

**Q1** Choose the amide which on reduction with  $\text{LiAlH}_4$  yields a secondary amine

- (A) Ethanamide  
 (B) N-methylethanamide  
 (C) N, N-dimethylethanamide  
 (D) Phenylmethanamide

**Q2** The correct increasing order of their  $\text{pK}_b$  values is

- (A) aniline < N-methylaniline < cyclohexylamine  
 (B) cyclohexylamine < N-methylaniline < aniline  
 (C) cyclohexylamine < aniline < N-methylaniline  
 (D) N-methylaniline < cyclohexylamine < aniline.

**Q3** N-Methylacetamide is formed from methylamine by the action of

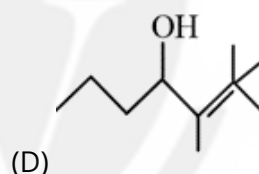
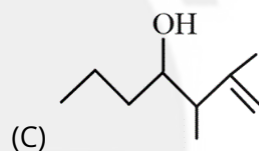
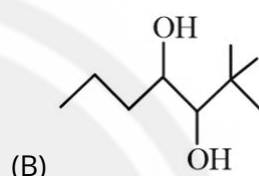
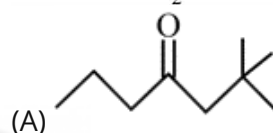
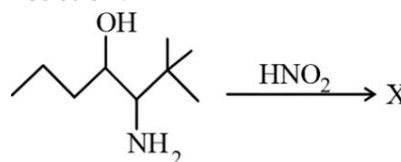
- (A) ammonia  
 (B) acetyl chloride  
 (C) acetamide  
 (D) methanol.

**Q4** The decreasing order of boiling points of ethyldimethylamine, n-butylamine and diethylamine is n-Butylamine > Diethylamine > Ethyldimethylamine.

This trend of boiling point can be explained as

- (A) boiling point increases with increase in molecular mass  
 (B) tertiary amines have highest boiling point due to highest basicity  
 (C) intermolecular hydrogen bonding is maximum in primary amines and absent in tertiary amines  
 (D) intramolecular hydrogen bonding is present in tertiary amines.

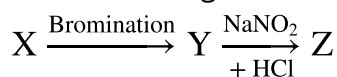
**Q5** Predict the major product 'X' in the following reaction:



**Q6** Treatment of nitrobenzene with acetyl chloride in the presence of anhydrous  $\text{AlCl}_3$  gives

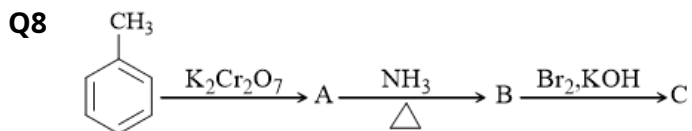
- (A) 2-nitroacetophenone  
 (B) 3-nitroacetophenone  
 (C) 4-nitroacetophenone  
 (D) None of these

**Q7** In the following reaction, X is

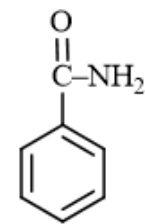
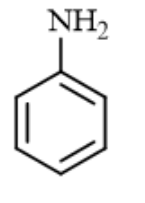
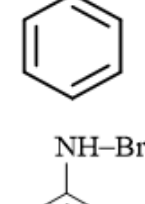
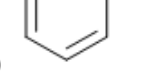


- (A) Benzoic acid  
 (B) Salicylic acid  
 (C) Phenol  
 (D) Aniline





The product 'C' in the above reaction is;

- (A) 
- (B) 
- (C) 
- (D) 

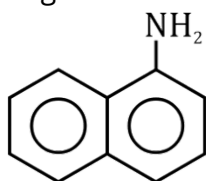
Q9 Which of the following gives primary amine on reduction?

- (A)  $\text{CH}_3\text{CH}_2\text{NO}_2$   
 (B)  $\text{CH}_3\text{CH}_2 - \text{O} - \text{N} = \text{O}$   
 (C)  $\text{C}_6\text{H}_5\text{N} = \text{NC}_6\text{H}_5$   
 (D)  $\text{CH}_6\text{CH}_2\text{NC}$

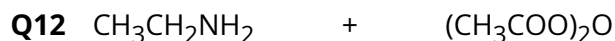
Q10 n-propylamine yields a volatile compound X on warming with alc. alkali and chloroform. X has an offensive odour. The structure of X is

- (A)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CN}$       (B)  $(\text{CH}_3)_2\text{CHCN}$   
 (C)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{NC}$       (D)  $(\text{CH}_3)_2\text{CHNC}$

Q11 Classify the following amine into respective degree



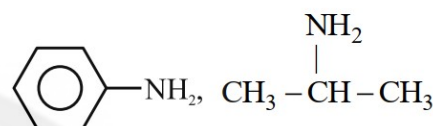
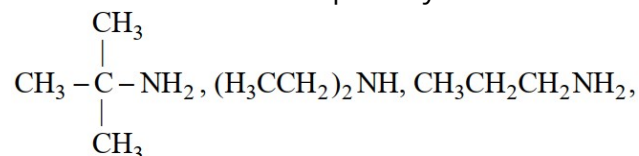
- (A) 1°                              (B) 2°  
 (C) 3°                              (D) 4°



The compound Q is

- (A) acetylchloride      (B) acetone  
 (C) ethanoic acid      (D) acetonitrile.

Q13 Among the following amines, how many amines are classified as primary amines?

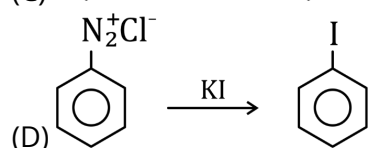
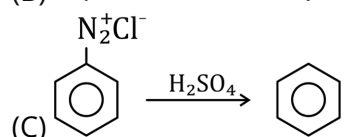
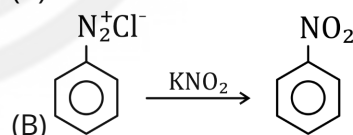
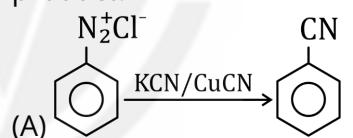


- (A) 2                              (B) 4  
 (C) 1                              (D) 3

Q14 The structural formula of methyl amino methane is :

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

Q15 Which of the following reactions gives wrong product?



**Q16** The correct order of the basic strength of methyl substituted amines in aqueous solution is:

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

**Q17** Guess the strong base:

- (i) Ethanamine with  $\text{p}K_b$  value = 3.29  
 (ii) N-Ethylamine with  $\text{p}K_b$  value 3.00  
 (iii) N, N-diethyl ethanamine with  $\text{p}K_b$  value = 3.25  
 (iv) Methanamine with  $\text{p}K_b$  value = 3.38
- (A) (ii) (B) (iv)  
 (C) (i) (D) (iii)

**Q18** Given below are two statements:

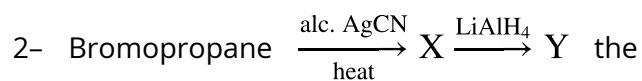
**Statement I:** The amines on reduction with  $\text{LiAlH}_4$  yield amides.

**Statement II:** In Hoffmann-bromamide degradation reaction, the amine formed in the product contains one carbon less than that present in the amide.

In the light of the above statements, choose the most appropriate answer from the options given below.

- (A) Statement I is correct but Statement II is incorrect.  
 (B) Statement I is incorrect but Statement II is correct.  
 (C) Both Statement I and Statement II are correct.  
 (D) Both Statement I and Statement II are incorrect.

**Q19** In the given set of reactions:



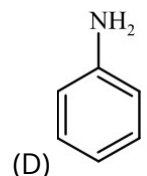
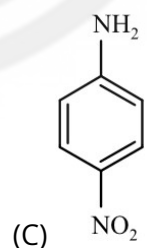
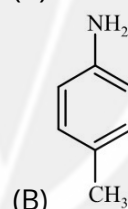
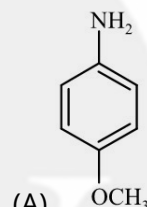
IUPAC name of product Y is

- (A) N - isopropylmethanamine  
 (B) N - methylpropan - 2 - amine  
 (C) N - methylpropanamine  
 (D) Butan - 2 - amine

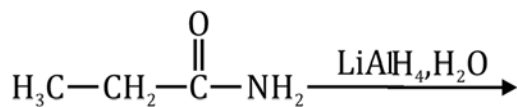
**Q20** Carbylamine test is performed in alcoholic KOH by heating a mixture of \_\_\_\_\_.

- (A) Trihalogenated methane and primary amine  
 (B) An alkyl halide and primary amine  
 (C) An alkyl cyanide and primary amine  
 (D) Chloroform and carbonyl compound

**Q21** Which of the following compounds responds in the carbylamine test in the fastest rate?

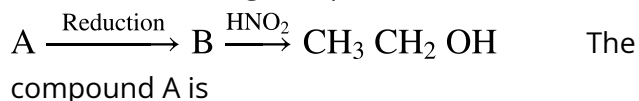


Q22



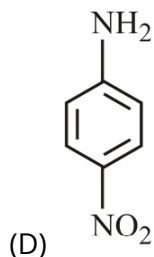
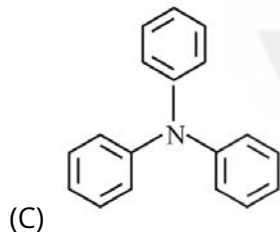
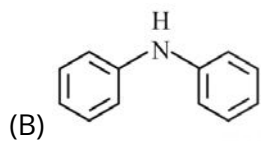
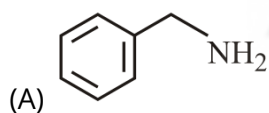
- (A)  $\text{H}_3\text{C}-\text{CH}_2-\text{NH}_2$   
 (B)  $\text{H}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{NH}_2$   
 (C)  $\text{H}_3\text{C}-\text{NH}_2$   
 (D)  $\text{H}_3\text{C}-(\text{CH}_2)_3-\text{NH}_2$

Q23 In the following sequence of reactions;



- (A) Propane nitrile  
 (B) Ethane nitrile  
 (C) Nitromethane  
 (D) Methyl isocyanate

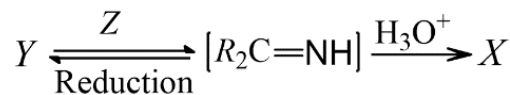
Q24 Which of the following is more basic than aniline?



Q25 n-Butylamine (I), diethylamine (II) and N,N-dimethyl-ethylamine (III) have the same molar mass. The increasing order of their boiling points is

- (A) III < II < I  
 (B) I < II < III  
 (C) II < III < I  
 (D) II < I < III

Q26



In the above sequence of reaction X, Y, Z are respectively

- (A) Aldehyde, ketone,  $\text{NH}_3$   
 (B) Ketone,  $1^\circ$

- amine,  
 $\text{KMnO}_4$   
 (C) Ketone,  $2^\circ$

- amine,  
 $\text{KMnO}_4$   
 (D) Ketimine,  $1^\circ$

- amine,  
 $\text{H}_2\text{SO}_5$

Q27 Benzyl amine cannot be prepared by

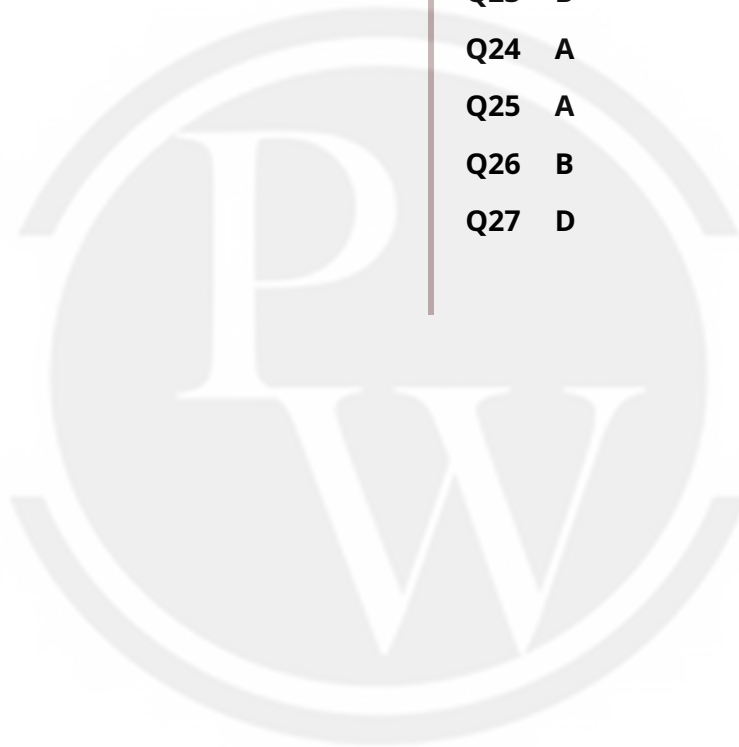
- (A)  $\text{C}_6\text{H}_5\text{CONH}_2 \xrightarrow[\text{ether}]{\text{LiAlH}_4}$   
 (B)  $\text{C}_6\text{H}_5\text{CH}_2\text{CONH}_2 + \text{Br}_2 + \text{KOH} \rightarrow$   
 (C)  $\text{C}_6\text{H}_5\text{CN} \xrightarrow{\text{LiAlH}_4}$   
 (D)  $\text{C}_6\text{H}_5\text{CH}_2\text{NC} \xrightarrow{\text{LiAlH}_4}$



# Answer Key

Q1 B  
Q2 B  
Q3 B  
Q4 C  
Q5 A  
Q6 D  
Q7 D  
Q8 B  
Q9 A  
Q10 C  
Q11 A  
Q12 C  
Q13 B  
Q14 C

Q15 C  
Q16 D  
Q17 A  
Q18 B  
Q19 B  
Q20 A  
Q21 A  
Q22 B  
Q23 B  
Q24 A  
Q25 A  
Q26 B  
Q27 D

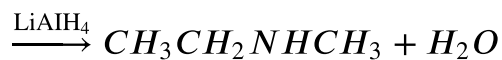


# Hints & Solutions

Note: scan the QR code to watch video solution

## Q1 Text Solution:

Secondary amides such as N-methylethanamide on reduction with  $\text{LiAlH}_4$  give secondary amines.



## Video Solution:



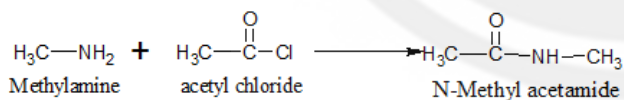
## Q2 Text Solution:

cyclohexylamine < N-methylaniline < aniline

## Video Solution:



## Q3 Text Solution:



## Video Solution:



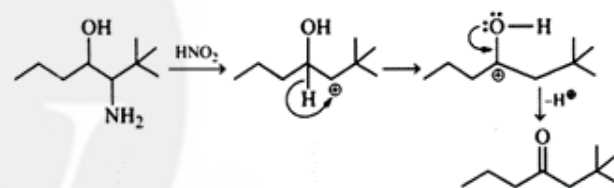
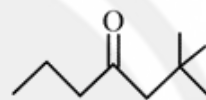
## Q4 Text Solution:

Stronger H bonding leads to higher B.P, Tertiary amines have zero hydrogen bonding while primary amines have maximum H bonding.

## Video Solution:



## Q5 Text Solution:



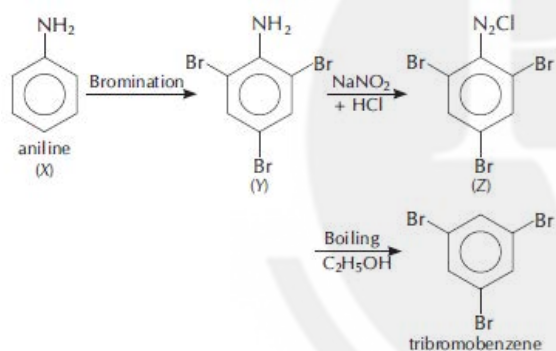
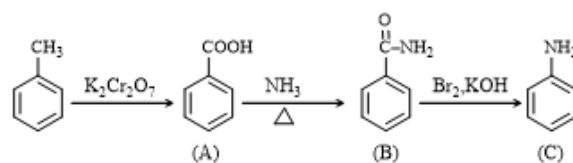
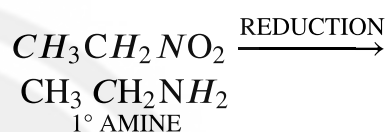
## Video Solution:



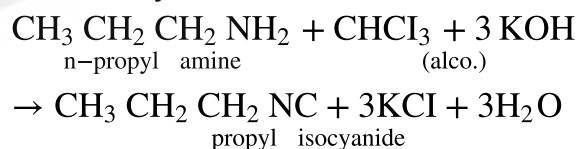
**Q6 Text Solution:**

$\text{NO}_2$  group is strong electron withdrawing group which reduces the electron density over the benzene ring or deactivates the nucleus towards electrophilic aromatic substitution reaction.

Since Friedel-Crafts reaction is an electrophilic substitution reaction and  $\text{NO}_2$  group reduces electron density on the ring, the reaction doesn't take place.

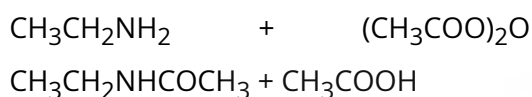
**Video Solution:****Q7 Text Solution:****Video Solution:****Q8 Text Solution:****Video Solution:****Q9 Text Solution:****Video Solution:****Q10 Text Solution:**

Primary amines react with alc alkali and chloroform to give an offensive odour compound *i.e.*, isocyanide. This reaction is called carbylamine reaction.

**Video Solution:**

**Q11 Text Solution:**

Only one hydrogen of ammonia is replaced with R group, so this is a primary amine

**Video Solution:****Q12 Text Solution:****Video Solution:****Q13 Text Solution:**

Primary amines are those in which N is bonded to just one carbon/aryl group (-NH<sub>2</sub>).

- (CH<sub>3</sub>)<sub>3</sub>C-NH<sub>2</sub>            1°
- (CH<sub>3</sub>CH<sub>2</sub>)<sub>2</sub>NH            2°
- CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>        1°
- C<sub>6</sub>H<sub>5</sub>NH<sub>2</sub>            1°
- CH<sub>3</sub>-CH(NH<sub>2</sub>)-CH<sub>2</sub>-CH<sub>3</sub>    1°

Total primary amines = 4

**Video Solution:****Q14 Text Solution:**

Methylaminomethane is trivial name of N-methyl methanamine (CH<sub>3</sub>)<sub>2</sub>NH.

**Video Solution:****Q15 Video Solution:****Q16 Text Solution:**

The basic strength of methyl amines in aqueous solution is dependent on Inductive effect of methyl groups, solvation effect (or) Hydrogen bonding during hydration and steric hindrance. The order of basic strength of methylated amines is:

2° amine > 1° amine > 3° amine.

**Video Solution:****Q17 Text Solution:**

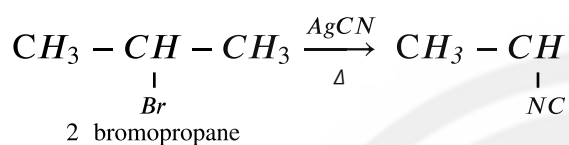
Lower the pK<sub>b</sub>, higher the basic nature

**Video Solution:**

**Q18 Text Solution:**

(2)

The amides on reduction with  $\text{LiAlH}_4$  yield amines.

**Video Solution:****Q19 Text Solution:**

$$- \text{CH}_3$$

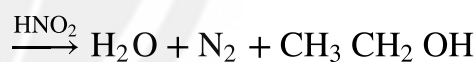
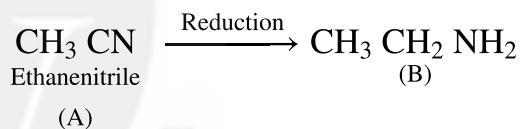

*N* - methylpropan - 2 - amine

**Video Solution:****Q20 Text Solution:**

Trihalogenated methane (Haloform) and primary amine

**Video Solution:****Q21 Text Solution:**

Due to +R effect of  $-\text{OCH}_3$  group, it reacts with electrophile dichlorocarbene in fastest rate.

**Video Solution:****Q22 Text Solution:****Video Solution:****Q23 Text Solution:****Video Solution:**

**Q24 Text Solution:**

(1)

More the phenyl groups attached, more will be the delocalization hence, lesser will be the basicity. Thus, option (2) and (3) are not correct.

Since, the nitro group is electron-withdrawing, it is also less basic than aniline.

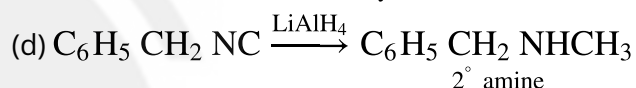
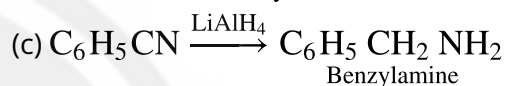
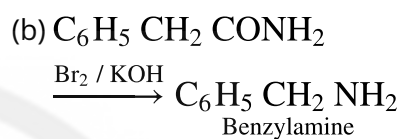
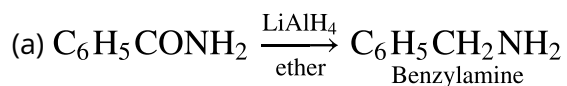
Hence, due to the +I effect option (1) is correct.

**Video Solution:****Q25 Text Solution:**

Stronger H bonding leads to higher B.P. Primary amines have maximum H bonds  
Tertiary amines do not have hydrogen bonds.

**Video Solution:****Q26 Text Solution:**

Ketone, 1° amine,  $\text{KMnO}_4$

**Video Solution:****Q27 Text Solution:****Video Solution:**
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