

34. Nitrogen compounds

Starter Quiz · 课前小测

A-Level Chemistry

Name: _____ Score: _____

1. A primary amine has the group:

- ☐ -NH_2
- ☐ -COOH
- ☐ -OH
- ☐ -COO-

2. Phenylamine is made from benzene by:

- ☐ nitrating to nitrobenzene, then reducing (Sn/conc. HCl , then NaOH)
- ☐ adding water
- ☐ oxidising with KMnO_4
- ☐ free-radical substitution

3. An amide is made from an acyl chloride and:

- ☐ ammonia or a primary amine
- ☐ an alcohol
- ☐ water
- ☐ an alkene

4. An amino acid contains:

- ☐ both a basic -NH_2 group and an acidic -COOH group
- ☐ only an -NH_2 group
- ☐ only a -COOH group
- ☐ a C=C double bond

5. A primary amine is made by heating a halogenoalkane with:

- ☐ ammonia in ethanol, under pressure
- ☐ water
- ☐ acidified dichromate
- ☐ bromine

6. Amines act as bases because the nitrogen has a lone _____.

7. Phenylamine can be used to make azo dyes via a diazonium salt.

- ☐ True ☐ False

8. The functional group -CONH_2 is found in an _____.

9. Amino acids contain both an amino group and a carboxylic acid group.

- ☐ True ☐ False

10. The order of basicity is:

- ☐ phenylamine < ammonia < ethylamine
- ☐ ethylamine < ammonia < phenylamine
- ☐ all equal
- ☐ ammonia < ethylamine < phenylamine

1. **–NH₂**

A primary amine has –NH₂; a secondary amine has –NH– between two carbons.

2. **nitrating to nitrobenzene, then reducing (Sn/conc. HCl, then NaOH)**

Benzene → nitrobenzene (nitration) → phenylamine (reduction with tin and acid, then NaOH).

3. **ammonia or a primary amine**

Ammonia or a 1°/2° amine reacts with an acyl chloride to give an amide.

4. **both a basic –NH₂ group and an acidic –COOH group**

Having both groups is what makes amino acids behave as they do (zwitterions, peptide bonds).

5. **ammonia in ethanol, under pressure**

Ammonia substitutes the halogen to give the amine (excess NH₃ favours the primary amine).

6. **pair**

It accepts a proton.

7. **True**

Azo compounds are brightly coloured.

8. **amide**

Formed from an acyl chloride and ammonia or an amine.

9. **True**

They can act as both acid and base (zwitterions).

10. **phenylamine < ammonia < ethylamine**

Ethylamine's alkyl group makes its lone pair most available; phenylamine's lone pair is delocalised into the ring, so it is weakest.