	INDIAN SCHOOL AL WADI AL KABIR	
Class: XII	**DEPARTMENT OF SCIENCE:2025– 2026** **SUBJECT: CHEMISTRY**	**Date: 12/08/2025**
Worksheet: 04	**CHAPTER : AMINES**	**Note:** **A4 FILE FORMAT**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

I. MULTIPLE CHOICE QUESTIONS(1M)

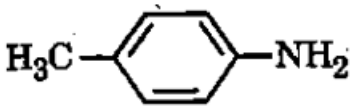
1. The IUPAC name for CH_3-CH_2-N(CH_3)-CH_2-CH_2-CH_3 is
   (a) N-Methylpentan-2-amine
   (b) N-Ethyl-N-methylpropan-1-amine
   (c) N,N-Diethylpropan-1-amine
   (d) N,N-Dimethylpropan-1-amine

2. The correct name of the given reaction is

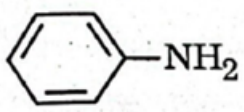
$$Ar\text{-}N_2^+X^- \xrightarrow{CuCN/KCN} Ar\text{-}CN + N_2$$

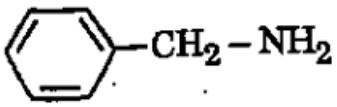
   (a) Sandmeyer's reaction
   (b) Gabriel Phthalimide synthesis
   (c) Carbylamine reaction
   (d) Hoffmann bromamide degradation reaction

3. Among the following, which is the strongest base?

(a) 

(b) 

(c) 

(d) 

4. Benzene diazonium chloride on hydrolysis gives:
   (a) Phenol (b) Chlorobenzene
   (c) Benzene (d) Aniline

5. Which of the following compounds on treatment with benzene sulphonyl chloride, forms an alkali-soluble precipitate?
   (a) CH_3CONH_2 (b) $(CH_3)_3N$
   (c) $CH_3CH_2NH_2$ (d) CH_3NHCH_3

6. Aniline on nitration gives:
   (a) Ortho product (b) Para product
   (c) Meta product (d) All the above

7. The chemical test used to distinguish between ethanamine and aniline is:
   (a) Haloform test (b) Tollens test
   (c) Azo dye test (d) Hinsberg test

8. Out of the following, the strongest base in aqueous solution is :
   (a) Methylamine (b) Dimethylamine
   (c) Trimethylamine (d) Aniline

9. Which of the following would be a better choice for reducing nitrobenzene to aniline?
   (a) H_2/Ni (b) $LiAlH_4$
   (c) Fe and HCl (d) Sn and HCl

10. The increasing basicities of CH_3NH_2 (I), $(CH_3)_2NH$ (II), $(CH_3)_3N$ (III) and $C_6H_5NH_2$ (IV) in aqueous medium are:
   (a) IV < III < I < II
   (b) II < I < IV < III
   (c) I < II < III < IV
   (d) II < III < I < IV

ASSERTION REASON TYPE

(a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
(b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
(c) Assertion is correct, but reason is a wrong statement.
(d) Assertion is wrong, but reason is a correct statement.

11. **Assertion (A):** Aniline is a stronger base than ammonia.
   Reason (R): The unshared electron pair on the nitrogen atom in aniline becomes less available for protonation due to resonance.
12. **Assertion (A):** Aliphatic primary amines can be prepared by Gabriel phthalimide synthesis.
   Reason (R): Alkyl halides undergo nucleophilic substitution with anion formed by phthalimide.

13. **Assertion (A):** Diazonium salts of aromatic amines are more stable than those of aliphatic amines.
   Reason (R): Diazonium salts of aliphatic amines show resonance.

14. **Assertion (A):** p-Nitroaniline is a weaker base than p-toluidine.
   Reason (R): The electron-withdrawing effect of the $-NO_2$ group in p-Nitroaniline makes it a weaker base.

15. **Assertion (A):** Aniline does not undergo Friedel-Crafts reaction.
   Reason (R): Friedel-Crafts reaction is an electrophilic substitution reaction.

II. SHORT ANSWER TYPE (2M)

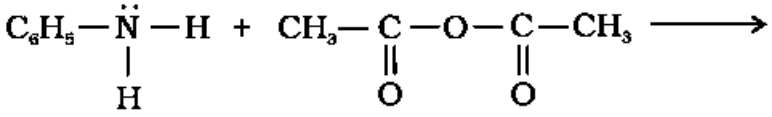
16. Write the chemical reactions involved in the following reactions.
   (a) Gabriel phthalimide synthesis
   (b) Carbylamine reaction

17. Give reasons:
    (a) $(CH_3)_2NH$ is more basic than $(CH_3)_3N$ in an aqueous solution.
    (b) Aromatic diazonium salts are more stable than aliphatic diazonium salts.

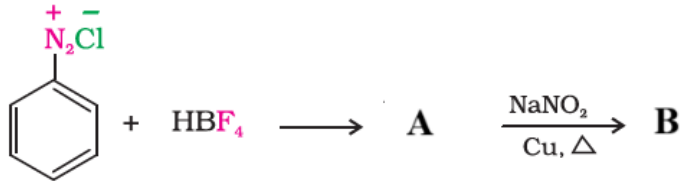
18. Carry out the following conversions.
    (a) Aniline to phenol
    (b) Nitrobenzene to aniline

19. (a) What is Hinsberg reagent?
    (b) Arrange the following in the increasing order of their basic strength in the gaseous phase:
    $C_2H_5NH_2$, $(C_2H_5)_3N$, $(C_2H_5)_2NH$

20. Complete the following reactions.
    (a)



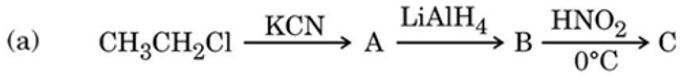
    (b)

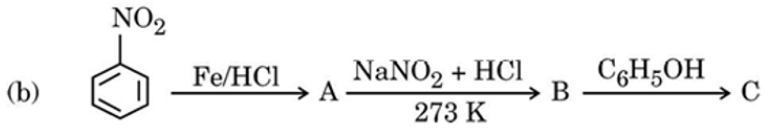


III. SHORT ANSWER TYPE (3M)

21. Account for the following statements.
    (a) Reduction with iron scrap and HCl is preferred for the preparation of amines from nitro compounds.
    (b) Lower aliphatic amines are soluble in water.
    (c) Pyridine is used in the acylation reaction of amines.

22. Give the structures of A, B, and C in the following reactions.





23. A compound 'X' with molecular formula C_3H_9N reacts with $C_6H_5SO_2Cl$ to give a solid, insoluble in alkali. Identify 'X' and give the IUPAC name of the product. Write the reaction involved.

24. Explain the following.
    (a) Coupling reaction
    (b) Hoffmann bromamide degradation
    (c) Diazotisation

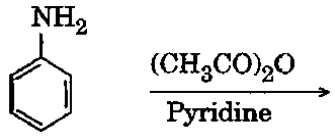
25. Give reasons.
(a) Methylamine is more basic than aniline.
(b) Aniline readily reacts with bromine water to give 2,4,6-Tribromoaniline.
(c) Primary amines have higher boiling points than tertiary amines.

IV. LONG ANSWER TYPE (5M)

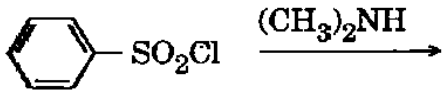
26. An amide 'A' with molecular formula C_7H_7ON undergoes Hoffmann Bromamide degradation reaction to give amine 'B'. 'B' on treatment with nitrous acid at 273-278 K forms 'C', and on treatment with chloroform and ethanolic potassium hydroxide forms 'D'. 'C' on treatment, with ethanol gives 'E'. Identify 'A', 'B', 'C', 'D' and 'E' and write the sequence of the reactions involved.

27. (a) Write the structures of the main product.

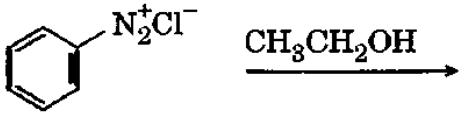
(i)



(ii)



(iii)



(b) Arrange the following in the increasing order of their pkb values.
$C_6H_5NH_2$, $C_2H_5NH_2$ $C_6H_5NHCH_3$

(c) Which is more soluble in water, Butanol or Butanamine? Why?

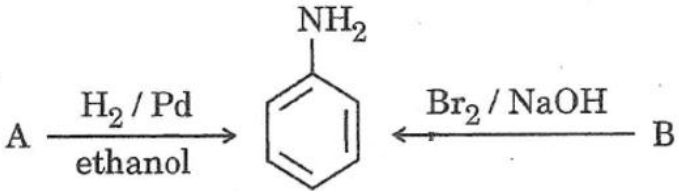
V. PASSAGE BASED QUESTION (4M)

28.

Amines can be prepared through several methods, including the reduction of nitro compounds, ammonolysis of alkyl halides, and reductive amination of carbonyl compounds. Another approach involves the reaction of ammonia or amines with alkyl halides, leading to a series of reactions that can produce primary, secondary, tertiary, or even quaternary ammonium salts.

Amines have a wide range of uses across various industries, including pharmaceuticals, textiles, agriculture, and more. They are crucial in the synthesis of drugs like antibiotics, antidepressants, and antihistamines. Amines are essential in the production of azo dyes, which are widely used in the textile industry for dyeing fabrics like nylon and leather.

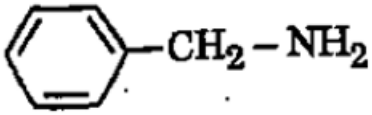
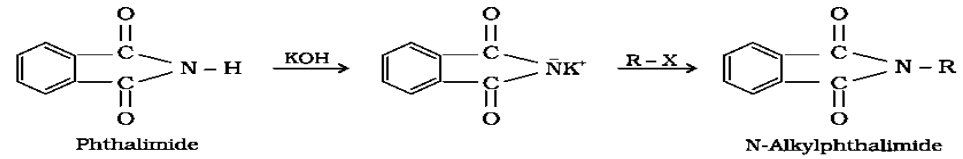
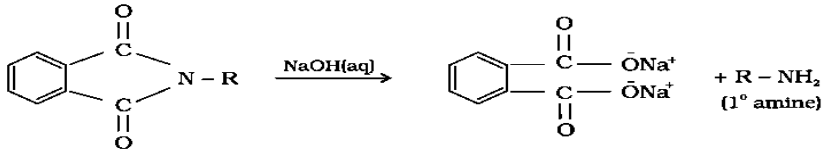
(a) A mixture of ethylamine and $CHCl_3$ is heated with ethanolic KOH, which forms a foul-smelling gas. Write the chemical reaction involved. (1)
(b) N,N-Diethylbenzenesulphonamide is insoluble in alkali. Give a reason. (1)
(c) Identify A and B in the following reaction. (2)

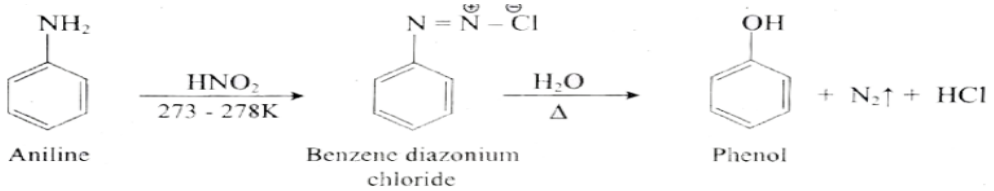
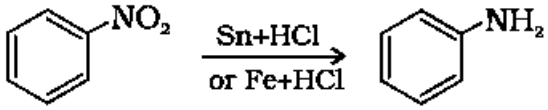
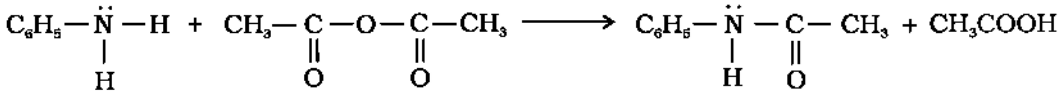
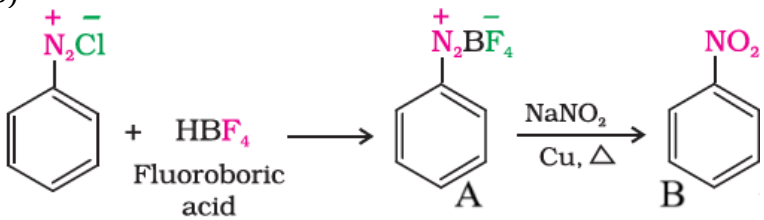


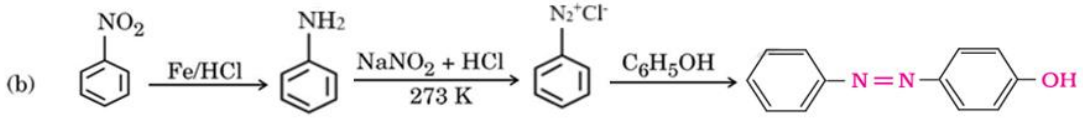
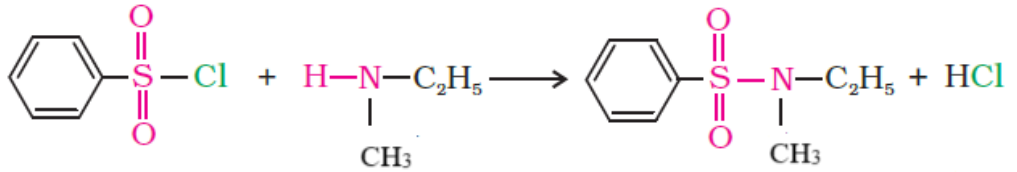
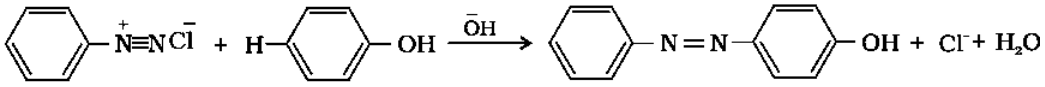
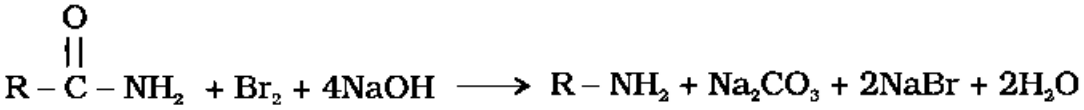
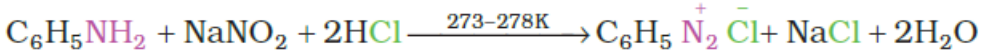
OR

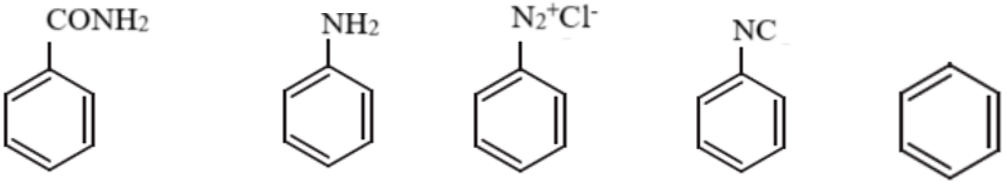
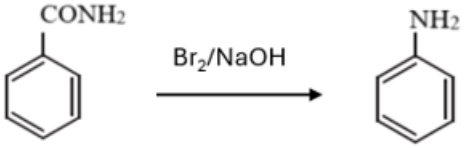
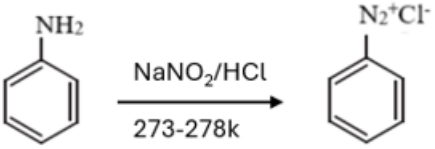
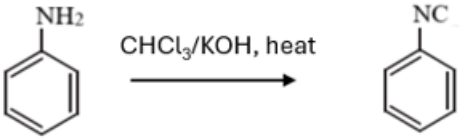
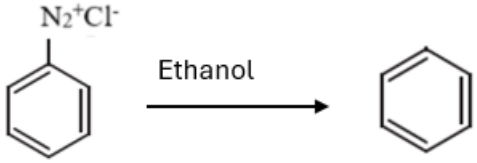
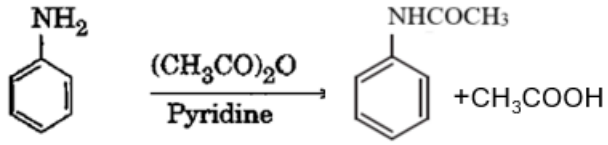
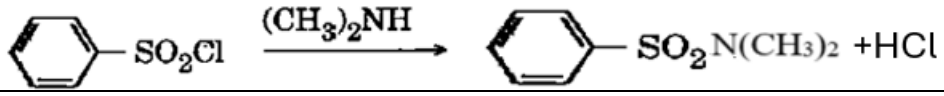
(c) Convert Aniline to
(i) Benzene
(ii) Sulphanilic acid

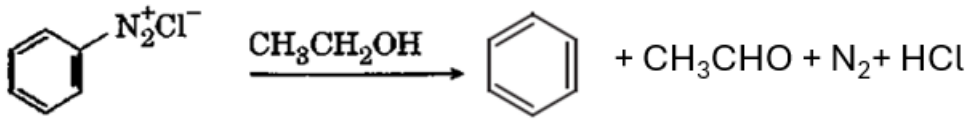
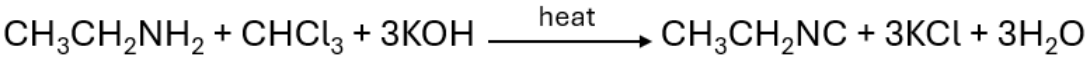
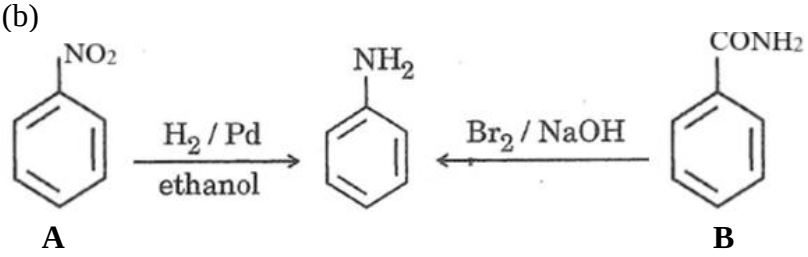
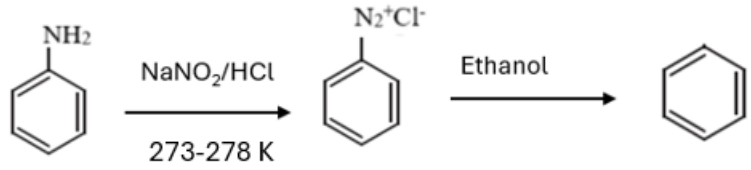
Answer Key

Q. No.	Answer
I.	**MULTIPLE CHOICE QUESTIONS (1M)**
1	(b) N-Ethyl-N-methylpropan-1-amine
2	(a) Sandmeyer's reaction
3	(d) 
4	(a) Phenol
5	(c) $CH_3CH_2NH_2$
6	(d) All the above
7	(c) Azo dye test
8	(b) Dimethylamine
9	(c) Fe and HCl
10	(a) IV < III < I < II
11	(d) Assertion is wrong, but reason is correct statement.
12	(a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
13	(c) Assertion is correct, but reason is wrong statement.
14	(a) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion
15	(b) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
II	VERY SHORT ANSWER TYPE QUESTIONS(2M)
16	(a) Phthalimide, on treatment with ethanolic potassium hydroxide forms potassium salt of phthalimide which on heating with alkyl halide, followed by alkaline hydrolysis, produces the corresponding primary amine.  

	(b) Aliphatic and aromatic primary amines on heating with chloroform and ethanolic potassium hydroxide form isocyanides or carbylamines which are foul smelling substances. 
17	(a) Considering the +I effect, tertiary amines are stronger bases. (b) In aqueous medium, considering solvation effect, primary amines are stronger bases. In aqueous medium, since both +I effect and solvation stabilise secondary ammonium cations, secondary amines are stronger bases. (b) Aromatic diazonium salts are stabilised through resonance.
18	(a)  Aniline Benzene diazonium chloride Phenol (b) 
19	(a) Hinsberg reagent is benzene sulphonyl chloride ($C_6H_5SO_2Cl$). It is a chemical compound primarily used in the Hinsberg test to differentiate between primary, secondary, and tertiary amines. (b) $C_2H_5NH_2 < (C_2H_5)_2NH < (C_2H_5)_3N$
20	(a)  Benzenamine Ethanoic anhydride N-Phenylethanamide or Acetanilide (b)  Fluoroboric acid A B
III	**SHORT ANSWER TYPE QUESTIONS (3M)**
21	(a) Reduction with iron scrap and hydrochloric acid is preferred because $FeCl_2$ formed gets hydrolysed to release hydrochloric acid during the reaction. Thus, only a small amount of hydrochloric acid is required to initiate the reaction.

	(b) Lower aliphatic amines are soluble in water because they can form hydrogen bonds with water molecules. (c) The acylation reaction is carried out in the presence of a base stronger than the amine, like pyridine, which removes HCl, so formed and shifts the equilibrium to the right-hand side.
22	(a) $CH_3CH_2Cl \xrightarrow{KCN} CH_3CH_2CN \xrightarrow{LiAlH_4} CH_3CH_2CH_2NH_2 \xrightarrow[0°C]{HNO_2} CH_3CH_2CH_2OH$ (b) 
23	X- $CH_3NHCH_2CH_3$ IUPAC Name of the product: N-Ethyl-N-methylbenzenesulphonamide  N-Ethyl-N-methylbenzenesulphonamide
24	(a) Benzene diazonium chloride reacts with phenol, in which the phenol molecule at its para position is coupled with the diazonium salt to form *p*-hydroxyazobenzene. This type of reaction is known as coupling reaction.  *p*-Hydroxyazobenzene (orange dye) (b) Hoffmann developed a method for the preparation of primary amines by treating an amide with bromine in an aqueous or ethanolic solution of sodium hydroxide.  (c) The conversion of primary aromatic amines into diazonium salts is known as diazotisation. 
25	(a) This is because the lone pair of electrons on the nitrogen atom in methylamine is more readily available for donation than in aniline. In aniline, the lone pair on the nitrogen is delocalized into the benzene ring through resonance, making it less available for protonation. (b) The amino group ($-NH_2$) on aniline activates the benzene ring, making it highly susceptible to attack by bromine. The bromine atoms preferentially add to the ortho and para positions (2, 4, and 6) relative to the amino group, resulting in the formation of 2,4,6-tribromoaniline. (c) Primary amines are engaged in intermolecular association due to hydrogen bonding between the nitrogen of one and the hydrogen of another molecule. There are two hydrogen

	atoms available for hydrogen bond formation in it. Tertiary amines do not have intermolecular association due to the absence of hydrogen atom available for hydrogen bond formation.
IV	**LONG ANSWER TYPE QUESTION**
26	**A-** **B-** **C-** **D-** **E-**   A B  B C  B D  C E
27	(a) (i)  (ii) 

	(iii)  (b) $C_2H_5NH_2 < C_6H_5NHCH_3 < C_6H_5NH_2$ (c) Butanol. The oxygen atom in the hydroxyl group of butanol is more electronegative than the nitrogen atom in the amino group of butanamine. This greater electronegativity leads to a stronger attraction between the oxygen atom and hydrogen atoms of water molecules, resulting in stronger hydrogen bonds.
28	(a)  (b) N, N-Diethylbenzene sulphonamide does not contain any hydrogen atom attached to nitrogen atom, it is not acidic and hence insoluble in alkali. (b)  **A** **B** (c) (i)  (ii)