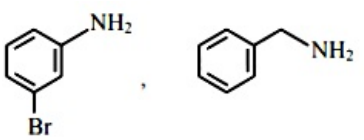
In the above reactions, product A and product B respectively are:
[20 Jul 2021 Shift 2]

Options:

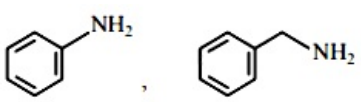
A.



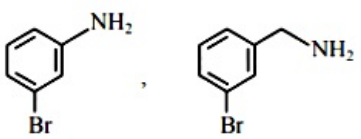
B.



C.

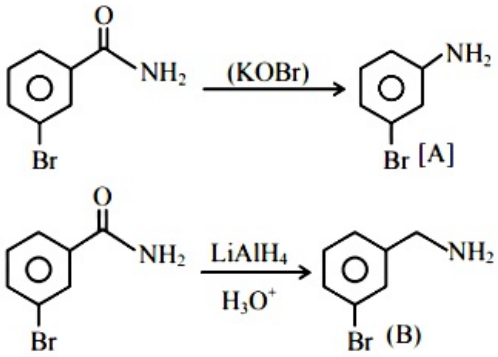


D.



Answer: D

Solution:

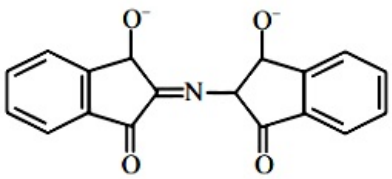


Question80

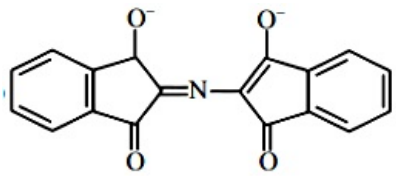
The correct structure of Rhumann's Purple, the compound formed in the reaction of ninhydrin with proteins is :
[20 Jul 2021 Shift 1]

Options:

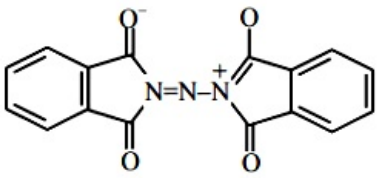
A.



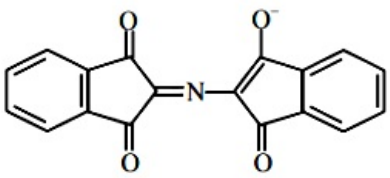
B.



C.

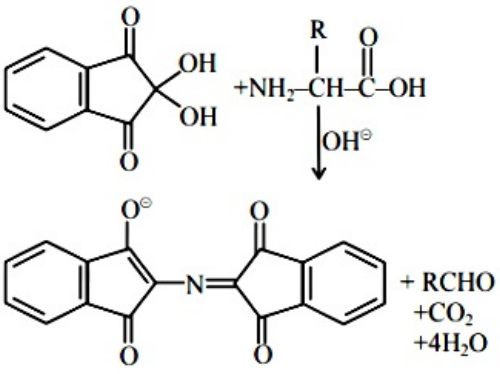


D.



Answer: D

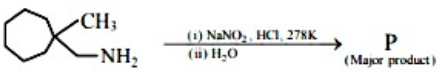
Solution:



Ninhydrin Test

Question81

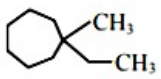
What is the major product "P" of the following reaction ?



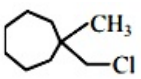
[25 Jul 2021 Shift 2]

Options:

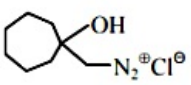
A.



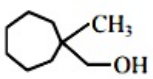
B.



C.

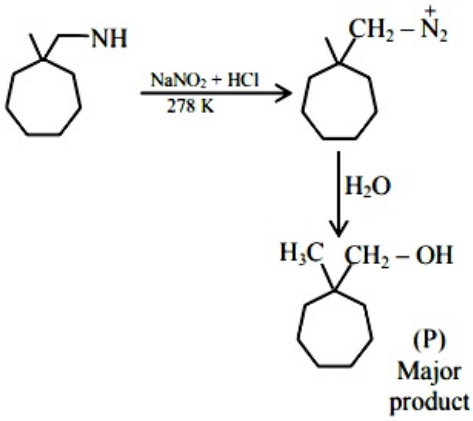


D.

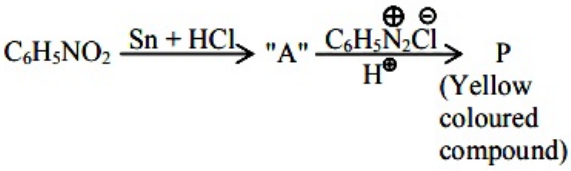


Answer: D

Solution:



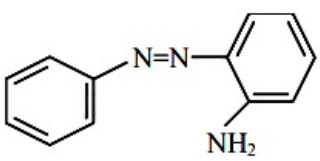
Question82



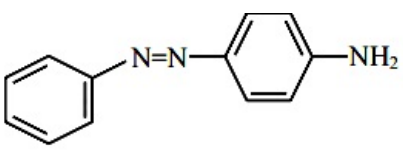
Consider the above reaction, the Product "P" is :
[25 Jul 2021 Shift 2]

Options:

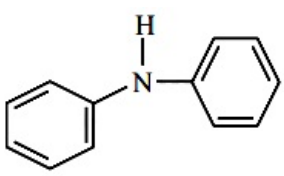
A.



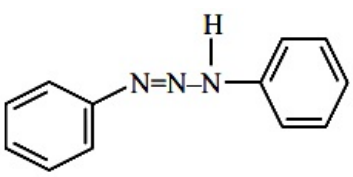
B.



C.

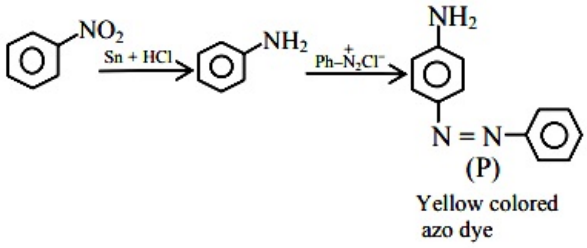


D.

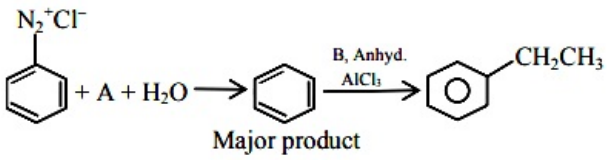


Answer: B

Solution:



Question83



In the chemical reactions given above A and B respectively are:
[22 Jul 2021 Shift 2]

Options:

A. H_3PO_2 and CH_3CH_2Cl

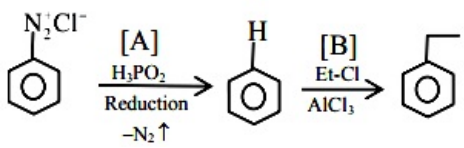
B. CH_3CH_2OH and H_3PO_2

C. H_3O_2 and CH_3CH_2OH

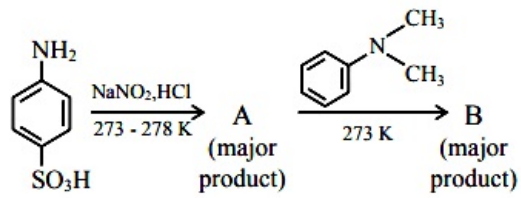
D. CH_3CH_2Cl and H_3PO_2

Answer: A

Solution:



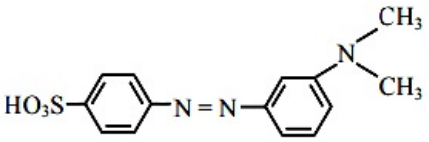
Question84



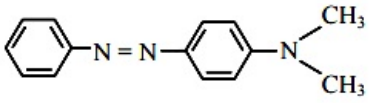
Consider the above reaction, compound B is :
[20 Jul 2021 Shift 2]

Options:

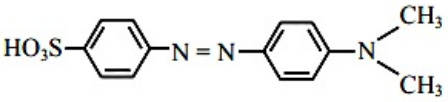
A.



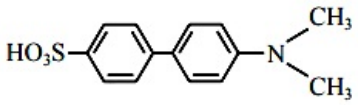
B.



C.

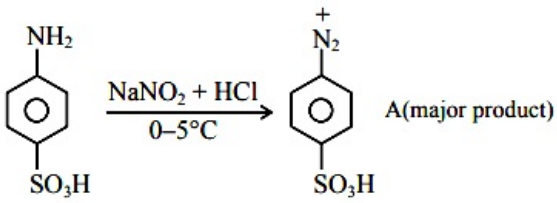


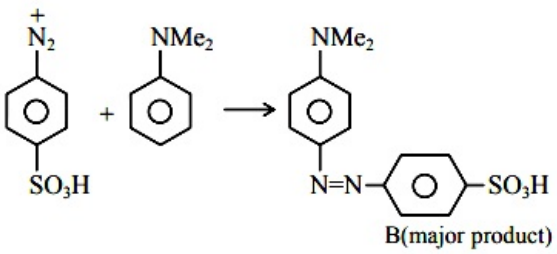
D.



Answer: C

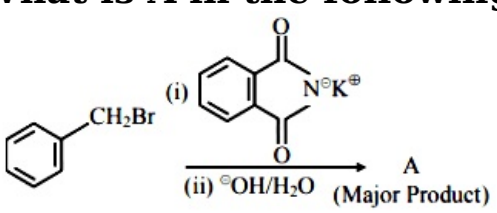
Solution:





Question85

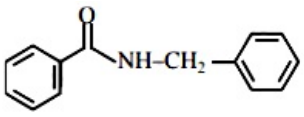
What is A in the following reaction ?



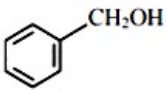
[27 Jul 2021 Shift 2]

Options:

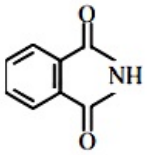
A.



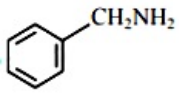
B.



C.

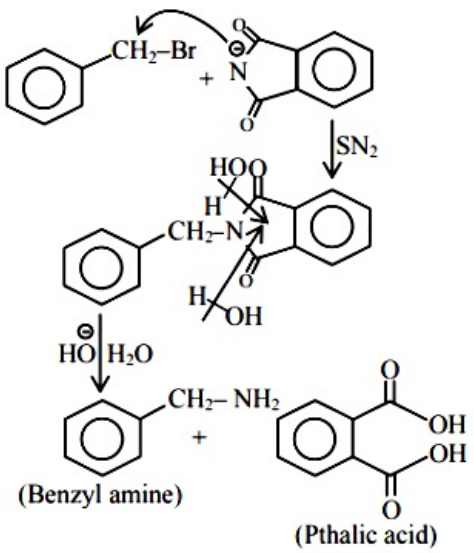


D.



Answer: D

Solution:

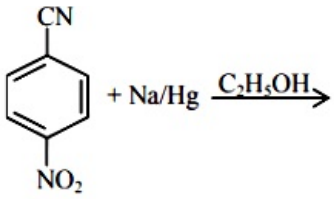


Question86

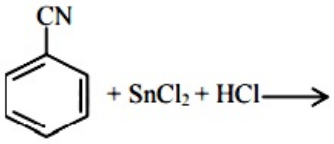
Which one of the products of the following reactions does not react with Hinsberg reagent to form sulphonamide?
[25 Jul 2021 Shift 1]

Options:

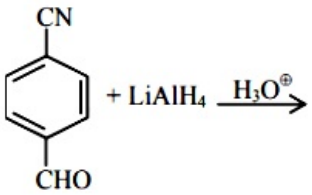
A.



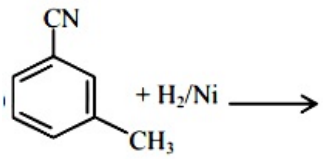
B.



C.

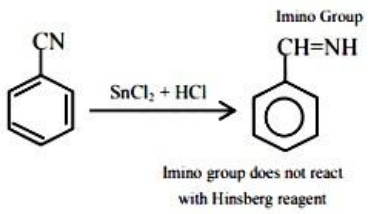


D.



Answer: B

Solution:

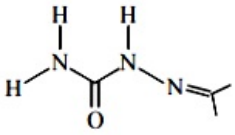


Question87

The number of nitrogen atoms in a semi carbazone molecule of acetone is _____.
[20 Jul 2021 Shift 1]

Answer: 3

Solution:



Semicarbazone molecule of acetone

Question88

Compound A is converted to B on reaction with $CHCl_3$ and KOH. The compound B is toxic and can be decomposed by C. A, B and C respectively are :
[20 Jul 2021 Shift 1]

Options:

A. primary amine, nitrile compound, conc. HCl

B. secondary amine, isonitrile compound, conc. NaOH

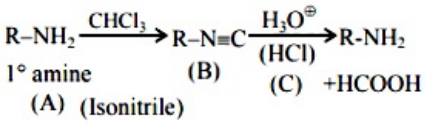
C. primary amine, isonitrile compound, conc. HCl

D. secondary amine, nitrile compound, conc. NaOH

Answer: C

Solution:

Solution:



Question89

Given below are two statements :
Statement I : Aniline is less basic than acetamide.
Statement II : In aniline, the lone pair of electrons on nitrogen atom is delocalised over benzene ring due to resonance and hence less available to a proton.
Choose the most appropriate option ;
[27 Jul 2021 Shift 1]

Options:

A. Statement I is true but statement II is false.

B. Statement I is false but statement II is true.

C. Both statement I and statement II are true.

D. Both statement I and statement II are false.

Answer: B

Solution:

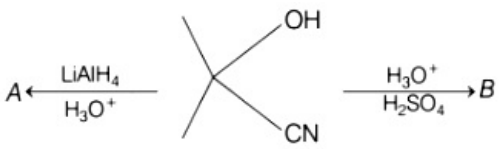
Solution:
Explanation :- aniline is more basic than acetamide because in acetamide, lone pair of nitrogen is delocalised to more electronegative element oxygen.
In Aniline lone pair of nitrogen delocalised over benzene ring.

Question90

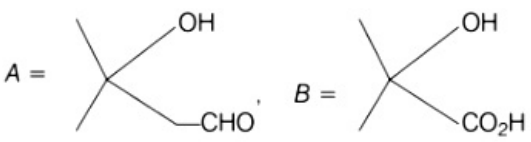
The major products A and B in the following set of reactions are [31 Aug 2021 Shift 1]

Options:

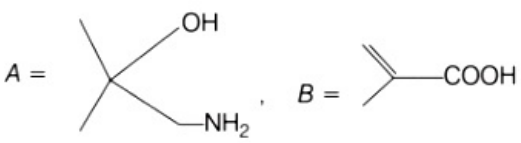
A.



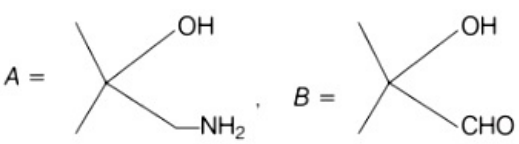
B.



C.



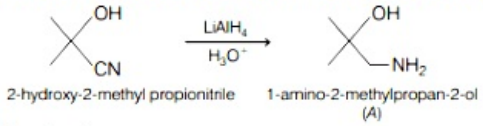
D.



Answer: C

Solution:

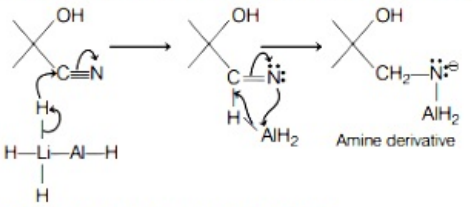
Nitriles can be converted to 1° amines by reaction with $LiAlH_4$.



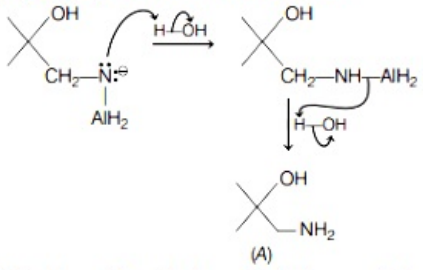
2-hydroxy-2-methyl propionitrile 1-amino-2-methylpropan-2-ol (A)

Mechanism

(i) Hydride nucleophile attacks the electrophilic carbon in nitrile to form imine anion.

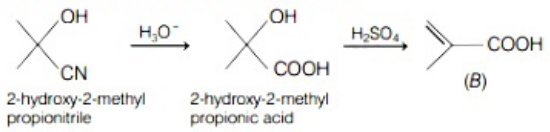


(ii) Hydrolysis of amine derivative.



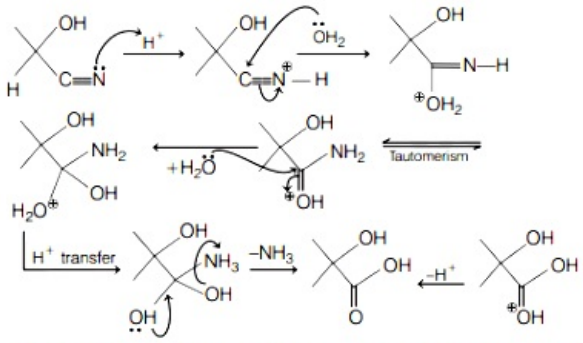
2-hydroxy-2-methyl propionitrile on acidic hydrolysis gives

2-hydroxy-2-methylpropionic acid.



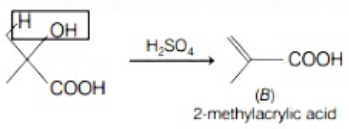
2-hydroxy-2-methyl propionitrile 2-hydroxy-2-methyl propionic acid

Mechanism



The last step of dehydration takes place in presence of H_2SO_4 to form 2-methylacrylic acid.

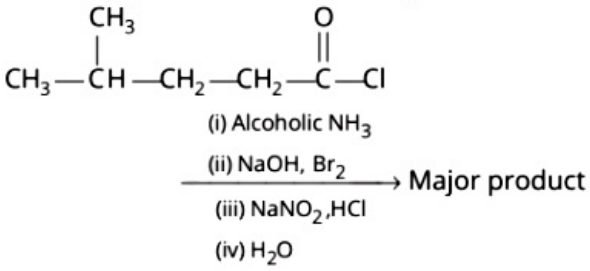
2-methylacrylic acid is the product (B).



Hence, correct answer is (c).

Question91

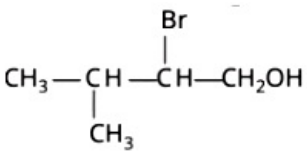
The major product of the following reaction is



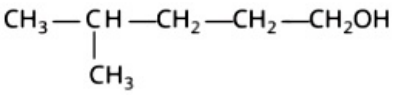
[27 Aug 2021 Shift 1]

Options:

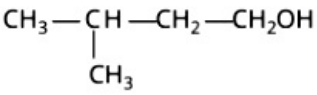
A.



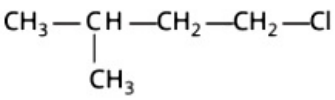
B.



C.



D.

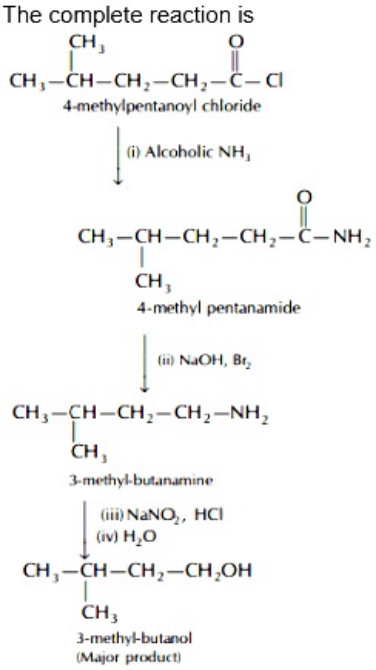


Answer: C

Solution:

Solution:
In first step, ammonia reacts with ethanoyl chloride to give ethanamide and HCl. In the second step degradation of amide takes place that is known as Hoffmann's bromamide degradation reaction. The third step is diazotisation, where an unstable diazonium salt is obtained, which further gives alcohol as a major product and alkene and alkyl halides.

The complete reaction is



Question92

Which of the following is not a correct statement for primary aliphatic

amines?
[27 Aug 2021 Shift 1]

Options:

A. The intermolecular association in primary amines is less than the intermolecular association in secondary amines.

B. Primary amines on treating with nitrous acid solution form corresponding alcohols except methyl amine.

C. Primary amines are less basic than the secondary amines.

D. Primary amines can be prepared by the gabriel phthalimide synthesis.

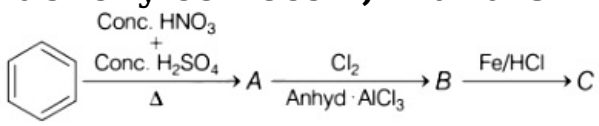
Answer: A

Solution:

Solution:
The intermolecular association is more prominent in case of primary amines as compared to secondary, due to the availability of two hydrogen atom.

Question93

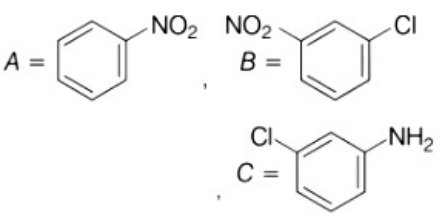
Identify correct A, B and C in the reaction sequence given below.



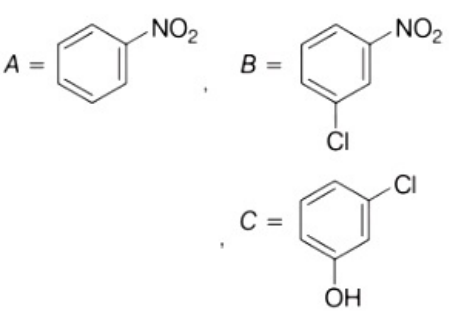
[31 Aug 2021 Shift 2]

Options:

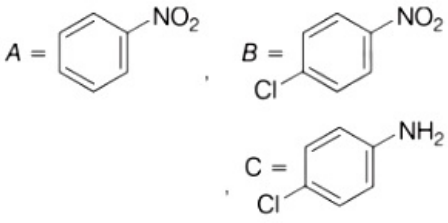
A.



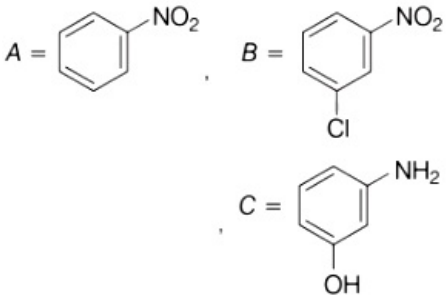
B.



C.



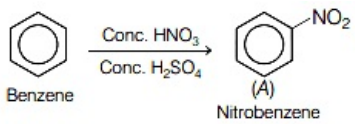
D.



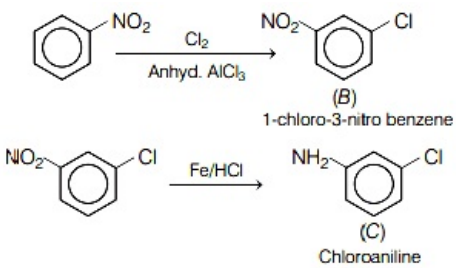
Answer: A

Solution:

Solution:
Benzene undergoes nitration on reaction with conc. HNO_3 and conc. H_2SO_4.

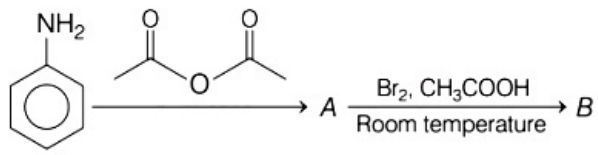


Nitrobenzene on reaction with Cl_2/ anhyd. $AlCl_3$ undergoes electrophilic substitution reaction to give 1 -chloro- 3 -nitro benzene, which on reaction with Fe / HCl gives chloroaniline.



Question94

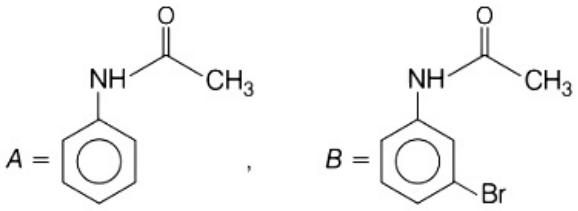
The major products A and B formed in the following reaction sequence are



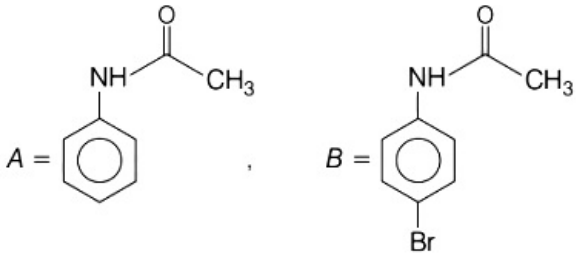
[31 Aug 2021 Shift 2]

Options:

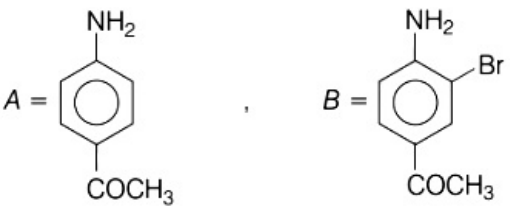
A.



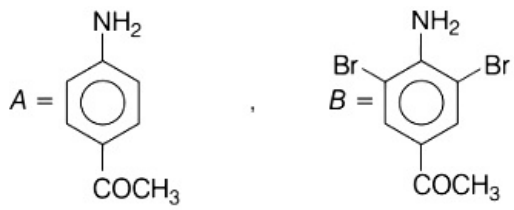
B.



C.



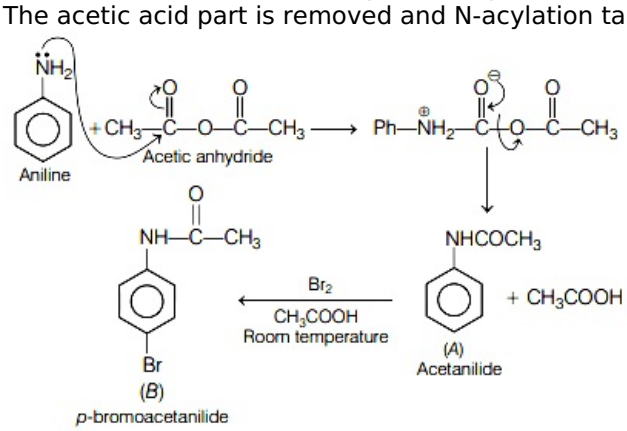
D.



Answer: B

Solution:

Solution:
Aniline reacts with acetic anhydride to give acetanilide.
The acetic acid part is removed and N-acylation takes place by nucleophilic substitution reaction.



Acetanilide is brominated with bromine/acetic acid. As $-\mathrm{NHCOCH_3}$ is ortho/para directing group (since lone pair on N activates the ring).
Bromine attached to para position is the major product losse.

Question95

The total number of reagents from those given below, that can convert nitrobenzene into aniline is ..... (Integer answer)

$I\ .\ Sn-HCI$	$II\ .\ \mathrm{Sn-NH_4OH}$
$III\ .\ Fe-HCl$	$IV\ .\ Zn-HCI$
$V\ .\ \mathrm{H_2-Pd}$	$VI\ .\ \mathrm{H_2-Raney\ nickel}$

[31 Aug 2021 Shift 1]

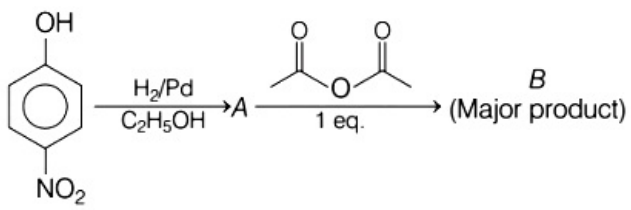
Answer: 5

Solution:

Solution:
The nitrobenzene can be reduced to aniline via followingreagents.
(I) Sn-HCl (V) $\mathrm{H_2}$ -Pd
(III) Fe-HCl (VI) $\mathrm{H_2}$ (Raney Ni)
(IV) Zn-HCl

Question96

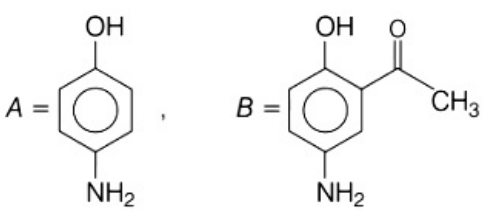
The correct structures of A and B formed in the following reactions are



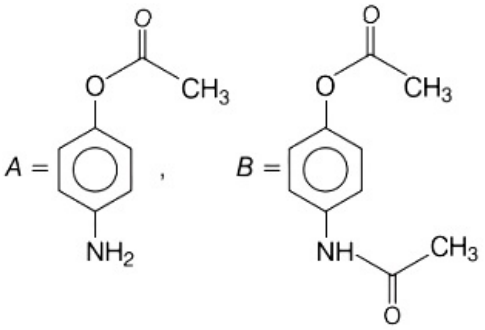
[27 Aug 2021 Shift 2]

Options:

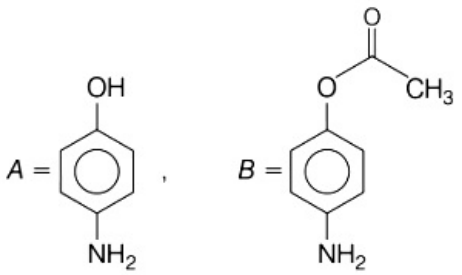
A.



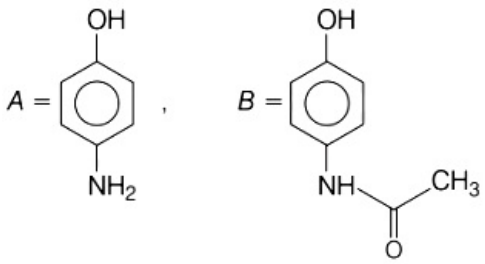
B.



C.



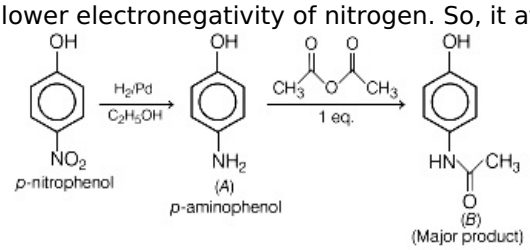
D.



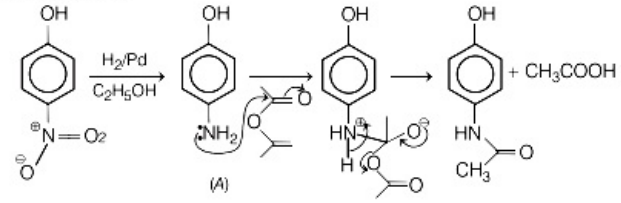
Answer: D

Solution:

Solution:
Since, only one equivalent of acetic anhydride is present and $-NH_2$ group is more nucleophilic than - OH group due to lower electronegativity of nitrogen. So, it attacks at the carbonyl center of acetic anhydride forming the product B.

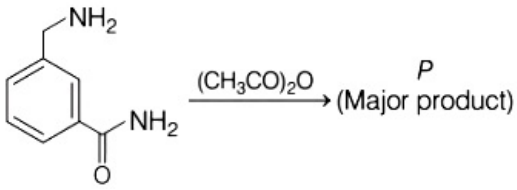


Mechanism



Therefore, the option (d) is correct.

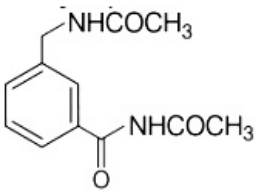
Question97



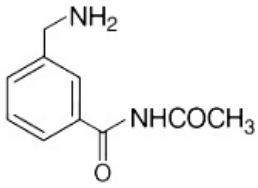
The major product in the above reaction is
[26 Aug 2021 Shift 2]

Options:

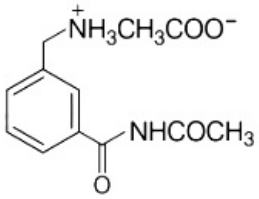
A.



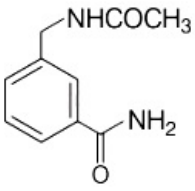
B.



C.



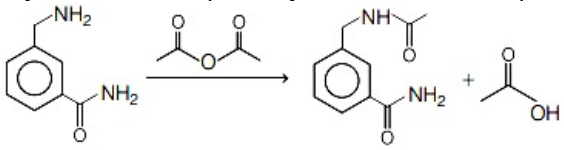
D.



Answer: D

Solution:

Solution:
Since $-CH_2-NH_2$ is more basic, the resulting amide will fail to react further. Therefore, imide formation takes place at only one site (i.e. primary amine). The complete reaction is as follows :

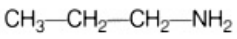


Question98

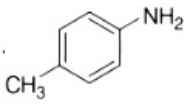
Which one of the following gives the most stable diazonium salt? [1 Sep 2021 Shift 2]

Options:

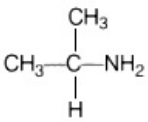
A.



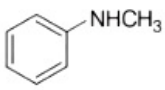
B.



C.



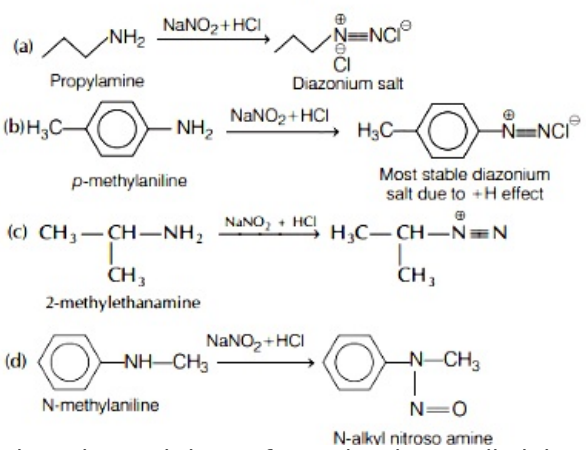
D.



Answer: B

Solution:

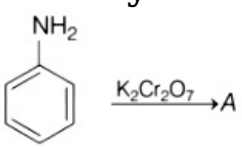
Solution:
Primary amines react with $NaNO_2$ and HCl to give diazonium salts.



Diazonium salt is not formed rather N-alkylnitroso amine is formedas product.
∴ In option (b) the most stable diazonium salt is formed.

Question99

Identify A in the following reaction.

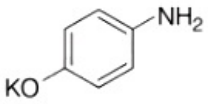


[1 Sep 2021 Shift 2]

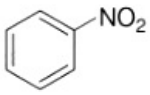
Options:

A.

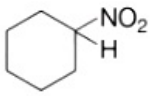
B.



C.



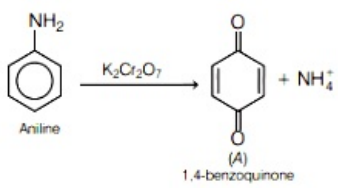
D.



Answer: A

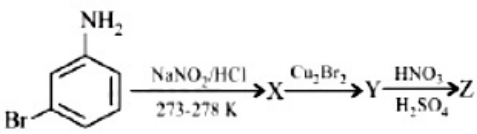
Solution:

Solution:
Aniline reacts with potassium dichromat ($K_2Cr_2O_7$) to form
1,4 - benzoquinone as the product. The nascent oxygen produced
from ($K_2Cr_2O_7$) reacts with aniline to form 1,4 - benzoquinone with the removal of NH_4^+ion.
This reaction involves oxidation of aniline



Question100

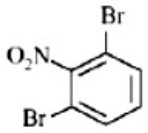
The major product Z obtained in the following reaction scheme is:



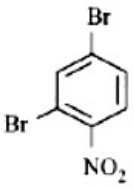
[Jan. 09,2020(I)]

Options:

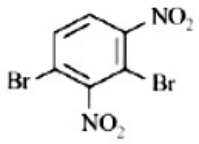
A.



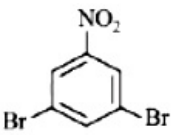
B.



C.

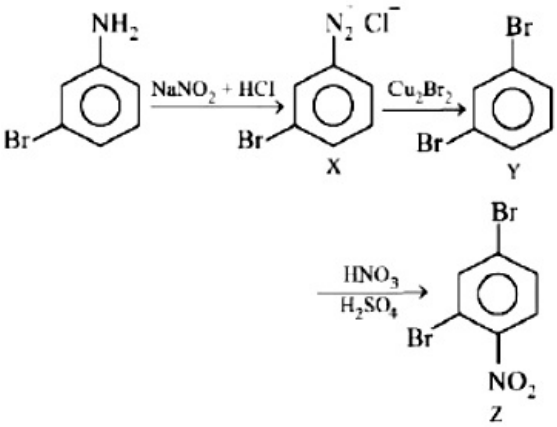


D.



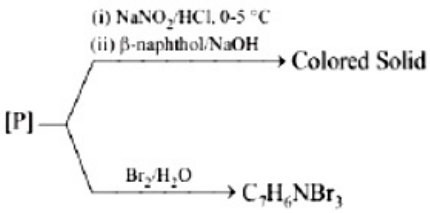
Answer: B

Solution:



Question101

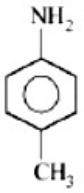
Consider the following reactions,



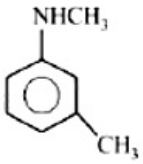
The compound [P] is:
[Jan. 09,2020(II)]

Options:

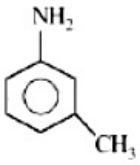
A.



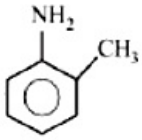
B.



C.



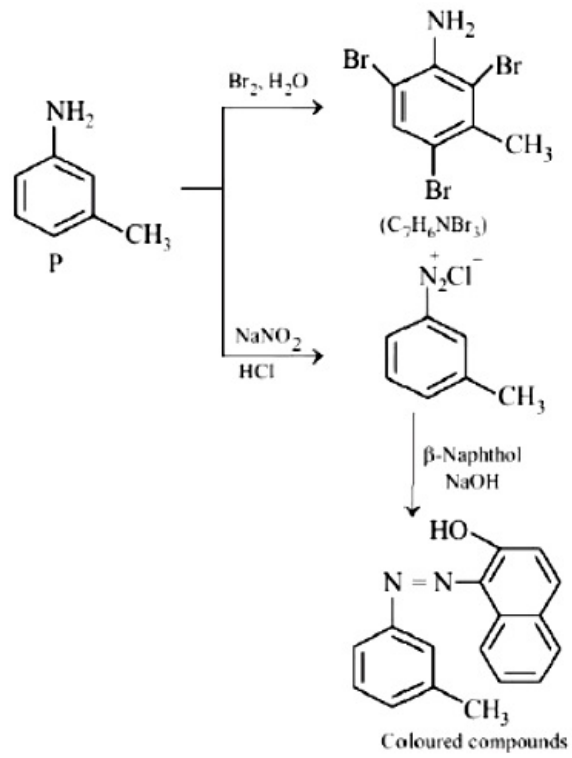
D.



Answer: C

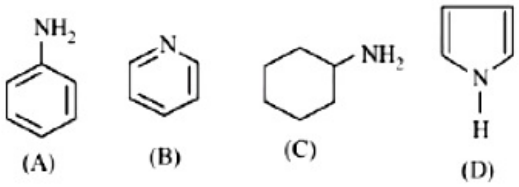
Solution:

Solution:



Question102

The decreasing order of basicity of the following amines is:



[Jan. 09,2020(II)]

Options:

A. (A) > (C) > (D) > (B)

B. (C) > (A) > (B) > (D)

C. (B) > (C) > (D) > (A)

D. (C) > (B) > (A) > (D)

Answer: D

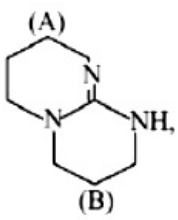
Solution:

Solution:
Basic strength of amines depends upon availability of lone pair of electrons. Aliphatic amines are more basic than aromatic amines.

Question103

The increasing order of pK_b for the following compounds will be:

$NH_2 - CH = NH$



CH_3NHCH_3
(C)

[Jan. 07,2020 (I)]

Options:

A. (B) < (C) < (A)

B. (A) < (B) < (C)

C. (C) < (A) < (B)

D. (B) < (A) < (C)

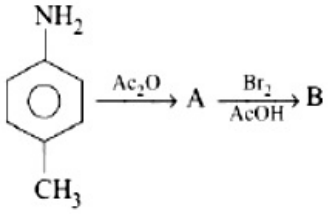
Answer: D

Solution:

Solution:
Conjugate acid of guanadine(B) is resonance stabilised and have 2 resonance structure. Similarly conjugate acid of (A) is also resonance stabilised and have one resonance structure. (C) does not exhibit resonance structure.
therefore the basic orderis, k_b : (B) > (A) > (C)
$\therefore pk_b$: (B) < (A) < (C)

Question104

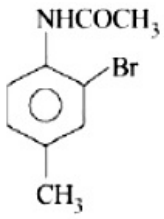
In the following reaction sequence,



the major product B is:
[Jan. 07,2020(II)]

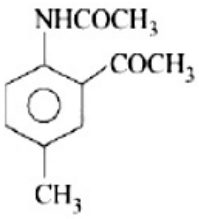
Options:

A.

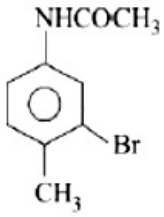


B.

C.



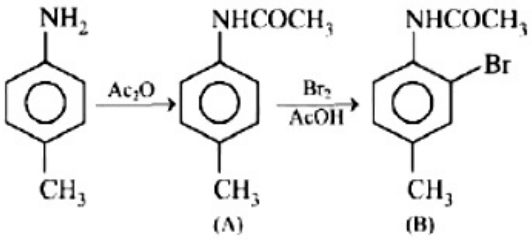
D.



Answer: A

Solution:

Solution:



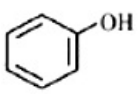
Question105

Which of these will produce the highest yield in Friedel Crafts reaction? [Jan.09,2020(I)]

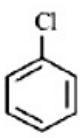
Options:

A.

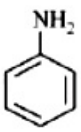
B.



C.



D.



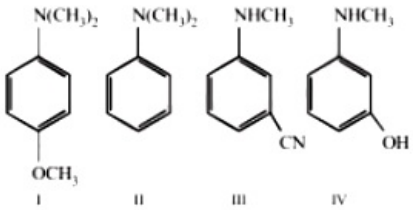
Answer: C

Solution:

Aniline and phenol form complex with lewis acid. Chlorobenzene produces highest yield in Friedel craft reaction among the given options.

Question106

The increasing order of pK_b values of the following compounds is :



[Sep. 06, 2020(I)]

Options:

A. $I I < I V < I I I < I$

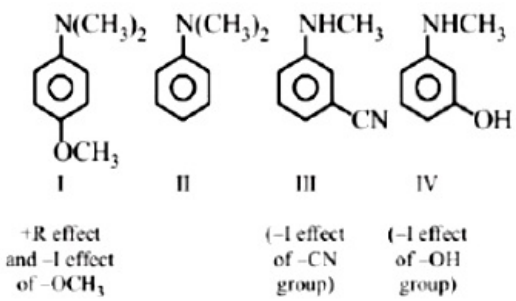
B. $I < I I < I V < I I I$

C. $I I < I < I I I < I V$

D. $I < I I < I I < I V$

Answer: B

Solution:



$-OCH_3$ group increases electron density of ring at o - and p - position making (I) most basic. (III) is least basic due to $-$ I effect of $-$ CN group at meta position.
Since, $-$ I effect of $-CN > -I$ effect of $-OH$ group.
Hence, correct basic strength will follow the order
$I > I I > I V > I I I$

Basic strength $\propto \frac{1}{pK_b \text{ value}}$

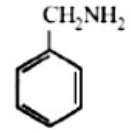
Order of K_b value is, $I < I I < I V < I I I$.

Question107

Which of the following compounds can be prepared in good yield by Gabriel phthalimide synthesis?
[Sep. 06, 2020(II)]

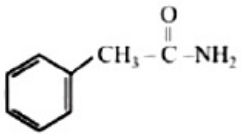
Options:

A.



B. $CH_3 - CH_2 - NHCH_3$

C.



D.

Answer: A

Solution:

Solution:
Gabriel phthalimide synthesis gives 1° amine in good yield.

Question108

The most appropriate reagent for conversion of C_2H_5CN into $CH_3CH_2CH_2NH_2$ is: [Sep. 05, 2020 (I)]

Options:

A. $NaBH_4$

B. CaH_2

C. $LiAlH_4$

D. $Na(CN)BH_3$

Answer: C

Solution:

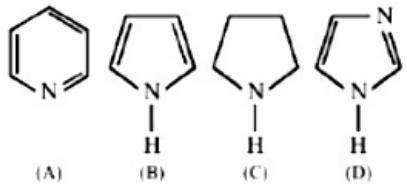
Solution:

$$CH_3CH_2 - C \equiv N \xrightarrow{LiAlH_4} CH_3CH_3 - CH_2 - NH_2$$

$NaBH_4$ does not reduce $R - CN$

Question109

The increasing order of basicity of the following compounds is:



[Sep, 05,2020(I)]

Options:

A. (A) < (B) < (C) < (D)

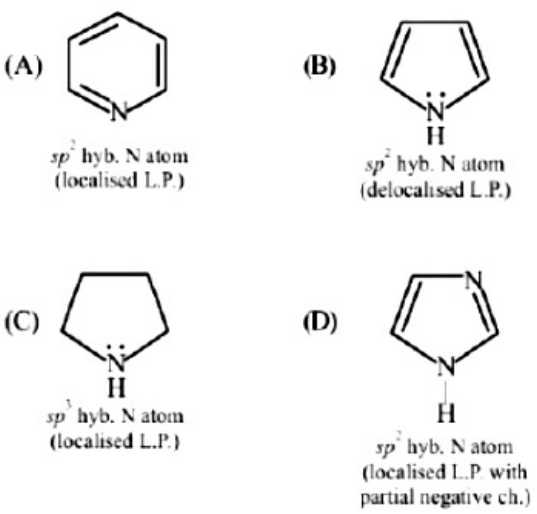
B. (B) < (A) < (D) < (C)

C. (D) < (A) < (B) < (C)

D. (B) < (A) < (C) < (D)

Answer: B

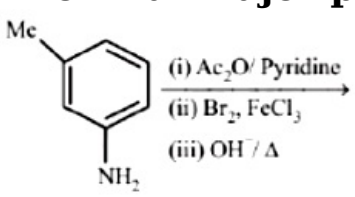
Solution:



Thus, increasing order of basicity is (B) < (A) < (D) < (C)

Question110

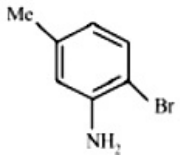
The final major product of the following reaction is:



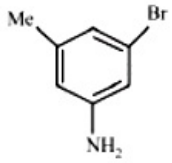
[Sep. 05, 2020(II)]

Options:

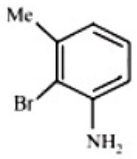
A.



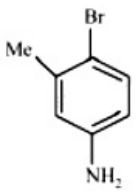
B.



C.



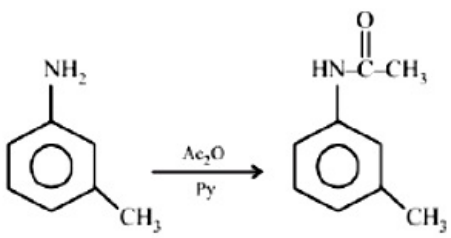
D.

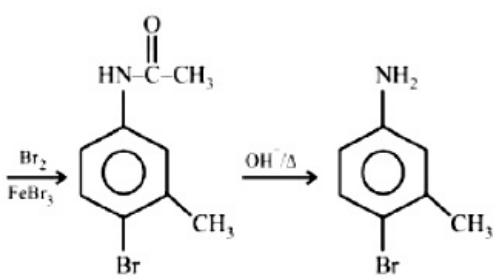


Answer: D

Solution:

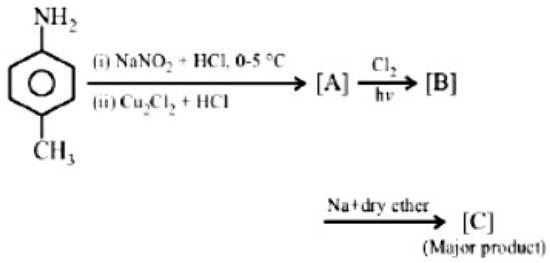
Solution:





Question111

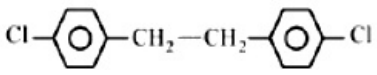
In the following reaction sequence, [C] is:



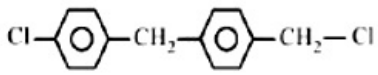
[Sep. 04, 2020(II)]

Options:

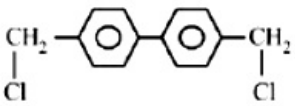
A.



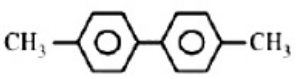
B.



C.

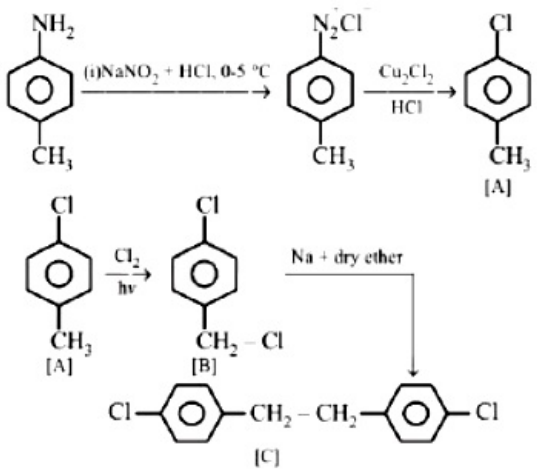


D.



Answer: A

Solution:



Question112

Three isomers A, B and C(mol . formula $C_8H_{11}N$) give the following results :

A and C $\xrightarrow{\text{Diazotization}}$ P + Q $\xrightarrow[\text{(ii) Oxidation}\ (KMnO_4 + H^+)]{\text{Hydrolysis}}$ R (product of A) + S (productof C)

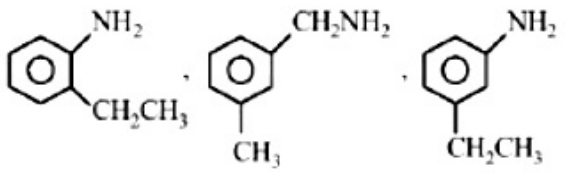
R has lower boiling point than S B $\xrightarrow{C_6H_5SO_2Cl}$ alkali-insoluble product

A, B and C, respectively are:

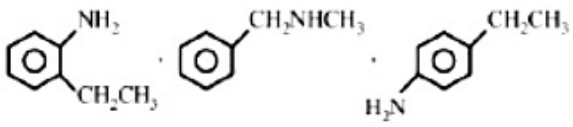
[Sep. 03, 2020 (II)]

Options:

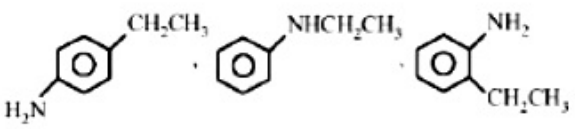
A.



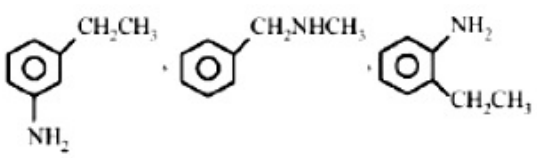
B.



C.

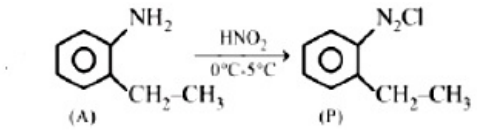


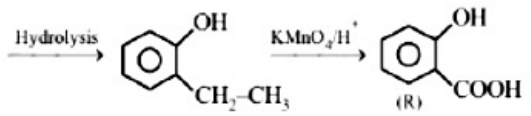
D.

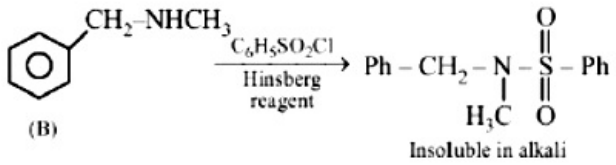


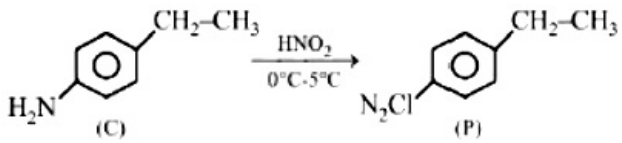
Answer: B

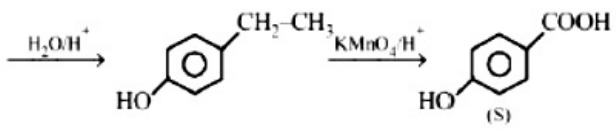
Solution:





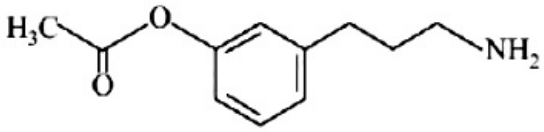






Question113

The major product of the following reaction is:



(i) $\xrightarrow{NaNO_2 / H^+}$

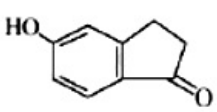
(ii) CrO_3 / H^+

(iii) H_2SO_4 (conc.), Δ

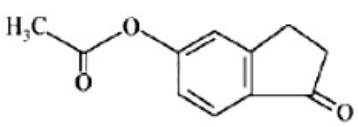
[Jan. 12,2019 (II)]

Options:

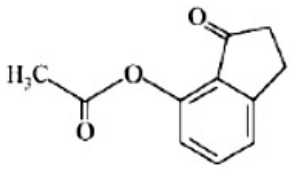
A.



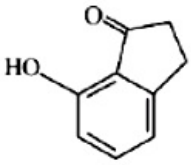
B.



C.



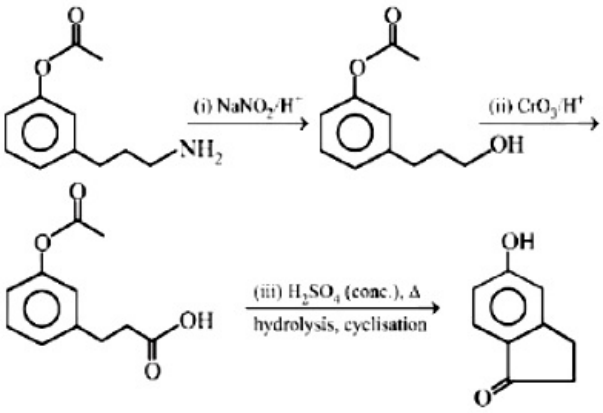
D.



Answer: A

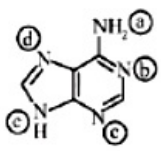
Solution:

Solution:



Question114

In the following compound,



the favourable site/s for protonation is/are: [Jan. 11,2019 (II)]

Options:

A. (a) and (c)

B. (b), (c) and (d)

C. (a) and (d)

D. (a)

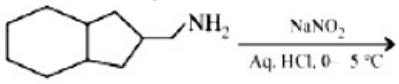
Answer: B

Solution:

Higher the electronegativity ($sp^2 > sp^3$) of an atom, more will be its capacity to take proton. Thus N labelled as (b, (c) and (d) are better protonated than the N at (a) and (e).

Question115

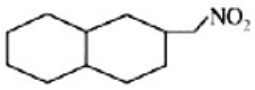
The major product formed in the reaction given below will be:



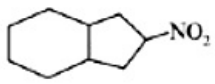
[Jan. 10,2019(I)]

Options:

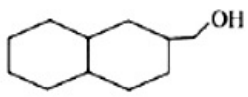
A.



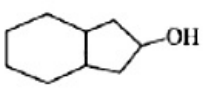
B.



C.

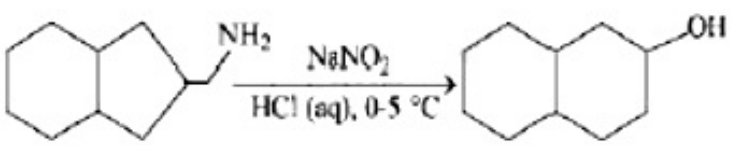


D.



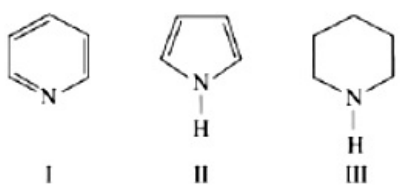
Answer: A

Solution:



Question116

Arrange the following amines in the decreasing order of basicity:



[Jan. 9,2019(I)]

Options:

A. I > Il > III

B. III > I > II

C. III > II > I

D. I > III > II

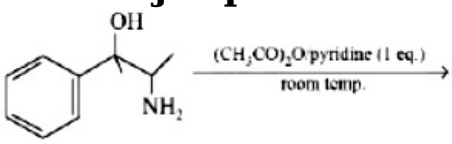
Answer: B

Solution:

Solution:
Compound, III is most basic as the lone pair of nitrogen is easily available for the donation. In case of compound (I) lone pair is not involved in resonance but nitrogen atom is sp^2 hybridsed, whereas in compound II the lone pair of nitrogen is involved in aromaticity which makes it least basic.

Question117

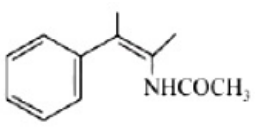
The major product obtained in the following reaction is:



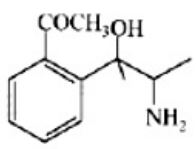
[Jan. 9,2019 (II)]

Options:

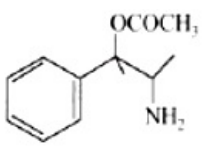
A.



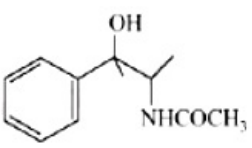
B.



C.



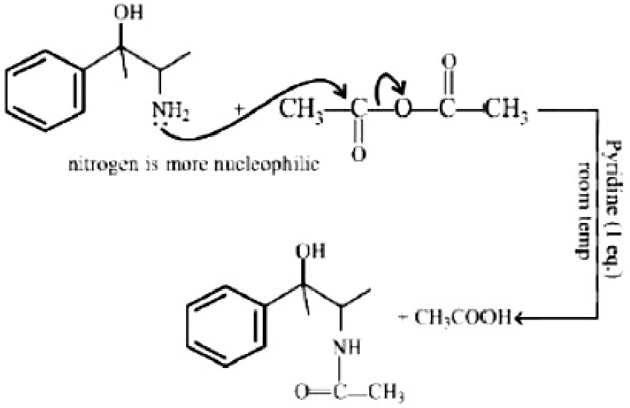
D.



Answer: D

Solution:

$-NH_2$ is a stronger base than $-OH$, hence 1 equation of acetic anhydride will acetylate only $-NH_2$ group. Reaction involved:



Question118

The increasing basicity order of the following compounds is:

(A) $CH_3CH_2NH_2$

(B) $CH_3CH_2\overset{CH_2CH_3}{\overset{|}{N}}H$

(C) $H_3C-\overset{CH_3}{\overset{|}{N}}-CH_3$

(D) $Ph-\overset{CH_3}{\overset{|}{N}}-H$

[Jan. 9,2019 (II)]

Options:

A. (D) < (C) < (B) < (A)

B. (D) < (C) < (A) < (B)

C. (A) < (B) < (C) < (D)

D. (A) < (B) < (D) < (C)

Answer: B

Solution:

	pK_b
(A) $EtNH_2$	3.29
(B)$(Et)_2NH$	3.00
(C) Me_3N	4.22
(D) $Ph-NH-Me$	4.7

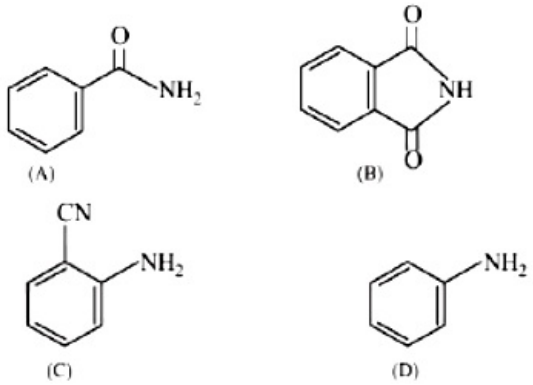
So, order of basic strength is:

$$\underset{2C_2H_5 \text{groups}}{C_2H_5 \rightarrow -NH \leftarrow C_2H_5} > \underset{|C_2H_5 \text{group}}{C_2H_5NH_2} > \underset{\text{steric factor}}{Me_3N} > \underset{\text{e-pair delocalised over ph-ring}}{PhNH-Me}$$

(B) > (A) > (C) > (D)

Question119

The increasing order of reactivity of the following compound towards reaction with alkyl halides directly is:



[Jan.12,2019(I)]

Options:

A. (B) < (A) < (C) < (D)

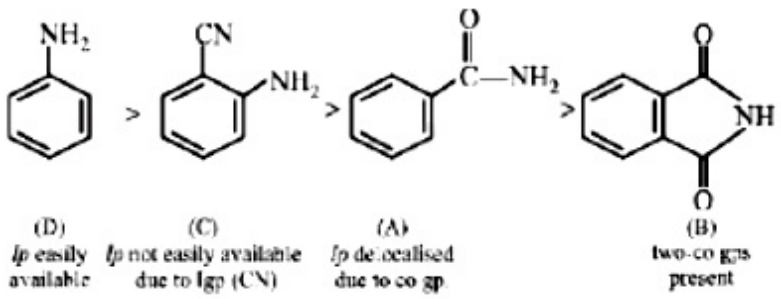
B. (A) < (B) < (C) < (D)

C. (B) < (A) < (D) < (C)

D. (A) < (C) < (D) < (B)

Answer: A

Solution:

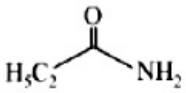


Question120

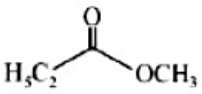
The increasing order of the reactivity of the following with $LiAlH_4$ is : [Jan. 12,2019(II)]

Options:

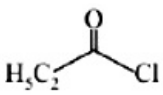
A.



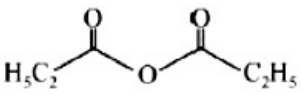
B.



C.



D.



Answer: C

Solution:

Solution:
The reactivity order of carboxylic acid derivatives depends on the electrophilicity of the carbonyl carbon and leaving tendency of the leaving group. Leaving ability of the four groups is $-Cl > -COOC_2H_5 > -OCH_3 > -NH_2$
Therefore, reactivity order towards $LiAlH_4$ is

$$CH_3-CH_2C-C-H \xrightarrow{\text{(i) KOH (alc.)}} CH_3CH_2\underset{\underset{Br}{|}}{CH}-CH_2 \xrightarrow{\text{(ii) } NaNH_2 \text{ In liq . } NH_3} CH_3CH_2C=C-H$$

Question121

A compound ' X ' on treatment with Br_2 / NaOH , provided C_3H_9N , which gives positive carbylamine test. Compound 'X' is: [Jan. 11, 2019 (II)]

Options:

A. $CH_3COCH_2NHCH_3$

B. $CH_3CH_2COCH_2NH_2$

C. $CH_3CH_2CH_2CONH_2$

D. $CH_3CON(CH_3)_2$

Answer: C

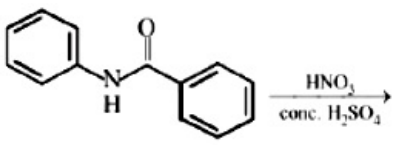
Solution:

Solution:

$$\underset{(X)}{CH_3CH_2CH_2CONH_2} \xrightarrow[\text{(Hofimana rearrangcment)}]{Br_2NaOH} \underset{(C_3H_9N)}{CH_3CH_2CH_2NH_2} \xrightarrow[KOH\text{(Carbylamine reaction)}]{CHCl_3} CH_3CH_2CH_2NC$$

Question122

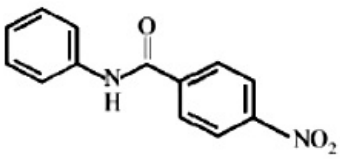
What will be the major product in the following mononitration reaction?



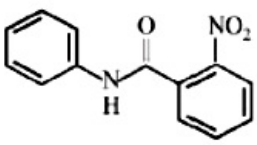
[Jan. 10,2019 (II)]

Options:

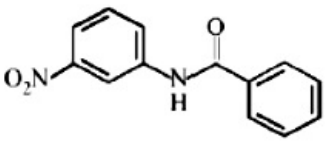
A.



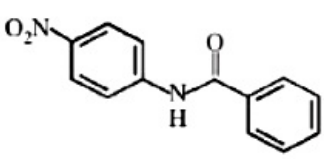
B.



C.



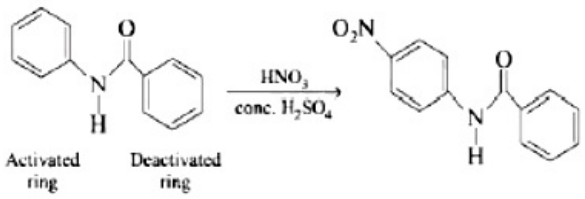
D.



Answer: D

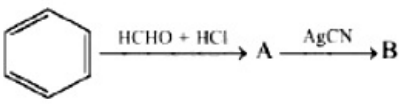
Solution:

In the given nitration reaction, major product will be formed as per the activating group, $-NH$ part of $-NH-\overset{O}{\overset{\|}{C}}-$ is activating, while $-\overset{O}{\overset{\|}{C}}-$ part is deactivating group.



Question123

The compounds A and B in the following reaction are, respectively:



[Jan. 9,2019 (I)]

Options:

A. A = Benzyl alcohol, B = Benzyl cyanide

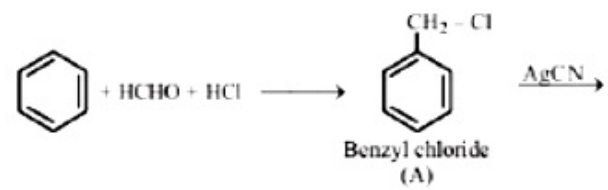
B. A = Benzyl chloride, B = Benzyl cyanide

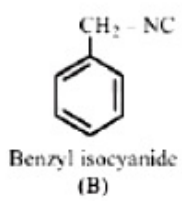
C. A = Benzyl alcohol, B = Benzy 1 isocyanide

D. A − B enzyl chloride, B - Benzyl isocyanide

Answer: D

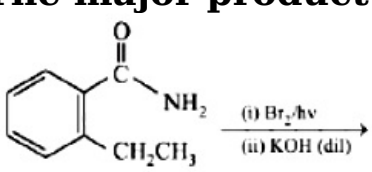
Solution:





Question124

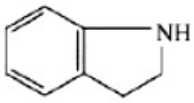
The major product of the following reaction is:



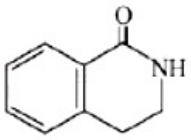
[Jan. 9,2019 (II)]

Options:

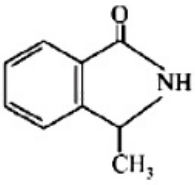
A.



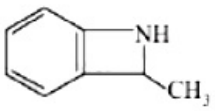
B.



C.



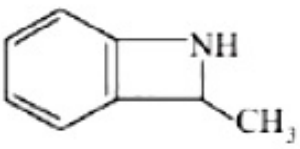
D.



Answer: C

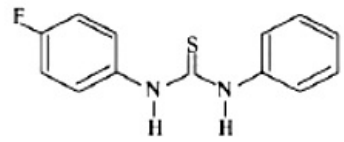
Solution:

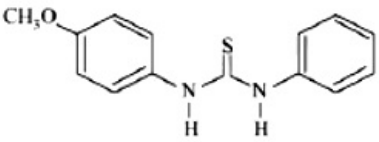
Reaction involved for the given reaction:

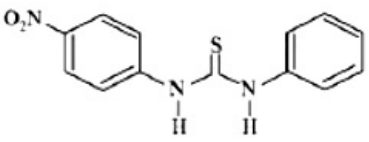


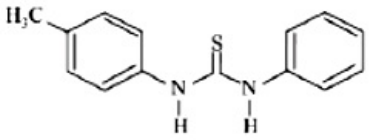
Question125

The increasing order of the pK_b of the following compounds is:









[April 12, 2019 (I)]

Options:

A. (A) < (C) < (D) < (B)

B. (C) < (A) < (D) < (B)

C. (B) < (D) < (A) < (C)

D. (B) < (D) < (C) < (A)

Answer: C

Solution:

Solution:
Electron withdrawing group attached to benzene ring will reduce the basic strength and increase pK_b, while electron donating group decreases pK_b.
Therefore the correct increasing order of pK_b is
(B) < (D) < (A) < (C)

Question126

Ethylamine ($C_2H_5NH_2$) can be obtained from N ethyl phthalimide on treatment with:
[April 10,2019(I)]

Options:

A. NH_2NH_2

B. CaH_2

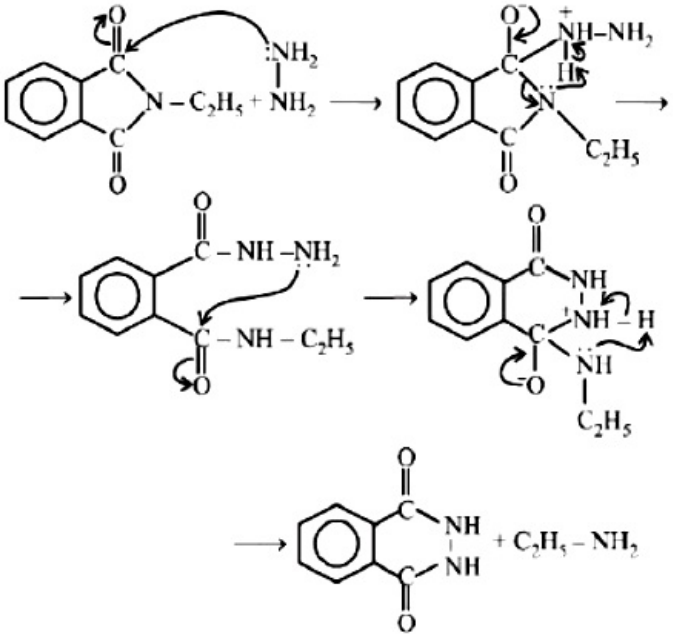
C. $NaBH_4$

D. H_2O

Answer: A

Solution:

N -Ethyl phthalimide on treatment with $NH_2 - NH_2$ gives ethylamine.



In place of NH_2NH_2 'we can also use H_2O in presence of H^+ or OH^- as a catalyst.

Question127

The major product of the following reaction is:

$$CH_3\overset{OH}{\underset{|}{C}}HCH_2CH_2NH_2 \xrightarrow[\text{triethylamine}]{\text{ethyl formate (1 equiv.)}}$$

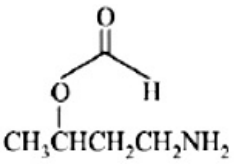
[April 10, 2019 (I)]

Options:

A. $CH_3 - \overset{OH}{\underset{|}{C}}H - CH = CH_2$

B. $CH_3\overset{OH}{\underset{|}{C}}HCH_2CH_2NHCHO$

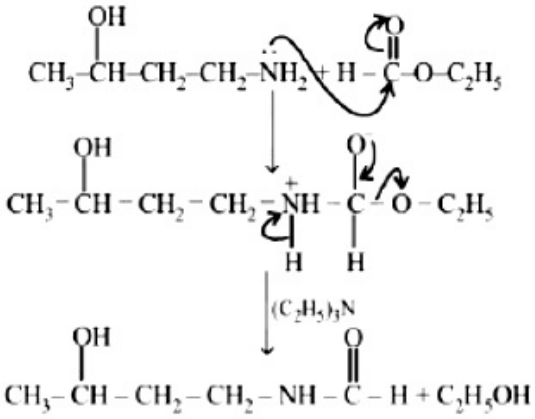
C.



D. $CH_3CH = CH - CH_2NH_2$

Answer: B

Solution:



Question128

Which of the following is NOT a correct method of the preparation of benzylamine from cyanobenzene?
[April 10,2019(II)]

Options:

A. H_2 / Ni

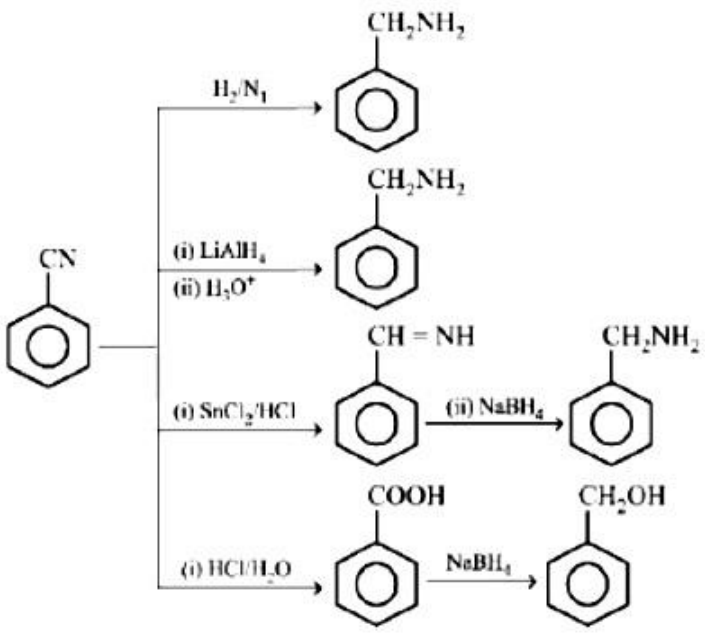
B. (i) $LiAlH_4$ (ii) H_3O^+

C. (i) $SnCl_2$ + HCl (gas) (ii) $NaBH_4$

D. (i) HCl / H_2O (ii)$NaBH_4$

Answer: D

Solution:



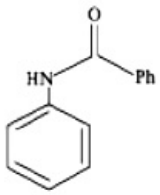
Question129

The major product ' Y ' in the following reaction is:

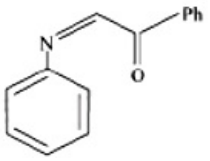
[April 10, 2019 (II))

Options:

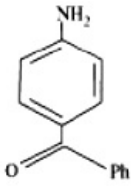
A.



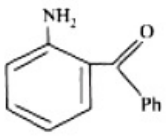
B.



C.

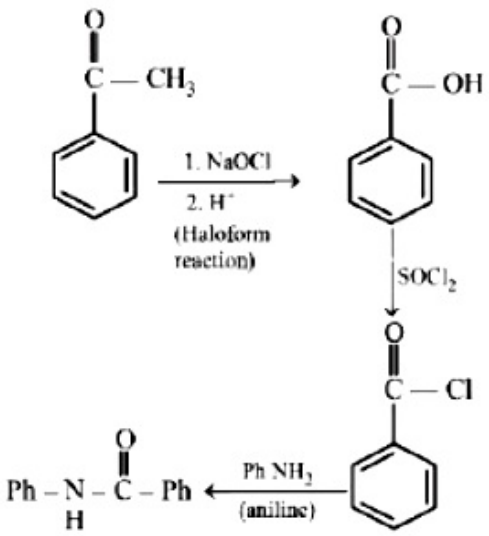


D.



Answer: A

Solution:



Question130

Hinsberg's reagent is:
[April 9, 2019 (II)]

Options:

A. C_6H_5COCl

B. $SOCl_2$

C. $C_6H_5SO_2Cl$

D. $(COCl)_2$

Answer: C

Solution:

Solution:
Hinsberg's reagent is benzenesulphonyl chloride ($C_6H_5SO_2Cl$). It is used for detection of primary, secondary and tertiary amines.

Question131

Which of the following amines can be prepared by Gabriel phthalimide reaction?
[April 8,2019(I)]

Options:

A. n -butylamine

B. triethylamine

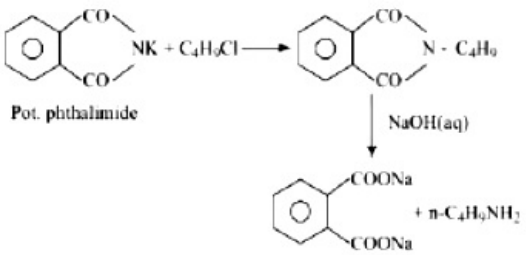
C. t -butylamine

D. neo-pentylamine

Answer: A

Solution:

Solution:
Primary amines are prepared by Gabriel phthalimide synthesis



Question132

In the following compounds, the decreasing order of basic strength will be:
[April 8, 2019 (I)]

Options:

A. $C_2H_5NH_2 > NH_3 > (C_2H_5)_2NH$

B. $(C_2H_5)_2NH > NH_3 > C_2H_5NH_2$

C. $(C_2H_5)_2NH > C_2H_5NH_2 > NH_3$

D. $NH_3 > C_2H_5NH_2 > (C_2H_5)_2NH$

Answer: C

Solution:

Solution:
$(C_2H_3)_2NH > C_2H_5NH_2 > NH_4$

Question133

Polysubstitution is a major drawback in:
[April 8,2019 (II)]

Options:

A. Friedel Craft's alkylation

B. Reimer Tiemann reaction

C. Acetylation of aniline

D. Friedel Craft's acylation

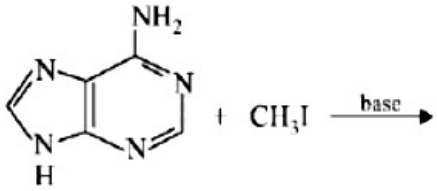
Answer: A

Solution:

Solution:
Polysubstitution is a major drawback in Fricdel Craft's alkylation because the introduced alkyl group is activating and gives polyalkylated product.

Question134

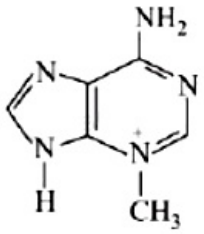
The major product in the following reaction is:



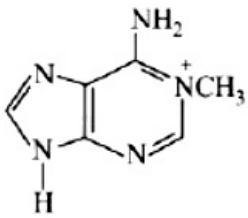
[April 8, 2019 (II)]

Options:

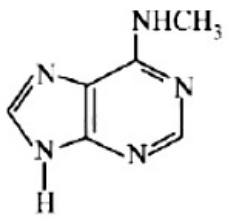
A.



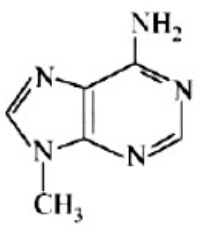
B.



C.

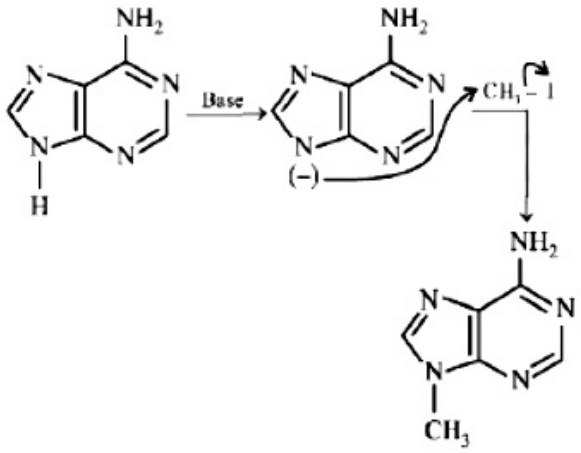


D.



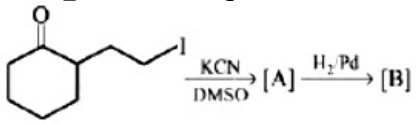
Answer: D

Solution:



Question135

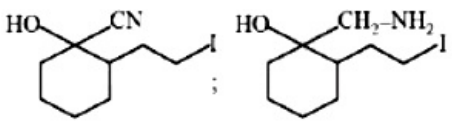
The major products A and B for the following reactions are, respectively:



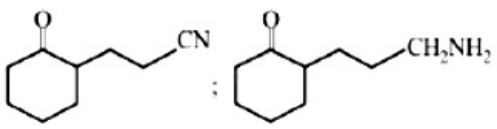
[April 9, 2019 (II)]

Options:

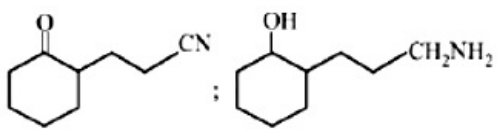
A.



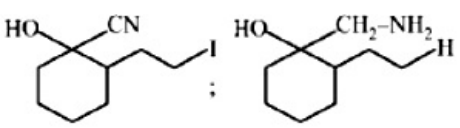
B.



C.

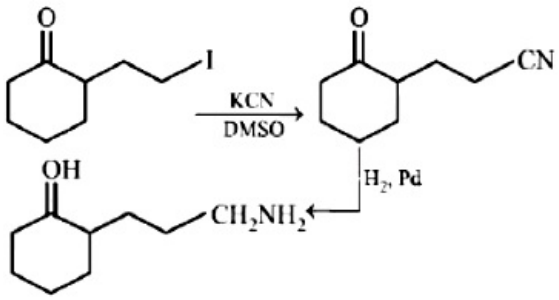


D.



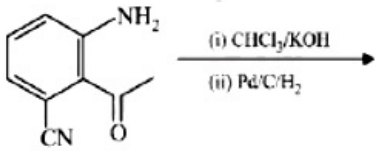
Answer: C

Solution:



Question136

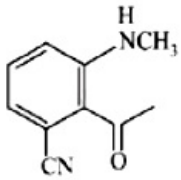
The major product obtained in the following reaction is:



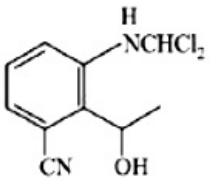
[April 8, 2019 (II)]

Options:

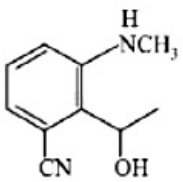
A.



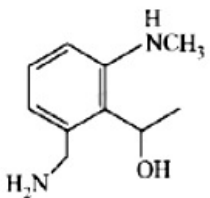
B.



C.

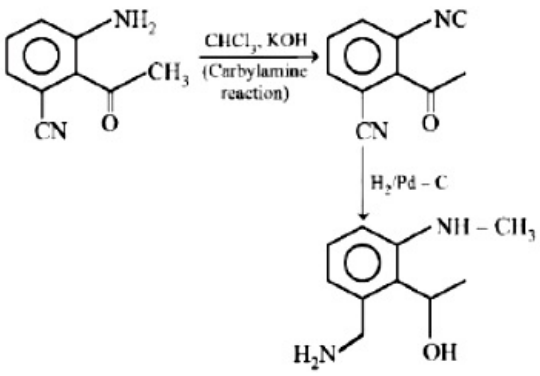


D.



Answer: D

Solution:

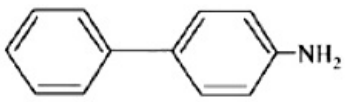


Question137

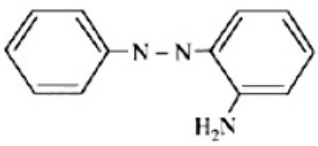
Benzene diazonium chloride on reaction with aniline in the presence of dilute hydrochloric acid gives:
[April 12, 2019 (II)]

Options:

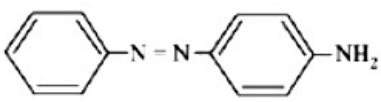
A.



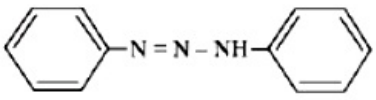
B.



C.

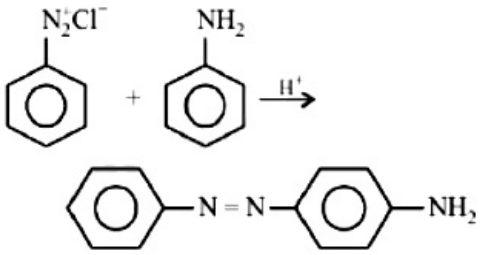


D.



Answer: C

Solution:

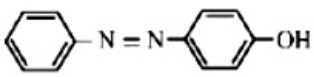


Question138

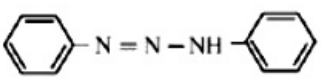
Aniline dissolved in dilute H Cl is reacted with sodium nitrate at 0˚C. This solution was added dropwise to a solution containing equimolar mixture of aniline and phenol in dil. H Cl . The structure of the major product is:
[April 9, 2019 (I)]

Options:

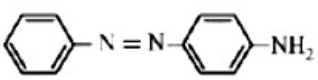
A.



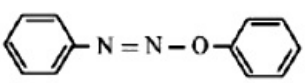
B.



C.



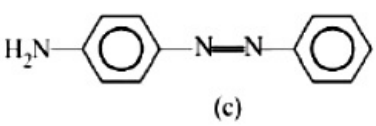
D.



Answer: C

Solution:

Solution:
In acidic medium, benzene diazonium chloride reacts with aniline (a basic compound) forming a_{30} dye (c).



(c)

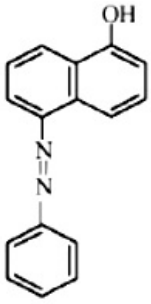
Question139

Coupling of benzene diazonium chloride with 1 -naphthol in alkaline

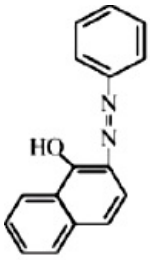
medium will give:
[April 8, 2019 (I)]

Options:

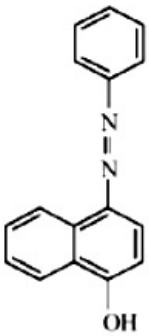
A.



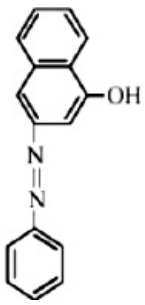
B.



C.

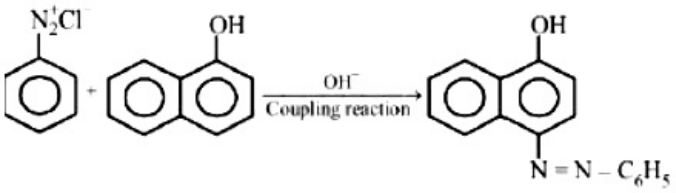


D.



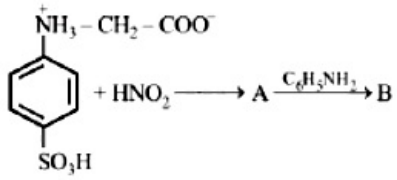
Answer: C

Solution:



Question140

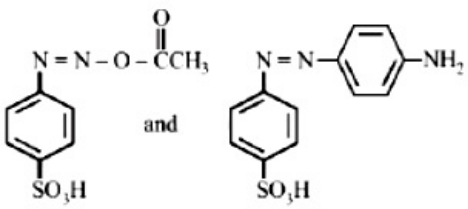
Products A and B formed in the following reactions are respectively:



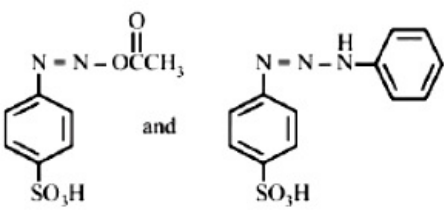
[Online April 16, 2018]

Options:

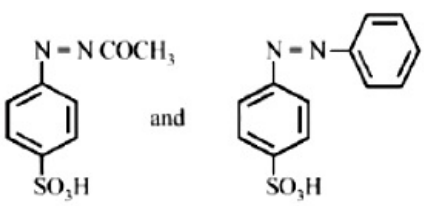
A.



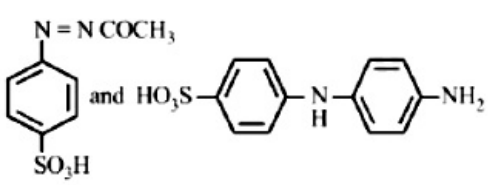
B.



C.

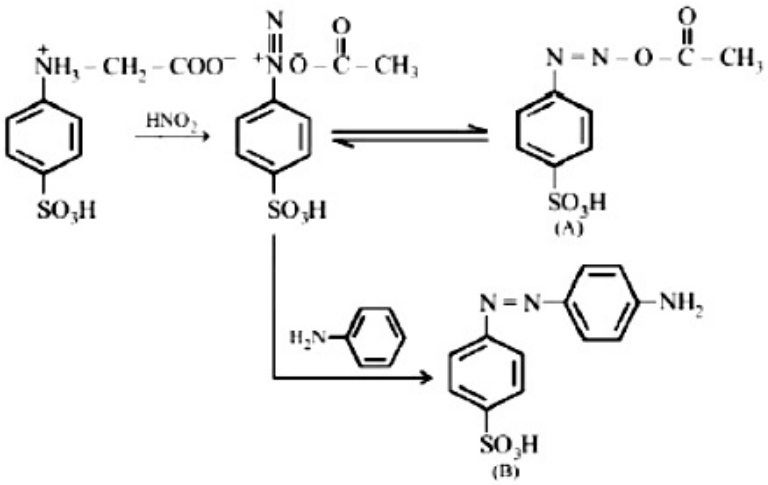


D.



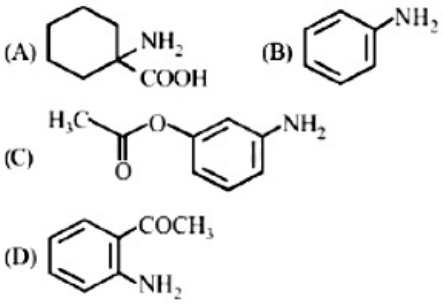
Answer: A

Solution:



Question141

The increasing order of diazotisation of the following compounds is:



[Online April 15, 2018 (II)]

Options:

A. (D) < (C) < (B) < (A)

B. (A) < (D) < (B) < (C)

C. (A) < (B) < (C) < (D)

D. (A) < (D) < (C) < (B)

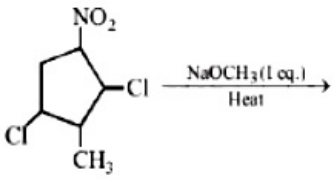
Answer: D

Solution:

Solution:
Aromatic diazonium salts are more stable than aliphatic diazonium salts. The higher stability of aryl diazonium salts is due to resonance. Electron donating substituents increase electron density on benzene ring. Hereby they increase the stability of diazonium salts. Electron withdrawing substituents decrease electron density on benzene ring. Hereby they decrease the stability of diazonium salts. $-COCH_3$ group is electron withdrawing and hence, diazonium salts from (D) is lessstable than that from (B). Although - O-COCH $_3$ iselectron donatingsubstituent, but it is present in metaposition. Hence, it will not have significant effect on stability.
Therefore the increasing order of diazotisation is
(A) < (D) < (C) < (B)

Question142

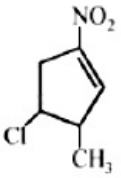
The major product formed in the following reaction is:



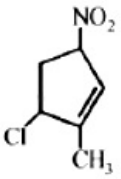
[Online April 15, 2018 (II)]

Options:

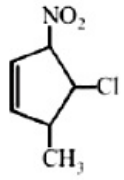
A.



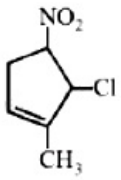
B.



C.



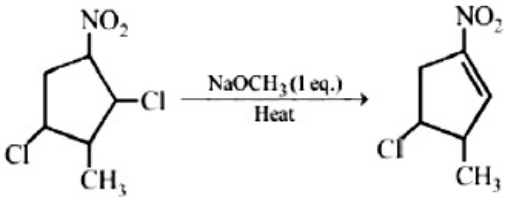
D.



Answer: A

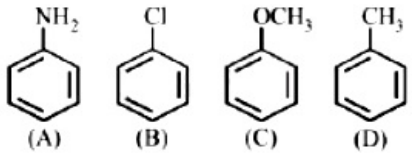
Solution:

Solution:
Note: In the given reaction a molecule of H Cl is lost and C = C double bond is formed. Thus it is dehydrohalogenation reaction. Nitro group is electron withdrawing group. Hence increases the acidity of H atom (attached to C atom bearing nitro group) which is removed easily. Further the newly formed double bond is in conjugation with nitro group.



Question143

The increasing order of nitration of the following compounds is:



[Online April 15, 2018 (I)]

Options:

A. (A) < (B) < (D) < (C)

B. (A) < (B) < (C) < (D)

C. (B) < (A) < (C) < (D)

D. (B) < (A) < (D) < (C)

Answer: A

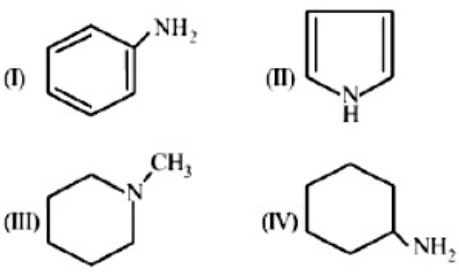
Solution:

Solution:
In the given substituted benzene rings, the substitutents methoxy ($-OCH_3$) and amino ($-NH_2$) are strongly activating groups, while methyl ($-CH_3$) is weakly activating and chloro ($-Cl$) is a deactivating group towards electrophilic aromatic substituation reaction. Since among methyl and methoxy group, methoxy group is more reactive than methyl group, (c) is more reactive than (d). Although amino group is strongly activating group, it gets protonated in presence of acid to form anilinium ion ($-NH_3$) which is strongly deactivating. Hence, (a) is less reactive than (c) and (d). Chloro group is also deactivating group but less deactivating than ($-NH_3$). Thus order is (a) < (b) < (d) < (c)

Note:
The activating groups increases the electron density on benzene ring and thus increases the rate of electrophilic aromatic substitution reaction. The deactivating groups decreases the electron density on benzene ring and thus decreases the rate of electrophilic aromatic substitution reaction.

Question144

Among the following compounds, the increasing order of their basic strength is:



[Online April 9,2017]

Options:

A. (II) < (I) < (IV) < (III)

B. (II) < (I) < (III) < (IV)

C. (I) < (II) < (IV) < (III)

D. (I) < (II) < (III) < (IV)

Answer: A

Solution:

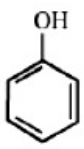
Solution:
I) Resonance leads to a decrease in basic strength. In aniline, the lone pair electrons of N are in resonance with the benzene ring. Hence, the lone pairs are not easily available to donate, hence it has less basicity.
II) Pyrrole is an aromatic compound, here also lone pair of electrons are involved in the aromaticity, hence it has the least basicity.
III) In the given structure, N is bonded with 1 methyl and $2CH_2$ groups. Hence, due to the $+I$ effect, it is the most basic compound among them all.
IV) In the given structure, N is attached with only one CH group, so it has less basic character than III.
Therefore, the basic strength of given compounds is II < I < IV < III.

Question145

Which of the following compounds will form significant amount of metal product during mono-nitration reaction? [2017]

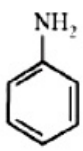
Options:

A.



B.

C.



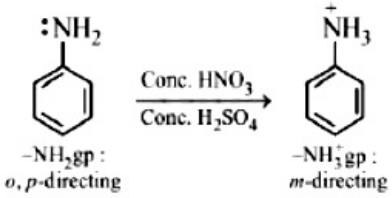
D.

Answer: C

Solution:

Solution:
Nitration takes place in presence of conc. HNO_3 + conc.H_2SO_4 In strongly acidic medium, amine is converted into

anilinium ion ($-NH_3^+$); substitution is thus controlled not by $-NH_2$ group but by $-NH_3^+$ group which, because of its positive charge, directs the entering group to the meta-position instead of ortho- and para.



Question146

In the Hofmann bromamide degradation reaction, the number of moles of NaOH and Br_2 used per mole of amine produced are : [2016]

Options:

A. Two moles of NaOH and two moles of Br_2.

B. Four moles of NaOH and one mole of Br_2.

C. One mole of NaOH and one mole of Br_2.

D. Four moles of NaOH and two moles of Br_2.

Answer: B

Solution:

Solution:
$RCONH_2 + Br_2 + 4NaOH \longrightarrow R-NH_2 + K_2CO_3 + 2NaBr + 2H_2O$

Question147

The test to distinguish primary, secondary and tertiary amines is: [Online April 9, 2016]

Options:

A. Sandmeyer's reaction

B. Carbylamine reaction

C. Mustard oil test

D. $C_6H_5SO_2Cl$

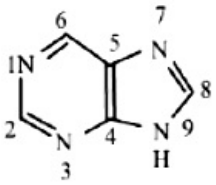
Answer: D

Solution:

Primary, secondary and tertiary amines are distinguished by Hinsberg reagent test. The Hinsberg reagent is an alternative name for benzene sulphonyl chloride ($C_6H_5SO_2Cl$)

Question148

The " N '' which does not contribute to the basicity for the compound is:



[Online April 10,2016]

Options:

A. N 9

B. N x3

C. N |

D. N 7

Answer: A

Solution:

Solution:
Lone pair of N is involved in aromatically.

Question149

Fluorination of an aromatic ring is easily accomplished by treating a diazonium salt with HBF_4. Which of the following conditions is correct about this reaction?
[Online April 10, 2016]

Options:

A. NaF / Cu

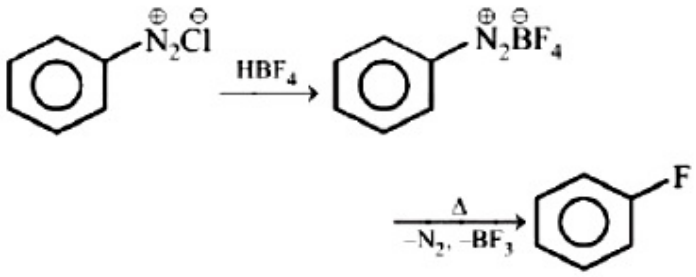
B. Cu_2O / H_2O

C. Only heat

D. $NaNO_2$ / Cu

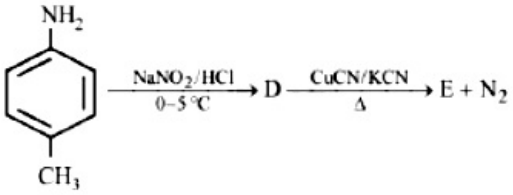
Answer: C

Solution:



Question150

In the reaction

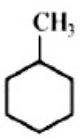


the product E is :
[2015]

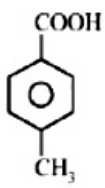
Options:

A.

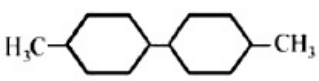
B.



C.

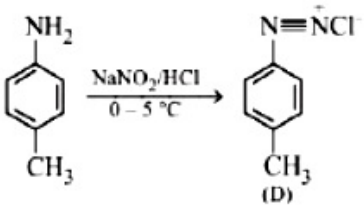


D.

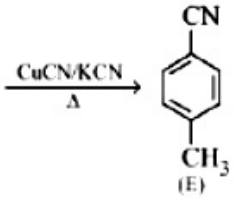


Answer: A

Solution:



(D)



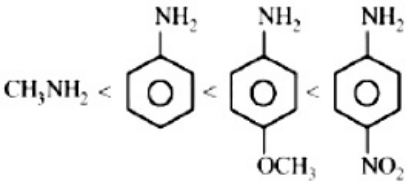
(E)

Question151

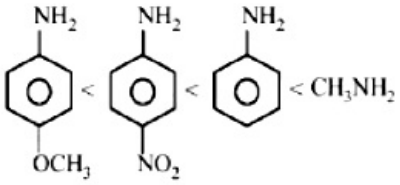
Arrange the following amines in the order of increasing basicity. [Online April 10,2015]

Options:

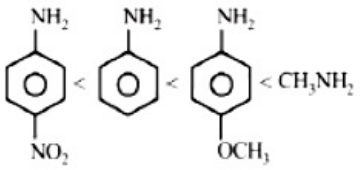
A.



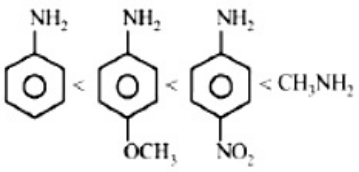
B.



C.



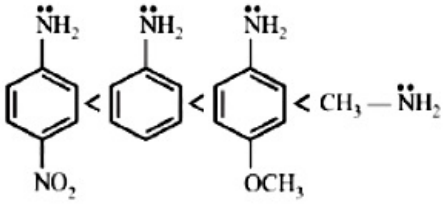
D.



Answer: C

Solution:

Aliphatic amines are more basic than aromatic amines thus methylamine is most basic. Electron donating groups increase the basicity whereas electron withdrawing groups decrease the basicity of the aromatic amines. Thus p^- methoxyaniline is more basic than aniline which is further more basic than p -nitroaniline.



Question152

On heating an aliphatic primary amine with chloroform and ethanolic potassium hydroxide, the organic compound formed is: [2014]

Options:

A. an alkanol

B. an alkanediol

C. an alkyl cyanide

D. an alkyl isocyanide

Answer: D

Solution:

Solution:

$$R-CH_2-NH_2+CHCl_3+3KOH(alc)\xrightarrow{\text{(Carbyl amins reaction)}}\underset{\text{Alkyl isecyanide}}{R-CH_2-NC}+3KCl+3H_2O$$

Question153

Considering the basic strength of amines in aqueous solution, which one has the smallest pK_b value? [2014]

Options:

A. $(CH_3)_2NH$

B. CH_3NH_2

C. $(CH_3)_3N$

D. $C_6H_5NH_2$

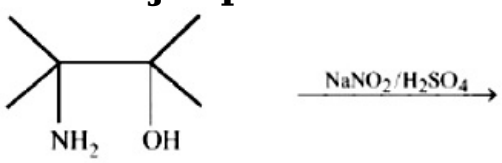
Answer: A

Solution:

Arylamines are less basic than alkyl amines and even ammonia. This is due to resonance. In aryl amines the lone pair of electrons on N is partly shared with the ring and is thus less available for sharing with a proton. In alkylamines, the electron releasing alkyl group increases the electron density on nitrogen atom and thus also increases the ability of amine for protonation. Hence more the no, of alkyl groups higher should be the basicity of amine. But a slight discrepancy occurs in case of trimethyl amines due to steric effect. Hence the correct order is
$(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N > C_6H_5NH_2$

Question154

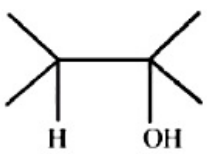
The major product of the reaction



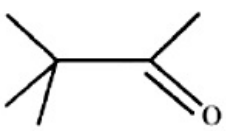
[Online April 9, 2014]

Options:

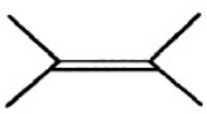
A.



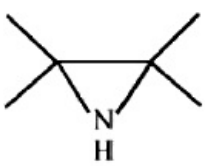
B.



C.



D.



Answer: B

Solution:

Question155

The final product formed when methyl amine is treated with $NaNO_2$ and HCl is:
[Online April 19,2014]

Options:

A. Diazomethane

B. Methylalcohol

C. Methylcyanide

D. Nitromethane

Answer: B

Solution:

$$CH_3NH_2 + HNO_2 \longrightarrow CH_3OH + N_2 + H_2O$$

Question156

Complete reduction of benzene-diazonium chloride with Zn/HCl gives:
[Online April 11, 2014]

Options:

A. Aniline

B. Phenylhydrazine

C. Azobenzene

D. Hydrazobenzene

Answer: A

Solution:

Solution:
On reduction with Zn and HCl, $C_6H_5N_2Cl$ forms aniline as the main product.

Question157

Conversion of benzene diazonium chloride to chlorobenzene is an example of which of the following reactions?
[Online April 12, 2014]

Options:

A. Claisen

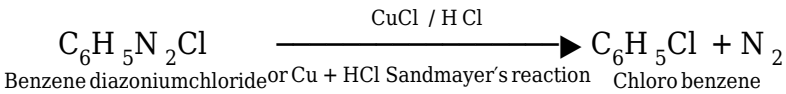
B. Friedel-craft

C. Sandmeyer

D. Wurtz

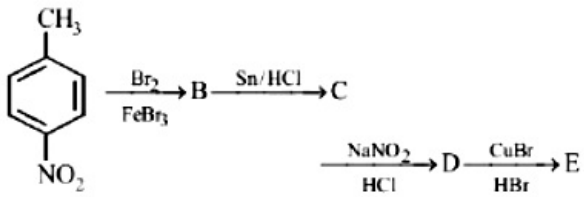
Answer: C

Solution:



Question158

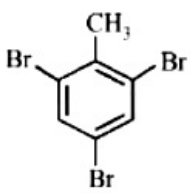
In a set of reactions p -nitrotoluene yielded a product E.



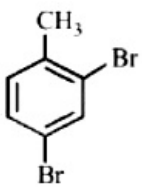
[Online April 19, 2014]

Options:

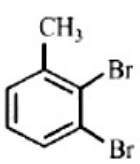
A.



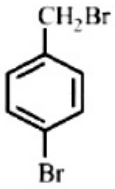
B.



C.

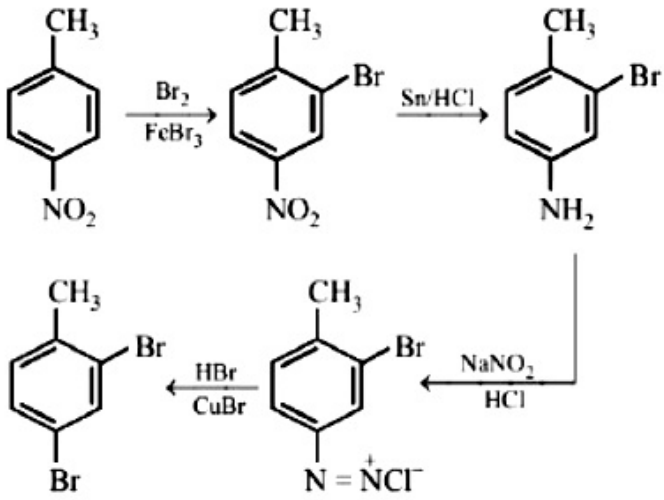


D.



Answer: B

Solution:



Question159

A compound with molecular mass 180 is acylated with CH_3COCl to get a compound with molecular mass 390. The number of amino groups present per molecule of the former compound is:
[2013]

Options:

A. 2

B. 5

C. 4

D. 6

Answer: B

Solution:

$$\underset{\text{Mol. Mass} = 16}{R-NH_2} + CH_3-\overset{O}{\overset{\|}{C}}-Cl \xrightarrow[-HCl]{} \underset{\text{Mol. Mass} = 58}{R-NH-\overset{O}{\overset{\|}{C}}-CH_3}$$

Now since the molecular mass increases by 42 unit as a result of the reaction of one mole of CH_3COCl with one-NH, group and the given increase in mass is (390 − 180) 210. Hence the number of $-NH_2$ groups = 210 / 42 = 5.

Question160

The order of basicity of amines in gaseous state is:
[Online April 23, 2013]

Options:

A. $1^{\circ} > 2^{\circ} > 3^{\circ} > NH_3$

B. $3^{\circ} > 2^{\circ} > NH_3 > 1^{\circ}$

C. $3^{\circ} > 2^{\circ} > 1^{\circ} > NH_3$

D. $NH_3 > 1^{\circ} > 2^{\circ} > 3^{\circ}$

Answer: C

Solution:

Solution:
The correct order of relative basicity of amines in the gasphase is $3^{\circ} > 2^{\circ} > 1^{\circ} > NH_3$ The alkyl group releases electron and thus, tends to disperse the positive charge of the alkyl ammonium ion and therefore stabilises it. Since, NH_4^+ (from NH_3) has no such alkyl group, it is not stabilised to such an extent as alkylammonium ion.

Question161

Carbylamine forms from aliphatic or aromatic primary amine via which of the following intermediates?
[Online April 25,2013]

Options:

A. Carbanion

B. Carbene

C. Carbocation

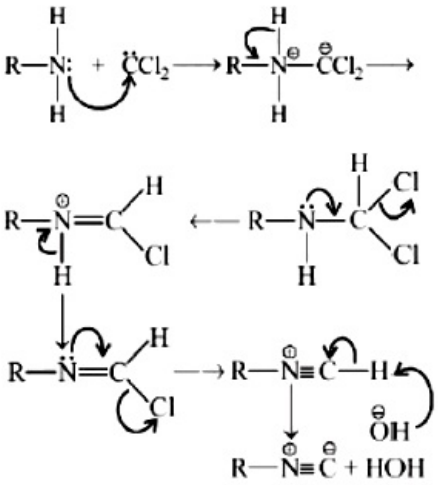
D. Carbon radical

Answer: B

Solution:

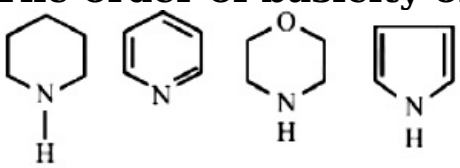
Solution:

$$\underset{\text{Mechanism}}{RNH_2} + CHCl_3 + 3KOH \longrightarrow RNC + 3KCl + 3H_2O \; CHCl_3 \xrightarrow[\text{a elimination}]{OH^-/\Delta} \underset{\text{Dichlorocarbene}}{\ddot{C}Cl_2}$$



Question162

The order of basicity of the compounds



(I) (II) (III) (IV)

[Online May 19,2012 ; Online May 26,2012]

Options:

A. IV > I > III > II

B. I > III > II > IV

C. III > II > IV > II

D. II > I > III > IV

Answer: B

Solution:

Solution:
The order of basicity is I > III > II > IV The lone pair of electrons on N is more readily available for protonation in I and III than in II. III contains an oxygen atom which has −I effect due to which it is less basic than I. In compound IV lone pair of es on N-atom is contributed towards the aromatic sextet formation and hence it is not at all available for protonation.

Question163

The conversion of benzene diazonium chloride to bromobenzene can be accomplished by
[Online May 12,2012]

Options:

A. Reimer-Tiemann reaction

B. Friedel-Crafts reaction

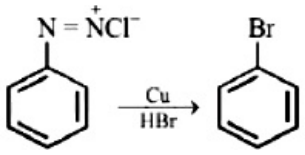
C. Gattermann reaction

D. Azo-Coupling reaction

Answer: C

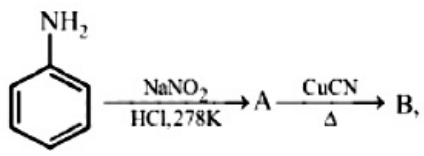
Solution:

Diazonium salts react with copper powder and hydrogen bromide to form bromobenzene. This reaction is known as Gattermann reaction.



Question164

In the chemical reactions:



the compounds A and B respectively are: [2011 RS]

Options:

A. Benzene diazonium chloride and benzonitrile

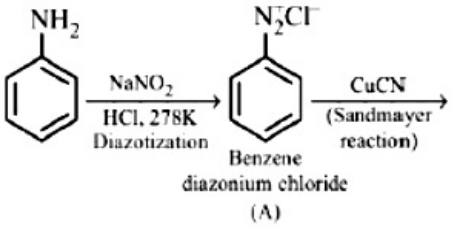
B. Nitrobenzene and chlorobenzene

C. Phenol and bromobenzene

D. Fluorobenzene and phenol

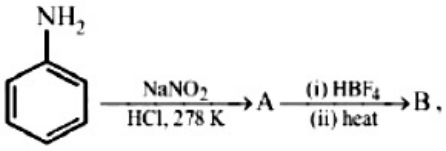
Answer: A

Solution:



Question165

In the chemical reactions,



the compounds 'A' and 'B' respectively are [2010]

Options:

A. nitrobenzene and fluorobenzene

B. phenol and benzene

C. benzene diazonium chloride and fluorobenzene

D. nitrobenzene and chlorobenzene

Answer: C

Solution:

Solution:

$$\underset{1^{\circ}\text{ Aromatic amine}}{ArNH_2} + NaNO_2 + 2HX \xrightarrow{\text{cold}} \underset{\text{Arene diazonium salt}}{Ar-N \equiv N^{+}X^{-}} + NaX + 2H_2O$$

The diazonium group can be replaced by fluorine by treating the diazonium salt with fluoroboric acid (HBF_4). The precipitated diazonium fluoroborate is isolated, dried and heated until decomposition occurs to yield the aryl fluoride. This reaction is known as Balz-Schiemann reaction.

$$Ar-N_2^{+}X^{-} \xrightarrow{HBF_4} Ar-N_2^{+}BF_4^{-} \downarrow \xrightarrow{\text{heat}} Ar-F + BF_3 + N_2$$

Question166

Which one of the following is the strongest base in aqueous solution? [2007]

Options:

A. Methylamine

B. Trimethylamine

C. Aniline

D. Dimethylamine.

Answer: D

Solution:

Solution:
Note: Aromatic amines (e.g. aniline) are less basic than aliphatic amines due to delocalisation of electrons. Among aliphatic amines the order of basicity in aq. solution is $2^{\circ} > 1^{\circ} > 3^{\circ}$. The electron density is decreased in 3° amine due to crowding of alkyl group over N atom which makes the approach and bonding by a proton relatively difficult. Therefore the basicity decreases.
∴ The correct order of basic strength is
Dimethylamine > Methyl amine > Trimethylamine > Aniline.

Question167

In the chemical reaction,

$\mathrm{CH_3CH_2NH_2 + CHCl_3 + 3KOH \rightarrow (A) + (B) + 3H_2O}$, the compounds (A) and (B) are respectively [2007]

Options:

A. $\mathrm{C_2H_5NC}$ and $\mathrm{3KCl}$

B. $\mathrm{C_2H_5CN}$ and $\mathrm{3KCl}$

C. $\mathrm{CH_3CH_2CONH_2}$ and $\mathrm{3KCl}$

D. $\mathrm{C_2H_5NC}$ and $\mathrm{K_2CO_3}$.

Answer: A

Solution:

Solution:
This is carbylamine reaction.
$\mathrm{CH_3CH_2NH_2 + CHCl_3 + 3KOH \longrightarrow C_2H_5NC + 3KCl + 3H_2O}$

Question168

The most basic compound among the following is [2005, Online May 7,2012]

Options:

A. Acetanilide

B. Benzylamine

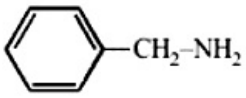
C. p -Nitro aniline

D. Aniline

Answer: B

Solution:

Solution:



compound is most basic due to presence of localized lone pair of electron on nitrogen atom while other compounds have delocalized lone pair of electron.

Question169

Which one of the following methods is neither meant for the synthesis nor for separation of amines? [2005]

Options:

A. Curtius reaction

B. Wurtz reaction

C. Hofmann method

D. Hinsberg method

Answer: B

Solution:

Solution:
Wurtz reaction is used for the preparation of hydrocarbons from alkyl halides.
$RX + 2Na + XR \longrightarrow R - R + 2NaX$

Question170

The correct order of increasing basic nature for the bases NH_3, CH_3NH_2 and $(CH_3)_2NH$ is [2003]

Options:

A. $(CH_3)_2NH < NH_3 < CH_3NH_2$

B. $NH_3 < CH_3NH_2 < (CH_3)_2NH$

C. $CH_3NH_2 < (CH_3)_2NH < NH_3$

D. $CH_3NH_2 < NH_3 < (CH_3)_2NH$

Answer: B

Solution:

Solution:
The alkyl groups are electron releasing (+ I) groups, thus increase the electron density around the nitrogen thereby increasing the availability of the lone pair of electrons to proton or Lewis acid and making the amine more basic. Hence more the number of alkyl groups, more basic is the amine. Therefore, the correct order is
$NH_3 < CH_3NH_2 < (CH_3)_2NH$

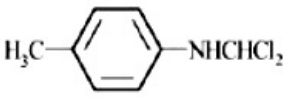
Question171

The reaction of chloroform with alcoholic KOH and p-toluidine forms [2003]

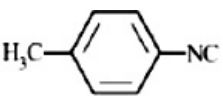
Options:

A.

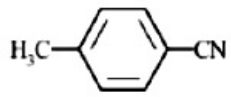
B.



C.

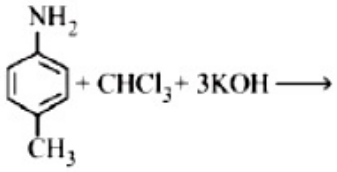


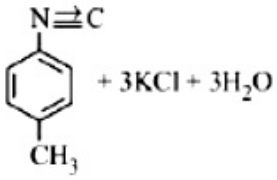
D.



Answer: C

Solution:





Question172

Ethyl isocyanide on hydrolysis in acidic medium generates [2003]

Options:

A. propanoic acid and ammonium salt

B. ethanoic acid and ammonium salt

C. methylamine salt and ethanoic acid

D. ethylamine salt and methanoic acid

Answer: D

Solution:

Ethyl isocyanide on hydrolysis form primary amines.

$$CH_3CH_2N \overset{=}{\rightarrow} C + H_2O \xrightarrow{H^+} CH_3CH_2NH_2 + HCOOH$$

Question173

When a primary amine reacts with chloroform in ethanolic KOH then the product is [2002]

Options:

A. an isocyanide

B. an aldehyde

C. a cyanide

D. an alcohol.

Answer: A

Solution:

$$C_2H_5NH_2 + CHCl_3 + 3KOH \longrightarrow \underset{\text{(Ethyl isocyanide)}}{C_2H_3N} \Longrightarrow C + 3KCl + 3HCl$$
