

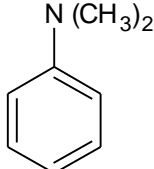


## Blue Print (As per PU Board)

Topic	1 mark questions	2 marks questions	3 marks questions	5 marks questions	Total Marks
Amines	-	-	-	1	5

## One mark questions

- Name the foul smelling gas liberated when aniline is heated with chloroform and alcoholic potash  
Answer: Phenyl isocyanide
- Among ethyl amine and ethyl alcohol which has higher boiling point?  
Answer: Ethyl alcohol can form stronger hydrogen bond than ethyl amine because oxygen is more electro negative than nitrogen.
- Arrange the following amines in the decreasing order of their  $pK_b$  values  
(i)  $C_2H_5NH_2$       (ii)  $C_6H_5NHCH_3$       (iii)  $(C_2H_5)_2NH$       (iv)  $C_6H_5NH_2$   
Answer:  $C_6H_5NH_2 > C_6H_5NHCH_3 > C_2H_5NH_2 > (C_2H_5)_2NH$
- Give reason: Primary amines have higher boiling point than tertiary amine  
Answer:  $3^\circ$  amines do not form intermolecular hydrogen bonds, hence they have lower B.P than  $1^\circ$  and  $2^\circ$  amines.
- What is the IUPAC name of Acetanilide?  
Answer: N-Phenyl ethanamide

- Write the IUPAC name of  benzenamine  
Answer: N,N-Dimethyl benzenamine

## Five marks questions

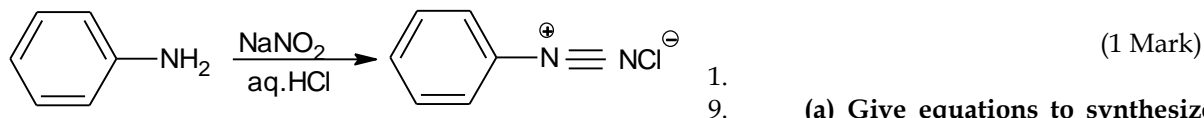
- $C_6H_5CONH_2 \xrightarrow{Br_2/NaOH} X$
  - $X \xrightarrow[0^\circ C]{NaNO_2+HCl} Y$ . What are X and Y?  
Name the reaction occurring in step (i)

(b) Arrange the following in the increasing order of their base strengths in the aqueous medium.  $(CH_3)_3N, CH_3NH_2, (CH_3)_2NH$ . Give one reason for the trend observed.

Answer: (a)  $X = C_6H_5NH_2$  (1 Mark)  
 $Y = C_6H_5N_2Cl$  (1 Mark)  
 Hoffmann's bromamide degradation reaction (1 Mark)  
 $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$  (1 Mark)  
 Inductive effect or solvation effect or steric hinderance (1 Mark)
- Complete the following equations  
(i)  $R-C \equiv N \xrightarrow{H_2/Ni} \dots$   
(ii)  $R-NH_2 + CHCl_3 + 3KOH \xrightarrow[\text{(alcoholic)}]{\text{heat}} \dots + 3KCl + 3H_2O$   
(iii)  $C_6H_5NH_2 + 3Br_2 \xrightarrow{\text{water}} \dots + 3HBr$
  - Explain diazotisation reaction of aniline (3+2 marks)  
Answer: (a) (i)  $\rightarrow R-CH_2-NH_2$  (1 Mark)  
(ii)  $\rightarrow R-NC$  (1 Mark)



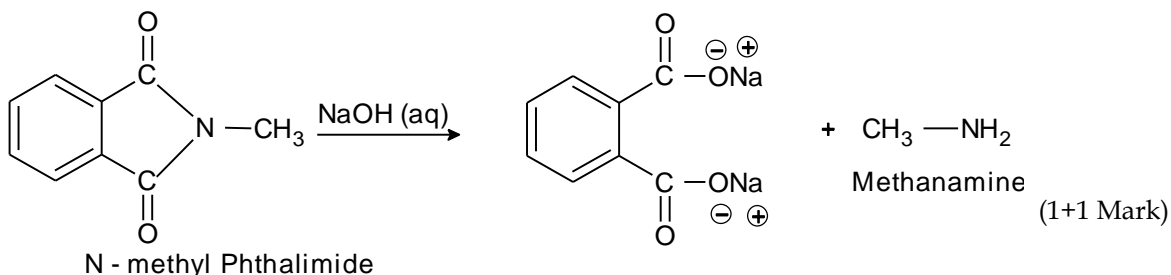
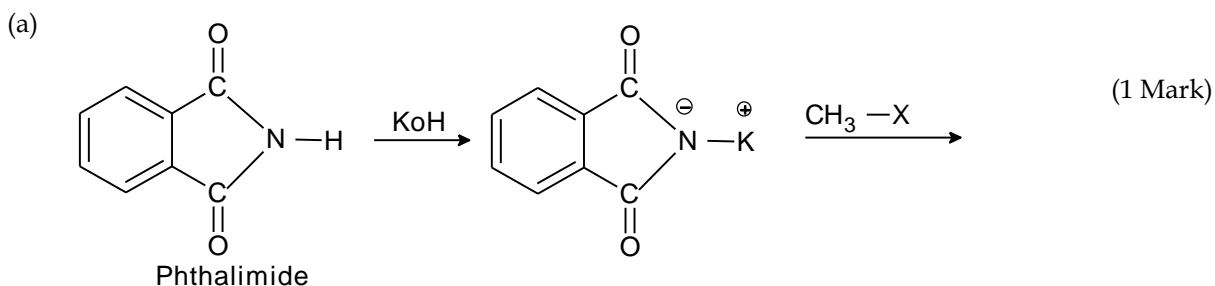
(b) Reaction of aniline with nitrous acid at 273-278K to form benzene diazonium chloride is known as diazotisation. (1 Mark)



**methanamine by Gabriel phthalimide synthesis**

**(b) Explain the trend in base strengths of 1°, 2° and 3° methyl amines in gaseous phase**

Answer:

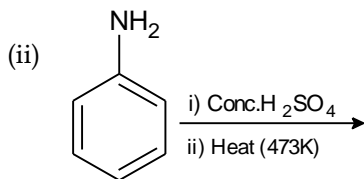
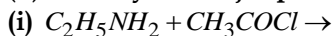


(b) The trend for the base strength of amines is  $3^\circ > 2^\circ > 1^\circ$  (1 Mark)

This is due to increase in +I effect of alkyl groups which makes lone pair of electron on N more available for a proton and also increases the stability of ammonium ion formed (1 Mark)

10. (a) **What is Hinsberg's reagent? How is it used to distinguish primary amine from a secondary amine?**

**(b) Identify the major product in the following**



Answer: (a) It is benzene sulphonyl chloride or  $C_6H_5SO_2Cl$ . Primary amine reacts with Hinsberg's reagent to form a product soluble in an alkali (3+2 Mark)

Secondary amine reacts with Hinberg's reagent to form a product insoluble is an alkali



(b) (i)  $\rightarrow C_2H_5NHCOCH_3$  (1 Mark)



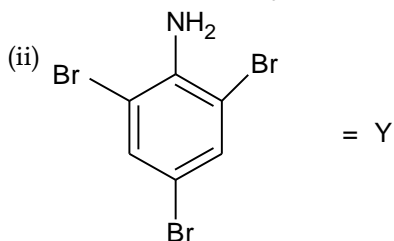
11. (a) (i)  $C_6H_5CONH_2 \xrightarrow{Br_2/SO_3H} X + 2NaBr + Na_2CO_3 + 2H_2O$

(ii)  $X + Br_2 \xrightarrow{Br_2/H_2O} Y + 3HBr$

What are X and Y in the above reaction? Write the name of the reaction (i)

(b) How do you convert aniline to benzene diazonium chloride? Give equation

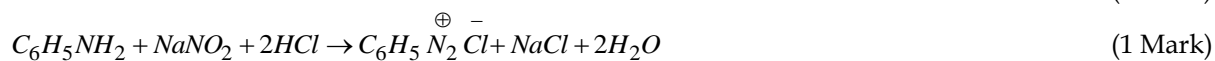
Answer: (a) (i)  $C_6H_5NH_2 = X$  (1 Mark)



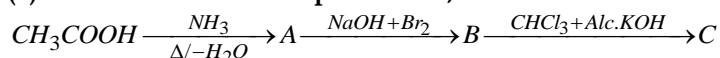
2, 4, 6-Tribromo aniline

(iii) Hoffman's Bromamide reaction (1 Mark)

(b) Prepared by adding cold aqueous solution of sodium nitrite to aniline dissolved in dil HCl at 273K-278K (1 Mark)



12. (a) Give structures of the products A, B and C in the following reaction



(b) Give reason:

(i) Methyl amine is soluble in water but not aniline (3+2 Mark)

(ii) Methyl amine is more basic than ammonia

Answer: (a)  $A \rightarrow CH_3CONH_2$  (1 Mark)

(b)  $B \rightarrow CH_3NH_2$  (1 Mark)

(c)  $\rightarrow CH_3NC$  (1 Mark)

(b) (i) Methyl amine forms hydrogen bonding with water but aniline retards the tendency of the  $-NH_2$  gp to form H-bonding. (1 Mark)

(ii) Due to +I effect of  $-CH_3$  group (1 Mark)