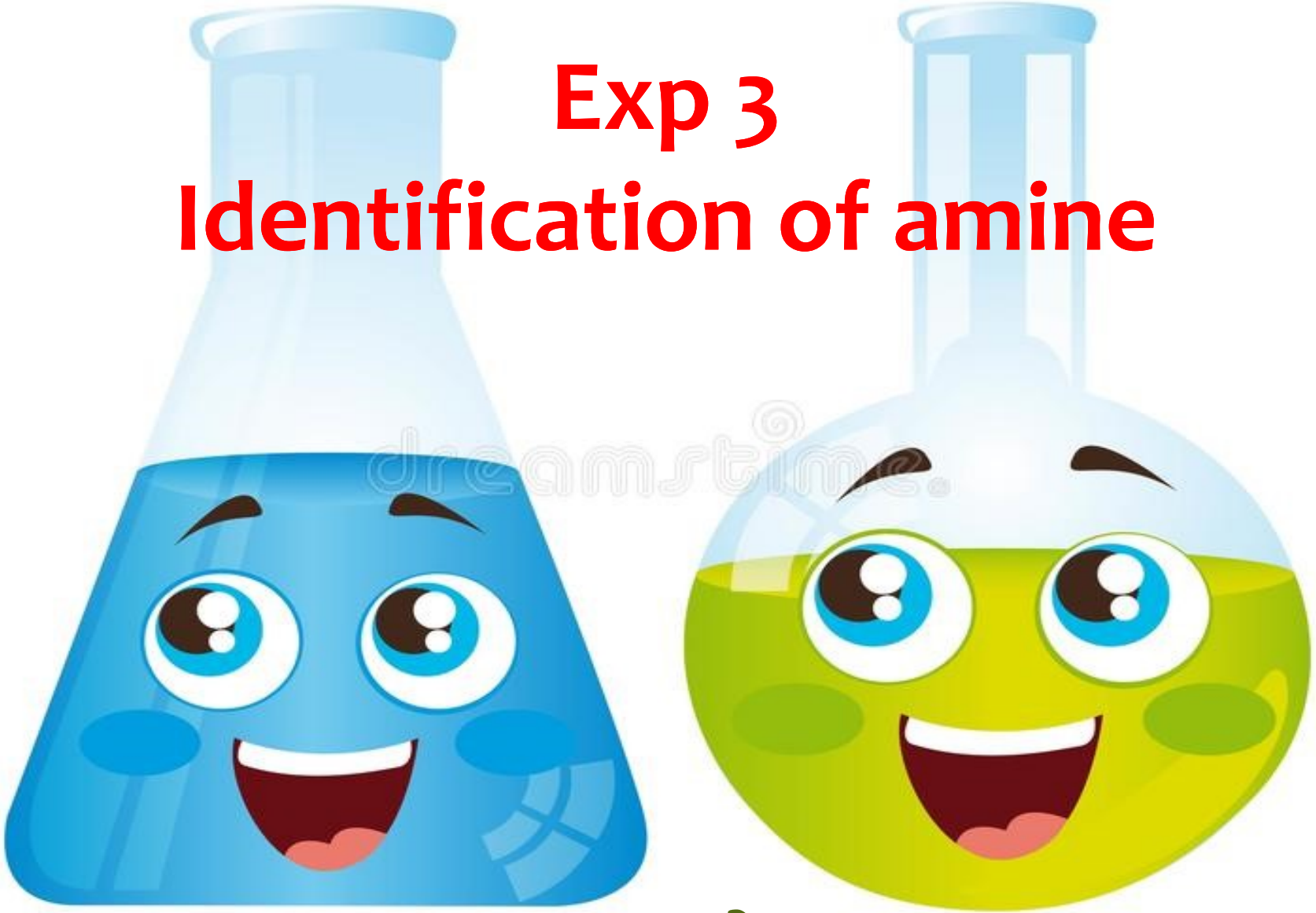
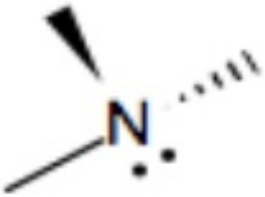
Exp 3
Identification of amine



By
Dr. Aseel Salah

- ✓ Amines are basic organic compounds that can be considered as derivatives of ammonia.

- ✓ Amines have an amino group.



- ✓ amine classified according to no. of groups attached to nitrogen atom: 1°, 2°, 3° , where R is any alkyl or aryl group.

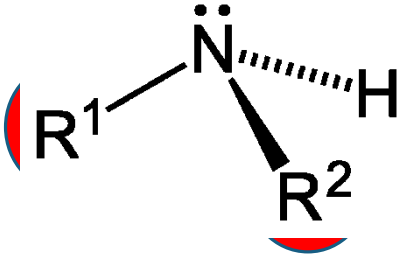
Aryl is any functional group or substitutions derived from an aromatic ring

What is the classification of amine ?

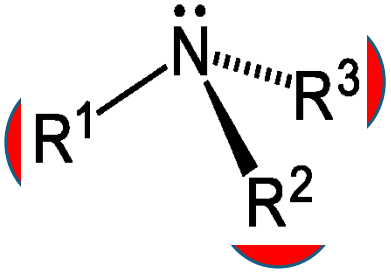
1- Aliphatic amine

alkyl groups (R) bonded to (N) atom

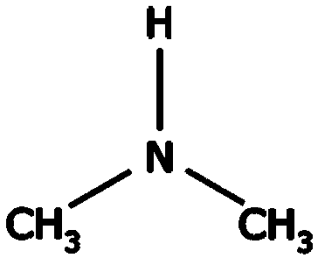
1°



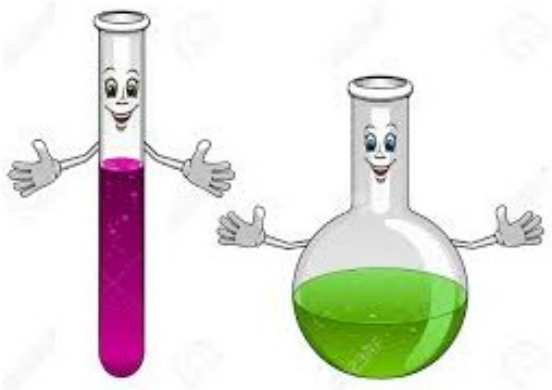
2°



3°

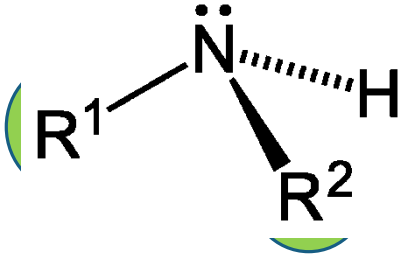


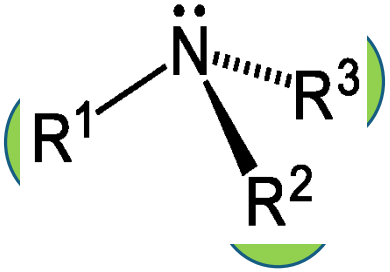
dimethyl amine
(2° aliphatic amine)



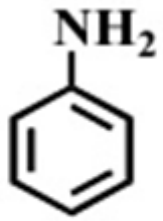
2- Aromatic amine

- ✓ aryl groups (R) bonded to (N) atom



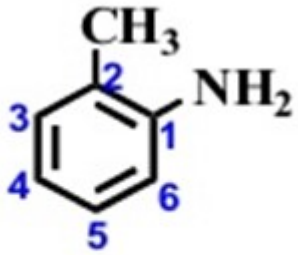


1°



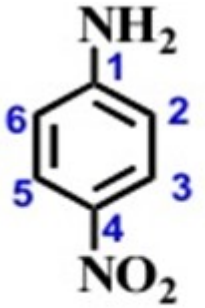
phenylamine
(aniline)

2°



2-methylphenylamine
(2-methylaniline)

3°



4-nitrophenylamine
(4-nitroaniline)

Physical Properties:

I. Physical State:

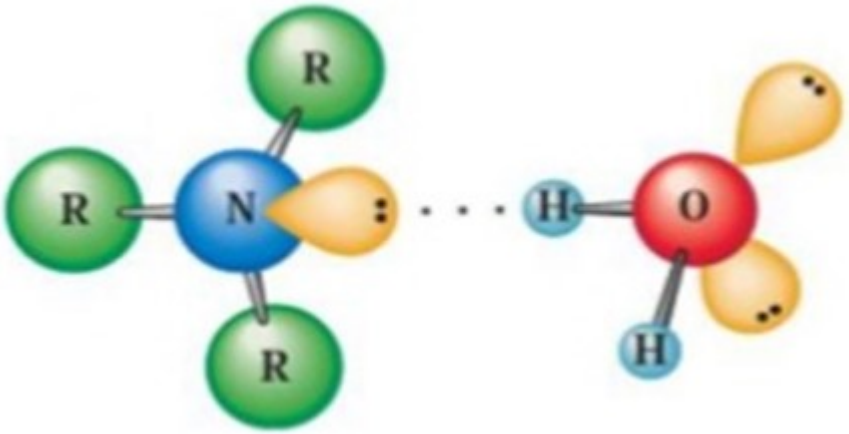
- ✓ Amine are solids or liqu and it had characterist odor like fish

II. Solubility

- ✓ Amines tend to be water- soluble because amins are polar and can be formed H-bonding interactions with water molecules.

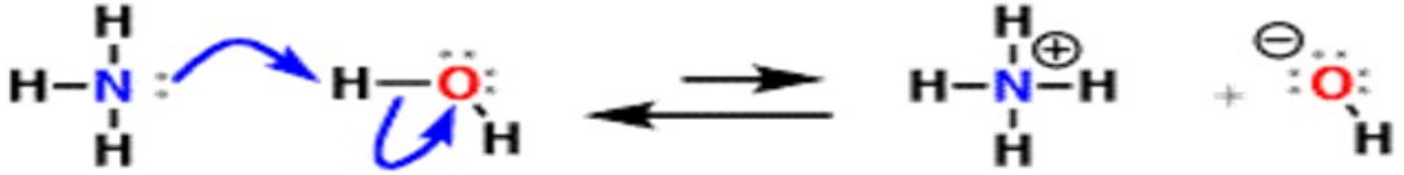
Physical Properties:

- ✓ In fact, amines having lower than six carbon atoms are soluble with water, water-solubility decreases as:
- Chain length increases, and,
- The degree of N-substitution increases



- A base donates a pair of electrons to a proton

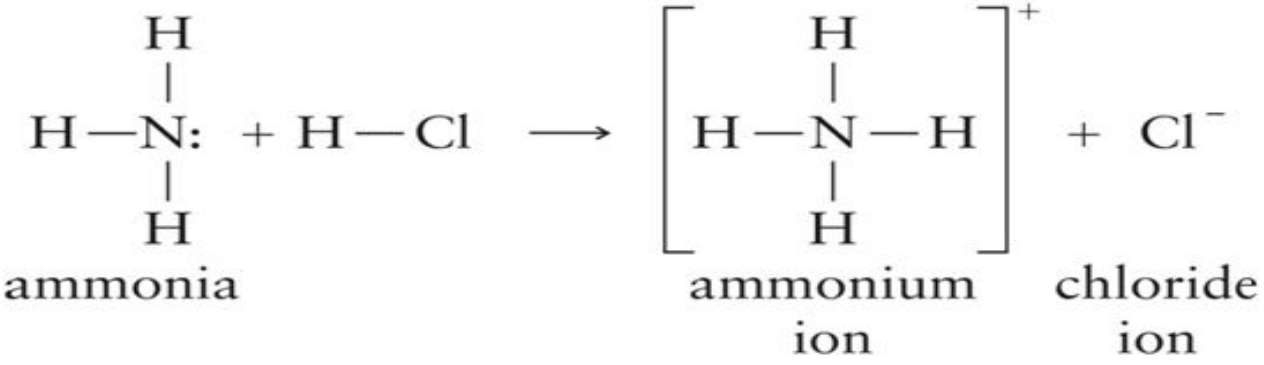
Example



weaker base *stronger base*

✓ **Amines are soluble in HCl dil. Because are basic organic compounds**

- Basicity: Amines are weak bases

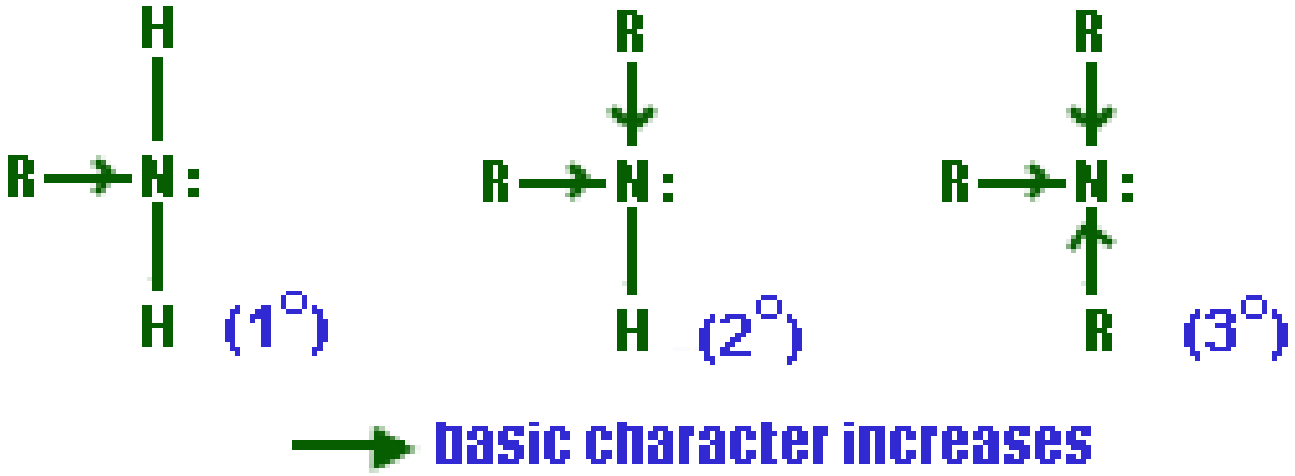


WHY AMINE CAN ACT AS BASES??

✓ 

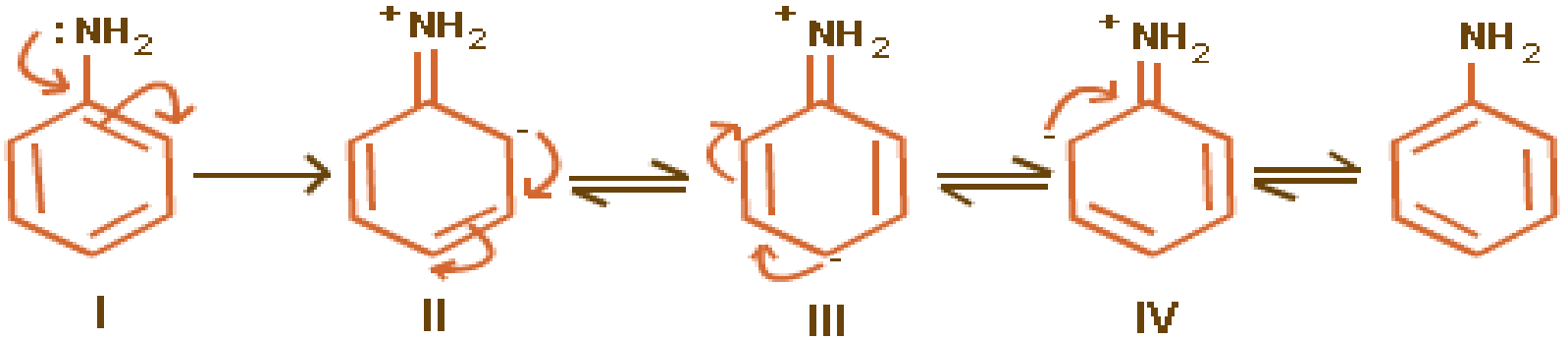
Explain why amine can act as bases??

- ✓ The basicity of amine due to the unshared electron pair on the nitrogen atoms they can share with other atoms.



✓ Aromatic amine are weaker bases than aliphatic due to resonance???

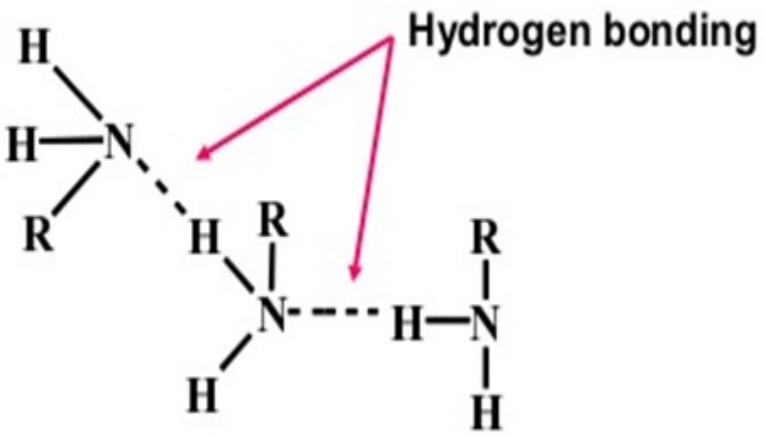
lone pair on nitrogen (N:) delocalizes into the ring (Resonance) decreased basicity



II. Boiling point

- ✓ **Boiling point of amines is increase with increasing relative molecular mass??**

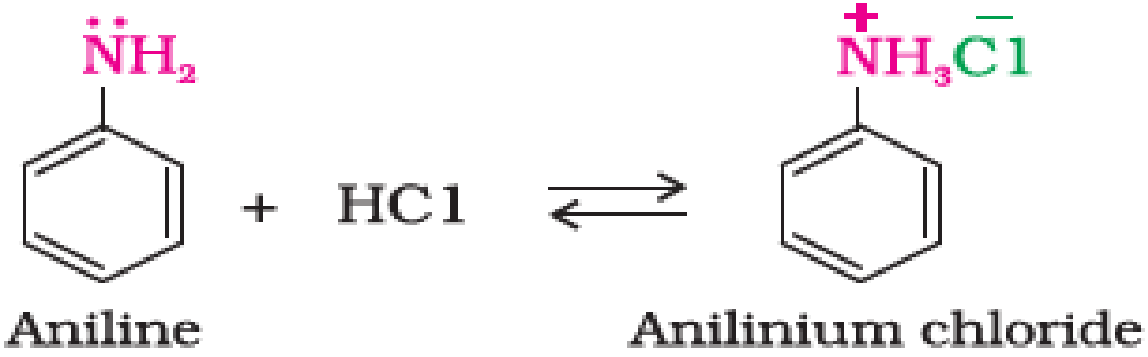
Because, amine are polar compounds and can be formed intermolecular H-bonds between molecules



- primary amines have higher boiling point than tertiary amines??

I. General test (hydrochloric acid test)

- ✓ place 3ml of water in a clean test tube
- ✓ Added 1 drop of amine
- ✓ If compound is not soluble in water added 3 ml of HCl
- ✓ Indicated the results

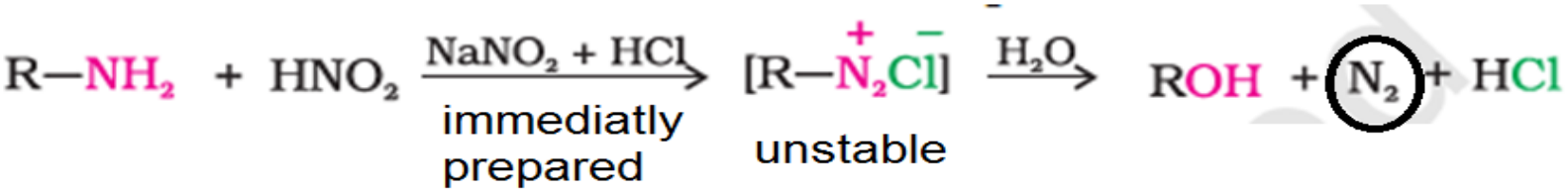


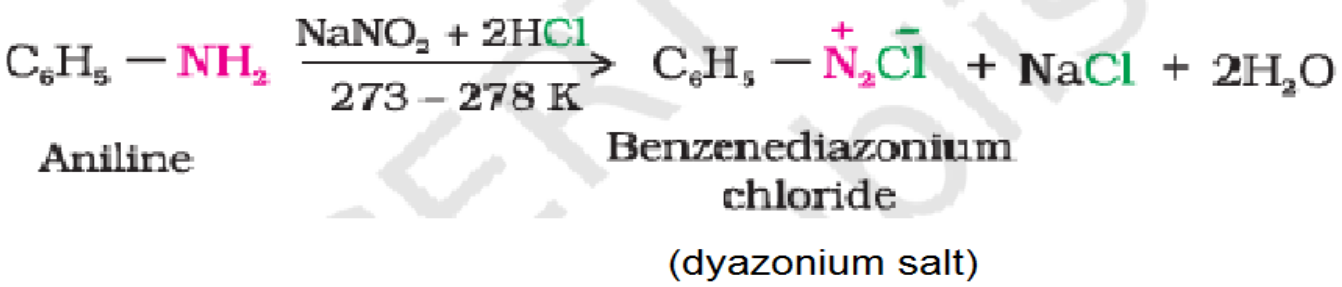
II. Nitrous acid test

- Used to distinguished between 1°, 2°, 3° amines
- it is specific for aromatic amine distinguish.

➢ **Primary amine: -**

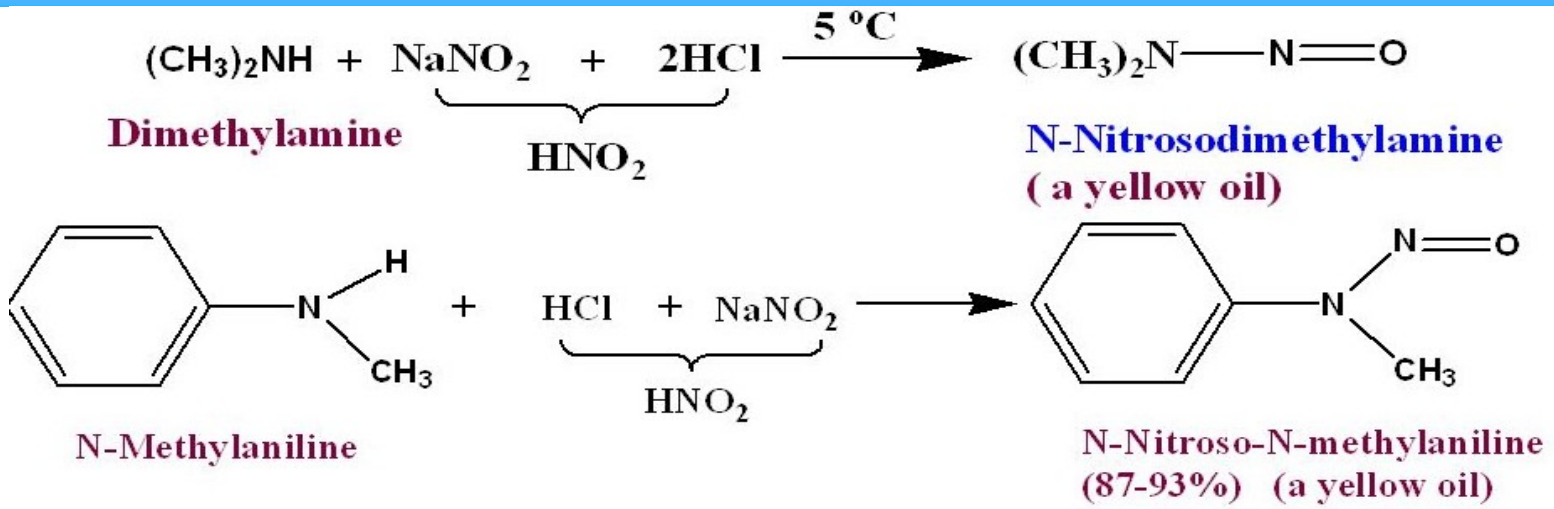
- aliphatic amine give clear solution and N_2 gas.
- Aromatic amine give clear solution, so coupling with phenol compounds to give azo-dye.





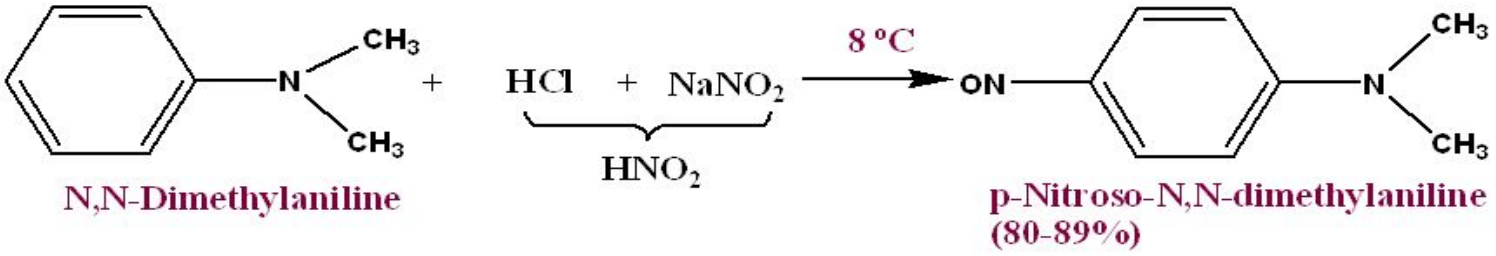
➢ Secondary amine: -

- Aromatic amine and aliphatic amine yellow oily layer



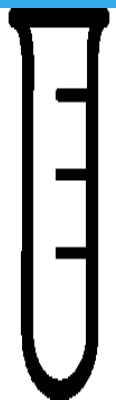
➢ Tertiary amine: -

- aliphatic amine do not react
- Aromatic amine give green or red ppt.



Procedure :-

A

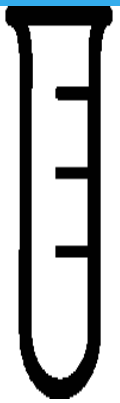


0.5ml of aniline
1.5 ml of HCl (10%).

B

1ml of solution
sodium nitrite $NaNO_2$ (20%).

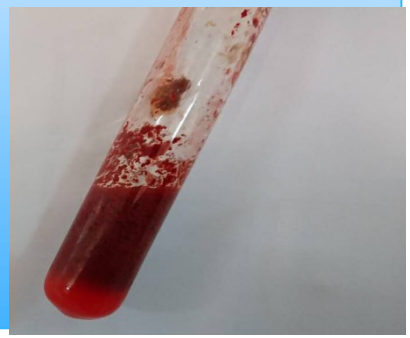
C



0.1g β-Naphthol
2ml of 10% NaOH.

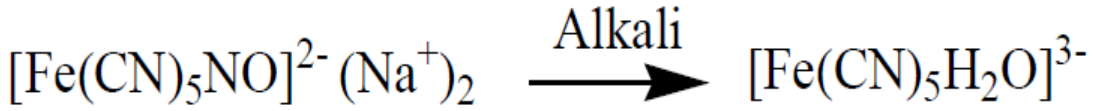
Keep the 3 test tubes in ice bath & add tube (B) to tube (A) slowly, then add mixture to tube (C).And observe the color change:

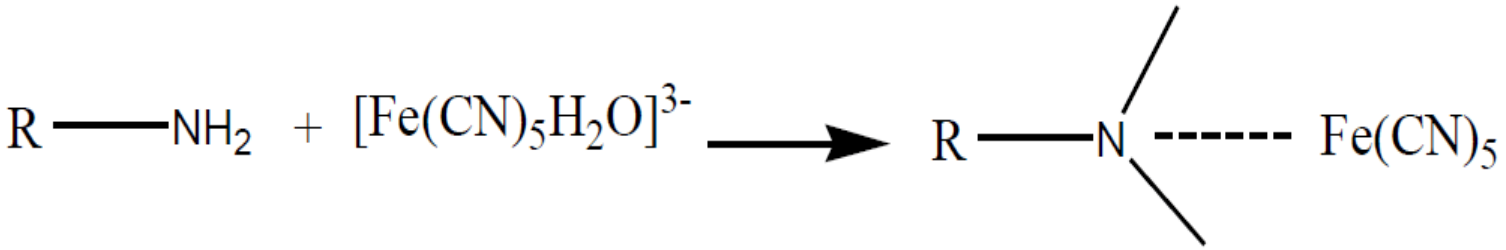
- ✓ If a red dye color → Phenol, Resorcinol
- ✓ If a orange-red ppt.→ β-Naphthol



III- Sodium nitroprusside test (SNP test):-

- It is specific test for distinguish between (1°, 2°, 3°) aliphatic amine.

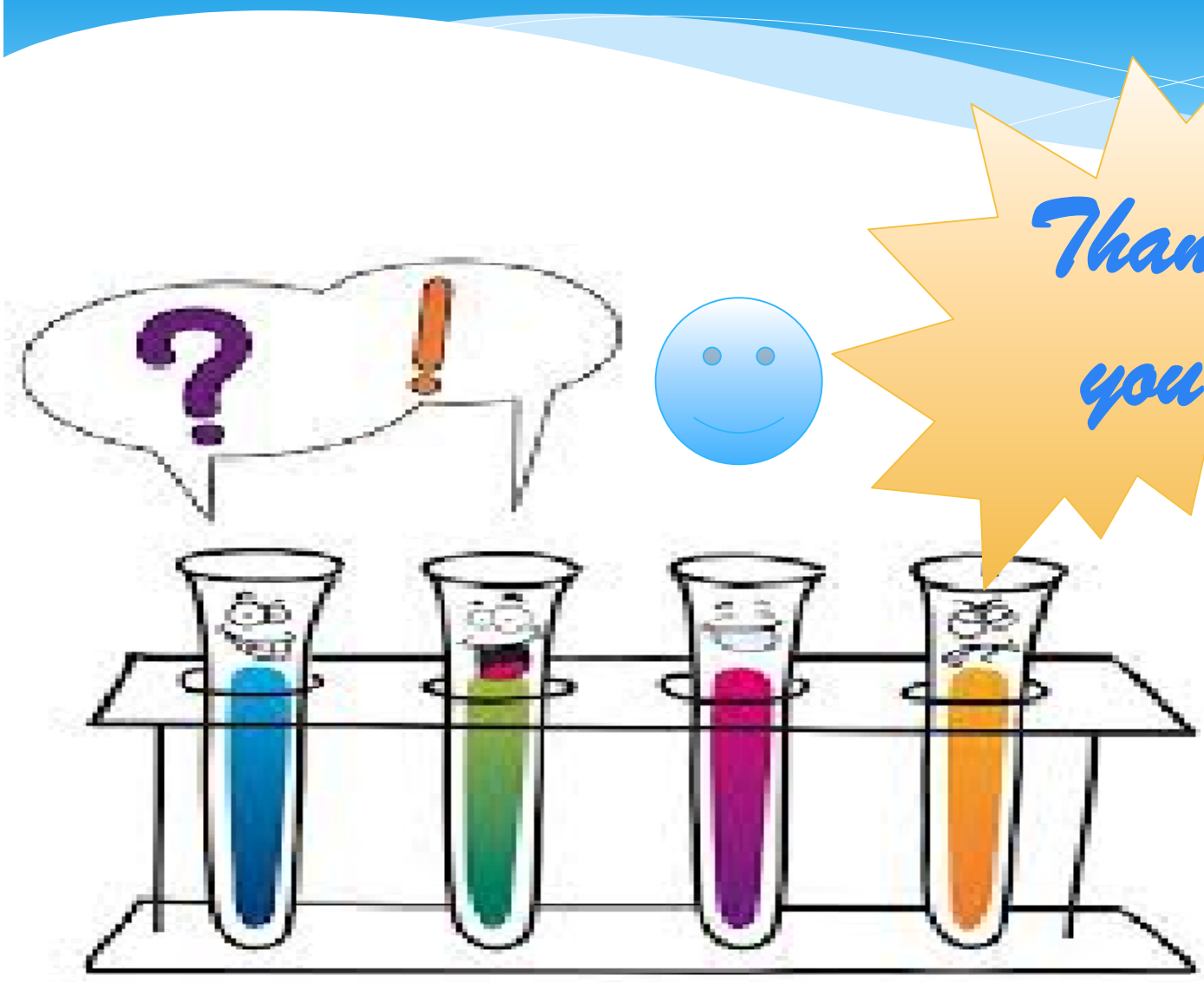




1° Aliphatic amine ⟶ violet color

2° Aliphatic amine ⟶ blue color

3° Aliphatic amine ⟶ no color


Thank you