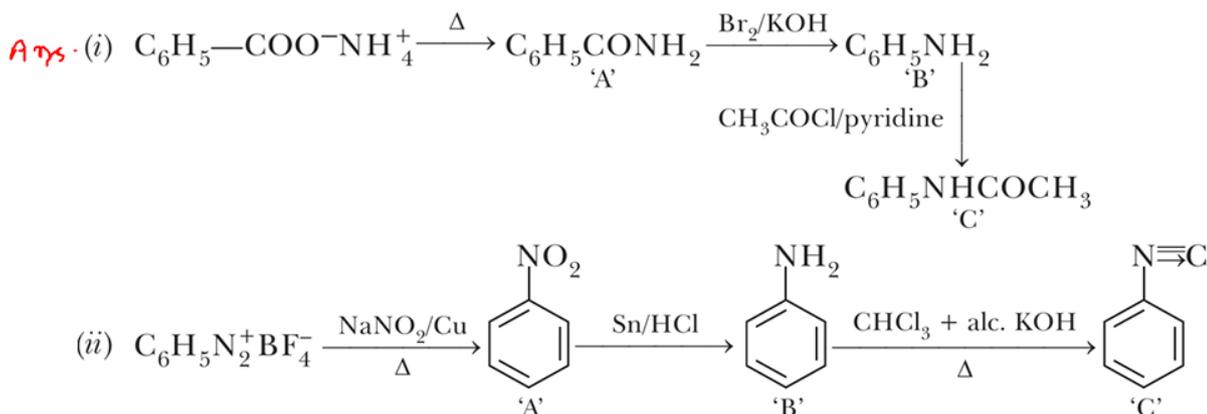
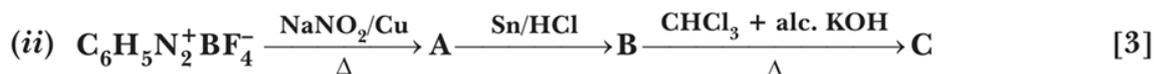
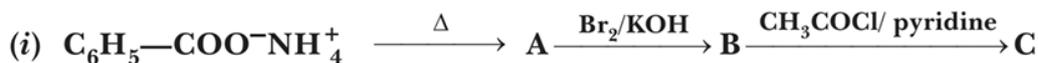


**CBSE- 2016**

1. Complete the following reactions: **CBSE-2016**



**CBSE-2017**

1. Give reasons for the following **CBSE-2017**

- Acetylation of aniline reduces its activation effect.
- $\text{CH}_3\text{NH}_2$  is more basic than  $\text{C}_6\text{H}_5\text{NH}_2$ .
- Although  $\text{—NH}_2$  is *o/p* directing group, yet aniline on nitration gives a significant amount of *m*-nitroaniline. [3]

**Ans.** (a)  $\text{CH}_3\text{—C(=O)—}$  group is electron withdrawing, it reduces activation effect of  $\text{—NH}_2$  group because it reduces electron density on nitrogen as well as benzene ring.

(b) It is because  $\text{—CH}_3$  group is electron releasing and  $\text{C}_6\text{H}_5\text{—}$  group is electron withdrawing.  $\text{CH}_3\text{—}$  group increases electron density on 'N', whereas  $\text{C}_6\text{H}_5$  reduces electron density on 'N'.

(c) It is because  $\text{—NH}_2$  group gets protonated,  $\text{NH}_3^+$  is electron withdrawing and *m*-directing.  $\text{NH}_3^+$  decreases electron density at *o* and *p*, therefore, electrophile will attack at *m*-position.

**CBSE- 2018**

1. (a) Write the reactions involved in the following: **CBSE-2018**

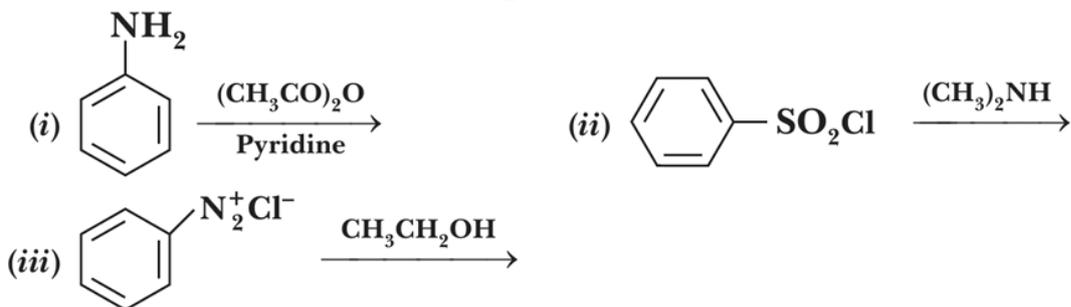
- Hofmann bromamide degradation reaction
- Diazotisation
- Gabriel phthalimide synthesis

(b) Give reasons:

- $(\text{CH}_3)_2\text{NH}$  is more basic than  $(\text{CH}_3)_3\text{N}$  in an aqueous solution.
- Aromatic diazonium salts are more stable than aliphatic diazonium salts. 3+2=5

Or

(a) Write the structures of the main products of the following reactions:



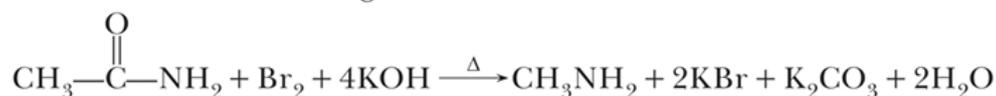
(b) Give a simple chemical test to distinguish between Aniline and N,N-dimethylaniline.

(c) Arrange the following in the increasing order of their  $pK_b$  values:

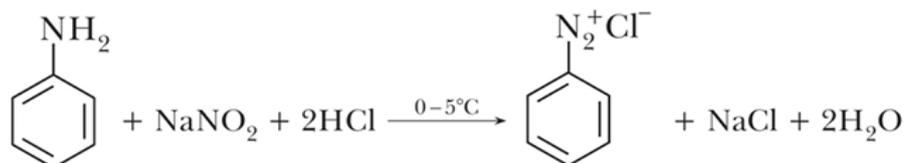


5

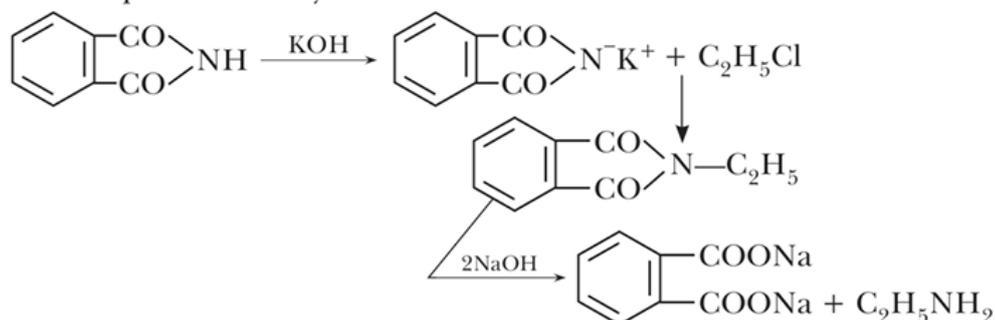
Ans. (a) (i) Hofmann bromamide degradation reaction



(ii) Diazotisation



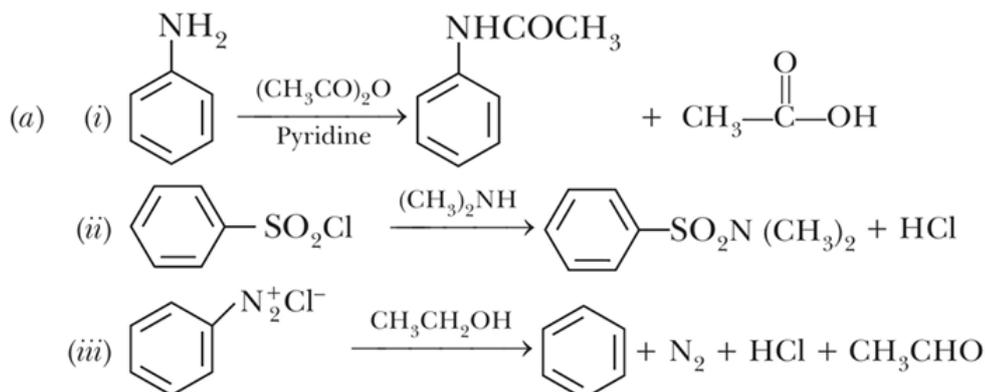
(iii) Gabriel phthalimide synthesis



(b) (i) It is because in  $(CH_3)_3N$ , lone pair of electron is less readily available due to steric hindrance as compared to  $(CH_3)_2NH$ .

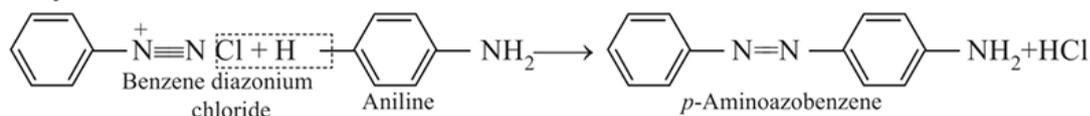
(ii) It is because aromatic diazonium ion is stabilized by resonance.

Or





- (ii) **Coupling reaction:** When benzene diazonium chloride reacts with aniline or phenol, orange azo dye is formed.



- (iii) **Carbyl amine reaction:** When primary amine reacts with  $\text{CHCl}_3$  and  $\text{KOH}$ , it forms isocyanide which is an offensive smelling compound.



## CBSE- 2020

1.  $\text{CH}_3\text{CONH}_2$  on reaction with  $\text{NaOH}$  and  $\text{Br}_2$  in alcoholic medium gives



CBSE-2020

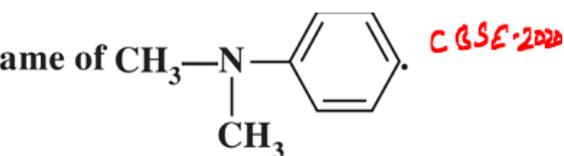


2. Give reasons:

CBSE-2020

- (i) Aniline does not undergo Friedal-Crafts reaction.  
 (ii) Aromatic primary amines cannot be prepared by Gabriel's phthalimide synthesis.  
 (iii) Aliphatic amines are stronger bases than ammonia. 3×1=3

3. Write the IUPAC name of



4. Out of  $(\text{CH}_3)_3\text{N}$  and  $(\text{CH}_3)_2\text{NH}$ , which one is more basic in aqueous solution?

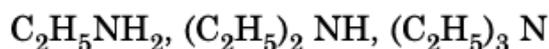


CBSE-2020

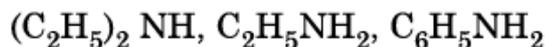
## CBSE-2021

1. Arrange the following compounds as directed : (any Two) CBSE-2021

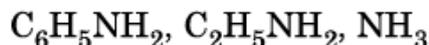
- (i) In decreasing order of basic strength in aqueous solution :



- (ii) In increasing order of solubility in water :



- (iii) In decreasing order of their  $\text{pK}_b$  values :



2. (a) Illustrate the following reactions giving suitable example in each case :

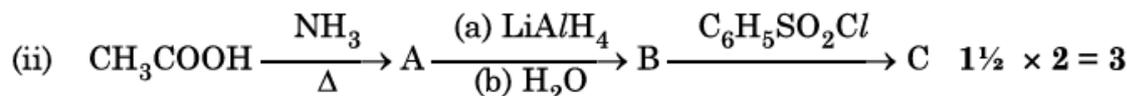
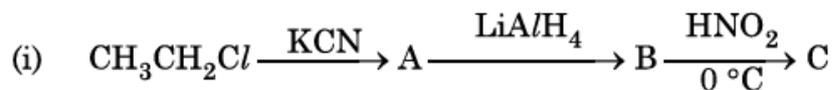
CBSE-2021

- (i) Gabriel phthalimide synthesis.  
 (ii) Carbylamine reaction.  
 (iii) Hoffmann bromamide degradation reaction.

1 × 3 = 3

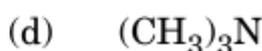
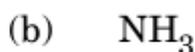
OR

(b) Write the structures of A, B and C in the following reactions :



CBSE-2023

1. Which of the following is least basic ? CBSE-2023



2. Assertion (A) :  $-\text{NH}_2$  group is *o*- and *p*-directing in electrophilic substitution reactions. CBSE-2023.

Reason (R) : Aniline cannot undergo Friedel-Crafts reaction.

3. Assertion (A) : Acetylation of aniline gives a monosubstituted product.

Reason (R) : Activating effect of  $-\text{NHCOCH}_3$  group is more than that of amino group. CBSE-2023.

4. Explain briefly : CBSE-2023.

(a) Carbylamine reaction

(b) Gabriel phthalimide synthesis

5. I. Give reasons: CBSE-2023

3+2

(i) Aniline on nitration gives good amount of *m*-nitroaniline, though  $-\text{NH}_2$  group is *o/p* directing in electrophilic substitution reactions.

(ii)  $(\text{CH}_3)_2\text{NH}$  is more basic than  $(\text{CH}_3)_3\text{N}$  in an aqueous solution.

(iii) Ammonolysis of alkyl halides is not a good method to prepare pure primary amines.

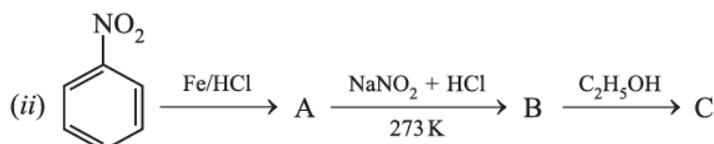
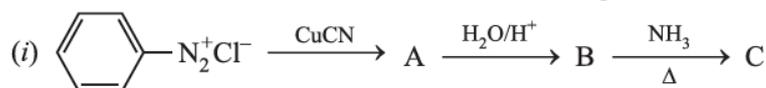
II. Write the reaction involved in the following:

(i) Carbyl amine test

(ii) Gabriel phthalimide synthesis

OR

(b) I. Write the structures of A, B and C in the following reactions:



II. Why aniline does not undergo Friedal-Crafts reaction?

III. Arrange the following in increasing order of their boiling point:



## CBSE-2024

1. Which of the following compounds on treatment with benzene sulphonyl chloride forms an alkali-soluble precipitate? **CBSE-2024**

- (A)  $\text{CH}_3\text{CONH}_2$
- (B)  $(\text{CH}_3)_3\text{N}$
- (C)  $(\text{CH}_3)_2\text{NH}$
- (D)  $\text{CH}_3\text{CH}_2\text{NH}_2$

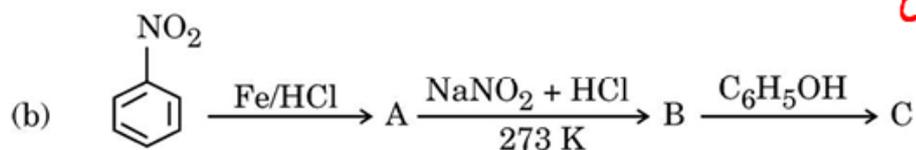
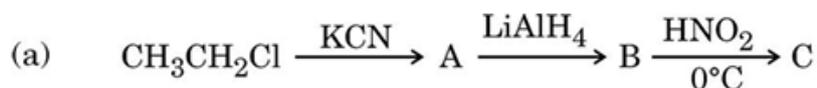
2. The order of increasing basicities of  $\text{CH}_3\text{NH}_2$  (I),  $(\text{CH}_3)_2\text{NH}$  (II),  $(\text{CH}_3)_3\text{N}$  (III) and  $\text{C}_6\text{H}_5\text{NH}_2$  (IV) in aqueous media is: **CBSE-2024**

- (A)  $\text{IV} < \text{III} < \text{I} < \text{II}$
- (B)  $\text{II} < \text{I} < \text{IV} < \text{III}$
- (C)  $\text{I} < \text{II} < \text{III} < \text{IV}$
- (D)  $\text{II} < \text{III} < \text{I} < \text{IV}$

3. Assertion (A): Aniline does not undergo Friedel-Crafts reaction.

Reason (R): Friedel-Crafts reaction is an electrophilic substitution reaction. **CBSE-2024**

4. Give the structures of A, B and C in the following reactions:  $2 \times 1 \frac{1}{2} = 3$

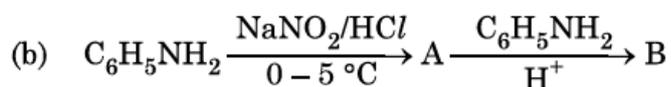
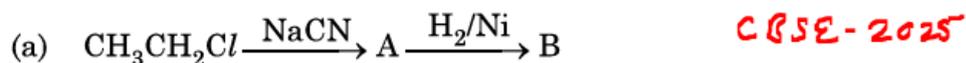


## CBSE-2025

1. The best reagent for converting propanamide into propanamine is \_\_\_\_\_ **CBSE-2025**

- (A) excess  $\text{H}_2$
- (B)  $\text{Br}_2$  in aqueous  $\text{NaOH}$
- (C) iodine in the presence of red phosphorus
- (D)  $\text{LiAlH}_4$  in ether

2. Identify A and B in each of the following reaction sequence : (1 + 1 = 2)



3. (a) Arrange the following compounds in increasing order of their boiling point : (1 + 2 = 3)



(b) Give plausible explanation for each of the following :

(i) Aromatic primary amines cannot be prepared by Gabriel Phthalimide synthesis.

(ii) Amides are less basic than amines. CBSE - 2025.

4. The best reagent for converting propanamide into propanamine is \_\_\_\_\_ . CBSE - 2025.

(A) excess  $\text{H}_2$

(B)  $\text{Br}_2$  in aqueous  $\text{NaOH}$

(C) iodine in the presence of red phosphorus

(D)  $\text{LiAlH}_4$  in ether

5. Assertion (A) : Aromatic primary amines cannot be prepared by Gabriel Phthalimide synthesis.

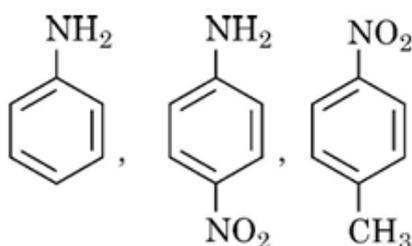
Reason (R) : Aryl halides do not undergo nucleophilic substitution reaction with the anion formed by phthalimide. CBSE - 2025.

6. Amines have a lone pair of electrons on nitrogen atom due to which they behave as Lewis base. Greater the value of  $K_b$  or smaller the value of  $\text{p}K_b$ , stronger is the base. Amines are more basic than alcohols, ethers, esters, etc. The basic character of aliphatic amines should increase with the increase of alkyl substitution. But it does not occur in a regular manner as a secondary aliphatic amine is unexpectedly more basic than a tertiary amine in aqueous solutions. Aromatic amines are weaker bases than ammonia and aliphatic amines. Electron releasing groups such as  $-\text{CH}_3$ ,  $-\text{OCH}_3$ ,  $-\text{NH}_2$ , etc., increase the basicity while electron-withdrawing substituents such as  $-\text{NO}_2$ ,  $-\text{CN}$ , halogens etc., decrease the basicity of amines. The effect of these substitute is more at  $\text{p}^-$  than at  $\text{m}^-$  position.

(a) Arrange the following in the increasing order of their basic character.

Give reason :

CBSE - 2025.



(b) Why  $pK_b$  of aniline is more than that of methylamine ? 1

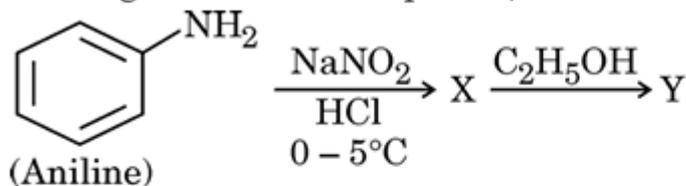
(c) (i) Arrange the following in the increasing order of their basic character in an aqueous solution : 1



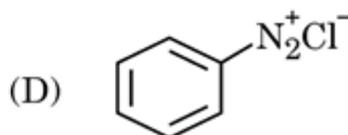
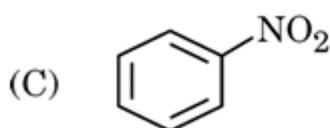
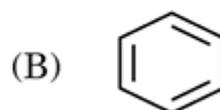
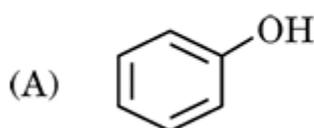
OR

(c) (ii) Why ammonolysis of alkyl halides is not a good method to prepare pure amines ? 1

7. In the given reaction sequence, the structure of Y would be :

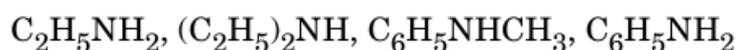


CBSE-2025.

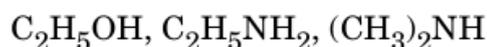


8. Arrange the following compounds as asked : CBSE-2025.

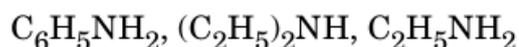
(a) in decreasing order of  $pK_b$  values



(b) increasing order of boiling point



(c) increasing order of solubility in water



9. The IUPAC name for  $\text{CH}_3 - \text{CH}_2 - \text{N}(\text{CH}_3) - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$  is :

(A) N-methylpentan-2-amine

(B) N-ethyl-N-methylpropan-1-amine

(C) N,N-diethylpropan-1-amine

(D) N,N-dimethylpropan-1-amine

CBSE-2025.

10. (a) (i) In a chemistry practical class, the teacher gave his students an amine 'X' having molecular formula  $C_2H_7N$ , and asked the students to identify the type of amine. One of the students, Neeta, observed that it reacts with  $C_6H_5SO_2Cl$ , to give a compound which dissolves in NaOH solution. Can you help Neeta to identify the compound 'X'? CBSE-2025 1

(ii) Arrange the following in the increasing order of their  $pK_b$  value in aqueous phase : 1



(iii) Aniline on nitration gives considerable amount of meta product along with ortho and para products. Why? 1

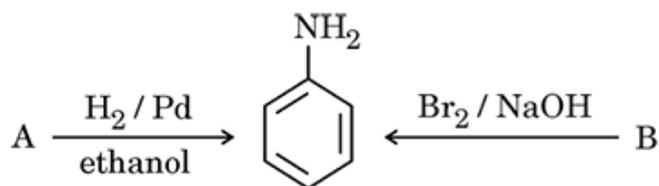
(iv) Convert aniline to : 2

(I) p-bromoaniline

(II) phenol

(b) (i) Arun heated a mixture of ethylamine and  $CHCl_3$  with ethanolic KOH, which forms a foul smelling gas. Write the chemical equation involved. 1

(ii) Identify A and B in the following reactions : 2



(iii) Convert aniline to : 2

(I) benzene

(II) sulphanilic acid